

**DRILLING PLAN  
WEXPRO COMPANY  
BW MUSSER 49  
MOFFAT COUNTY, COLORADO**

1. SURFACE FORMATION, ESTIMATED TOPS AND WATER, OIL, GAS OR MINERAL BEARING FORMATIONS:

	<b>MD</b>	<b>TVD</b>
<b>Wasatch</b>	<b>Surface</b>	<b>Surface</b>
A-4-G SD	4,565'	4,481', gas - Secondary Objective
A-4-H SD	5,190'	5,093', gas - Secondary Objective
<b>Fort Union</b>	<b>5,433'</b>	<b>5,334'</b>
Allen 8 - A	6,236'	6,133'
Allen 8 - B	6,267'	6,164', gas, - Major Objective
Allen 8 - E	6,431'	6,328'
Allen 8 - F	6,545'	6,442', gas, - Major Objective
Allen 8 - G	6,593'	6,490'
Allen 8 - H	6,663'	6,560'
Allen 9 - A	6,817'	6,714', gas, - Secondary Objective
Allen 9 - B	6,865'	6,762', gas, - Secondary Objective
Allen 9 - C	6,958'	6,855'
Allen 11	7,088'	6,985'
L. F. U. 4600	7,742'	7,639'
Allen 10 - B	8,061'	7,958'
Allen 10 - C	8,109'	8,006'
Allen 6 - A	8,252'	8,149'
Allen 6 - G	8,730'	8,627', gas, - Major Objective
Allen 6 - H	8,804'	8,701', gas, - Major Objective
Allen 6 - K	8,956'	8,853', gas, - Major Objective
<b>Total Depth</b>	<b>9,306'</b>	<b>9,203'</b>

All fresh water and prospectively valuable minerals encountered during drilling will be recorded by depth and adequately protected.

2. **PRESSURE CONTROL EQUIPMENT:** (see attached diagram) Operator's minimum specifications for pressure control equipment require an 11-inch 3000 psi double gate hydraulically operated blowout preventer and an 11-inch 3000 psi annular preventer. BOP equipment will be tested to its rated working pressure or 70-percent of the internal yield of the surface casing. The annular preventer will be tested at 50-percent of its rated working pressure. NOTE: The surface casing will be pressure tested to a minimum of 1500 psi. BOP's will be checked daily as to mechanical operating condition and will be tested by rig equipment after each string of casing is run. All ram type preventers will have hand wheels which will be operative and accessible at the time the preventers are

installed. Accumulator will include both electric and air power source (see attached diagram).

At this time Wexpro Company requests approval, if needed, to use "Flex Hose" between the BOP and Choke Manifold. The Flex Hose will have a minimum rating of 5,000 psi. Please see the attached specifications sheet for more details.

**AUXILIARY EQUIPMENT:**

- a) Manually operated kelly cock
- b) No floats at bit
- c) Monitoring of mud system will be visual
- d) Full opening floor valves in the full open position, capable of fitting all drill stem connections manually operated

**3. CASING PROGRAM:**

Size		Top	Bottom	Weight	Grade	Thread	Condition
Hole	Casing						
20"	16"	sfc	80'	Steel Pipe Conductor			New
12-3/4"	9-5/8"	sfc	1500'	36#	J55	LT&C	New
7-7/8"	4-1/2"	sfc	9,306' MD 9,203' TVD	13.5#	P-110	LT&C	New

Casing Strengths:				Collapse	Burst	Tensile (minimum)
9-5/8'	36 lb.	J55	LTC	2,020 psi	3,520 psi	453,000 lb.
4-1/2"	13.5 lb.	P110	LTC	10,670 psi	12,410 psi	338,000 lb.

Area Fracture Gradient: 0.750 psi/foot

The variance to Onshore #2 is requested because surface casing depth for this well is 1500' and high pressure is not expected.

**A properly lubricated and maintained rotating head:** A diverter bowl will be utilized in place of a rotating head. The diverter bowl will force the air and cutting returns to the reserve pit as it is used to drill the surface casing.

