

# HALLIBURTON

iCem<sup>®</sup> Service

**TERRA ENERGY LTD.**

**For: Terra**

Date: Sunday, January 21, 2018

**PA 311-25 Production**

API#05-045-23657

Sincerely,

**Grand Junction Cement Engineering**

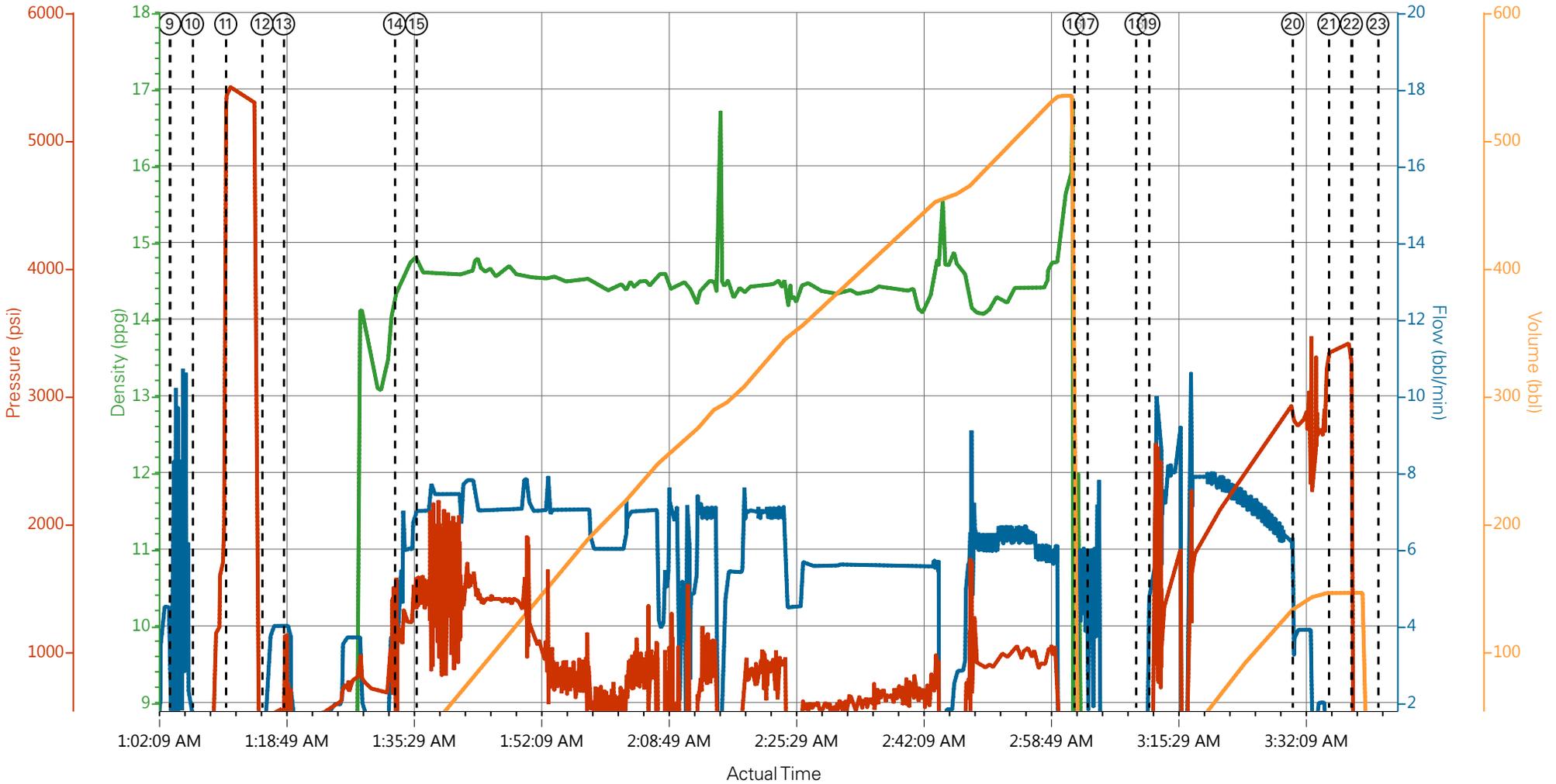
## 1.0 Real-Time Job Summary

### 1.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	Pass-Side Pump Pressure (psi)	Downhole Density (ppg)	Combined Pump Rate (bbl/min)	Pump Stage Total (bbl)	Comments
Event	1	Call Out	1/20/2018	10:00:00	USER					REQUESTED ON LOCATION @ 1900
Event	2	Pre-Convoy Safety Meeting	1/20/2018	12:30:00	USER					ALL HES PRESENT
Event	3	Crew Leave Yard	1/20/2018	12:35:00	USER					1 F550, 1 PUMP TRUCK & 1 660 BULK TURCK
Event	4	Arrive At Loc	1/20/2018	14:00:00	USER					RIG RUNNING CASING
Event	5	Assessment Of Location Safety Meeting	1/20/2018	14:10:00	USER					MET WITH COMP REP AND WENT OVER NUMBERS AND JOB PROCEDURE. WALKED AROUND LOCATION AND COLLECTED WATER SAMPLE (PH- 7, CHLORIDES- 0, TEMP- 61F). COMP REP WAS OFFERED SDS FOR ALL CHEMICLES USED BY HES.
Event	6	Pre-Rig Up Safety Meeting	1/20/2018	14:15:00	USER					ALL HES PRESENT
Event	7	Rig-up Lines	1/20/2018	14:20:00	USER					HES RIGGED UP EQUIPMENT WITHOUT ENTERING RED ZONE.
Event	8	Pre-Job Safety Meeting	1/20/2018	23:00:00	USER					ALL HES AND RIG CREW PRESENT
Event	9	Start Job	1/21/2018	01:04:00	COM3					TD 8428', TP 8418.1', SJ 32.34', OH 8.75", CSG 4.5" 11.6#, MUD 13.0 PPG. RIG CIRCULATED WELL @ 11 BPM WITH 1700 PSI.
Event	10	Prime Pumps	1/21/2018	01:06:58	USER	340.00	8.33	2.00	2.00	8.33 PPG FRESH WATER
