

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS**

United States of America, COLORADO

### **For: TEP**

Date: Sunday, August 12, 2018

### **Clough NR 311-3 Production PJR**

API #: 05-045-23903

Sincerely,

**Grand Junction Cement Engineering**

## 1.0 Real-Time Job Summary

### 1.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	DS Pump Press <i>(psi)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	8/11/2018	11:00:00						Requested on Location @ 17:00
Event	2	Pre-Convoy Safety Meeting	8/11/2018	13:00:00						
Event	3	Crew Leave Yard	8/11/2018	13:10:00						1 Elite, 2 660's, 1 pickup
Event	4	Arrive At Loc	8/11/2018	17:00:00						Rig running casing
Event	5	Assessment Of Location Safety Meeting	8/11/2018	17:10:00						JSA completed - Customer offered/received SDS - water test pH 7.0, CI <200, temp 83 degrees
Event	6	Pre-Rig Up Safety Meeting	8/11/2018	17:15:00						
Event	7	Rig-Up Equipment	8/11/2018	17:30:00						DME iron to ground manifold, standpipe, hardline to pit. Water hoses to both uprights, bulk hoses to Silo and 660's.
Event	8	Other	8/11/2018	18:00:00						Rig Circulated 1:30 hrs prior to cement job at 450 gpm 1600 psi. Mud scales calibrated to drinking water prior to job.
Event	9	Pre-Job Safety Meeting	8/11/2018	19:00:00						All HES personnel, rig crew, and company rep.
Event	10	Start Job	8/11/2018	21:31:34						TD 11028', TP 11018', SJ 31.91', OH 8.75'', Csg 4.5'' 11.6 lb/ft P-110 Prev. Csg.

9.625" 36# @ 1127', Mud 11.0 ppg.									
Event	11	Fill Lines	8/11/2018	21:32:47	8.33	2	60	5	Fresh Water
Event	12	Release PSI	8/11/2018	21:40:16					Fix Leak
Event	13	Test Lines	8/11/2018	21:41:37			6177		Held pressure 2 minutes
Event	14	Pump Spacer	8/11/2018	21:47:27	8.33	4	460	5	Fresh Water
Event	15	Pump Spacer	8/11/2018	21:49:58	8.4	4	425	20	80 lbs. Mud Flush III
Event	16	Check Weight	8/11/2018	21:53:17					Density verified via mud cup
Event	17	Pump Lead Cement	8/11/2018	21:57:46	12.7	8	1250	227.3	690 sks, 12.7 ppg, 1.85 yield, 8.94 gal/sk
Event	18	Pump Tail Cement	8/11/2018	22:29:15	14.2	7	950	224.1	740 sks, 14.2 ppg, 1.7 Yield, 7.53 gal/sk
Event	19	Shutdown	8/11/2018	23:05:31					Wash lines to pit
Event	20	Drop Top Plug	8/11/2018	23:14:46					Co-Rep Verify Plug Launched
Event	21	Pump Displacement	8/11/2018	23:15:50	8.4	10	2950	170.3	3 lbs BE-6, 1 gal MMCR, 2% KCl
Event	22	Slow Rate	8/11/2018	23:33:33	8.4	4	2600	160	Slow Rate 10 bbls to Calculated Displacement
Event	23	Bump Plug	8/11/2018	23:35:54			3300		Plug Bumped at 2600 psi, Brought up to 3300 psi
Event	24	Check Floats	8/11/2018	23:39:36					Floats held – 2 bbl back to the truck
Event	25	End Job	8/11/2018	23:40:34					Good returns throughout job. Pipe was not reciprocated during job.
Event	26	Pre-Rig Down Safety Meeting	8/12/2018	00:20:18					No sugar, HES top plug used, 0 add hours
Event	27	Rig-Down Equipment	8/12/2018	00:28:23					

