

Laboratory Cement Test Report
Devon - North Thistle 15 10 State Com 3H - Surface
11.5 Lead
Service Order Number: 2887392

LAR Name	: HNM - 50	Client	: Devon	Location	: Hobbs-HNM-2003
Date	: Dec-26-2018	Well Name	: North Thistle 15 10 State Com 3H - Surface	Rig	: C126
String	: Surface				

SignaturesReport created by:
Vanessa PatinoDesign input by:
Carolina Suarez

Job Type	: Primary	MD	: 975.00 ft	TVD	: 975.00 ft
BHST	: 88.00 °F	BHCT	: 81.00 °F	BHP	: 626.00 psi
Starting Temp	: 80.00 °F	Time To Temp	: 00:10 hr:mn	Heating Rate	: 0.10 °F/min
Starting Pressure	: 200.00 psi	Time To Pressure	: 00:10 hr:mn		

Composition

Slurry Density	: 11.50 lb/gal	Yield	: 2.32 ft³/sk	Mix Fluid	: 13.283 gal/sk
Solid Vol. Fraction	: 23.50 %	Slurry Type	: Lead	Mix Water	: 13.233 gal/sk

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D049	100.00 % BVOB	Blend sack: 75 lb	Cement	176.05 lb/ft³	FB 13982
D047	0.020 gal/sk VBWOB		Anti Foam		D00918PL69
D154	2.00 % BWOB		Extender		B25U11-04
D020	10.00 % BWOB		Extender		FB 13982
D208	0.10 % BWOB		Viscosifier		8D3388W
D042	5.00 lb/sk WBWOB		Extender		FB 13982
D130	0.13 lb/sk WBWOB		Lost Circulation Control Agent		50065
Fresh Water	13.233 gal/sk		Base Fluid		Cactus 126

Rheology

S/N: 1044				S/N: 1044			
Surface (Configuration: R1B1 F1.0)				Downhole (Configuration: R1B1 F1.0)			
Temperature	78 °F			Temperature	81 °F		
(rpm)	Up (deg)	Down (deg)	Average (deg)	(rpm)	Up (deg)	Down (deg)	Average (deg)
300	95	95	95	300	87	87	87
200	87	85	86	200	76	77	76.5
100	74	75	74.5	100	61	64	62.5
60	70	69	69.5	60	54	59	56.5
30	65	66	65.5	30	50	55	52.5
6	63	63	63	6	41	50	45.5
3	45	55	50	3	32	51	41.5
10 sec Gel	51 deg - 54.29 lbf/100ft²			10 sec Gel	41 deg - 43.64 lbf/100ft²		
10 min Gel	64 deg - 68.12 lbf/100ft²			10 min Gel	52 deg - 55.35 lbf/100ft²		
Rheo. computed	PV: 36.8 cP, Ty: 59.99 lbf/100ft²			Rheo. computed	PV: 42.7 cP, Ty: 46.23 lbf/100ft²		
Conditioned at 78.00 °F and atmospheric pressure for 30 mins after reaching temperature							

Thickening Time S/N: 447**Set Conditions - Thick (Gelled)**

Consistency	Time	Temp
POD Time	05:05 hr:mn	81 °F
30 Bc	06:41 hr:mn	81 °F
50 Bc	08:00 hr:mn	81 °F
70 Bc	10:26 hr:mn	81 °F

Free Fluid

(0.0%) 0 / 250mL in 2 hrs
At 81 °F and 0 deg inclination
Conditioned at 81.00 °F for 30 mins after reaching temperature
Sedimentation: None
Tube Dimensions: 100mL: 25 mm X 185 mm

UCA S/N: 247L

Time	CS	Temp
07:35 hr:mn	50 psi	110 °F
24:00 hr:mn	404 psi	110 °F
29:02 hr:mn	500 psi	110 °F
72:00 hr:mn	932 psi	110 °F

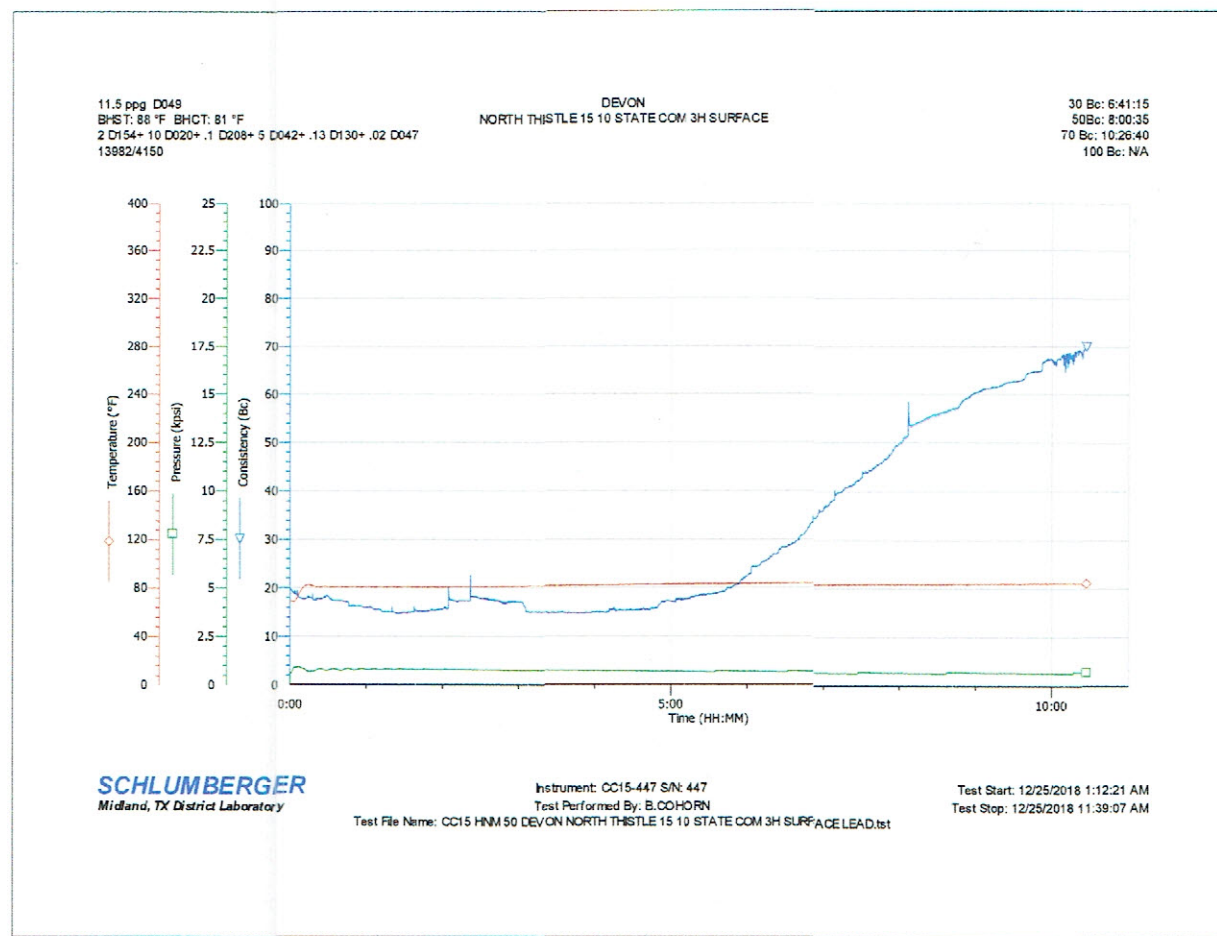
Comments

All slurries prepared and tested in accordance with API RB10B-2 unless otherwise noted