Event	11	Test Lines	1/21/2018	01:11:19	COM3	5427.00	8.33	0.50	0.50	ALL LINES HELD PRESSURE AT 5547 PSI
Event	12	Pump Spacer 1	1/21/2018	01:16:04	COM3	530.00	8.33	4.00	10.00	8.33 PPG FRESH WATER (10 BBL)
Event	13	Pump Spacer 2	1/21/2018	01:18:52	COM3	786.00	8.45	4.00	20.00	8.4 PPG MUDFLUSH III (20 BBL)
Event	14	Pump Cement	1/21/2018	01:33:23	COM3	1472.00	14.50	8.00	453.70	NEOCEM CEMENT 1930 SKS (453.7 BBLs), 14.5 PPG, 1.32 FT3/SK, 5.86 GAL/SK

Event	15	Check weight	1/21/2018	01:36:15	COM3					WEIGHT VERIFIED VIA PRESSUREIZED MUD SCALES
Event	16	Shutdown	1/21/2018	03:02:16	USER					END OF CMT
Event	17	Clean Lines	1/21/2018	03:03:58	USER					WASH UP PUMPS AND LINES TO THE PIT
Event	18	Drop Plug	1/21/2018	03:10:23	USER					PLUG WENT, VERIFIED BY CO REP
Event	19	Pump Displacement	1/21/2018	03:12:03	COM3	2932.00	8.33	8.00	120.00	
Event	20	Slow Rate	1/21/2018	03:30:52	USER	2600.00	8.33	4.00	10.00	SLOW RATE TO 4 BPM PER CO REP TO LAND PLUG
Event	21	Bump Plug	1/21/2018	03:35:36	USER	3346.00	8.33	4.00	130.00	LAND PLUG AT 1840 PSI, BROUGHT UP TO 2345 PSI
Event	22	Check Floats	1/21/2018	03:38:32	USER	.00	8.36	0.00	145.8	FLOATS HELD, 1 BBL BACK TO TRUCK
Event	23	End Job	1/21/2018	03:42:00	USER					GOOD RETURNS THROUGHOUT, PIPE WAS NOT RECIPROCATED
Event	24	Post-Job Safety Meeting (Pre Rig-Down)	1/21/2018	03:50:00	USER					ALL HES PRESENT
Event	25	Rig-Down Equipment	1/21/2018	03:55:00	USER					ALL HES PRESENT
Event	26	Pre-Convoy Safety Meeting	1/21/2018	04:45:00	USER					ALL HES PRESENT
Event	27	Crew Leave Location	1/21/2018	04:50:00	USER					THANK YOU FOR CHOOSING HALLIBURTON CEMENT, CHRIS SMITH AND CREW