Event	28	Pre-Convoy Safety Meeting	8/12/2018	01:02:21
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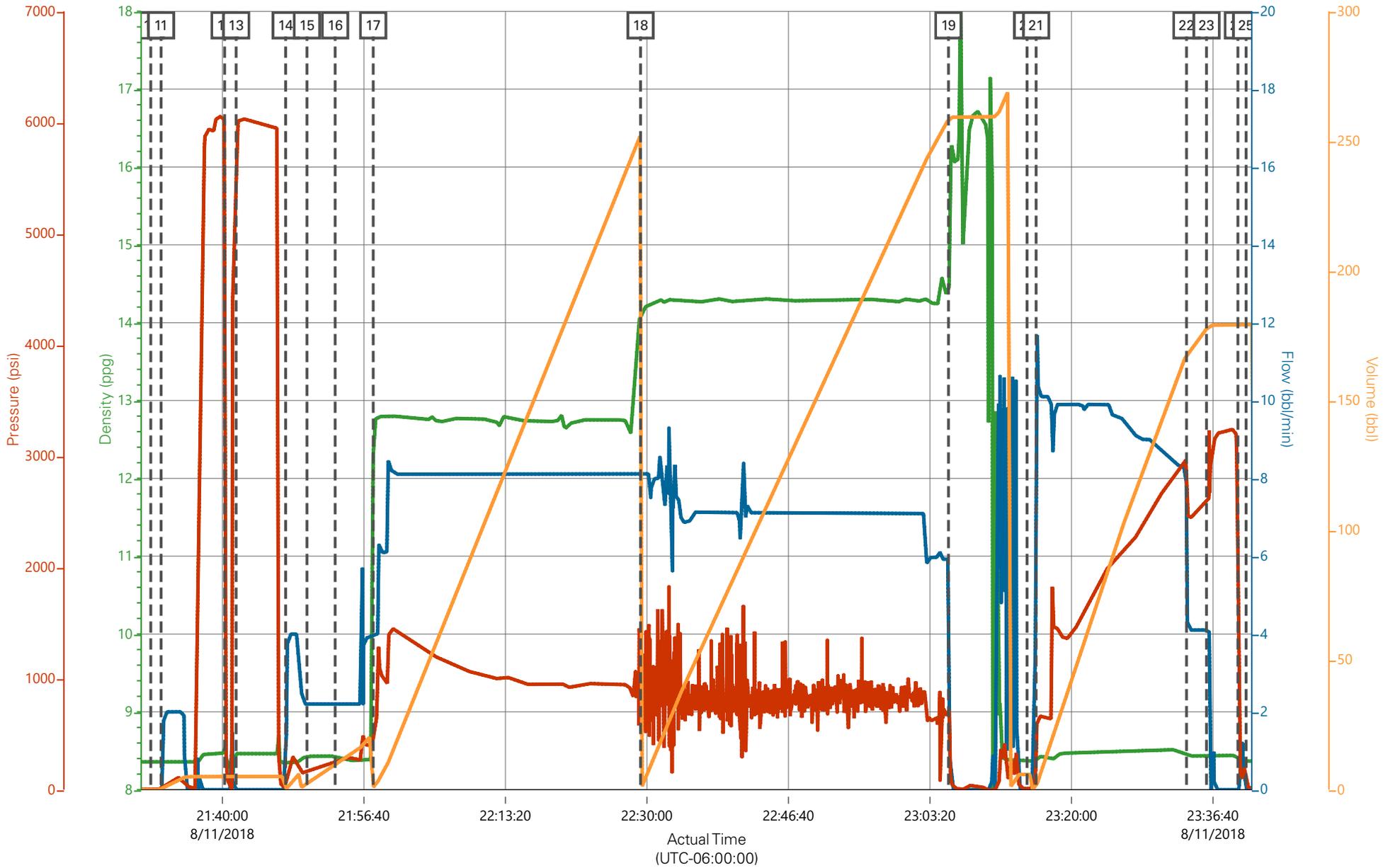
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Event	29	Crew Leave Location	8/12/2018	01:13:07
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Thanks for using Halliburton  
Cement, Chris Martinez and  
crew.