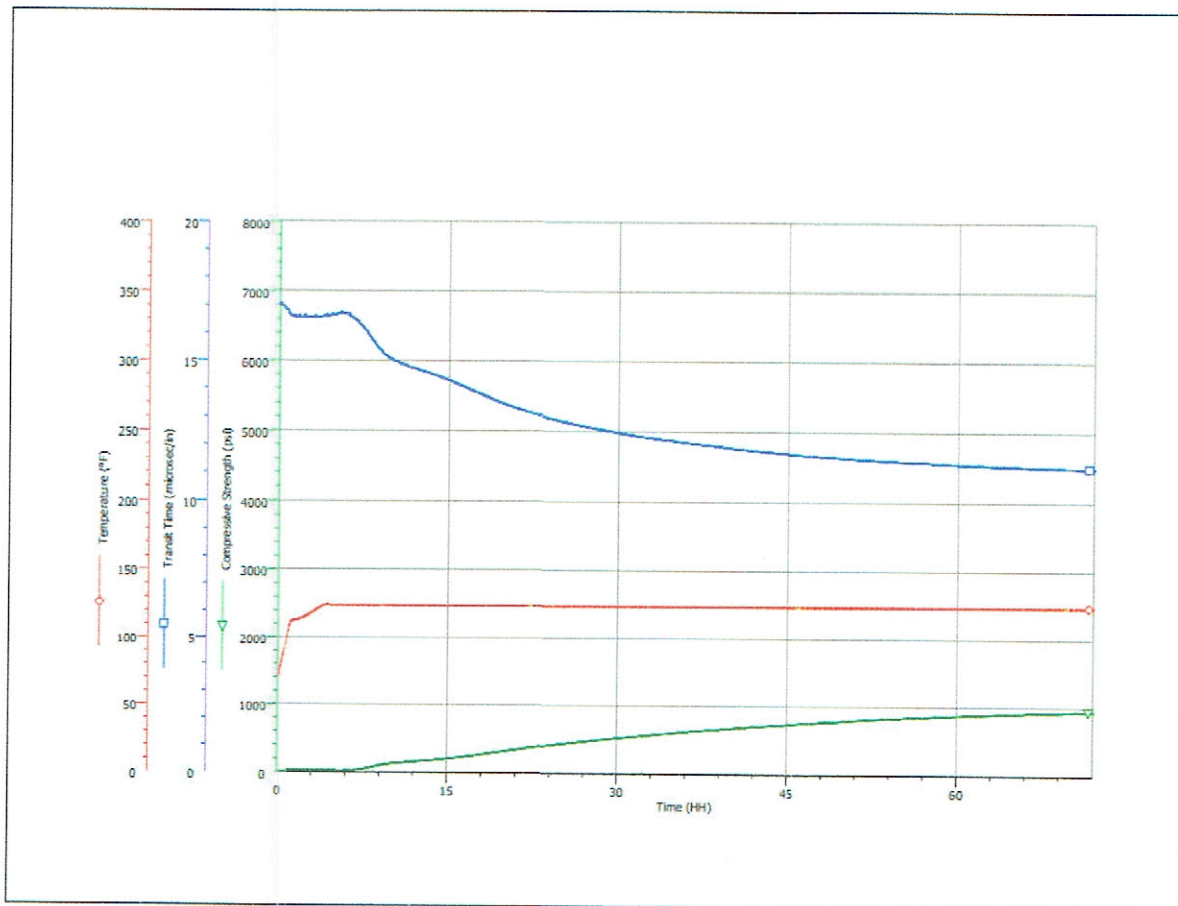
Time to Add Solids : 00:00 mn:sc

Vortex Quality: good/visible

TT Graph

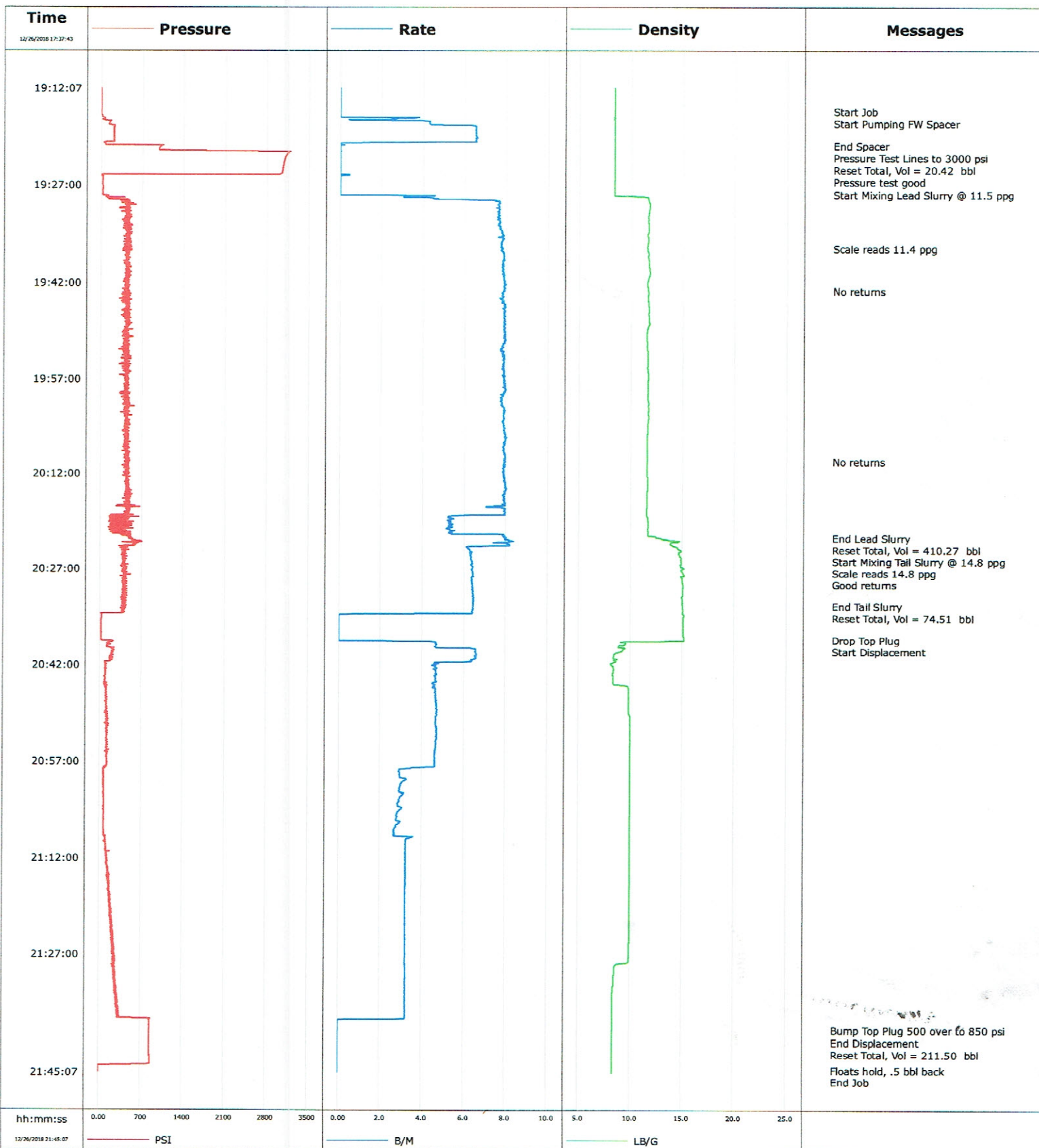


UCA Graph



V. Patino
I have reviewed
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39:37

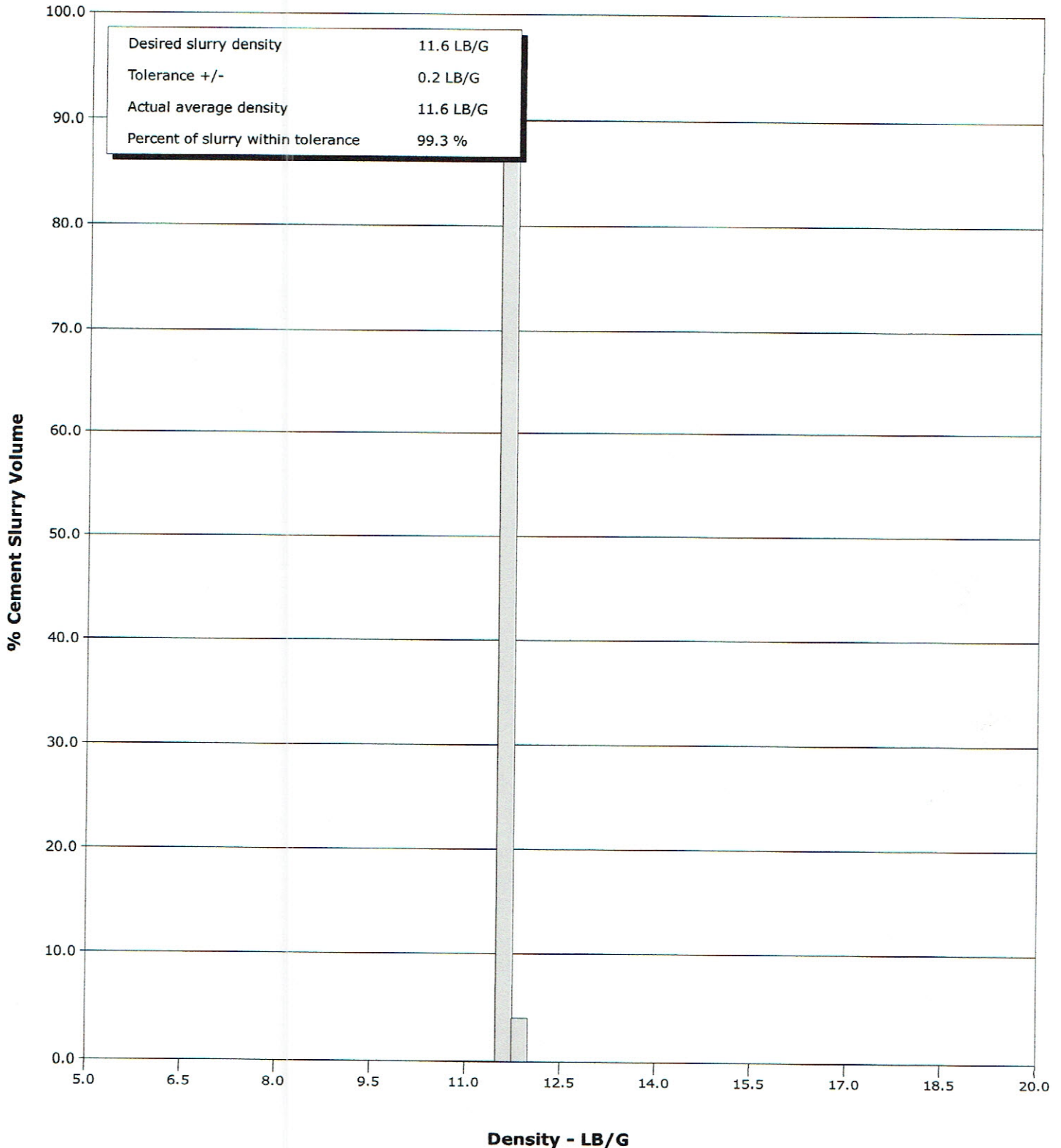
Well	North Thistle 15-10	Client	Devon
Field	Wildcat	SIR No.	2887392
Engineer	Steve Mutchler	Job Type	13 3/8" Surface
Country	United States	Job Date	12-26-2018



Cementing Qa/Qc Density Report

Well	North Thistle 15-10	Client	Devon
Field	Wildcat	SIR No.	2887392
Engineer	Steve Mutchler	Job Type	13 3/8" Surface
Country	United States	Job Date	12-26-2018

Cement Slurry - 12/26/2018 19:30:43 to 12/26/2018 20:10:07



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Well			Field		Job Start		Customer		Job Number	
North Thistle 15-10 3H			Wildcat		Dec/26/2018		Devon		2887392	
Date	Time 24-hr clock	Treating Pressure PSI		Flow Rate B/M	Density LB/G	Volume BBL	Message			
12/26/2018	19:27:03		33	0.0	8.37	0.0				
12/26/2018	19:28:25		32	0.0	8.37	0.0	Start Mixing Lead Slurry @ 11.5 ppg			
12/26/2018	19:33:53		418	7.7	11.68	37.9				
12/26/2018	19:36:40		380	7.8	11.55	59.5	Scale reads 11.4 ppg			
12/26/2018	19:40:43		425	7.8	11.79	91.3				
12/26/2018	19:43:07		453	7.9	11.63	110.2	No returns			
12/26/2018	19:47:33		422	7.9	11.73	145.1				
12/26/2018	19:54:23		486	7.9	11.63	198.9				
12/26/2018	20:01:13		445	7.8	11.70	252.6				
12/26/2018	20:08:03		457	7.9	11.60	306.6				
12/26/2018	20:10:08		495	7.9	11.58	323.1	No returns			
12/26/2018	20:14:53		457	7.9	11.60	360.7				
12/26/2018	20:21:43		343	7.8	11.68	407.0				
12/26/2018	20:22:06		494	7.9	12.42	410.0	End Lead Slurry			
12/26/2018	20:22:08		516	7.9	12.48	410.3	Reset Total, Vol = 410.27 bbl			
12/26/2018	20:22:10		499	8.0	12.61	0.3	Start Mixing Tail Slurry @ 14.8 ppg			
12/26/2018	20:24:42		402	6.4	14.67	18.4	Scale reads 14.8 ppg			
12/26/2018	20:27:05		408	6.4	14.99	33.6	Good returns			
12/26/2018	20:28:33		407	6.4	14.96	43.0				
12/26/2018	20:32:46		446	6.4	15.00	70.1	End Tail Slurry			
12/26/2018	20:33:18		370	6.5	15.01	73.5	Reset Total, Vol = 74.51 bbl			
12/26/2018	20:35:23		31	0.0	15.13	4.8				
12/26/2018	20:38:03		27	0.0	15.15	4.8	Drop Top Plug			
12/26/2018	20:38:04		27	0.0	15.15	4.8	Start Displacement			
12/26/2018	20:42:13		100	4.6	8.37	27.0				
12/26/2018	20:49:03		111	4.7	9.88	58.8				
12/26/2018	20:55:53		135	4.6	9.99	90.7				
12/26/2018	21:02:43		76	3.0	10.00	114.6				
12/26/2018	21:09:33		117	3.2	10.00	134.4				
12/26/2018	21:16:23		177	3.2	10.00	156.5				
12/26/2018	21:23:13		218	3.2	10.00	178.5				
12/26/2018	21:30:03		259	3.2	8.54	200.6				
12/26/2018	21:36:53		864	0.2	8.39	222.5				
12/26/2018	21:38:17		855	0.0	8.39	222.5	Bump Top Plug 500 over to 850 psi			
12/26/2018	21:38:18		855	0.0	8.39	222.5	End Displacement			
12/26/2018	21:38:20		855	0.0	8.39	222.5	Reset Total, Vol = 211.50 bbl			
12/26/2018	21:43:43		865	0.0	8.39	0.0				
12/26/2018	21:44:37		4	0.0	8.39	0.0	Floats hold, .5 bbl back			

Well North Thistle 15-10 3H	Field Wildcat	Job Start Dec/26/2018	Customer Devon	Job Number 2887392
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Post Job Summary

