

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS-EBUS**

United States of America, COLORADO

### **For: Terra**

Date: Wednesday, March 20, 2019

### **TR 443-22-597 Production PJR**

API# 05-045-23700-00

Sincerely,

**Grand Junction Cement Engineering**

## 2.0 Real-Time Job Summary

## 2.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	PS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	3/20/2019	01:30:00	USER					CREW CALLED OUT TO H&P 271 TEP PRODUCTION JOB. REQUESTED ON LOCATION AT 10:30.
Event	2	Pre-Convoy Safety Meeting	3/20/2019	04:15:00	USER					WITH ALL HES PERSONNEL
Event	3	Crew Leave Yard	3/20/2019	04:30:00	USER					
Event	4	Arrive at Location	3/20/2019	09:30:00	USER					RIG WAS RUNNING CASING UPON HES ARRIVAL
Event	5	Assessment of Location Safety Meeting	3/20/2019	09:35:00	USER					WITH ALL HES PERSONNEL
Event	6	Spot Equipment	3/20/2019	09:40:00	USER					SPOT EQUIPMENT
Event	7	Pre-Rig Up Safety Meeting	3/20/2019	09:50:00	USER					WITH ALL HES PERSONNEL
Event	8	Rig-Up Equipment	3/20/2019	10:00:00	USER					1-RCM ELITE PUMP TRUCK, 2- 1,700 FT3 SILOS, 1- 660 FT3 BULK TRUCK, 1-PICKUP TRUCK
Event	9	Rig-Up Completed	3/20/2019	10:45:00	USER					RIG UP COMPLETED. WAIT FOR RIG TO FINISH RUNNING CASING.
Event	10	Pre-Job Safety Meeting	3/20/2019	11:45:00	USER					WITH ALL PERSONNEL ON LOCATION. PLUG CONTAINER WOULD NOT FIT OVER CASING COLLAR. RIG HAD TO SWAP OUT COLLARS. WELL WAS STATIC APPROX 1 HR BEFORE CEMENTING
Event	11	Check Weight	3/20/2019	13:00:00	USER					PRESSURIZED MUD SCALES CALIBRATED USING FRESH WATER PRIOR TO JOB. ALL FLUID DENSITIES VERIFIED USING PRESSURIZED MUD SCALES

THROUGHOUT JOB.

Event	12	Start Job	3/20/2019	13:07:00	USER					
Event	13	Pump Water	3/20/2019	13:08:30	USER	30	8.33	2	2	PUMP 2 BBL H2O AHEAD TO PRIME LINES. PUMPED AT 2 BPM WITH 30 PSI
Event	14	Shutdown	3/20/2019	13:09:30	USER					SHUTDOWN TO LINE OUT VALVES ON MANIFOLD FOR PRESSURE TEST
Event	15	Pressure Test	3/20/2019	13:14:15	USER	6700				SET KICKOUTS TO 500 PSI FOR LOW TEST TO ENSURE KICKOUTS ARE FUNCTIONING PROPERLY. BROUGHT PRESSURE UP TO 6,700 PSI FOR HIGH TEST.
Event	16	Pump H2O Spacer	3/20/2019	13:16:40	USER	90	8.33	4	10	PUMP 10 BBL H2O SPACER. PUMPED AT 4 BPM WITH 90 PSI
Event	17	Pump Mud Flush III Spacer	3/20/2019	13:19:38	USER	90	8.4	4	20	PUMP 20 BBL MUD FLUSH III SPACER. PUMPED AT 4 BPM WITH 90 PSI. USED 80 LBS MUD FLUSH III FOR SPACER.
Event	18	Pump Lead Cement	3/20/2019	13:24:56	USER	620	12.3	8	195.2	PUMP 195.2 BBL NEOCEM GJ2 LEAD CEMENT. 565 SKS AT 12.5 PPG, 1.94 FT3/SK, 9.6 GAL/SK. PUMPED AT 8 BPM WITH 620 PSI
Event	19	Pump Tail Cement	3/20/2019	13:54:00	USER	700	13	8	294.9	PUMP 294.9 BBL NEOCOM HT TAIL CEMENT. 800 SKS AT 13 PPG, 2.07 FT3/SK, 9.43 GAL/SK. PUMPED AT 8 BPM WITH 700 PSI
Event	20	Shutdown	3/20/2019	14:42:20	USER					SHUTDOWN TO DROP TOP PLUG.
Event	21	Clean Lines	3/20/2019	14:43:00	USER					WASH PUMPS AND LINES TO PIT.
Event	22	Drop Top Plug	3/20/2019	14:48:00	USER					DROP THIRD PARTY TOP LATCH DOWN PLUG. PLUG LAUNCHED. WITNESSED BY CUSTOMER REP.
Event	23	Pump Displacement	3/20/2019	14:49:30	USER	2570	8.4	10	137.2	PUMP 137.2 BBL KCL DISPLACEMENT AT 10 BPM WITH 2,570 PSI. 3 LBS BE-6 IN FIRST 30 BBL, 1 GAL MMCR IN FIRST 10 BBL.
Event	24	Slow Rate	3/20/2019	15:03:30	USER	1800	8.4	4	10	SLOW RATE TO 4 BPM 10 BBL PRIOR TO

