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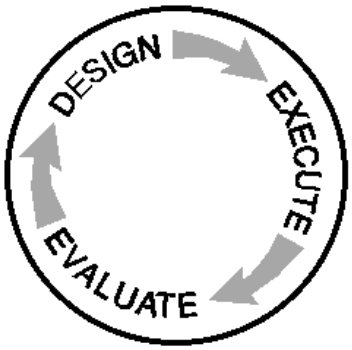
CemCADE* well cementing recommendation for Plug from 8,000 – 6,100ft

Operator	**: Northeast Natural Energy**	**Well**	**: MIP Unit 3H**
Country	: USA	Field	: Marcellus Field
State	: WV		

Prepared for	**: Mr. Jay Hewitt**	**Location**	**: Lat: 39.6018 Long: -79.9761**
Proposal No.	: V1	Service Point	: Weston, WV
Date Prepared	: 09-02-15	Business Phone	: (304) 269-1939
		FAX No.	:

Prepared by : Aan Austin
Phone : (469) 271-9517
E-Mail Address : asurati@slb.com



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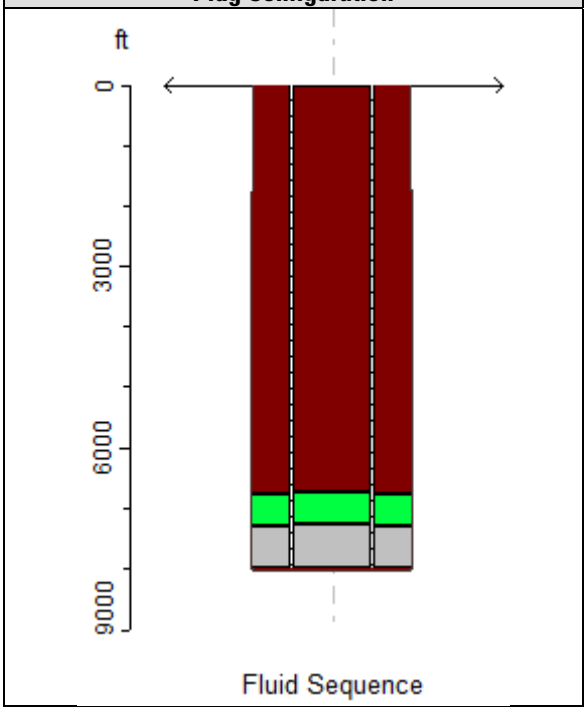
CemCADE* plug cementing recommendation for Plug #1

Operator	**: Northeast Natural Energy**	**Prepared for**	**: Mr. Jay Hewitt**
Prepared by	: Aan Austin	Date Prepared	: 09-02-15
Phone	: (469) 271-9517		
E-Mail	: asurati@slb.com		

Plug Configuration



Drill Pipe

MD (ft)	OD (in)	Weight (lb/ft)
8000.0	5	19.5

Other

Total pumping time:	01:10 hr:mn
Displacement volume:	118.8 bbl

SPACER	**MUDPUSH EXPRESS**
Density:	14.00 lb/gal
Volume:	39.7 bbl
Length (without Drill Pipe):	499.7 ft
Length (with Drill pipe):	544.5 ft

SLURRY	**17.5ppg Class H**
Density:	17.50 lb/gal
Volume:	51.6 bbl
Length (without Drill Pipe):	650.0 ft
Length (with Drill pipe):	698.5 ft

Wet Phase Content

Fresh water	Base Fluid	3.396 gal/sk
D080	Dispersant	0.030 gal/sk blend
D801	Retarder	0.030 gal/sk blend

Dry Phase Content

Blend:	D909	**Yield:**	0.94 ft3/sk

Fluids Placement

Name	**Volume** (bbl)	**Rate** (bbl/min)
MUDPUSH EXPRESS	30.0	3.0
17.5ppg Class H	51.6	3.0
MUDPUSH EXPRESS	9.7	3.0
WBM	118.8	3.0

Underdisplacement volume: 1 bbl

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CemCADE* plug cementing recommendation for Plug #2