Average Pump Rates, bbl/min				Volume of Fluid Injected, bbl			
Slurry 5.4	N2	Mud	Maximum Rate 8.4	Total Slurry 485.0	Mud 0.0	Spacer 20.0	N2
Treating Pressure Summary, psi				Breakdown Fluid			
Maximum 3190	Final 7	Average 235	Bump Plug to 850	Breakdown	Type Fresh Water	Volume bbl	Density 8.34 lb/gal
Avg. N2 Percent %	Designed Slurry Volume 0.0 bbl	Displacement 212.0 bbl	Mix Water Temp degF	Cement Circulated to Surface? ☒	Volume bbl	Washed Thru Perfs ☐	To ft
Customer or Authorized Representative Bryan		Schlumberger Supervisor Steve Mutchler		Circulation Lost ☐	Job Completed ☒		

Laboratory Cement Test Report Devon - North Thistle 15 10 State Com 3H 12.8 ppg Poz Intermediate Lead Field Blend Service Order Number: 2887437

LAR Name : HNM - 51	Client : Devon	Location : Hobbs-HNM-2003	Signatures
Date : Dec-29-2018	Well Name : North Thistle 15 10 State Com 3H	Rig : C126	Report created by: Chidubem Okam
String : Intermediate			Design input by: Carolina Suarez

Job Type : Primary	MD : 5,400.00 ft	TVD : 5,400.00 ft
BHST : 124.00 °F	BHCT : 107.00 °F	BHP : 3,800.00 psi
Starting Temp : 80.00 °F	Time To Temp : 72:00 hr:mn	Heating Rate : 0.00 °F/min
Starting Pressure : 420.00 psi	Time To Pressure : 72:00 hr:mn	

Composition

Slurry Density : 12.80 lb/gal	Yield : 1.83 ft³/sk	Mix Fluid : 9.856 gal/sk
Solid Vol. Fraction : 26.75 %	Slurry Type : Lead	Mix Water : 9.836 gal/sk

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
C	65.00 % BVOB	Blend sack: 87 lb	Cement	182.42 lb/ft³	FB7193
D035	35.00 % BVOB		Extender		FB7193
D047	0.020 gal/sk VBWOB		Anti Foam		8R8D0025A1
D130	0.13 lb/sk WBWOB		Lost Circulation Control Agent		Bulk
D020	2.00 % BWOB		Extender		Bulk
D065	0.10 % BWOB		Dispersant		05052018
D013	0.15 % BWOB		Retarder		09J-12
Tap Water	9.836 gal/sk		Base Fluid		Tap
D044	5.00 % BWOW		NaCl		32218ADAAA

Rheology

S/N: 383				S/N: 383			
Surface (Configuration: R1B1 F1.0)				Downhole (Configuration: R1B1 F1.0)			
Temperature	70 °F			Temperature	107 °F		
(rpm)	Up (deg)	Down (deg)	Average (deg)	(rpm)	Up (deg)	Down (deg)	Average (deg)
300	12	12	12	300	39	39	39
200	9	9	9	200	34	33	33.5
100	8	8	8	100	29	28	28.5
60	7	7	7	60	27	26	26.5
30	7	7	7	30	23	23	23
6	6	6	6	6	16	17	16.5
3	5	5	5	3	13	15	14
10 sec Gel	5 deg - 5.32 lbf/100ft²			10 sec Gel	14 deg - 14.9 lbf/100ft²		
10 min Gel	14 deg - 14.9 lbf/100ft²			10 min Gel	16 deg - 17.03 lbf/100ft²		
Rheo. computed	PV: 5.9 cP, Ty: 5.78 lbf/100ft²			Rheo. computed	PV: 22 cP, Ty: 18.59 lbf/100ft²		
Conditioned at 107 °F and atmospheric pressure for 30 mins after reaching temperature							

Thickening Time S/N: 757

Set Conditions - Thick Gelled

Consistency	Time	Temp
Go/No-Go:	On: 01:27 hr:mn	Off: 00:10 hr:mn
POD Time	03:47 hr:mn	107 °F
30 Bc	04:42 hr:mn	107 °F
50 Bc	05:19 hr:mn	107 °F
70 Bc	06:01 hr:mn	107 °F

Free Fluid

(0.0%) 0 / 250mL in 2 hrs
At 107 °F and 0 deg inclination
Conditioned at 107.00 °F and atm psi for 30 mins after reaching temperature
Sedimentation: None
Tube Dimensions:
250mL: 35 mm X 245 mm

Mud Balance S/N: 860210

Slurry Density Verified by Pressurized Fluid Balance: 12.80 lb/gal

UCA Compressive Strength S/N: 870L

Time	CS	Temp
04:16 hr:mn	50 psi	117 degF
10:55 hr:mn	500 psi	117 degF
24:00 hr:mn	797 psi	117 degF

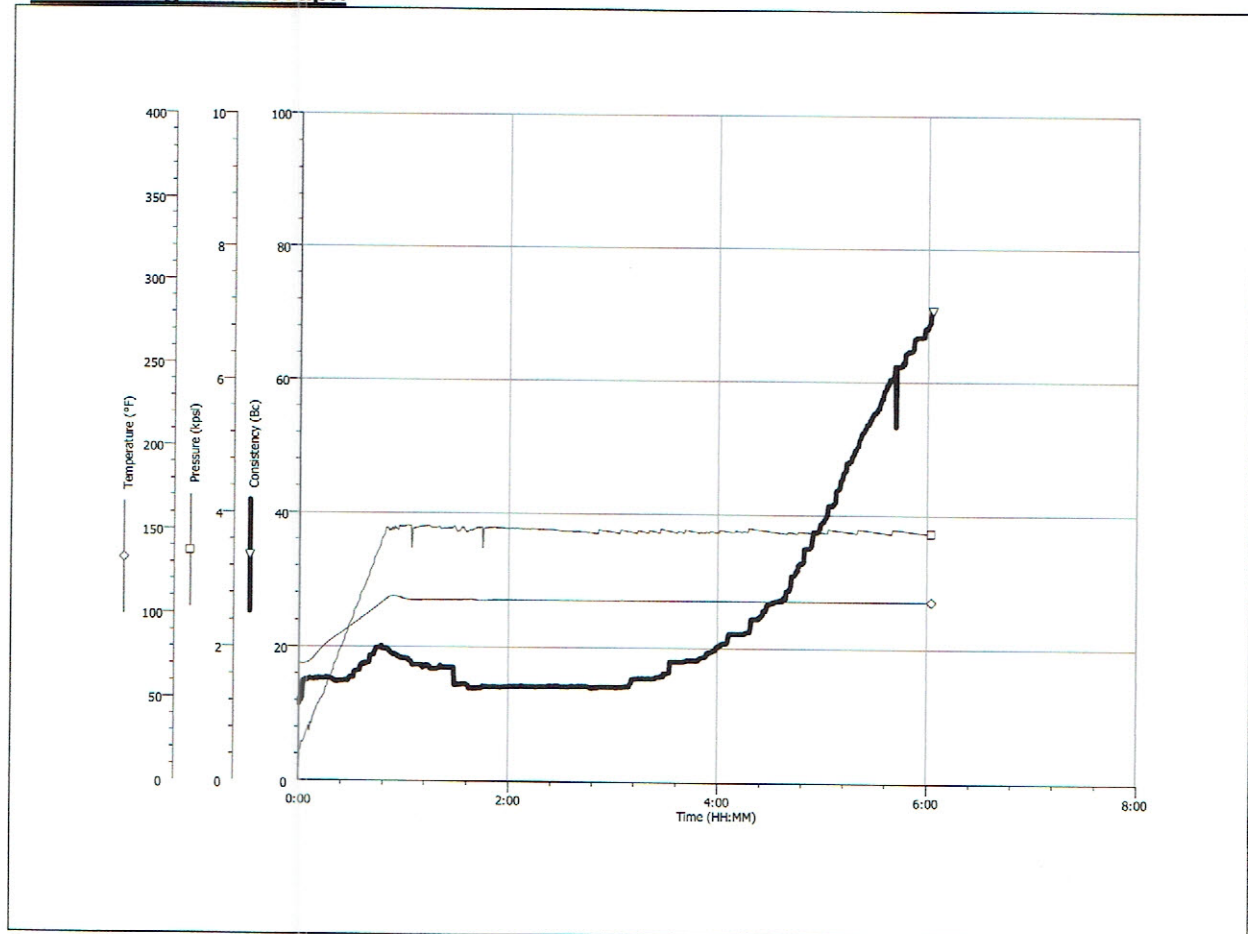
Comments

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Time to Add Solids : 00:12 mn:sc

Vortex Quality: good/visible

Thickening Time Graph

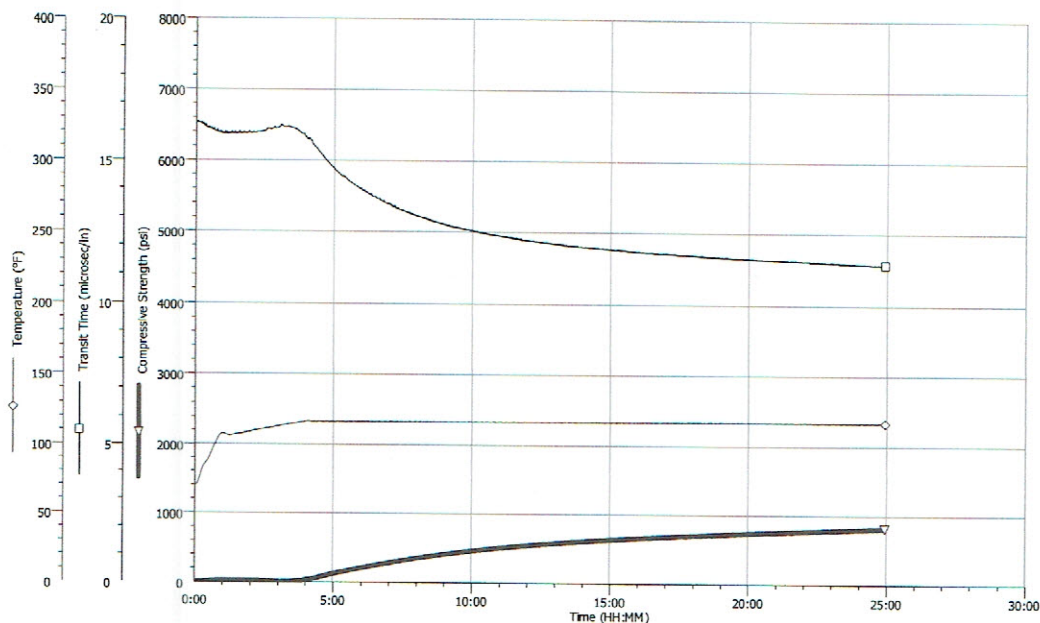


UCA Graph

BHCT: 105 BHST: 121
Density: 12.8
Additives: .13 pps D130 + 2% D20 + .1% D65 + .15% D13 + 5% D44 + .02 gpa D47

Algorithm: Compressive strength type A (less than 14 lb/gal)

50 psi: 4:16:00
500 psi: 10:55:30
24 hr: 797 psi



Laboratory Cement Test Report Devon - North Thistle 15 10 State Com 3H Intermediate Tail Field Blend Service Order Number: 2887437

LAR Name : HNM - 51	Client : Devon	Location : Hobbs-HNM-2003	Signatures
Date : Dec-30-2018	Well Name : North Thistle 15 10 State Com 3H	Rig : C126	Report created by: Nathan Fischer
String : Intermediate			Design input by: Carolina Suarez