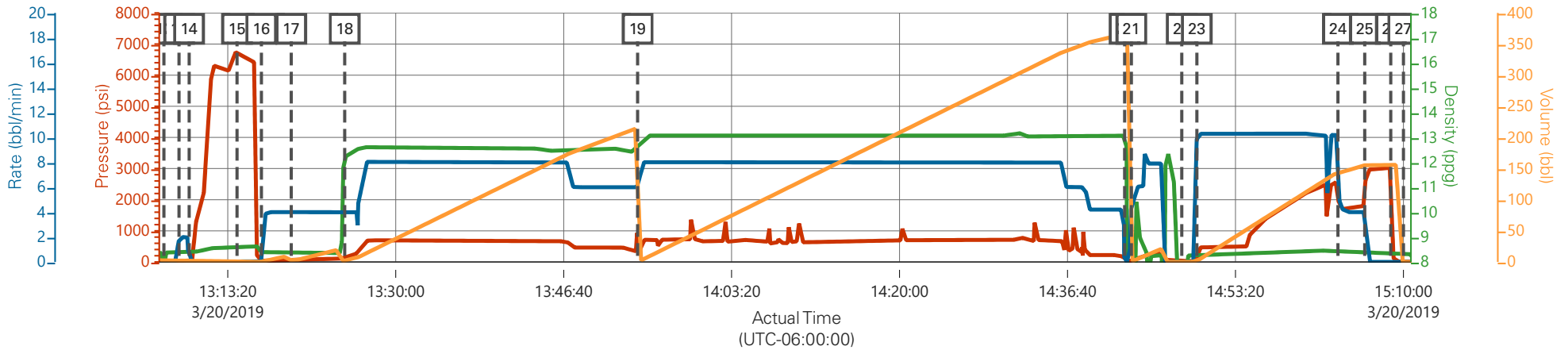
## CALCULATED DISPLACEMENT TO BUMP PLUG.

Event	25	Bump Plug	3/20/2019	15:06:10	USER	2980	147.2	PLUG BUMPED AT 4 BPM. FCP-1,800 PSI. BROUGHT PRESSURE UP TO 2,980 PSI. TOTAL DISPLACEMENT-147.2 BBL
Event	26	Check Floats	3/20/2019	15:08:45	USER			FLOATS HOLDING. RETURNED 1.5 BBL FLUID TO TRUCK
Event	27	End Job	3/20/2019	15:10:00	USER			PIPE WAS RECIPROCATED THROUGHOUT JOB. RIG PUMP 1,500 SCF OF AIR DOWN PARASITE STRING DURING CEMENT. AIR TO PARASITE STRING WAS SHUT OFF AT 60 BBL DISPLACEMENT AWAY. GOOD CIRCULATION THROUGHOUT CEMENT. CIRCULATION WAS LOST WHEN HES SHUT DOWN TO DROP THE TOP PLUG FOR DISPLACEMENT.
Event	28	Pre-Rig Down Safety Meeting	3/20/2019	15:15:00	USER			WITH ALL HES PERSONNEL
Event	29	Rig-Down Equipment	3/20/2019	15:20:00	USER			
Event	30	Rig-Down Completed	3/20/2019	16:15:00	USER			
Event	31	Pre-Convoy Safety Meeting	3/20/2019	16:20:00	USER			WITH ALL HES PERSONNEL
Event	32	Crew Leave Location	3/20/2019	16:30:00	USER			
Event	33	Well Info	3/20/2019	16:31:00	USER			TD-9,533', TP-9,527.41', SHOE-29.92', HOLE 8 3/4", MUD-9.1 PPG WBM, CSG-4 1/2" 11.6 LB/FT P-110, PREV CSG SET AT 2,854' 9 5/8" 36 LB/FT
Event	34	Rig Info	3/20/2019	16:32:00	USER			RIG ON BOTTOM AT 10:30 , CIRCULATED AT 11.5 BPM WITH 1,500 PSI. 700 BBL CIRCULATED. RIG PUMPED 1,000 SCF OF AIR DOWN CASING AND 1,500 SCF OF AIR DOWN PARASITE STRING WHILE CIRCULATING.
Event	35	Job Info	3/20/2019	16:33:00	USER			CALCULATED TOP OF TAIL CEMENT-4,145', CALCULATED TOP OF LEAD CEMENT-691', USED 80