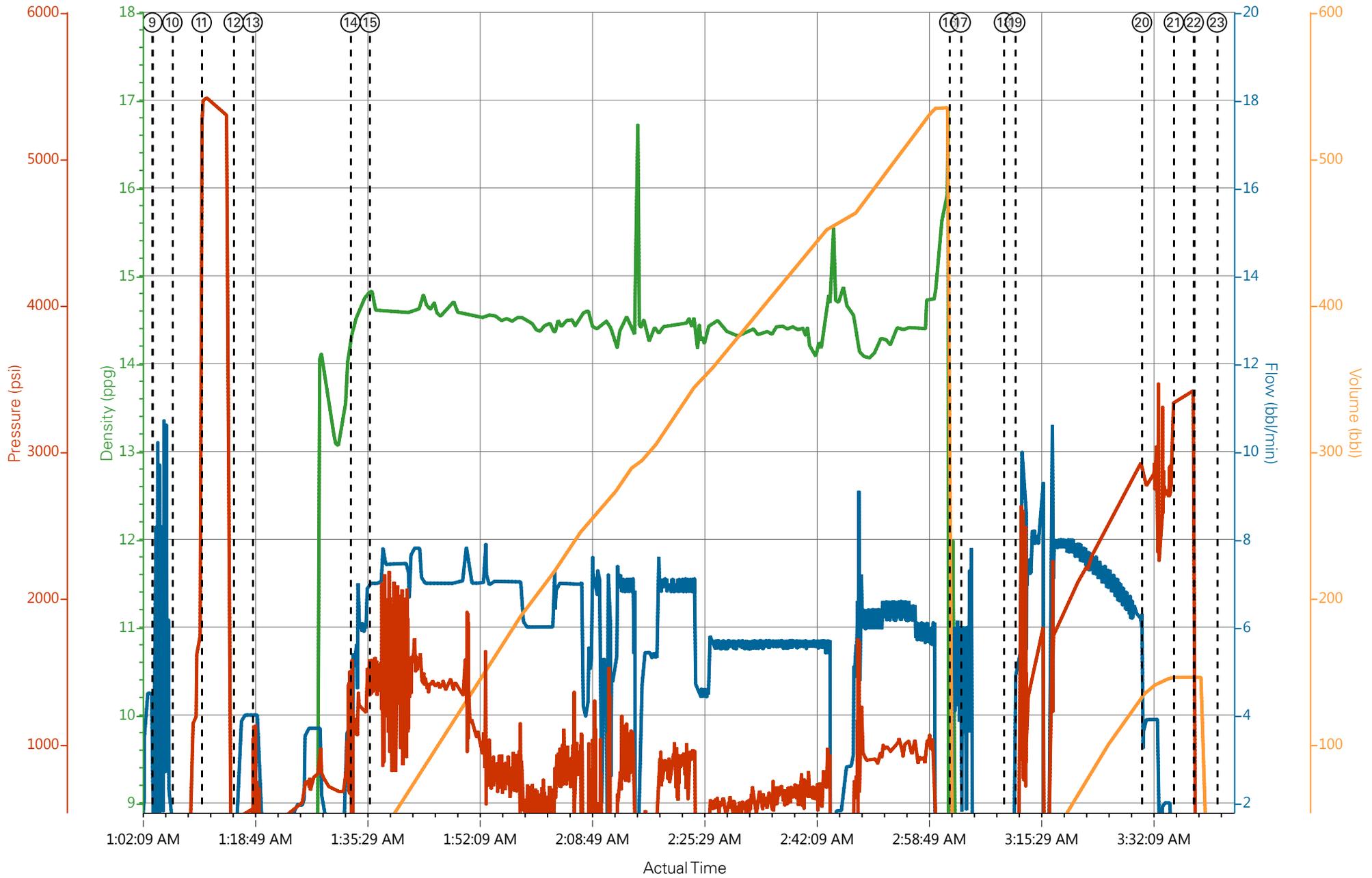
# TEP - PA 311-25 - 904578709 - 4.5" PRODUCTION