Job Type : Primary	MD : 5,400.00 ft	TVD : 5,400.00 ft
BHST : 124.00 °F	BHCT : 107.00 °F	BHP : 3,800.00 psi
Starting Temp : 80.00 °F	Time To Temp : 00:40 hr:mn	Heating Rate : 0.68 °F/min
Starting Pressure : 420.00 psi	Time To Pressure : 00:40 hr:mn	

Composition

Slurry Density : 14.80 lb/gal	Yield : 1.33 ft³/sk	Mix Fluid : 6.344 gal/sk
Solid Vol. Fraction : 35.86 %	Slurry Type : Tail	Mix Water : 6.344 gal/sk

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D903	100.00 % BWOB	Blend sack: 94 lb	Cement	197.28 lb/ft³	FB - 7214
D800	0.35 % BWOB		Retarder		1180103
Tap Water	6.344 gal/sk		Base Fluid		Tap

Rheology

S/N: 383				S/N: 383			
Surface (Configuration: R1B1 F1.0)				Downhole (Configuration: R1B1 F1.0)			
Temperature	70 °F			Temperature	107 °F		
(rpm)	Up (deg)	Down (deg)	Average (deg)	(rpm)	Up (deg)	Down (deg)	Average (deg)
300	35	35	35	300	65	65	65
200	29	30	29.5	200	59	58	58.5
100	22	24	23	100	50	49	49.5
60	19	22	20.5	60	44	45	44.5
30	16	20	18	30	40	41	40.5
6	13	17	15	6	24	27	25.5
3	12	16	14	3	18	19	18.5
10 sec Gel	14 deg - 14.9 lbf/100ft²			10 sec Gel	27 deg - 28.74 lbf/100ft²		
10 min Gel	26 deg - 27.68 lbf/100ft²			10 min Gel	27 deg - 28.74 lbf/100ft²		
Rheo. computed	PV: 20.3 cP, Ty: 15.41 lbf/100ft²			Rheo. computed	PV: 39.6 cP, Ty: 30.05 lbf/100ft²		
Conditioned at 107.00 °F and atmospheric pressure for 30 mins after reaching temperature							

Thickening Time S/N: 752

Set Conditions - Thick

Consistency	Time	Temp
Go/No-Go:	On: 00:55 hr:mn	Off: 00:10 hr:mn
POD Time	02:43 hr:mn	107 °F
30 Bc	02:50 hr:mn	107 °F
50 Bc	03:09 hr:mn	107 °F
70 Bc	03:34 hr:mn	107 °F

Mud Balance S/N: 860210

Slurry Density Verified by Pressurized Fluid Balance: 14.80 lb/gal

Free Fluid

(0.8%) 2 / 250mL in 2 hrs

At 107 °F and 0 deg inclination

Conditioned at 107.00 °F and ATM psi for 30 mins after reaching temperature

Sedimentation: None

Tube Dimensions:
250mL: 35 mm X 245 mm

UCA Compressive Strength S/N: 903-L

MBB18-0815PT001

Time	CS	Temp
05:44 hr:mn	50 psi	120 degF
08:04 hr:mn	500 psi	120 degF
24:00 hr:mn	1920 psi	120 degF
72:00 hr:mn	2371 psi	120 degF

Comments

All slurries prepared and tested in accordance with API RB10B-2 unless otherwise noted

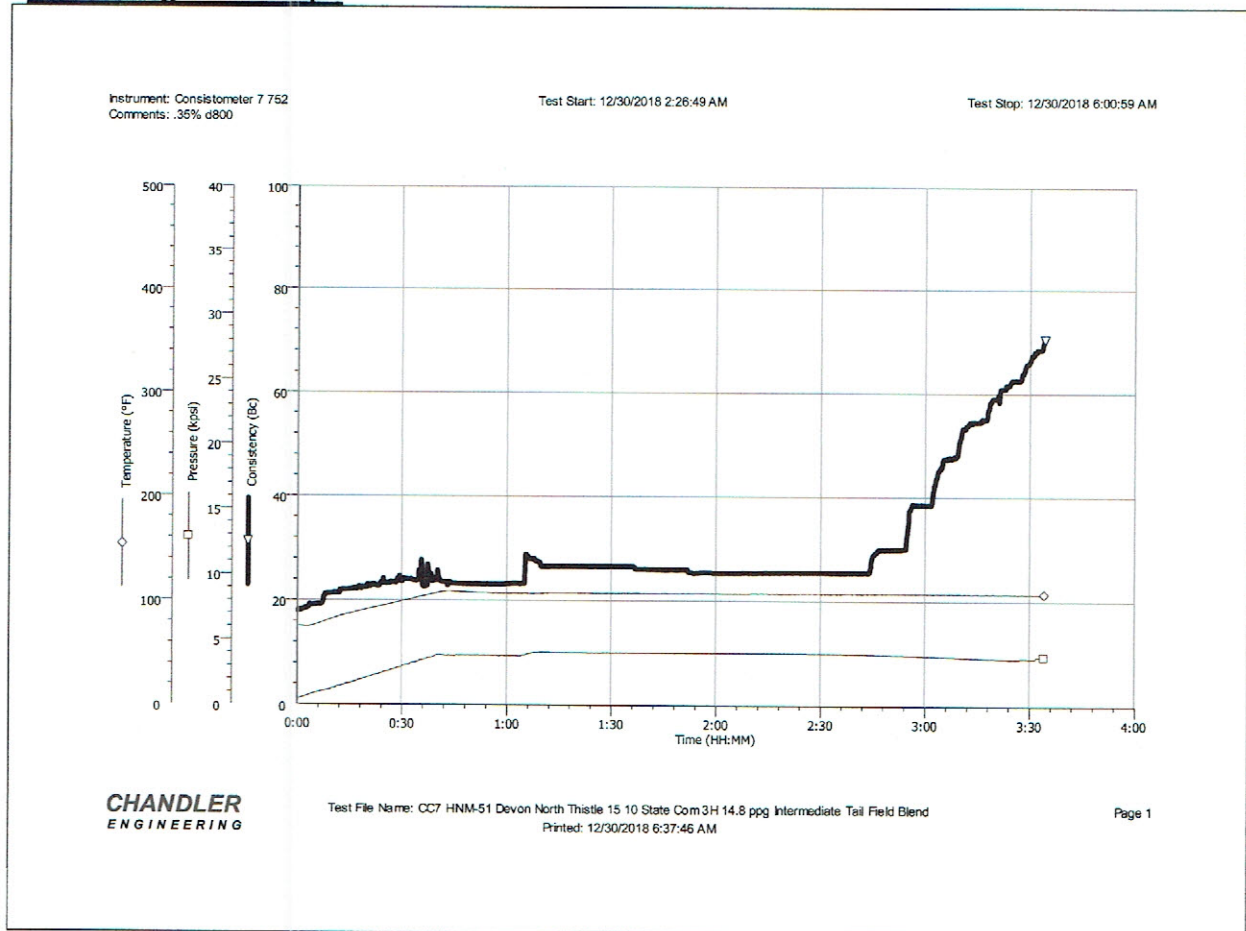
Time to Add Solids : 00:11 mn:sc

Vortex Quality: good/visible

Free Fluid

FF: Approved by D. Phelan, SE

Thickening Time Graph

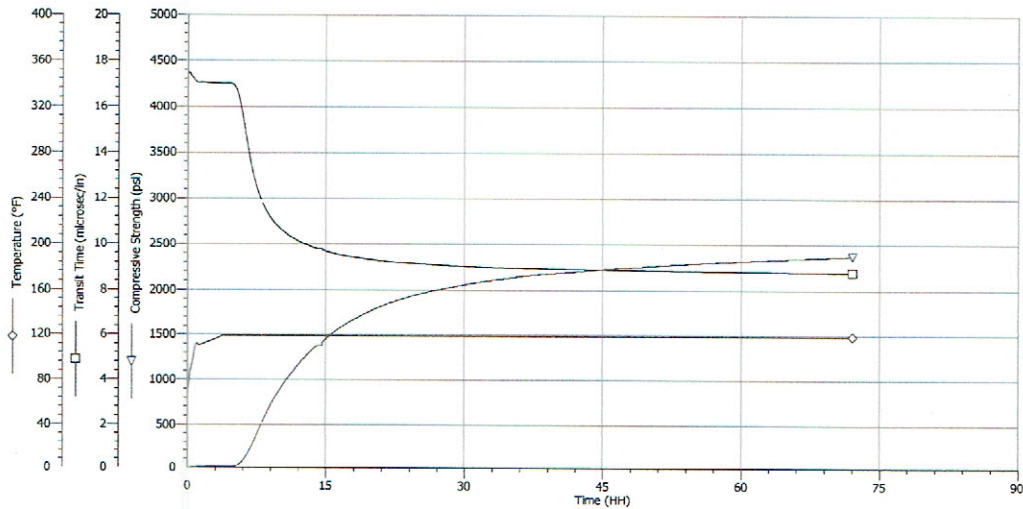


UCA Graph

BHST: 130 BHCT: 110
Density: 14.80
Instrument: UCA-9 S/N 903

Algorithm: Compressive strength type B (more than 14 lb/gal)