LBS MUDFLUSH III, 3 LBS BE-6, 1 GALLON MMCR  
FOR JOB. THIRD PARTY TOP PLUG WAS USED FOR  
JOB. HES TOP PLUG WAS RETURNED TO  
WAREHOUSE.

Event	36	Comment	3/20/2019	16:34:00	USER	THANK YOU FOR USING HALLIBURTON CEMENT DEPARTMENT. JEREMY YOUNG AND CREW.
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# TEP - TR 443-22-597 - PRODUCTION



PS Pump Press (psi)    DH Density (ppg)    Comb Pump Rate (bbl/min)    Pump Stg Tot (bbl)

Description	Actual Time (UTC-06:00:00)	PS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	
12 Start Job	13:07:00	-2.00	8.16	0.00	3.00	
13 Pump Water	13:08:30	25.00	8.40	2.00	0.10	
14 Shutdown	13:09:30	28.00	8.39	0.00	0.00	
15 Pressure Test	13:14:15	6762.00	8.56	0.00	0.00	
16 Pump H2O Spacer	13:16:40	15.00	8.39	0.00	0.00	
17 Pump Mud Flush III Spacer	13:19:38	94.00	8.34	4.00	0.90	
18 Pump Lead Cement	13:24:56	161.00	12.25	4.00	2.20	
19 Pump Tail Cement	13:54:00	262.00	12.60	6.00	0.10	
20 Shutdown	14:42:20	118.00	13.08	0.00	367.10	
21 Clean Lines	14:43:00	14.00	0.37	4.80	0.40	
22 Drop Top Plug	14:48:00	4.00	-0.13	0.00	0.00	
23 Pump Displacement	14:49:30	42.00	8.25	10.00	1.40	
24 Slow Rate	15:03:30	2122.00	8.45	5.90	144.40	
25 Bump Plug	15:06:10	2066.00	8.35	4.00	155.40	
26 Check Floats	15:08:45	1881.00	8.41	0.00	155.90	
27 End Job	15:10:00	3.00	8.31	0.00	0.00	

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Created: 2019-03-20 10:39:56, (UTC-06:00), Version: 5.0.161.0