— DH Density (ppg) -0.04   
 — Comb Pump Rate (bbl/min) 1.8   
 — PS Pump Press (psi) 5   
 — Pump Stg Tot (bbl) 88.8

- |   |                          |                     |  |
|---|--------------------------|---------------------|--|
| ① Call Out                              | ⑧ Pre-Job Safety Meeting | ⑮ Check weight      | ⑳ Check Floats                           |
| ② Pre-Convoy Safety Meeting             | ⑨ Start Job              | ⑯ Shutdown          | ㉓ End Job                                |
| ③ Crew Leave Yard                       | ⑩ Prime Pumps            | ⑰ Clean Lines       | ㉔ Post-Job Safety Meeting (Pre Rig-Down) |
| ④ Arrive At Loc                         | ⑪ Test Lines             | ⑱ Drop Plug         | ㉕ Rig-Down Equipment                     |
| ⑤ Assessment Of Location Safety Meeting | ⑫ Pump Spacer 1          | ⑲ Pump Displacement | ㉖ Pre-Convoy Safety Meeting              |
| ⑥ Pre-Rig Up Safety Meeting             | ⑬ Pump Spacer 2          | ㉚ Slow Rate         | ㉗ Crew Leave Location                    |
| ⑦ Rig-up Lines                          | ⑭ Pump Cement            | ㉛ Bump Plug         |  |

TEP - PA 311-25 - 904578709 - 4.5" PRODUCTION



DH Density (ppg) -0.04    Comb Pump Rate (bbl/min) 1.8    PS Pump Press (psi) 5    Pump Stg Tot (bbl) 88.8

### Job Information

<b>Request/Slurry</b>	2445071/3	<b>Rig Name</b>	H&P 271	<b>Date</b>	16/JAN/2018
<b>Submitted By</b>	Connor Matthews	<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 311-25

### Well Information

<b>Casing/Liner Size</b>	4.5 in	<b>Depth MD</b>	8433 ft	<b>BHST</b>	102°C / 216°F
<b>Hole Size</b>	8.75 in	<b>Depth TVD</b>	7978 ft	<b>BHCT</b>	63°C / 146°F
<b>Pressure</b>	4885 psi				

### Drilling Fluid Information

<b>Mud Supplier Name</b>	AMC	<b>Mud Trade Name</b>		<b>Density</b>	
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### Cement Information - Primary 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				Slurry Density	14.5	lbm/gal
						Slurry Yield	1.32	ft <sup>3</sup> /sack
						Water Requirement	5.856	gal/sack
						Total Mix Fluid	5.856	gal/sack
						Water Source	Fresh Water	
						Water Chloride		

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**Operation Test Results Request ID 2445071/3**