# TEP, Clough NR 311-3, 4 1/2" Production



— DH Density (ppg) 8.07    
 — Comb Pump Rate (bbl/min) 3.6    
 — DS Pump Press (psi) 24    
 — Pump Stg Tot (bbl) 61.4

## Job Information

<b>Request/Slurry</b>	2491711/1	<b>Rig Name</b>	H&P 318	<b>Date</b>	31/JUL/2018
<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>	NR 311-3

## Well Information

<b>Casing/Liner Size</b>	4.5 in	<b>Depth MD</b>	11044 ft	<b>BHST</b>	122°C / 251°F
<b>Hole Size</b>	8.75 in	<b>Depth TVD</b>	10074 ft	<b>BHCT</b>	88°C / 190°F
<b>Pressure</b>	6352 psi				

## Drilling Fluid Information

<b>Mud Supplier Name</b>	<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>		
		NeoCem				Slurry Density	12.7	lbm/gal
						Slurry Yield	1.853	ft <sup>3</sup> /sack
						Water Requirement	8.959	gal/sack
						Total Mix Fluid	8.959	gal/sack
						Water Source	Fresh Water	
						Water Chloride		

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# Operation Test Results Request ID 2491711/1

## Thickening Time - ON-OFF-ON

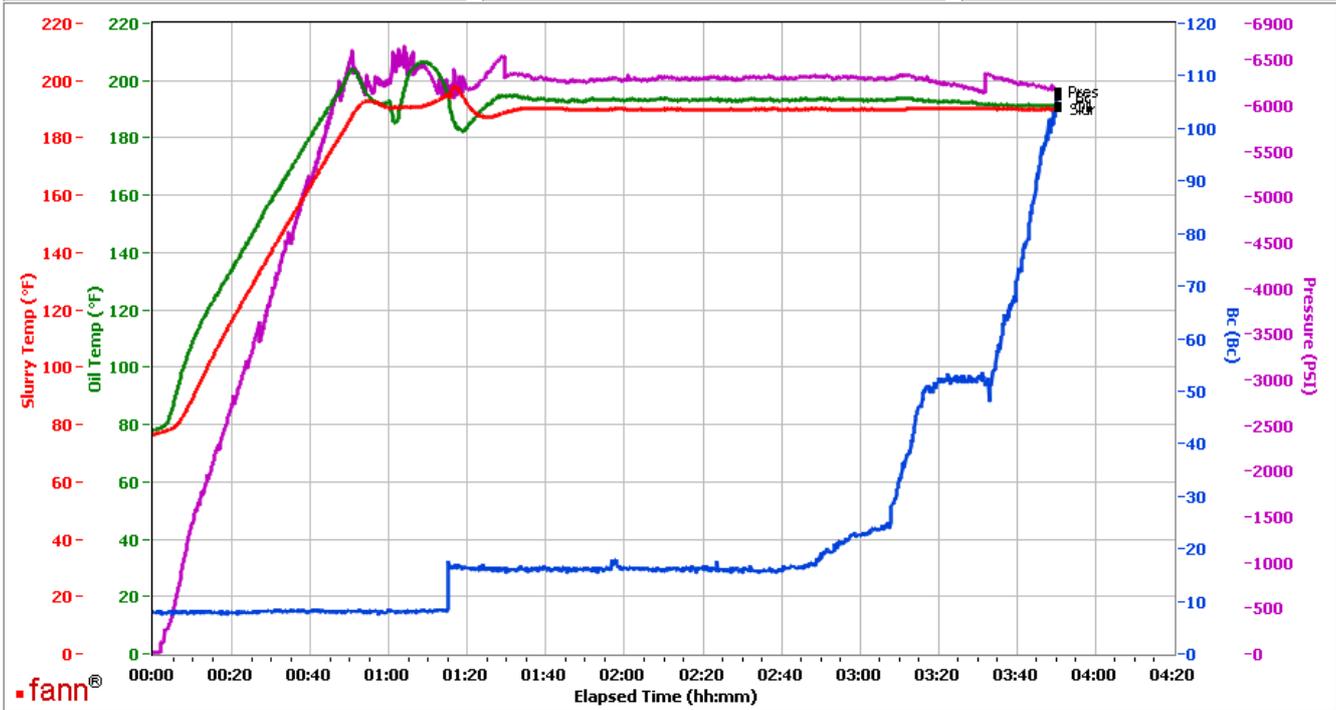
**07/AUG/2018**

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)
190	6352	50	3:09	3:16	3:39	3:48	8	60	15	19