50 psi: 5:44:30
500 psi: 8:04:19
24hr: 1920 psi
72hr: 2371 psi

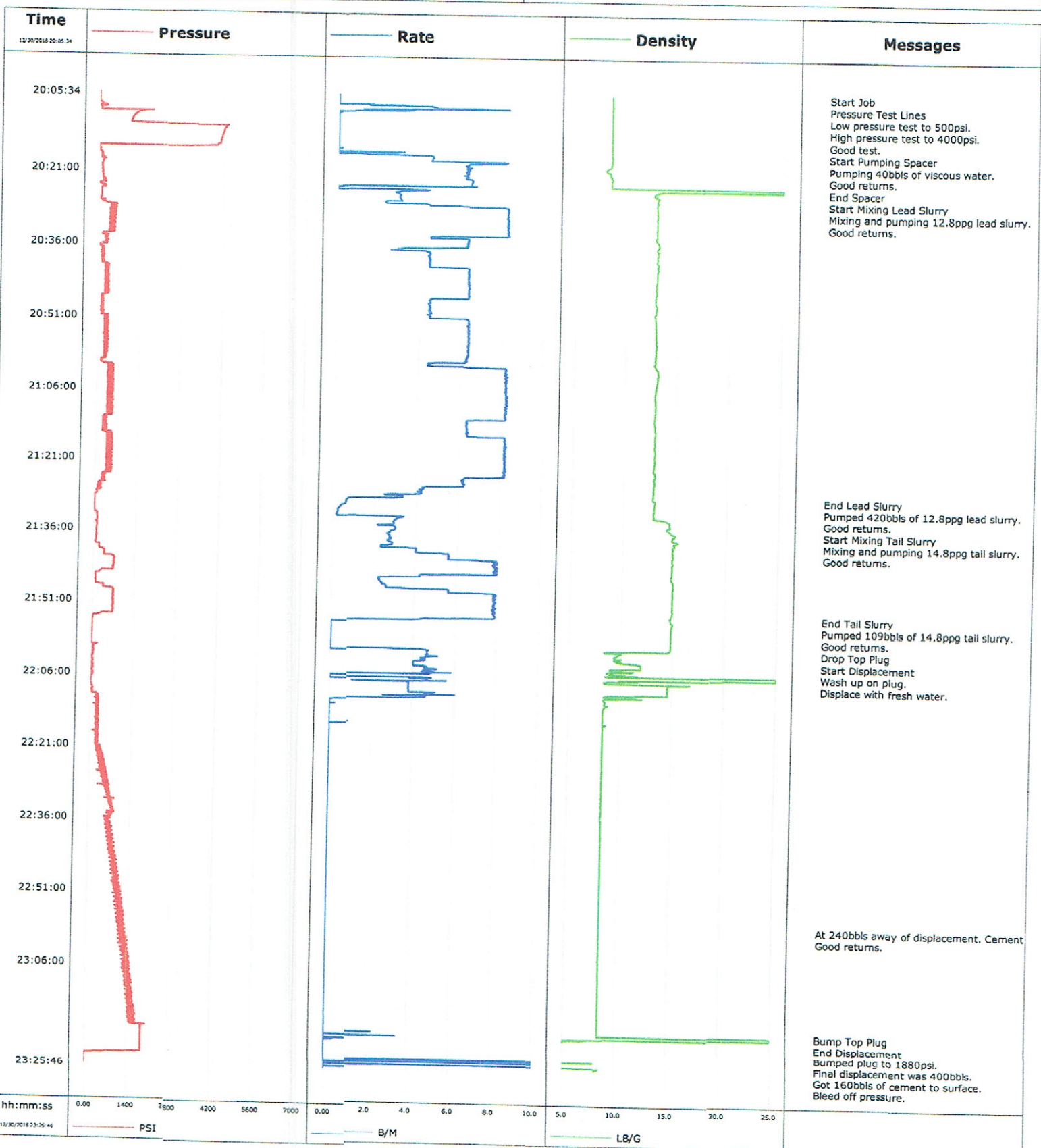


SCHLUMBERGER
Midland, TX District Laboratory

Comments:
Test Performed By: SR

Well North Thistle 15 10-003H
Field Wildcat
Engineer Jeff Patterson
Country United States

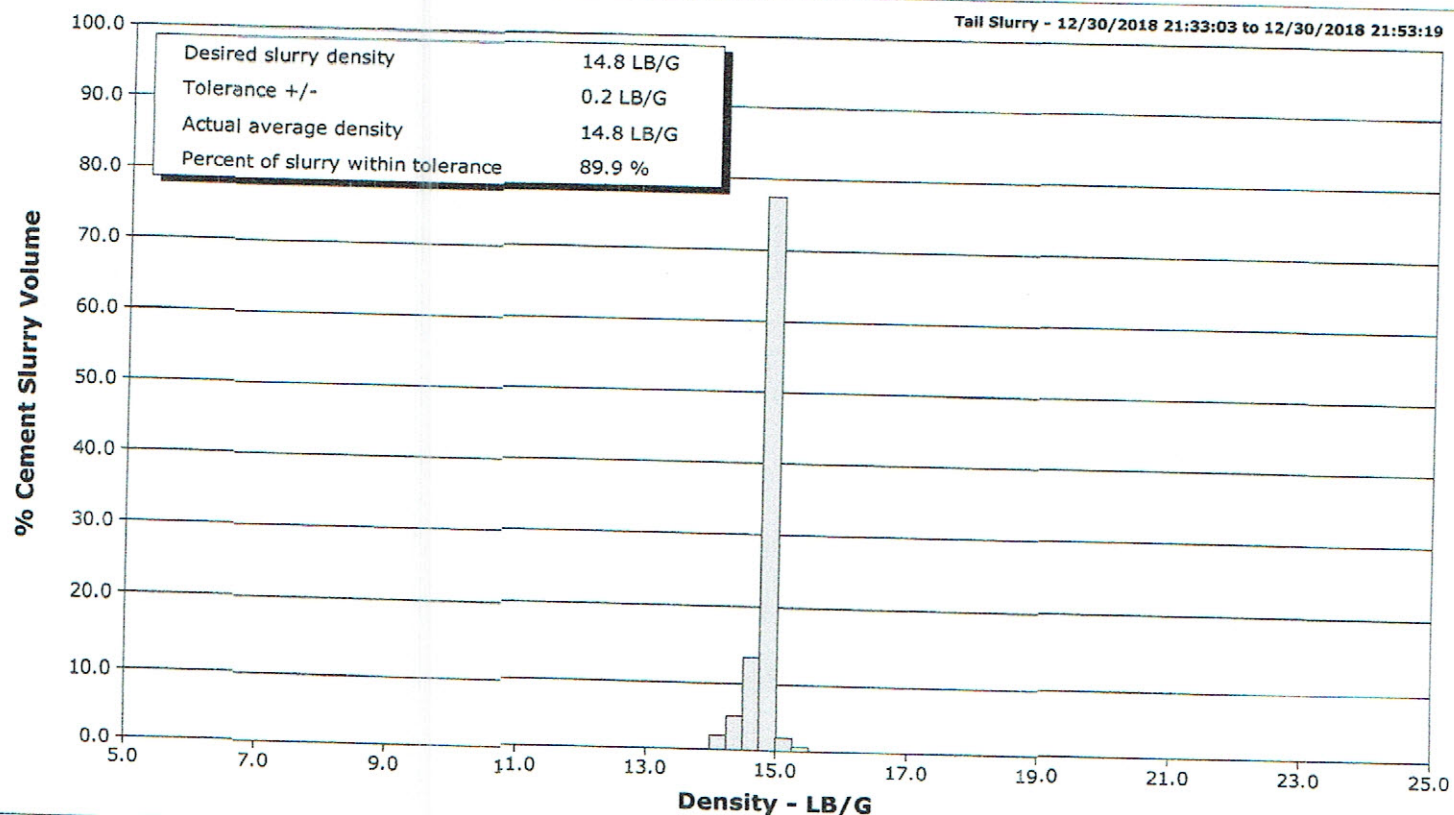
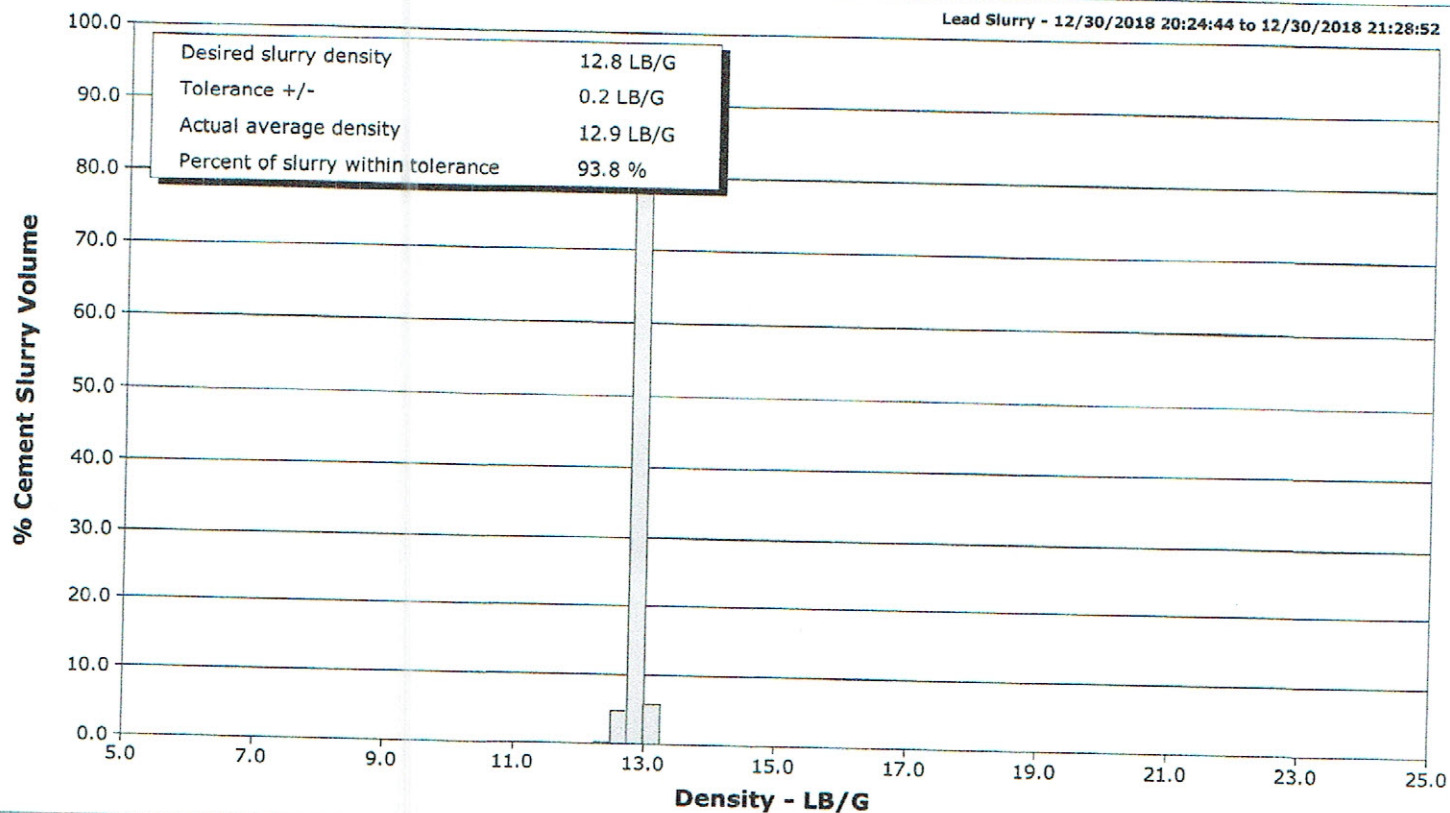
Client Devon
SIR No. 2887437
Job Type Intermediate
Job Date 12-30-2018



Cementing Qa/Qc Density Report

Well North Thistle 15 10-003H
Field Wildcat
Engineer Jeff Patterson
Country United States