Edit

Customer : TERRA ENERGY PARTNERS-EBUS

Job Date : 3/20/2019

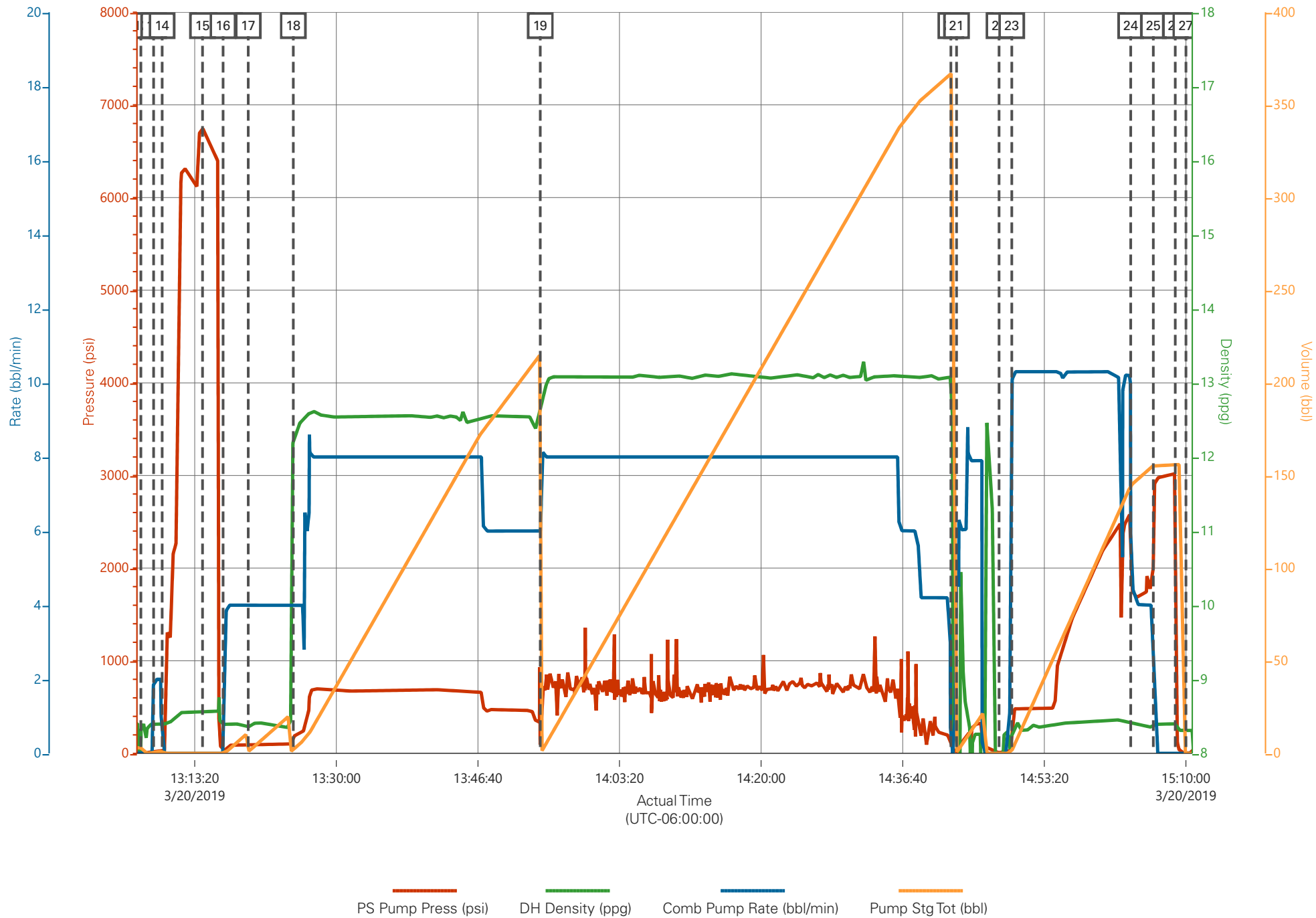
Well : TR 443-22-597

Representative : GARRETT WADE

Sales Order # : 905564169

Elite/Operator : 12610956/ROBERT HOEY

# TEP - TR 443-22-597 - PRODUCTION



## Job Information

Request/Slurry	2542234/2	Rig Name	H&P 271	Date	15/MAR/2019
Submitted By	Connor Matthews	Job Type	Production Casing	Bulk Plant	Grand Junction
Customer	Terra Energy Partners	Location	Garfield	Well	Trail Ridge 443-22-597

## Well Information

Casing/Liner Size	4.5 in	Depth MD	9538 ft	BHST	112°C / 234°F
Hole Size	8.75 in	Depth TVD	9079 ft	BHCT	73°C / 164°F
Pressure	5655 psi				

## Drilling Fluid Information

Mud Supplier Name	Baroid	Mud Trade Name	BARADRIL-N	Density
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## Cement Information - Lead Design



<u>Conc</u>	<u>UOM</u>	<u>Cement/Additive</u>	<u>MP</u>	<u>Sample Type</u>	<u>Sample Date</u>	<u>Lot No.</u>	Cement Properties		
							Slurry Density	12.5	lbm/gal
							Slurry Yield	1.94	ft3/sack
							Water Requirement	9.62	gal/sack
							Total Mix Fluid	9.62	gal/sack
							Water Source	Fresh Water	
							Water Chloride		

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# **Operation Test Results Request ID 2542234/2**