**Blooie line discharge will be 100 feet from the well bore and securely anchored:** The blooie line discharge for this operation will be located 50 to 70 feet from the wellhead.

**Automatic ignitor or continuous pilot light on the blooie line:** A diffuser will be used rather than an automatic pilot/ignitor. Water is injected into the compressed air and eliminates the need for the pilot light and the need for dust suppression equipment.

**Compressor located in the direction from the blooie line is a minimum of 100' from the well bore:** Truck mounted air compressors will be located within 50 feet on the opposite side of the wellhead from the blooie line and equipped with a (1) emergency kill switch on the driller's console, (2) pressure relief valve on the compressor and (3) spark arrestors on the motors.

CEMENTING PROGRAMS: (See Attached Details)

9-5/8" Surface Casing: **Tail Slurry:** 1051 cubic feet Class "G" with 2% CaCl<sub>2</sub> and 1/4 % cello flake (only if lost circulation is encountered).

4-1/2" Production Casing: **Lead Slurry:** 1422 cubic feet Light 50/50 Poz-G with retarder, reducer and fluid loss additive. Volume to be calculated from caliper logs to bring lead cement from 4,800' to surface, with 15% excess.  
**Tail Slurry:** 1184 cubic feet 35/65 Poz-G with retarder, reducer and fluid loss additive. Volume to be calculated from caliper logs to bring tail cement from TD to 4,800', with 15% excess.

4. MUD PROGRAM:

- 1) Surface hole mud drilled and cased with a Drilling rig using fresh water and polymer sweeps.
- 2) Surface casing will be drilled out 10 feet and formation tested to 10.5 ppg mud equivalent.
- 3) Fresh water with gel and polymer sweeps as necessary. Mud weight of 9.5 - 10.0 ppg to be accomplished by 1,500 feet to total depth, if needed.
  - A. Mud weight 9.0 - 10.0 ppg
  - B. Viscosity 35 - 45 cp
  - C. PH < 8
  - D. Water Loss 10 - 14
  - E. Type Fresh water and dispersed mud
  - F. Asphalt 6 lb/sack

Sufficient mud materials to maintain mud properties, control lost circulation and to contain blowout will be available at the wellsite.

No chrome constituent additives will be used in the mud system on Federal, State and Indian lands without prior BLM/State approval to ensure adequate protection of fresh water aquifers.

5. LOGGING:
  - DIL-SFL-GR: Total depth to surface casing.
  - BHC-Sonic-GR: Total depth to surface casing.
  - FDC-CNL-GR-PE-Cal: Total depth to surface casing.
  - Cement/Bore Hole Profile Log
  
- TESTING: None.
  
- CORING: None.
  
6. ABNORMAL PRESSURE AND TEMPERATURE: A BHT of 183° F and a BHP of 3500 psi are possible.
  
7. ANTICIPATED STARTING DATE: December 1, 2012
  
- DURATION OF OPERATION: 25 days

# MUSSER WELL NO. 49: CEMENT CALCULATIONS

## SURFACE CASING:

CASING:	9.625 " 36#, J-55	0.4340 cu.ft./lin.ft	ID= 8.921
ANNULUS:	12.250 " x 9.625" Gauge Hole	0.3131 cu.ft./lin.ft	
CONDUCTOR	16.000 " STEEL PIPE	0.8908	
EXCESS:		100%	
CEMENT YIELD:	LEAD	2.65 cu.ft/sack	11.5 PPG
	TAIL	1.26 cu.ft/sack	15.2 PPG
CONDUCTOR DEPTH		80	
TOTAL DEPTH		1,500 Feet	
TOP OF TAIL		0 Feet	
TOP OF LEAD		0 Feet	(Surface)

LEAD SLURRY				CU.FT	
ANN	-	TO	-	0.3131	0.00
ANN EXCESS				100%	0.00
				0.00	0 SACKS      0 CU.FT.