Total sks = 690  
 CS1716, Trailer 7094, 345 sks  
 CS1717, Trailer 8321, 345 sks  
 Deflected from 8Bc--- > 19Bc-- > 17 with in one minute

### Grand Junction, Colorado

Fields	Values	Fields	Values	Events	Results
Project Name	GJ2491711-1 TERRA BULK PRODUCTION LE	Job Type	PRODUCTION CASING	30.00 Bc	03h:09m
Test ID	35705001 - TT	Cement Type	GCC TYPE I-II	40.00 Bc	03h:13m
Request ID	2491711-1	Cement Weight	Standard	50.00 Bc	03h:16m
Tested by	CT	Test Date	08/07/18	70.00 Bc	03h:39m
Customer	TERRA ENERGY PARTNERS	Test Time	1:12 PM	100.00 Bc	03h:48m
Well No	NR 311-3	Temp. Units	degF	00h:30m	8.09
Rig	H&P 318	Pressure Units	PSI	01h:00m	8.20
Casing/Liner Size	4.5 INCH	SW Version	2.1.0.507	01h:30m	16.46



Data File C:\Documents and Settings\M290\Local Settings\Temporary Internet Files\Content.IE5\SPUJOLQV\GJ2491711-1 TERRA BULK PRODUCTION LEAD[1].tdms  
 Comments CS1716, TRAILER 7094, 345 SKS - CS1717, TRAILER 8321, 345 SKS

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### Job Information

<b>Request/Slurry</b>	2491712/2	<b>Rig Name</b>	H&P 318	<b>Date</b>	31/JUL/2018
<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>	NR 311-3

### Well Information

<b>Casing/Liner Size</b>	4.5 in	<b>Depth MD</b>	11044 ft	<b>BHST</b>	122°C / 251°F
<b>Hole Size</b>	8.75 in	<b>Depth TVD</b>	10074 ft	<b>BHCT</b>	88°C / 190°F
<b>Pressure</b>	6352 psi				

### Drilling Fluid Information

<b>Mud Supplier Name</b>		<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>		
		ThermaCem				Slurry Density	14.2	lbm/gal
						Slurry Yield	1.704	ft <sup>3</sup> /sack
						Water Requirement	7.53	gal/sack
						Total Mix Fluid	7.53	gal/sack
						Water Source	Fresh Water	
						Water Chloride		

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**Operation Test Results Request ID 2491712/2**