**Thickening Time - ON-OFF-ON, Request Test ID:36327315**

**18/MAR/2019**

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)
164	5695	46	4:23	5:35	6:17	6:44	8	56	15	9

Total sks = 565

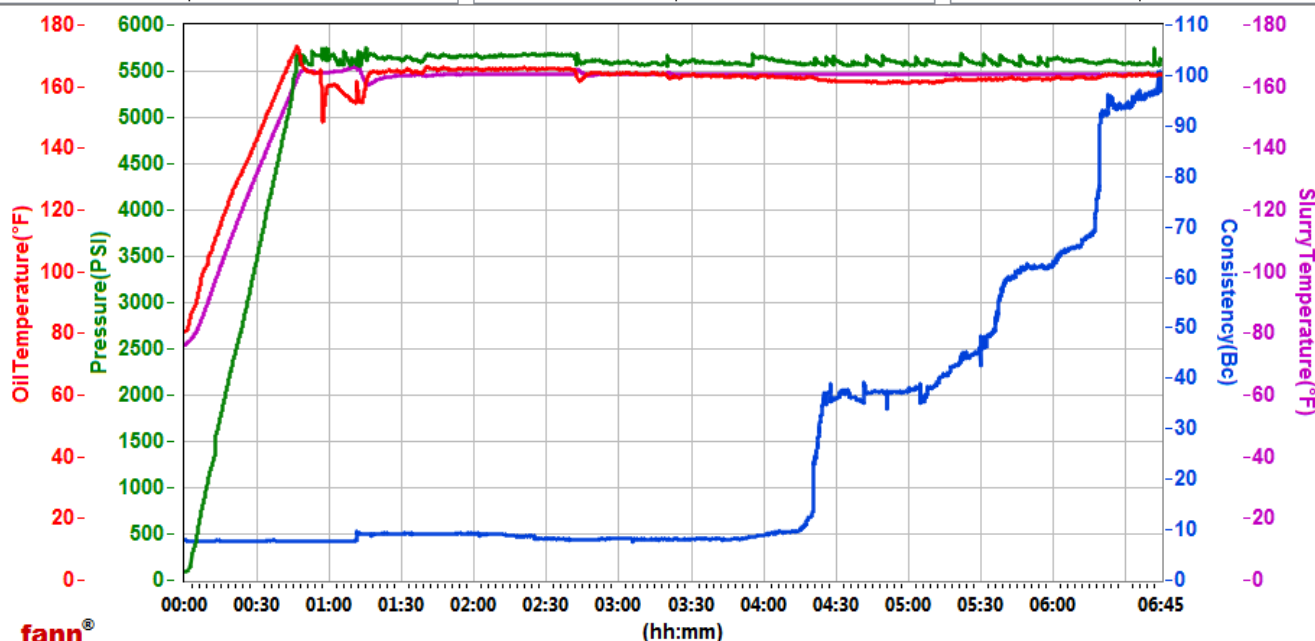
CS0353 TR 4064 145 SKS

deflected from 7Bc--- > 9Bc

Heat of hydration at 4:20

## **GRAND JUNCTION**

Fields	Values	Fields	Values	Events	Results
Project Name	TempTest	Rig	H&P 271	30Bc	4:23
SW Version	1.0	Casing/Liner Size	4.5 INCH	50Bc	5:35
Test ID	36327315 - TT	Job Type	PRODUCTION CASING	70Bc	6:17
Request ID	2542234-2	Cement Weight	GCC TYPE I-II	100Bc	6:44
Tested by	JASON	Comments	Light Weight		
Customer	TERRA ENERGY PARTN	Date Time	3/18/2019 05:11:47.385		
Well No	TR 443-22-597	Temp. Units	degF		



Data File C:\Users\hx25273\Desktop\HPHT Graphs\GJ2542234-2 TERRA BULK PRODUCTION LEAD.tdms

Comments Light Weight

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## Operation Test Results Request ID 2542234/1

Thickening Time - ON-OFF-ON, Request Test ID:36320395

18/MAR/2019

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)
164	5655	46	3:31	4:12	4:27	5:30	5	56	15	5