**Thickening Time - ON-OFF-ON**

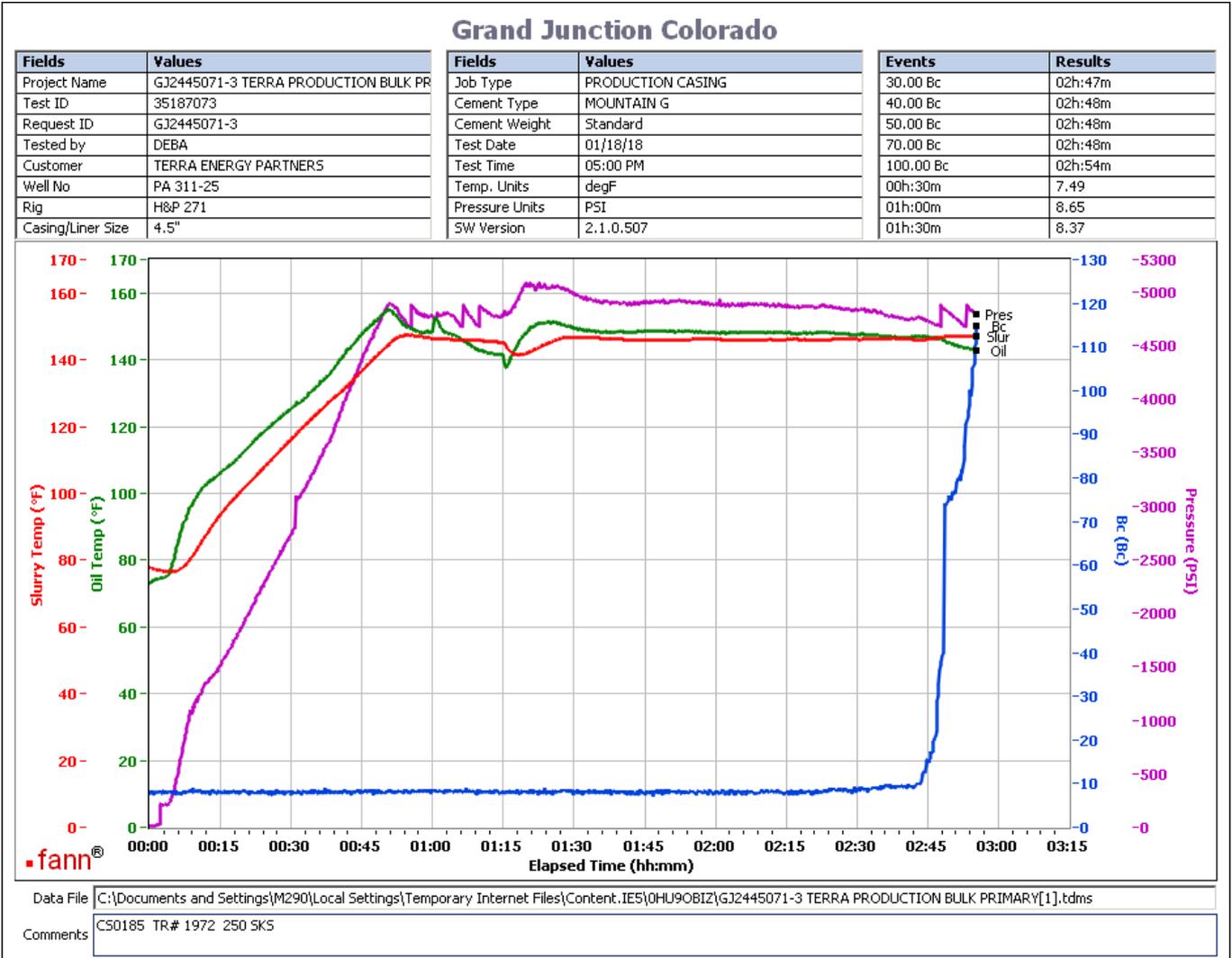
**18/JAN/2018**

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)
146	4885	50	2:47	2:48	2:48	2:54	8	60	15	8

1930 sks Total

CS0185 TR# 1972 250 SKS

no deflection was observed. 8Bc--- > 8Bc



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# Operation Test Results Request ID 2445071/2

## Thickening Time - ON-OFF-ON

17/JAN/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)	Termination time (hh:min)
146	4885	50	3:46	3:49	3:54	3:57	21	60	15	21	21