Operator : **Northeast Natural Energy**
Prepared by : Aan Austin
Phone : (469) 271-9517
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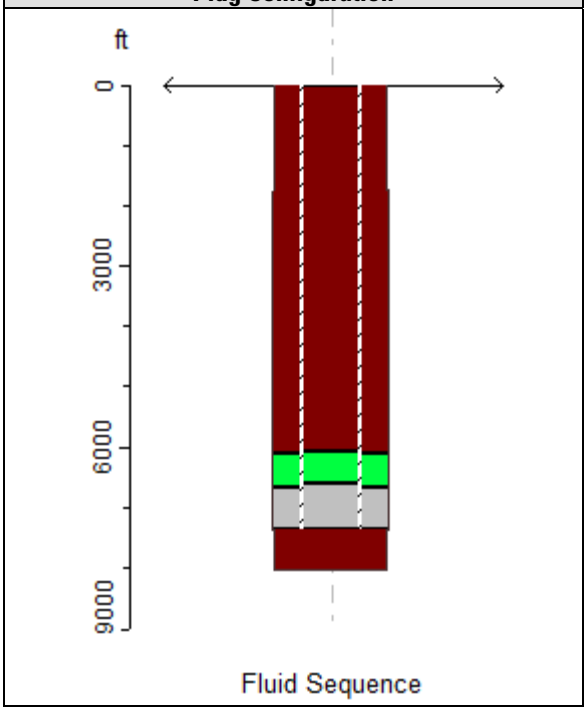
Prepared for : **Mr. Jay Hewitt**
Date Prepared : 09-02-2015

Plug Configuration



Fluids Placement

Name	Volume (bbl)	Rate (bbl/min)
MUDPUSH EXPRESS	30.0	3.0
17.5ppg Class H	51.6	3.0
MUDPUSH EXPRESS	9.7	3.0
WBM	107.3	3.0

Drill Pipe

MD (ft)	OD (in)	Weight (lb/ft)
7320.0	5	19.5

Other

Total pumping time:	01:06 hr:mn
Displacement volume:	107.3 bbl

SPACER — MUDPUSH EXPRESS

Density:	13.50 lb/gal
Volume:	39.7 bbl
Length (without Drill Pipe):	499.7 ft
Length (with Drill pipe):	544.5 ft

SLURRY — 17.5ppg Class H

Density:	17.50 lb/gal
Volume:	51.6 bbl
Length (without Drill Pipe):	650.0 ft
Length (with Drill pipe):	698.5 ft

Wet Phase Content

Fresh water	Base Fluid	3.381 gal/sk
D080	Dispersant	0.060 gal/sk blend
D801	Retarder	0.020 gal/sk blend

Dry Phase Content

Blend: D909 **Yield:** 0.94 ft3/sk

Underdisplacement Volume: 1 bbl

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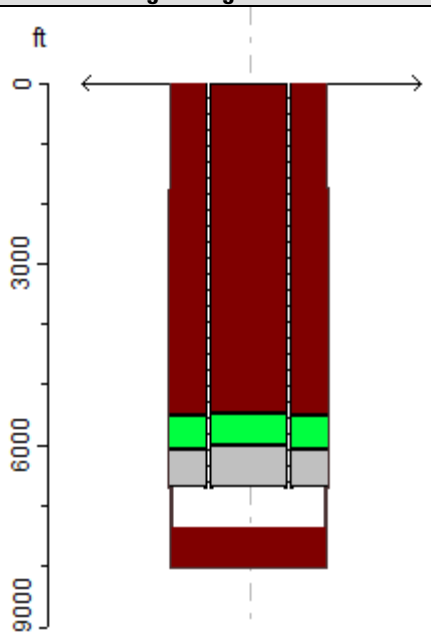
CemCADE* plug cementing recommendation for Plug #3

Operator	**: Northeast Natural Energy**	**Prepared for**	**: Mr. Jay Hewitt**
Prepared by	: Aan Austin	Date Prepared	: 09-02-2015
Phone	: (469) 271-9517		
E-Mail	: asurati@slb.com		

Plug Configuration



Fluid Sequence

Drill Pipe

MD (ft)	OD (in)	Weight (lb/ft)
6640.0	5	19.5

Other

Total pumping time:	01:01 hr:mn
Displacement volume:	96.7 bbl
Target K.O.P.:	6,300 ft