Client Devon
SIR No. 2887437
Job Type Intermediate
Job Date 12-30-2018



Cementing Service Report

Customer Devon				Job Number 2887437				
Well North Thistle 15 10-003H 003H		Location (legal)		Schlumberger Location Hobbs		Job Start Dec/30/2018		
Field Wildcat		Formation Name/Type		Deviation 0 deg		Well MD 5370.0 ft		
County Lea		State/Province New Mexico		Bit Size 12.3 in		Well TVD 5370.0 ft		
Well Master 0631803294		API/UWI 30025453940000		BHP psi		BHST 124 degF		
Rig Name Cactus 126		Drilled For Oil & Gas		Service Via Land		BHCT 107 degF		
Offshore Zone		Well Class New		Well Type Development		Pore Press. Gradient lb/gal		
Drilling Fluid Type Clear Brine		Max. Density 10.00 lb/gal		Plastic Viscosity 2.000 cP				
Service Line Cementing		Job Type Intermediate						
Max. Allowed Tub. Press psi		Max. Allowed Ann. Press psi		WH Connection Cement head				
Service Instructions				Casing/Liner				
				Depth, ft	Size, in	Weight, lb/ft	Grade	Thread
				5370.0	9.6	40.0	J-55	BUTT
				0.0	0.0	0.0		
				Tubing/Drill Pipe				
T/D	Depth, ft	Size, in	Weight, lb/ft	Grade	Thread			
				Perforations/Open Hole				
Top, ft		Bottom, ft		shot/ft		No. of Shots		
ft		ft						
ft		ft						
ft		ft						
Total Interval ft								
Diameter in								
Treat Down Casing		Displacement 404.0 bbl		Packer Type		Packer Depth ft		
Tubing Vol. bbl		Casing Vol. 407.0 bbl		Annular Vol. bbl		Openhole Vol. bbl		
Casing/Tubing Secured ☐ 1 Hole Vol. Circulated prior to Cement ☐				Casing Tools				
Lift Pressure psi				Squeeze Job				
Pipe Rotated ☐ Pipe Reciprocated ☐				Shoe Type Guide				
No. Centralizers Top Plugs 1 Bottom Plugs				Shoe Depth 9370.0 ft				
Cement Head Type Single				Tool Type				
Job Scheduled For Dec/30/2018 14:00				Tool Depth ft				
Arrived on Location Dec/30/2018 14:00				Stage Tool Type				
Leave Location Dec/31/2018 01:00				Stage Tool Depth ft				
				Tail Pipe Size in				
				Collar Type Float				
				Tail Pipe Depth ft				
				Collar Depth 5325.0 ft				
				Sqz. Total Vol. bbl				
Date	Time 24-hr clock	Treating Pressure PSI	Flow Rate B/M	Density LB/G	Volume BSL	CPF1_TTL_STAGE BSL	Message	
12/30/2018	20:05:34	-8	0.0	8.36	0.0	0.0	Started Acquisition	
12/30/2018	20:05:38	-8	0.0	8.36	0.0	0.0	Pressure Test Lines	
12/30/2018	20:05:39	-8	0.0	8.36	0.0	0.0	Low pressure test to 500psi.	
12/30/2018	20:05:40	-8	0.0	8.36	0.0	0.0	Good test.	
12/30/2018	20:05:43	-7	0.0	8.36	0.0	0.0	Start Pumping Spacer	
12/30/2018	20:05:46	-8	0.0	8.36	0.0	0.0	Pumping 40bbls of viscous water.	
12/30/2018	20:07:34	-2	1.7	8.39	0.0	0.0		
12/30/2018	20:09:34	1333	0.0	8.36	5.4	5.4		
12/30/2018	20:11:34	1053	0.0	8.36	5.4	5.4		
12/30/2018	20:13:34	4148	0.0	8.36	5.4	5.4		
12/30/2018	20:15:34	4064	0.0	8.36	5.4	5.4		
12/30/2018	20:17:34	13	1.4	8.36	0.3	0.3		
12/30/2018	20:19:34	130	6.3	8.33	10.6	10.6		
12/30/2018	20:21:34	108	6.2	8.28	23.1	23.1		
12/30/2018	20:23:34	185	6.4	8.36	35.8	35.8		
12/30/2018	20:24:00	68	3.7	12.17	38.5	38.5	End Spacer	
12/30/2018	20:24:44	157	4.3	12.99	39.5	0.9	Start Mixing Lead Slurry	
12/30/2018	20:24:46	199	4.3	12.96	39.7	1.0	Mixing and pumping 12.8ppg lead slurry.	
12/30/2018	20:24:47	199	4.3	12.94	39.7	1.1	Good returns.	
12/30/2018	20:25:34	94	2.9	12.55	42.1	3.5		
12/30/2018	20:27:34	150	4.4	12.79	48.1	9.4		

Well			Field		Job Start		Customer		Job Number	
North Thistle 15 10-003H 003H			Wildcat		Dec/30/2018		Devon		2887437	
Date	Time 24-hr clock	Treating Pressure PSI	Flow Rate B/M	Density LB/G	Volume BBL	CPF1_TTL_STAGE BBL	Message			
12/30/2018	20:31:34	363	8.2	12.84	79.4	40.7				
12/30/2018	20:33:34	405	8.2	12.77	95.8	57.1				
12/30/2018	20:35:34	318	6.3	12.98	108.7	70.0				
12/30/2018	20:37:34	131	4.4	12.92	118.3	79.7				
12/30/2018	20:39:34	129	4.4	12.95	127.2	88.6				
12/30/2018	20:41:34	235	6.3	12.89	138.2	99.6				
12/30/2018	20:43:34	283	6.3	12.80	150.9	112.2				
12/30/2018	20:45:34	327	6.4	12.81	163.6	124.9				
12/30/2018	20:47:34	174	4.5	12.76	174.7	136.0				
12/30/2018	20:49:34	150	4.5	12.72	183.6	144.9				
12/30/2018	20:51:34	322	6.3	12.76	193.8	155.2				
12/30/2018	20:53:34	287	6.4	12.81	206.5	167.9				
12/30/2018	20:55:34	225	6.4	12.84	219.3	180.6				
12/30/2018	20:57:34	266	6.3	12.83	231.9	193.3				
12/30/2018	20:59:34	294	6.3	12.80	244.6	205.9				
12/30/2018	21:01:34	557	8.2	13.08	256.7	218.1				
12/30/2018	21:03:34	457	8.2	13.03	273.1	234.4				
12/30/2018	21:05:34	395	8.2	12.87	289.5	250.8				
12/30/2018	21:07:34	490	8.2	12.84	305.9	267.2				
12/30/2018	21:09:34	545	8.2	12.89	322.4	283.7				
12/30/2018	21:11:34	512	8.2	12.82	338.8	300.1				
12/30/2018	21:13:34	288	6.3	12.87	352.8	314.1				
12/30/2018	21:15:34	229	6.4	12.88	365.5	326.8				
12/30/2018	21:17:34	558	8.2	12.84	381.5	342.9				
12/30/2018	21:19:34	536	8.2	12.88	397.9	359.3				
12/30/2018	21:21:34	473	8.2	12.88	414.3	375.6				
12/30/2018	21:23:34	389	8.2	12.94	430.7	392.0				
12/30/2018	21:25:34	225	6.2	12.88	444.6	406.0				
12/30/2018	21:27:34	131	4.2	12.80	454.5	415.8				
12/30/2018	21:28:52	9	0.7	12.93	458.6	420.0	End Lead Slurry			
12/30/2018	21:28:56	8	0.7	12.96	458.7	420.0	Pumped 420bbls of 12.8ppg lead slurry.			
12/30/2018	21:28:57	8	0.7	12.98	458.7	420.0	Good returns.			
12/30/2018	21:29:34	7	0.6	12.97	459.1	420.4				
12/30/2018	21:31:34	3	0.2	12.89	459.9	0.4				
12/30/2018	21:33:03	101	3.1	14.05	461.5	2.1	Start Mixing Tail Slurry			
12/30/2018	21:33:05	101	3.1	14.07	461.6	2.2	Mixing and pumping 14.8ppg tail slurry.			
12/30/2018	21:33:06	101	3.1	14.09	461.7	2.3	Good returns.			
12/30/2018	21:33:34	104	3.0	14.45	463.1	3.7				
12/30/2018	21:35:34	105	3.0	14.59	468.9	9.5				
12/30/2018	21:37:34	101	2.7	15.33	474.4	15.0				
12/30/2018	21:39:34	190	4.0	14.79	480.1	20.7				
12/30/2018	21:41:34	360	5.6	14.80	490.1	30.7				
12/30/2018	21:43:34	702	7.9	14.79	505.2	45.8				
12/30/2018	21:45:34	86	2.2	14.76	517.7	58.3				
12/30/2018	21:47:34	90	2.7	14.84	522.6	63.2				
12/30/2018	21:49:34	698	7.8	14.85	535.6	76.2				
12/30/2018	21:51:34	694	7.9	14.84	551.3	91.9				
12/30/2018	21:53:19	662	7.9	14.62	565.0	105.6	End Tail Slurry			
12/30/2018	21:53:22	681	7.9	14.66	565.4	106.0	Pumped 109bbls of 14.8ppg tail slurry.			
12/30/2018	21:53:34	671	7.8	14.68	567.0	107.5				
12/30/2018	21:54:00	96	3.1	14.70	569.2	109.8	Drop Top Plug			
12/30/2018	21:54:02	49	1.4	14.81	569.3	109.9	Start Displacement			
12/30/2018	21:54:04	34	0.8	14.88	569.4	110.0	Wash up on plug.			
12/30/2018	21:54:05	34	0.4	14.91	569.4	110.0	Displace with fresh water.			

Well North Thistle 15 10-003H 003H			Field Wildcat		Job Start Dec/30/2018		Customer Devon		Job Number 2887437	
Date	Time 24-hr clock	Treating Pressure PSI	Flow Rate B/M	Density LB/G	Volume BBL	CPF1_TTL_STAGE BBL	Message			
12/30/2018	21:57:34	0	0.0	14.77	569.4	110.0				
12/30/2018	21:59:34	-3	0.0	14.77	569.4	110.0				
12/30/2018	22:01:34	49	4.6	9.39	576.4	117.0				
12/30/2018	22:03:34	50	4.6	9.76	585.0	6.8				
12/30/2018	22:05:34	17	0.0	25.00	592.7	14.4				
12/30/2018	22:07:34	-0	3.8	14.52	599.5	21.3				
12/30/2018	22:09:34	32	4.8	10.75	607.6	29.4				
12/30/2018	22:11:34	199	0.0	8.59	621.6	43.4				
12/30/2018	22:13:34	202	0.0	8.37	638.6	60.4				
12/30/2018	22:15:34	262	0.0	8.41	655.6	77.4				
12/30/2018	22:17:34	264	0.0	8.37	672.6	94.4				
12/30/2018	22:19:34	205	0.0	8.37	689.7	111.5				
12/30/2018	22:21:34	251	0.0	8.36	706.7	128.5				
12/30/2018	22:23:34	476	0.0	8.36	723.7	145.5				
12/30/2018	22:25:34	435	0.0	8.36	740.7	162.5				
12/30/2018	22:27:34	459	0.0	8.35	757.7	179.5				
12/30/2018	22:29:34	572	0.0	8.35	774.7	196.5				
12/30/2018	22:31:34	727	0.0	8.35	791.7	213.5				
12/30/2018	22:33:34	776	0.0	8.35	808.7	230.5				
12/30/2018	22:35:34	748	0.0	8.36	824.7	246.5				
12/30/2018	22:37:34	681	0.0	8.36	834.5	256.3				
12/30/2018	22:39:34	848	0.0	8.36	843.7	265.5				
12/30/2018	22:41:34	800	0.0	8.36	852.9	274.7				
12/30/2018	22:43:34	789	0.0	8.36	862.1	283.9				
12/30/2018	22:45:34	988	0.0	8.36	871.4	293.2				
12/30/2018	22:47:34	914	0.0	8.36	880.6	302.4				
12/30/2018	22:49:34	965	0.0	8.35	889.8	311.6				
12/30/2018	22:51:34	993	0.0	8.35	899.1	320.9				
12/30/2018	22:53:34	1050	0.0	8.36	908.3	330.1				
12/30/2018	22:55:34	1153	0.0	8.36	917.5	339.3				
12/30/2018	22:57:22	1176	0.0	8.36	925.9	347.7	At 240bbls away of displacement. Cement to surface.			
12/30/2018	22:57:23	1209	0.0	8.36	925.9	347.7	Good returns.			
12/30/2018	22:57:34	1072	0.0	8.36	926.8	348.6				
12/30/2018	22:59:34	1148	0.0	8.36	936.0	357.8				
12/30/2018	23:01:34	1264	0.0	8.35	945.3	367.1				
12/30/2018	23:03:34	1385	0.0	8.35	954.5	376.3				
12/30/2018	23:05:34	1374	0.0	8.36	963.7	385.5				
12/30/2018	23:07:34	1424	0.0	8.36	973.0	394.8				
12/30/2018	23:09:34	1500	0.0	8.36	982.2	404.0				
12/30/2018	23:11:34	1588	0.0	8.36	991.4	413.2				
12/30/2018	23:13:34	1494	0.0	8.36	1000.7	422.5				
12/30/2018	23:15:34	1578	0.0	8.36	1009.9	431.7				
12/30/2018	23:17:34	1496	0.0	8.37	1019.1	440.9				
12/30/2018	23:18:07	1878	0.0	8.37	1020.1	441.9	Bump Top Plug			
12/30/2018	23:18:09	1896	0.0	8.37	1020.1	441.9	End Displacement			
12/30/2018	23:18:11	1897	0.0	8.37	1020.1	441.9	Bumped plug to 1880psi.			
12/30/2018	23:18:12	1897	2.3	8.37	1020.1	441.9	Check floats.			
12/30/2018	23:19:34	1884	0.0	0.01	1020.1	441.9				
12/30/2018	23:21:34	1889	0.0	0.00	1020.1	441.9				
12/30/2018	23:23:34	88	0.0	0.00	1020.1	441.9				
12/30/2018	23:25:34	-12	0.0	8.35	1020.1	441.9				
12/30/2018	23:25:37	-11	0.0	8.34	1020.1	441.9	End Job			
12/30/2018	23:25:40	-11	0.0	8.36	1020.1	441.9	Rig down.			

