

Well: State 8-60 16-2H
Zone of Interest: Niobrara Shale

1.0) Summary of Operations

Drill 12-1/4" surface hole to section TD at 1100'.
 Set 9-5/8" 40# J-55 casing and cement with Lead and Tail cement (see details below). Cement will be circulated to surface.
 Install 11" x 5,000 psi BOP and test as required
 Drill 8-3/4" hole to KOP.
 Kick off and drill 8-3/4" curve at 10 deg/100' to end of build.
 Drill 7-7/8" open hole to well TD
 Acquire shuttle logs: Triple combo and image logs in open hole
 Set 4-1/2" x 5-1/2" casing and cement as shown below.
 Suspend well and move drilling rig out in preparation for well completion

2.0 CASING AND CEMENTING PROGRAM

The proposed casing program will be as follows:

Purpose	Interval		Hole Size	Casing Size	Weight	Grade	Thread	Condition
	From	To	(")	(")	Lbs/Ft			
Surface	0	1100	12 1/4	9 5/8	40	J-55	LTC	New
Production	0	5756	8 3/4	5 1/2	17	P-110	LTC	New
	5756	10495	8 3/4	4 1/2	11.6	P-110	LTC	New

Casing design subject to revision based on geologic conditions encountered.

Casing Safety Factors:

Interval	Casing	Burst	Collapse	Axial
Surface	9 5/8	2.03	2.03	4.78
Production	4 1/2	1.32	2.26	1.63

Centralizer Program

Casing			
	9 5/8		4 1/2
# of Bow-type spring centralizer	9		27

Cement Program

Surface Casing	Slurry Volume			Weight (PPG)	Yield (cuft/sk)	Mix H2O (GPS)	TOC
	% Excess	(BBLs)	(Sacks)				
Lead Slurry	100%	92	175	11.50	2.95	17.88	0
Tail Slurry	100%	36	177	15.80	1.15	4.96	825

	Lead	Tail
Surface Casing with TOC at surface	Rockies LT 0.2 % Versaset (Additive Material) 0.2 % D-AIR 3000 (Additive Material) 0.125 lbm/sk Poly-E-Flake (Additive Material) 0.25 lbm/sk Kwik Seal (Additive Material)	Premium Cement, 94 lbm/sk Premium Cement (Cement) 1 % Calcium Chloride, Pellet (Accelerator) 0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

Cement must be circulated to surface

Production Casing Cement	Slurry Volume			Weight (PPG)	Yield (cuft/sk)	Mix H2O (GPS)	TOC
	% Excess	(BBLs)	(Sacks)				
Lead Slurry	30%	169	432	12.00	2.20	12.30	2361'
Tail Slurry	30%	297	1143	14.60	1.46	6.10	

	Lead	Tail
Production Casing Cement	Poz Type I-II 50/50 1 % Bentonite (Light Weight Additive) 3 lbm/sk Silicalite Compacted (Additive Material) 3 % Microbond HT (Additive Material) 0.2 % Halad(R)-322 (Low Fluid Loss Control) 0.4 % Halad(R)-344 (Low Fluid Loss Control) 0.3 % HR-5 (Retarder)	50/50 Poz Premium 2 % Bentonite (Light Weight Additive) 5 lbm/sk Silicalite Compacted (Light Weight Additive) 0.5 % Versaset (Thixotropic Additive) 0.5 % Econolite (Cement Material) 0.6 % HR-7 (Retarder) 0.5 % D-AIR 3000 (Defoamer) 0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive) 0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

The cement must achieve a compressive strength of at least 500 psi at the shoe prior to casing test and drilling out the shoe track. WOC time shall be recorded in the driller's log.

MUD PROGRAM

<u>Purpose</u>	<u>Interval</u>		<u>Hole Size</u>	<u>Mud Type</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>pH</u>
	<u>From</u>	<u>To</u>	(")	(")	<u>Lbs/Ft</u>			
Surface	0'	1100'	12 1/4	WBM	8.4 – 8.8	28 – 32	N/C	9
Production	1100'	6657'	8 3/4	WBM	8.5 – 9.5	35 – 46	4 – 6	9
	6657'	10495'	7 7/8	WBM	9.0 - 10.0	36 – 46	4 – 6	9

WBM = Water Based Mud