Total sks = 565 SKS

CS0350 TR#8476 420 SKS

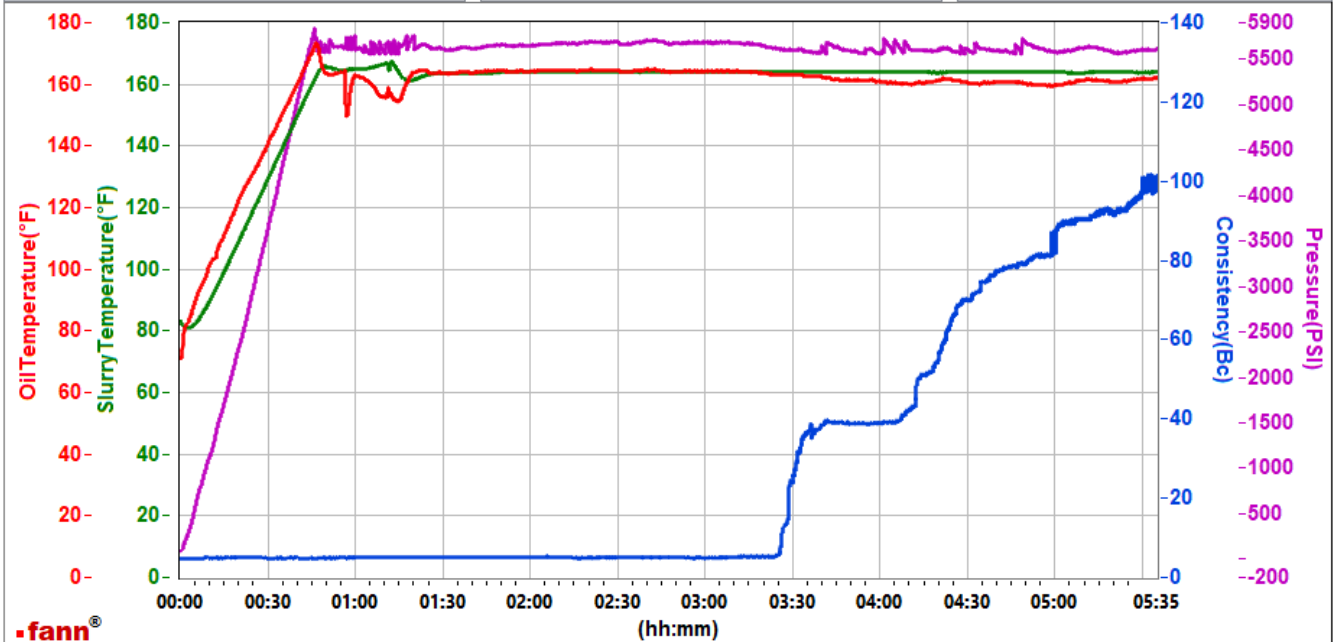
No deflection. Please note that heat of hydration started around 3:23 and slurry was 95% core set and balled up around paddle.

### GRAND JUNCTION

Fields	Values
Project Name	GJ2542234-1 Terra Bulk I
SW Version	1.0
Test ID	36320395 - TT
Request ID	2542234-1
Tested by	DEBA
Customer	TERRA ENERGY PARTN
Well No	TR 443-22-597

Fields	Values
Rig	H&P 271
Casing/Liner Size	4.5 INCH
Job Type	PRODUCTION CASING
Cement Weight	GCC TYPE I-II
Comments	Light Weight
Date Time	3/17/2019 09:29:01.076
Temp. Units	degF

Events	Results
30 Bc	3:31
50 Bc	4:12
70 Bc	4:27
100 Bc	5:30



Data File N:\01 Test Graphs\GJ2542234-1 TERRA BULK PRODUCTION LEAD.tdms

Comments Light Weight

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# HALLIBURTON

## Rockies, Grand Junction

## Lab Results- Tail

### Job Information

Request/Slurry	2542235/2	Rig Name	H&P 271	Date	15/MAR/2019
Submitted By	Connor Matthews	Job Type	Production Casing	Bulk Plant	Grand Junction
Customer	Terra Energy Partners	Location	Garfield	Well	Trail Ridge 443-22-597

### Well Information

Casing/Liner Size	4.5 in	Depth MD	9538 ft	BHST	112°C / 234°F
Hole Size	8.75 in	Depth TVD	9079 ft	BHCT	73°C / 164°F
Pressure	5655 psi				