Well North Thistle 15 10-003H 003H	Field Wildcat	Job Start Dec/30/2018	Customer Devon	Job Number 2887437
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Post Job Summary

Average Pump Rates, bbl/min					Volume of Fluid Injected, bbl			
Slurry 5.9	N2	Mud	Maximum Rate 8.6	Total Slurry 1025.8	Mud 0.0	Spacer 44.2	N2	
Treating Pressure Summary, psi					Breakdown Fluid			
Maximum 4321	Final 1880	Average 623	Bump Plug to 1880	Breakdown	Type FreshWater	Volume 5.0 bbl	Density 8.34 lb/gal	
Avg. N2 Percent %	Designed Slurry Volume 520.0 bbl	Displacement 450.9 bbl	Mix Water Temp 40 degF	Cement Circulated to Surface? ☒	Volume 164.0 bbl			
				Washed Thru Perfs ☐	To ft			
Customer or Authorized Representative Bryon Latham			Schlumberger Supervisor Jeff Patterson		Circulation Lost ☐	Job Completed ☒		

Laboratory Cement Test Report

MIX-448-Devon-C126-North Thistle 15 10 State Com 3H-Prod-FB Lead

Service Order Number: 2893443

LAR Name : MIX - 448	Client : Devon	Location : Midland	Signatures Report created by: James Barron Design input by: Danielle Willier	
Date : Jan-13-2019	Well Name : North Thistle 15 10 State Com 3H	Rig : C126		
String : Production				
Job Type : Primary	MD : 20,109.00 ft	TVD : 9,718.50 ft		
BHST : 159.00 °F	BHCT : 159.00 °F	BHP : 5,750.00 psi		
Starting Temp : 80.00 °F	Time To Temp : 00:40 hr:mn	Heating Rate : 1.97 °F/min		
Starting Pressure : 640.00 psi	Time To Pressure : 00:40 hr:mn			

Composition

Slurry Density	: 10.80 lb/gal	Yield	: 2.94 ft³/sk	Mix Fluid	: 18.283 gal/sk
Solid Vol. Fraction	: 16.63 %	Slurry Type	: Lead	Mix Water	: 18.263 gal/sk
Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D049	100.00 % BWOB	Blend sack: 75 lb	Cement	176.05 lb/ft³	FB 7393
D154	3.00 % BWOB		Extender		B25U11-4
D238	0.20 % BWOB		Fluid loss		31411
D047	0.020 gal/sk VBWOB		Anti Foam		D00918L96
D013	0.80 % BWOB		Retarder		121-15
D208	0.20 % BWOB		Viscosifier		8J3870W
D020	10.00 % BWOB		Extender		Bulk
Tap Water	18.263 gal/sk		Base Fluid		Tap

Rheology

S/N: 383				S/N: 383			
Surface (Configuration: R1B1 F1.0)				Downhole (Configuration: R1B1 F1.0)			
Temperature	71 °F			Temperature	159 °F		
(rpm)	Up (deg)	Down (deg)	Average (deg)	(rpm)	Up (deg)	Down (deg)	Average (deg)
300	40	40	40	300	50	50	50
200	33	33	33	200	44	48	46
100	26	24	25	100	33	28	30.5
60	22	20	21	60	27	24	25.5
30	18	13	15.5	30	20	20	20
6	13	11	12	6	12	13	12.5
3	11	10	10.5	3	10	11	10.5
10 sec Gel	10 deg - 10.64 lbf/100ft²			10 sec Gel	12 deg - 12.77 lbf/100ft²		
10 min Gel	24 deg - 25.55 lbf/100ft²			10 min Gel	26 deg - 27.68 lbf/100ft²		
Rheo. computed	PV: 28.9 cP, Ty: 12.79 lbf/100ft²			Rheo. computed	PV: 40 cP, Ty: 14.52 lbf/100ft²		
Conditioned at 159.00 °F and atmospheric pressure for 30 mins after reaching temperature							

Thickening Time S/N: 241

Set Conditions - Thick Gelled

Consistency	Time	Temp
GNG:	On: 1:42 hr:mn	Off: 00:10 hr:mn
POD Time	06:45 hr:mn	159 °F
30 Bc	06:56 hr:mn	159 °F
50 Bc	07:04 hr:mn	159 °F
70 Bc	07:20 hr:mn	159 °F

Free Fluid

(0%) 0 / 250mL in 2 hrs
At 159 °F and 0 deg inclination
Conditioned at 159.00 °F and atm psi for 30 mins after reaching temperature
Sedimentation: None
Tube Dimensions:
250mL: 35 mm X 245 mm

Fluid Loss S/N: 05-034

API/Calculated Fluid Loss	273 mL
Collected	66 mL filtrate in 7 min at 160 degF and 1000 psi
Filter Cake Thickness:	0.6 "
Filter Cake Consistency:	Crumbly
Non-Stirred Fluid Loss Apparatus	
Thermocouple Located in Cell Wall	

UCA Compressive Strength S/N: 944-R

Time	CS	Temp
15:24 hr:mn	50 psi	150 degF
24:00 hr:mn	246 psi	150 degF
72:00 hr:mn	476 psi	150 degF

Mud Balance S/N: 860210

Slurry Density Verified by Pressurized Fluid Balance: 10.80 lb/gal

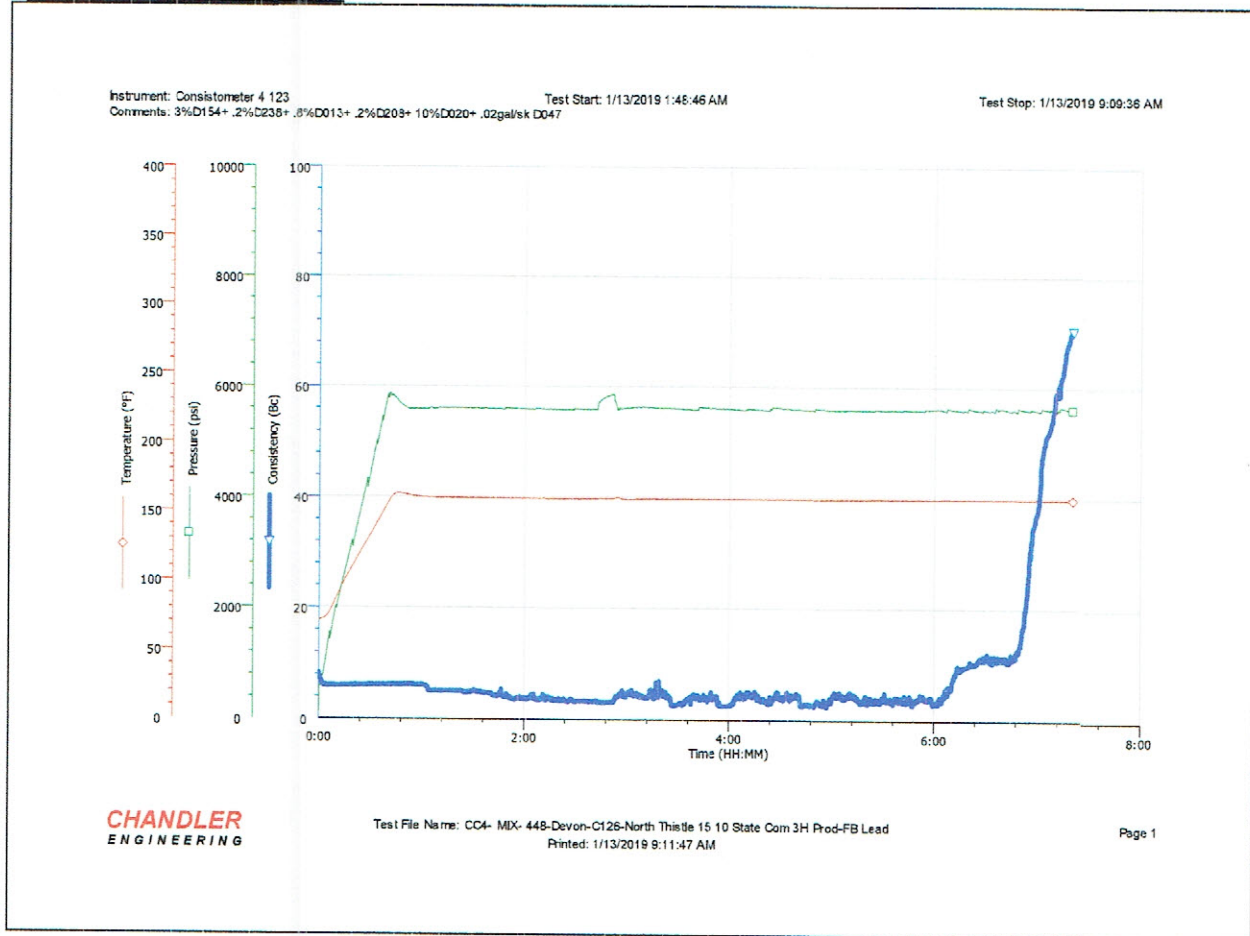
Comments

All slurries prepared and tested in accordance with API RB10B-2 unless otherwise noted

Time to Add Solids : 00:14 mn:sc

Vortex Quality: good/visible

Thickening Time Graph

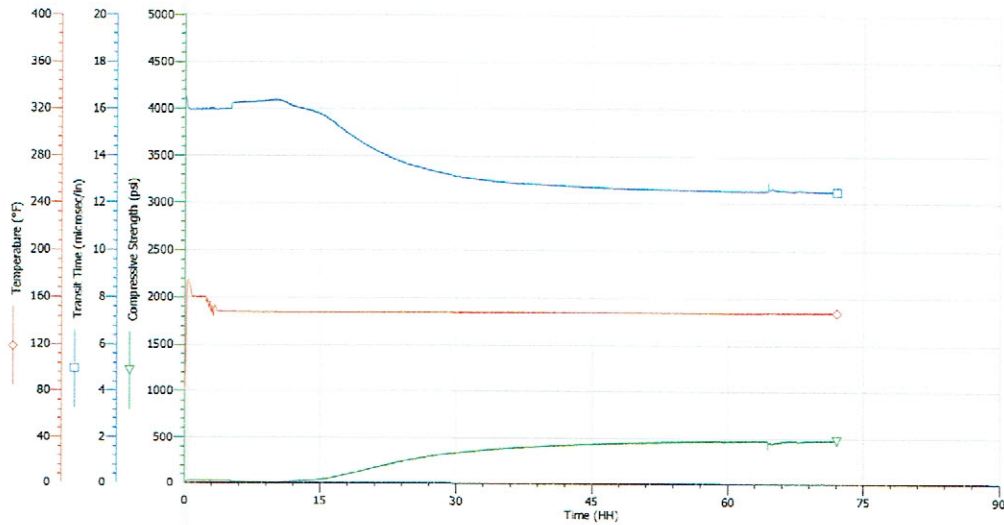


UCA Graph

BHST: 160 BHCT: 160
Density: 10.80
Instrument: UCA 00 S/N 944

Algorithm: Compressive strength type A (less than 14 lb/gal)