SPACER	**MUDPUSH EXPRESS**
Density:	14.00 lb/gal
Volume:	39.7 bbl
Length (without Drill Pipe):	500.3 ft
Length (with Drill pipe):	544.5 ft

SLURRY	**17.5ppg Class H**
Density:	17.50 lb/gal
Volume:	47.6 bbl
Length (without Drill Pipe):	600.0 ft
Length (with Drill pipe):	644.1 ft

Wet Phase Content

Fresh water	Base Fluid	3.396 gal/sk
D080	Dispersant	0.030 gal/sk blend
D801	Retarder	0.030 gal/sk blend

Dry Phase Content

Blend:	D909	**Yield:**	0.94 ft3/sk

Fluids Placement

Name	**Volume** (bbl)	**Rate** (bbl/min)
MUDPUSH EXPRESS	30.0	3.0
17.5ppg Class H	47.6	3.0
MUDPUSH EXPRESS	9.7	3.0
WBM	96.7	3.0

Underdisplacement Volume: 1 bbl

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Section 1: Job Procedure

All volumes are based on 10% Excess in the 8 ¾" Open Hole.

Plug #1:

1. RIH with combination of 5", 19.5 ppf drill pipe down to 8,000 ft. Any changes on the string configuration will have dramatic effects on the results, re-do calculations with Company Man with the actual tubing tally.
2. Circulate the well minimum 2 B/U. Monitor returns and ensure density and rheology in is similar to that coming out of the well.
3. Hold pre job safety meeting.
4. Pump 5 bbl of fresh water to flush the lines.
5. Pressure test treating lines to 2000 psi, then bleed of pressure.
6. Mix and pump 30 bbls of MUDPUSH Express @ 14 ppg at 3 bpm
7. Followed by pumping 52 bbl of Class H Slurry @ 17.5 ppg at 3 bpm.
8. Drop wiper ball
9. Pump 10.0 bbl of MUDPUSH Express behind @ 3 bpm.
10. Continue displacement with 118 bbl of WBM @ 3 bpm, taking into account 1 bbl of under-displacement
11. Open the return valve on the unit to allow the plug to balance itself while monitoring returns.
12. Pull out slowly (< 30ft/min) to 30 ft (1 joint) above the planned top of cement (7,320 ft)
13. Observe for dry pull – vacuum while pulling up the pipe.
14. Circulate, check the return for spacer and wash volume, estimate the TOC from the returns.
15. Ready to pump the second plug

Plug #2:

1. Pump 5 bbl of fresh water to flush the lines.
2. Mix and pump 30 bbls of MUDPUSH Express @ 14 ppg at 3 bpm
3. Follow by pumping 52 bbl of Slurry @ 17.5 ppg at 3 bpm.
4. Drop wiper ball
5. Pump 10.0 bbl of MUDPUSH Express behind @ 3 bpm.
6. Continue displacement with 106 bbl of WBM @ 3 bpm, taking into account 1 bbl of under-displacement
7. Open the return valve on the unit to allow the plug to balance itself while monitoring returns.
8. Pull Out slowly (< 30ft/min) up to at least 30 ft (1 joint) above the planned top of cement (6,640 ft)
9. Observe for dry pull – vacuum while pulling up the pipe.
10. Circulate, check the return for spacer and wash volume, estimate the TOC from the returns.
11. Ready to pump the third plug

Plug #3:

1. Pump 5 bbl of fresh water to flush the lines.
2. Mix and pump 30 bbls of MUDPUSH Express @ 14 ppg at 3 bpm
3. Follow by pumping 48 bbl of Slurry @ 17.5 ppg at 3 bpm.
4. Drop wiper ball
5. Pump 10.0 bbl of MUDPUSH Express behind @ 3 bpm.
6. Continue displacement with 96 bbl of WBM @ 3 bpm, taking into account 1 bbl of under-displacement
7. Open the return valve on the unit to allow the plug to balance itself while monitoring returns.

8. Pull Out slowly (< 30ft/min) up to at least **270 ft** (3 stands) above the planned top of cement (**5,770ft**)
9. Observe for dry pull – vacuum while pulling up the pipe.
10. Circulate with SBM, check the return for spacer and wash volume, estimate the TOC from the returns.
11. Wait on Cement and skid to the 5H