### Drilling Fluid Information

Mud Supplier Name	Baroid	Mud Trade Name	BARADRIL-N	Density
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### Cement Information - Tail Design



<u>Conc</u>	<u>UOM</u>	<u>Cement/Additive</u>	<u>MP</u>	<u>Sample Type</u>	<u>Sample Date</u>	<u>Lot No.</u>	<b>Cement Properties</b>		
							Slurry Density	13	lbm/gal
							Slurry Yield	2.07	ft3/sack
							Water Requirement	9.42	gal/sack
							Total Mix Fluid	9.42	gal/sack
							Water Source	Fresh Water	
							Water Chloride		

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# **Operation Test Results Request ID 2542235/2**

**Thickening Time - ON-OFF-ON, Request Test ID:36327292**

**18/MAR/2019**

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)
164	5655	46	2:26	2:26	2:36	2:41	12	56	15	13

Total sks = 800

CS0352 TR 8678 350 SKS

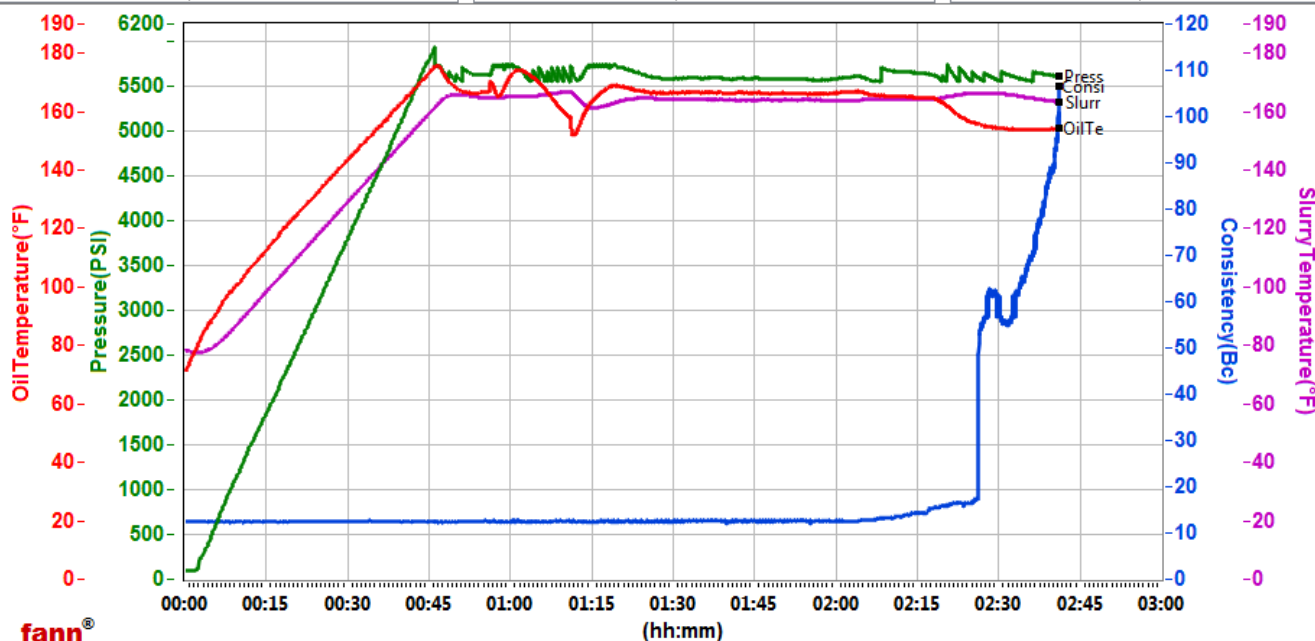
CS0354 TR 4064 100 SKS

No deflection 13Bc--- > 13Bc

Heat of hydration at 2:17

## **GRAND JUNCTION**

Fields	Values	Fields	Values	Events	Results
Project Name	TempTest	Rig	H&P 271	30Bc	2:26
SW Version	1.0	Casing/Liner Size	4.5 INCH	50Bc	2:26
Test ID	36327292-TT	Job Type	PRODUCTION CASING	70Bc	2:36
Request ID	2542235-2	Cement Weight	GCC TYP0E II	100Bc	2:41
Tested by	JASON	Comments	Light Weight		
Customer	TERRA ENERGY PARTN	Date Time	3/18/2019 02:52:52.998		
Well No	TR 443-22-597	Temp. Units	degF		