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

**07/AUG/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)
190	6352	50	2:30	2:31	2:37	2:40	14	60	15	13

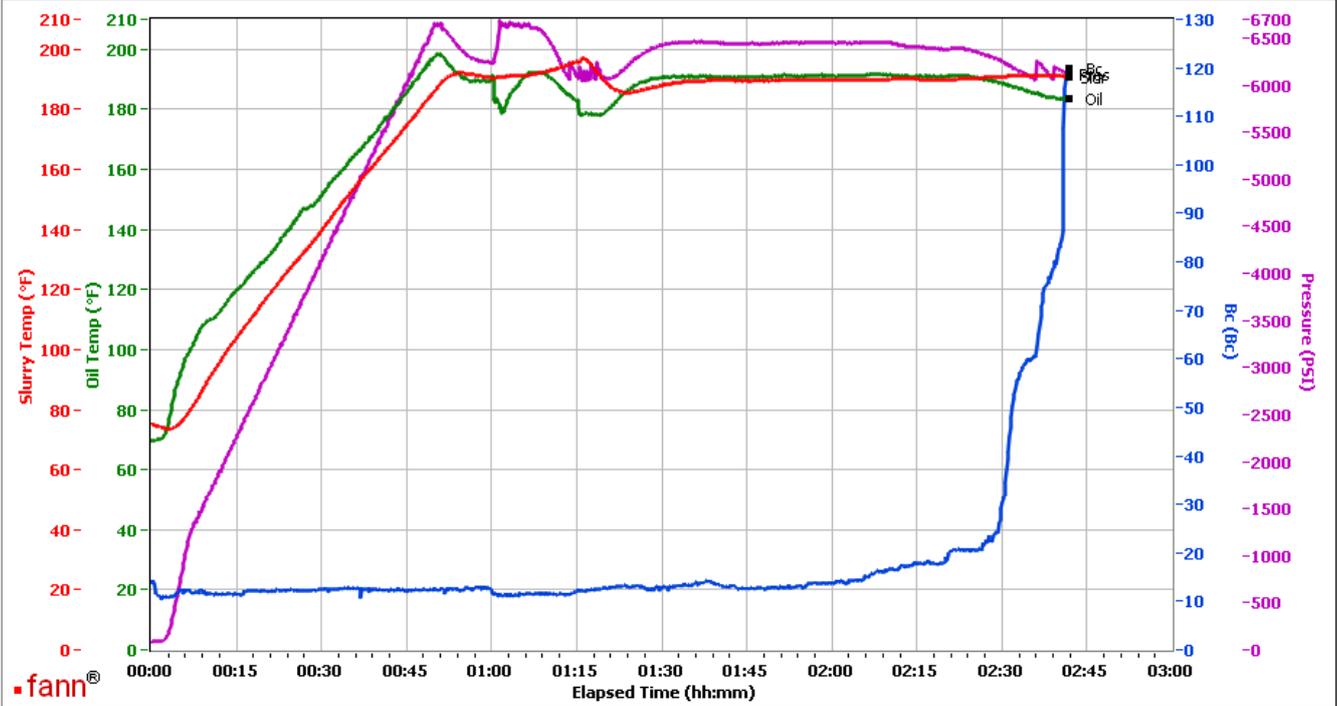
Total sks = 740  
 CS1715, Trailer 8476, 370 sks  
 Deflected from 12Bc--- > 13Bc  
 please note the heat of hydration at 2:29

**Grand Junction Colorado**

Fields	Values
Project Name	GJ2491712-2 TERRA BULK PRODUCTION TA
Test ID	35721697 - TT
Request ID	2491712-2
Tested by	CT
Customer	TERRA ENERGY PARTNERS
Well No	NR 311-3
Rig	H&P 318
Casing/Liner Size	4.5 INCH

Fields	Values
Job Type	PRODUCTION CASING
Cement Type	MOUNTAIN G
Cement Weight	Standard
Test Date	08/07/18
Test Time	11:18AM
Temp. Units	degF
Pressure Units	PSI
SW Version	2.1.0.507

Events	Results
30.00 Bc	02h:30m
40.00 Bc	02h:31m
50.00 Bc	02h:31m
70.00 Bc	02h:37m
100.00 Bc	02h:40m
00h:30m	12.50
01h:00m	11.56
01h:30m	12.89



Data File C:\Documents and Settings\M290\Local Settings\Temporary Internet Files\Content.IE5\CDER4HJW\GJ2491712-2 TERRA BULK PRODUCTION TAIL[1].tdms  
 Comments CS1715, TRAILER 8476, 370 SKS

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**Operation Test Results Request ID 2491712/1**