50 psi @ 15:24:30
600 psi @ N/A
24hr: 246 psi
72hr: 476 psi



SCHLUMBERGER
Midland, TX District Laboratory

James
Baron
James Baron
Thompson/Wellbore Services
2013-01-13 11:21:08

Laboratory Cement Test Report **MIX-448-Devon-C126-North Thistle 15 10 State Com 3H Prod-FB Tail** **Service Order Number: 2893443**

LAR Name : MIX - 448	Client : Devon	Location : Midland	Signatures
Date : Jan-12-2019	Well Name : North Thistle 15 10 State Com 3H	Rig : C126	Report created by: James Barron
String : Production			Design input by: Danielle Willier
Job Type : Primary	MD : 20,109.00 ft	TVD : 9,718.50 ft	
BHST : 159.00 °F	BHCT : 159.00 °F	BHP : 5,750.00 psi	
Starting Temp : 80.00 °F	Time To Temp : 00:40 hr:mn	Heating Rate : 1.97 °F/min	
Starting Pressure : 640.00 psi	Time To Pressure : 00:40 hr:mn		

Composition

Slurry Density	: 13.20 lb/gal	Yield	: 1.54 ft³/sk	Mix Fluid	: 7.759 gal/sk
Solid Vol. Fraction	: 32.23 %	Slurry Type	: Tail	Mix Water	: 7.739 gal/sk
Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D909	50.00 % BVOB	Blend sack: 84 lb	Cement	176.05 lb/ft³	FB 7382
D035	50.00 % BVOB		Extender		FB 7382
D020	3.00 % BWOB		Extender		Bulk
D238	0.35 % BWOB		Fluid loss		31411
D208	0.10 % BWOB		Viscosifier		8J3870W
D079	0.25 % BWOB		Extender		U02718
D013	0.20 % BWOB		Retarder		121-15
D047	0.020 gal/sk VBWOB		Anti Foam		D00918L96
D065	0.10 % BWOB		Dispersant		05052018
Tap Water	7.739 gal/sk		Base Fluid		Tap

Rheology

S/N: 383				S/N: 383			
Surface (Configuration: R1B1 F1.0)				Downhole (Configuration: R1B1 F1.0)			
Temperature	70 °F			Temperature	159 °F		
(rpm)	Up (deg)	Down (deg)	Average (deg)	(rpm)	Up (deg)	Down (deg)	Average (deg)
300	120	120	120	300	112	112	112
200	98	97	97.5	200	92	90	91
100	70	69	69.5	100	66	63	64.5
60	56	55	55.5	60	53	50	51.5
30	43	42	42.5	30	39	40	39.5
6	27	26	26.5	6	25	26	25.5
3	22	23	22.5	3	22	23	22.5
10 sec Gel	29 deg - 30.87 lbf/100ft²			10 sec Gel	30 deg - 31.93 lbf/100ft²		
10 min Gel	58 deg - 61.74 lbf/100ft²			10 min Gel	55 deg - 58.54 lbf/100ft²		
Rheo. computed	PV: 95.7 cP, Ty: 30.06 lbf/100ft²			Rheo. computed	PV: 88.6 cP, Ty: 28.51 lbf/100ft²		
Conditioned at 159.00 °F and atmospheric pressure for 30 mins after reaching temperature							

Thickening Time S/N: 757

Set Conditions - Thick Gelled

Consistency	Time	Temp
POD Time	05:07 hr:mn	159 °F
30 Bc	05:10 hr:mn	159 °F
50 Bc	05:50 hr:mn	159 °F
70 Bc	06:15 hr:mn	159 °F

Free Fluid

(0%) 0 / 250mL in 2 hrs
At 159 °F and 45 deg inclination
Conditioned at 159.00 °F and atm psi for 30 mins after reaching temperature
Sedimentation: None
Tube Dimensions: 250mL: 35 mm X 245 mm

Fluid Loss S/N: 142

API/Calculated Fluid Loss 70 mL
Collected 35 mL filtrate in 30 min at 160 degF and 1000 psi
Filter Cake Thickness: 0.8 in
Filter Cake Consistency: Hard
Non-Stirred Fluid Loss Apparatus
Thermocouple Located in Cell Wall

UCA Compressive Strength S/N: 903-L

Time	CS	Temp
10:25 hr:mn	50 psi	150 degF
21:10 hr:mn	500 psi	150 degF
24:00 hr:mn	679 psi	150 degF
72:00 hr:mn	1820 psi	150 degF

Mud Balance S/N: 860210

Slurry Density Verified by Pressurized Fluid Balance: 13.20 lb/gal
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Comments

All slurries prepared and tested in accordance with API RB10B-2 unless otherwise noted

Time to Add Solids : 00:10 mn:sc

Vortex Quality: good/visible

Testing Approved By: M. Courtney, SC

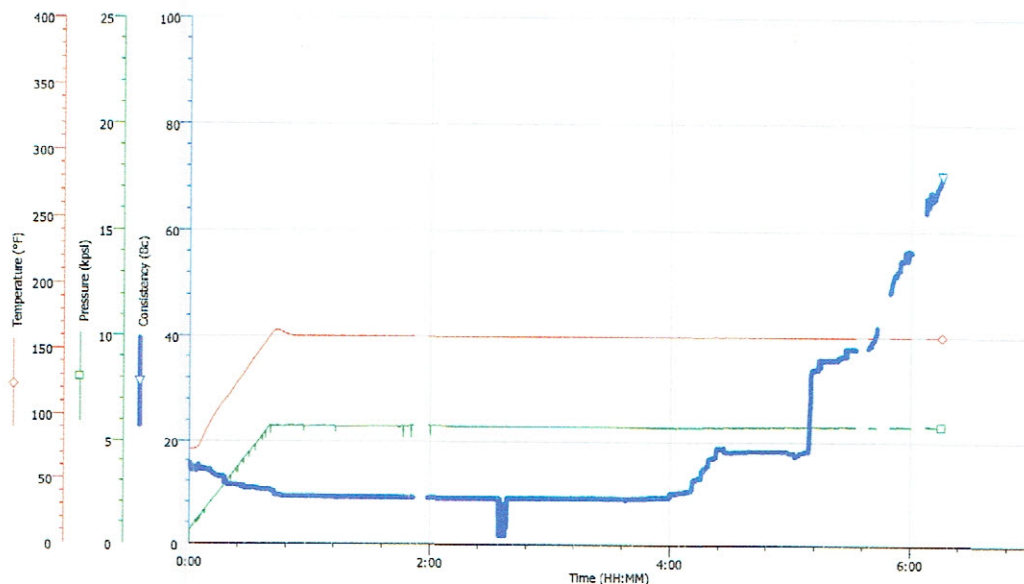
Thickening Time Graph

Instrument: Consistometer 1 757

Test Start: 1/12/2019 7:11:25 AM

Test Stop: 1/12/2019 1:27:09 PM

Comments: 3%D020+ .35%D238+ .1%D208+ .25%D079+ .2%D013+ .1%D013+ .02gal/skD047

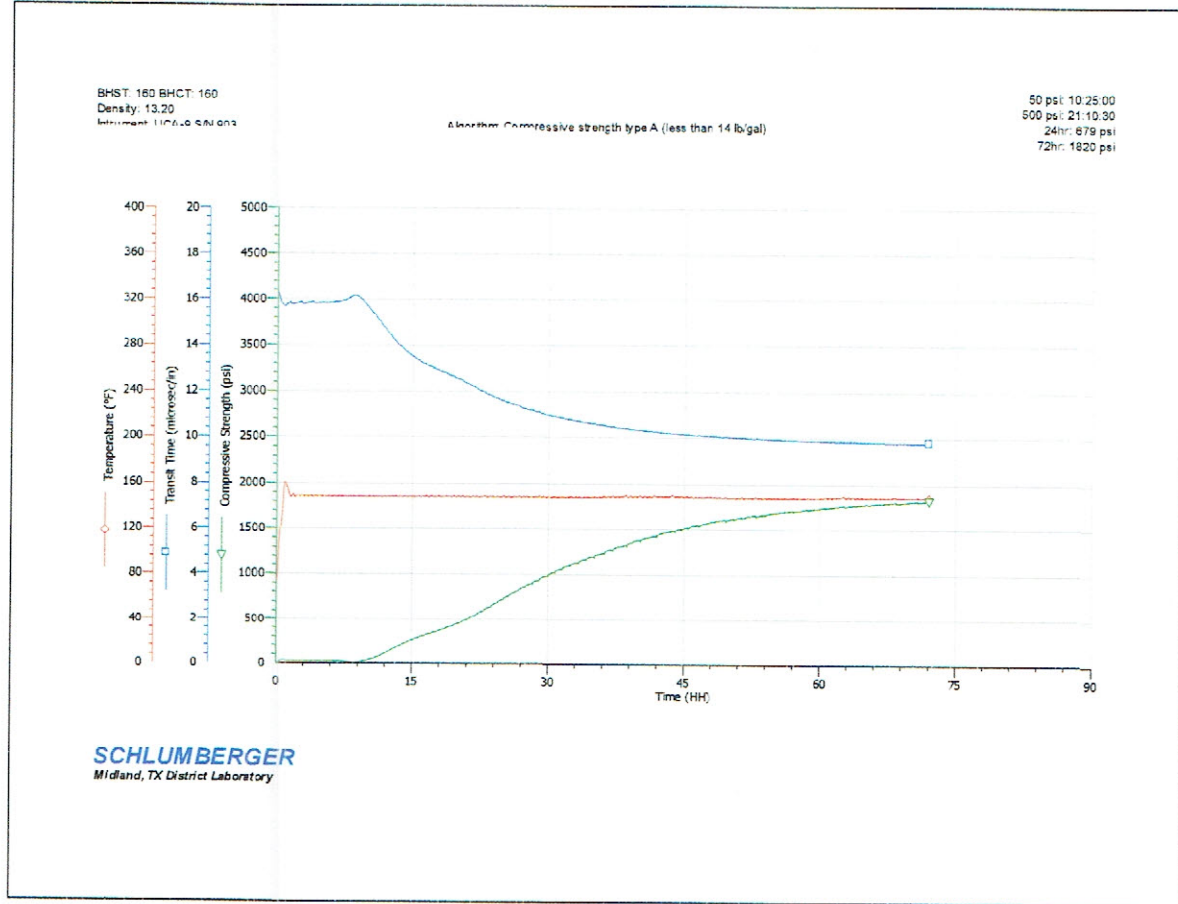


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ENGINEERING

Test File Name: CC1- MDX - 448-Devon-C126-North Thistle 15 10 State Corn 3H Prod-FB Ts11
Printed: 1/12/2019 3:52:52 PM

Page 1

UCA Graph



C. Okam Chidubem Okam
I have reviewed this
document
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