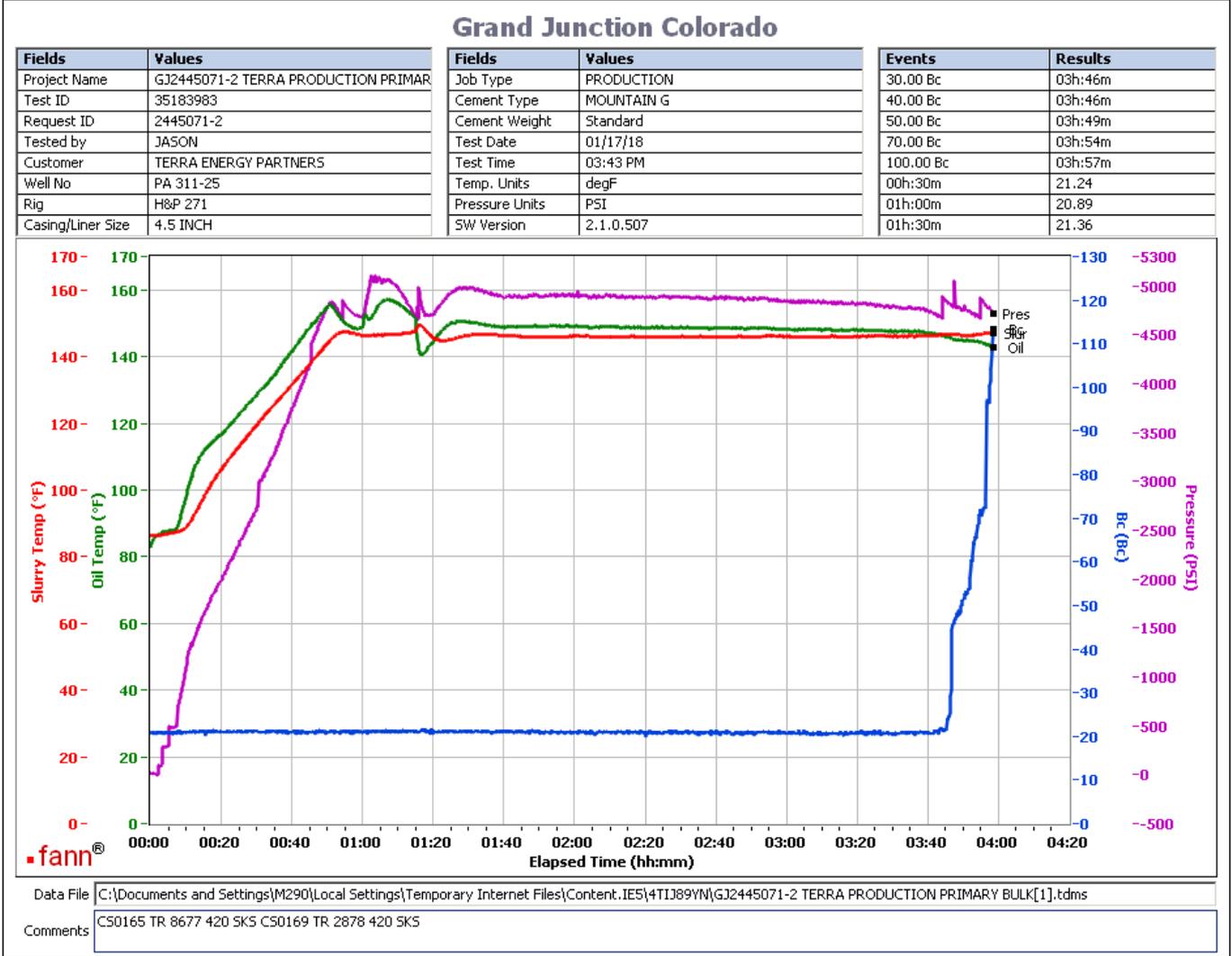
1930 sks Total

Composite:

CS0165 TR 8677 420 SKS

CS0169 TR 2878 420 SKS

no deflected was observed. 21Bc--- > 21Bc



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# Operation Test Results Request ID 2445071/1

## Thickening Time - ON-OFF-ON

17/JAN/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)
146	4885	50	3:32	3:33	3:36	3:38	8	60	15	9