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

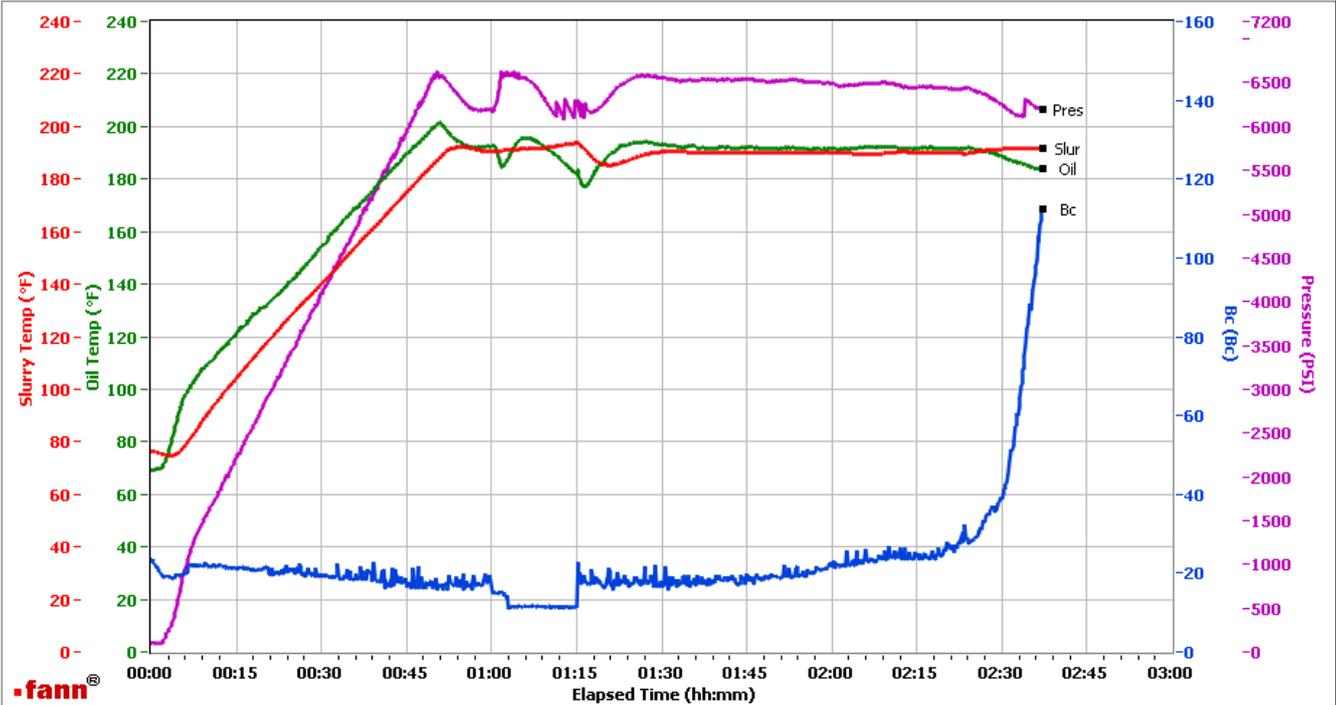
**07/AUG/2018**

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)
190	6352	50	2:23	2:31	2:33	2:36	23	60	15

Total sks = 740  
CS1714 TR#1513 370 SKS

**Grand Junction, Colorado**

Fields	Values	Fields	Values	Events	Results
Project Name	GJ2491712-1 TERRA PRODUCTION BULK TA	Job Type	PRODUCTION CASING	30.00 Bc	02h:23m
Test ID	35705003	Cement Type	MOUNTAIN G	40.00 Bc	02h:30m
Request ID	GJ2491712-1 TT	Cement Weight	Standard	50.00 Bc	02h:31m
Tested by	DEBA	Test Date	08/06/18	70.00 Bc	02h:33m
Customer	TERRA ENERGY PARTNERS	Test Time	10:52 PM	100.00 Bc	02h:36m
Well No	NR 311-3	Temp. Units	degF	00h:30m	19.19
Rig	H8P 318	Pressure Units	PSI	01h:00m	15.05
Casing/Liner Size	4.5"	SW Version	2.1.0.507	01h:30m	16.37



Data File C:\Documents and Settings\M290\Local Settings\Temporary Internet Files\Content.IE5\CDER4HJW\GJ2491712-1 TERRA PRODUCTION BULK TAIL[1].TDM5  
 Comments CS1714 TR#1513 370 SKS

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