Data File C:\Users\hx25273\Desktop\HPHT Graphs\GJ2542235-2 TERRA PRODUCTION BULK TAIL.tdms

Comments Light Weight

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## Operation Test Results Request ID 2542235/1

Thickening Time - ON-OFF-ON, Request Test ID:36320397

18/MAR/2019

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)
164	5655	46	2:12	2:20	2:33	2:35	11	56	15	12

Total sks =800

CS0351, TR#1513 350 SKS

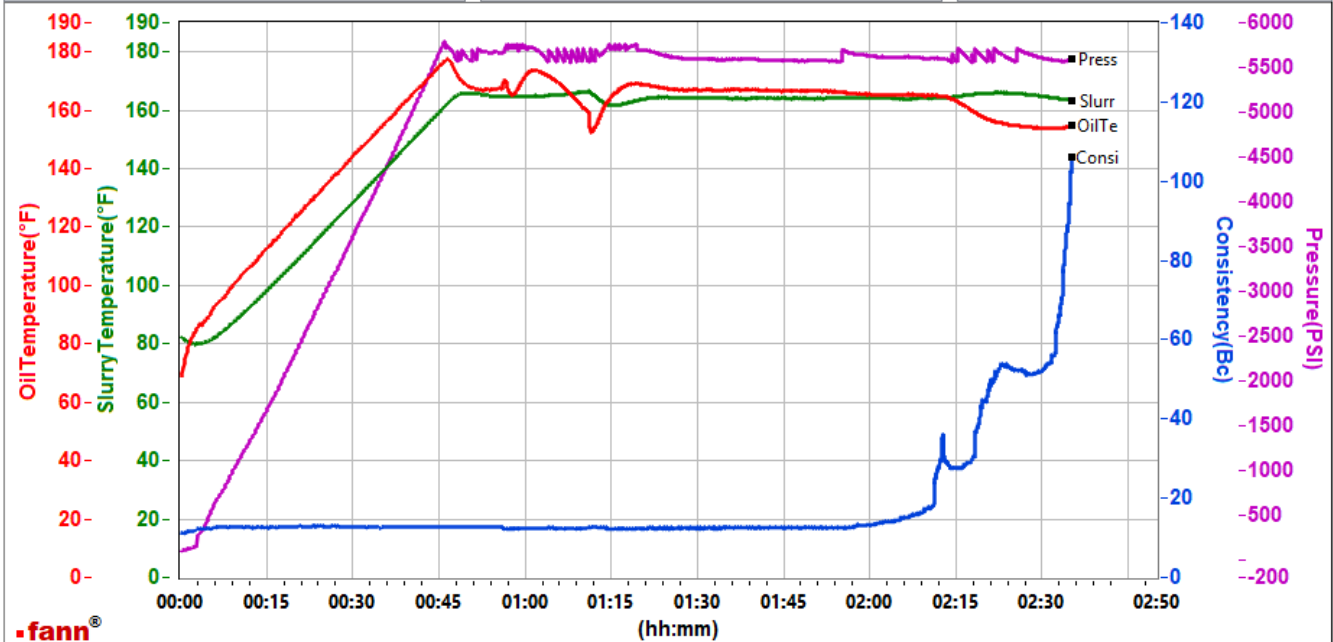
No deflection. Please note heat of hydration started around 2:14 and slurry was 95% core set and balled up around paddle.

### GRAND JUNCTION

Fields	Values
Project Name	GJ2542235-1 Terra Prodi
SW Version	1.0
Test ID	36320397-TT
Request ID	2542235-1
Tested by	DS
Customer	TERRA ENERGY PARTN
Well No	TR 443-22-597

Fields	Values
Rig	H&P 271
Casing/Liner Size	4.5 INCH
Job Type	PRODUCTION CASING
Cement Weight	GCC TYP0E I-II
Comments	Light Weight
Date Time	3/17/2019 09:10:44.525
Temp. Units	degF

Events	Results
30 Bc	2:12
50 Bc	2:20
70 Bc	2:33
100 Bc	2:35



Data File N:\01 Test Graphs\GJ2542235-1 TERRA PRODUCTION BULK TAIL.tdms

Comments Light Weight

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