1930 sks Total

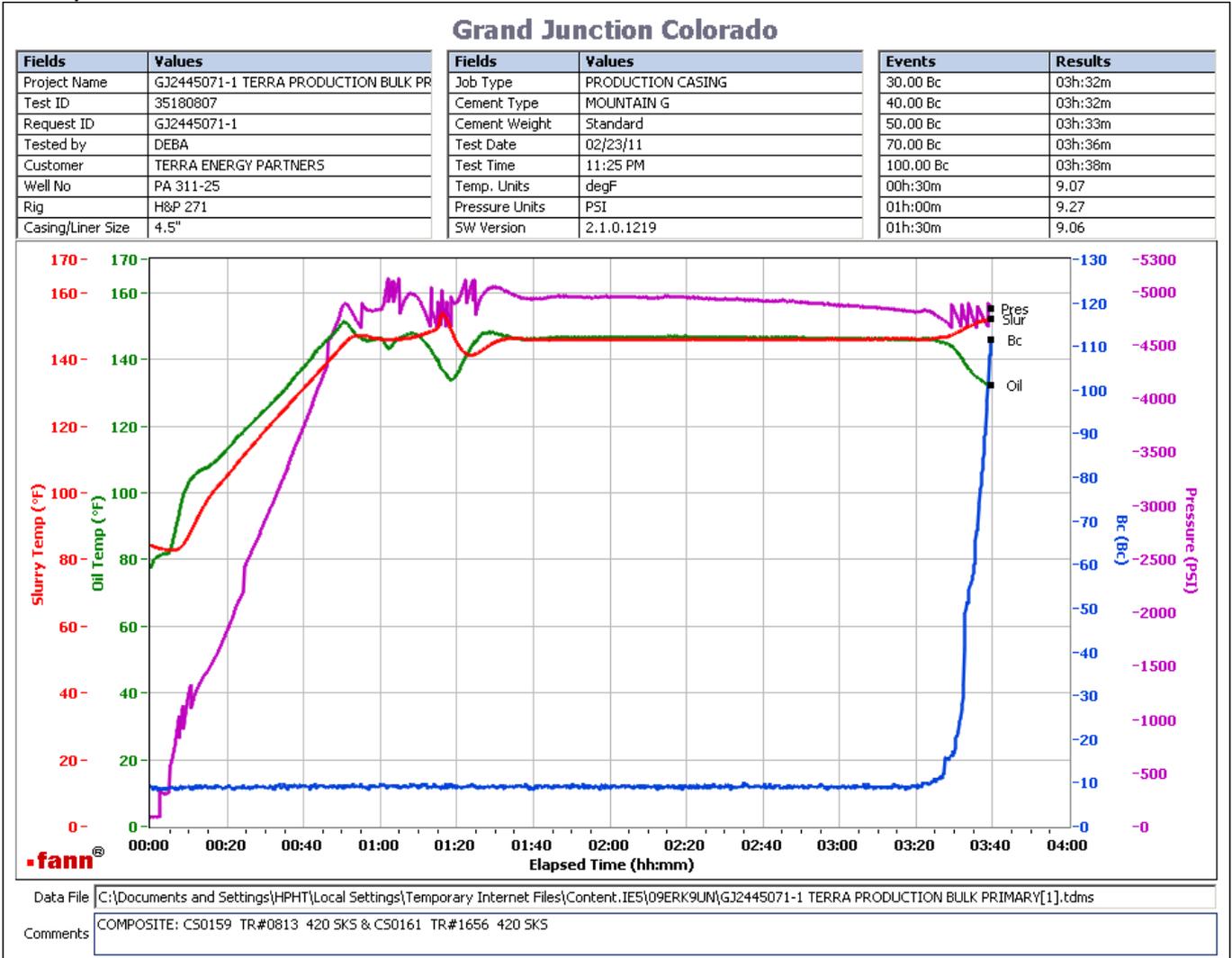
Composite:

CS0159 TR#0813 420 SKS

CS0161 TR#1656 420 SKS

deflected from 8Bc--- > 9Bc

Heat of hydration at 3:26



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