TAIL SLURRY				CU.FT	
CSG	1,500	TO	1,455	0.4340	19.53
COND/CSG	80	TO	0	0.8908	71.27
ANN	1,500	TO	80	0.3131	444.64
ANN EXCESS				100%	515.91
				1051.35	834 SACKS      1051 CU.FT.
				DISPLACEMENT	112.5 BBLs

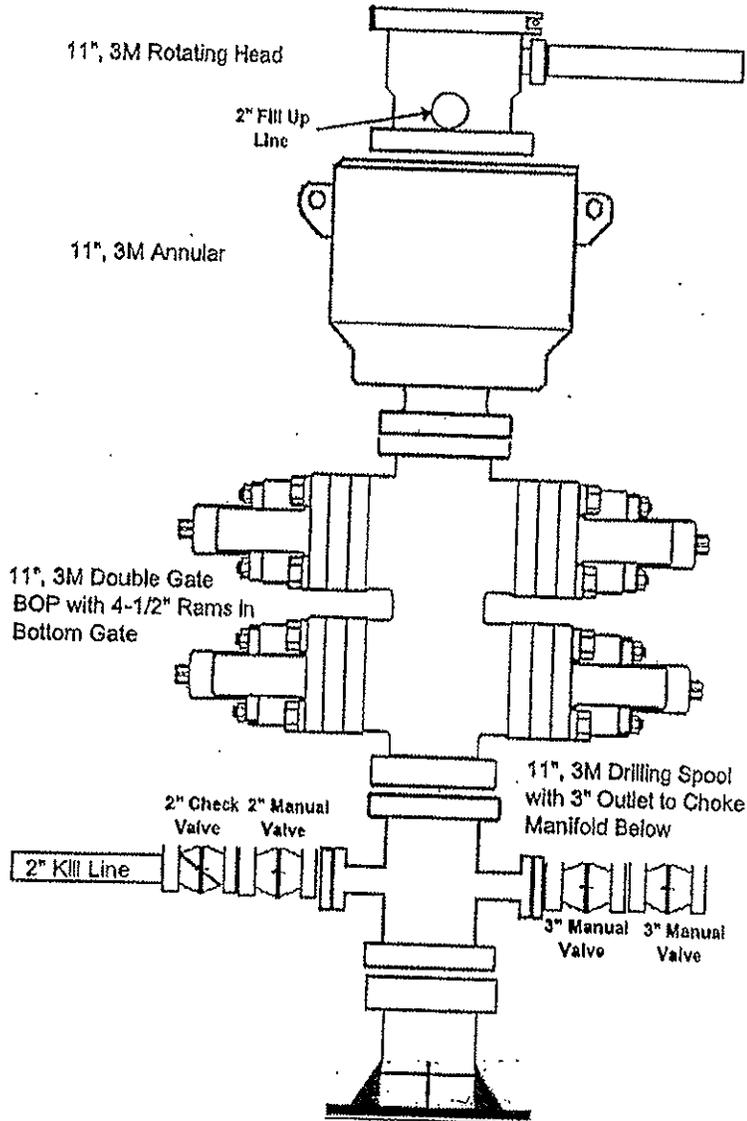
## PRODUCTION CASING:

CASING:	4.500 " 13.5#, P-110	0.0838 cu.ft./lin.ft	ID= 3.92
ANNULUS:	7.875 "(For Gauge Hole)	0.2278 cu.ft./lin.ft	
	8.921 " ID x 4-1/2" CASING ANNULUS	0.3236 cu.ft./lin.ft	
EXCESS:		15%	
CEMENT YIELD:	LEAD	2.63 cu.ft/sack	11.5 PPG
	TAIL	1.49 cu.ft/sack	14.2 PPG
TOTAL DEPTH		9,306 Feet	
TOP OF TAIL		4,800 Feet	
TOP OF LEAD	OPEN HOLE TOP	1,500 Feet	
	CASED HOLE TOP	SURFACE Feet	

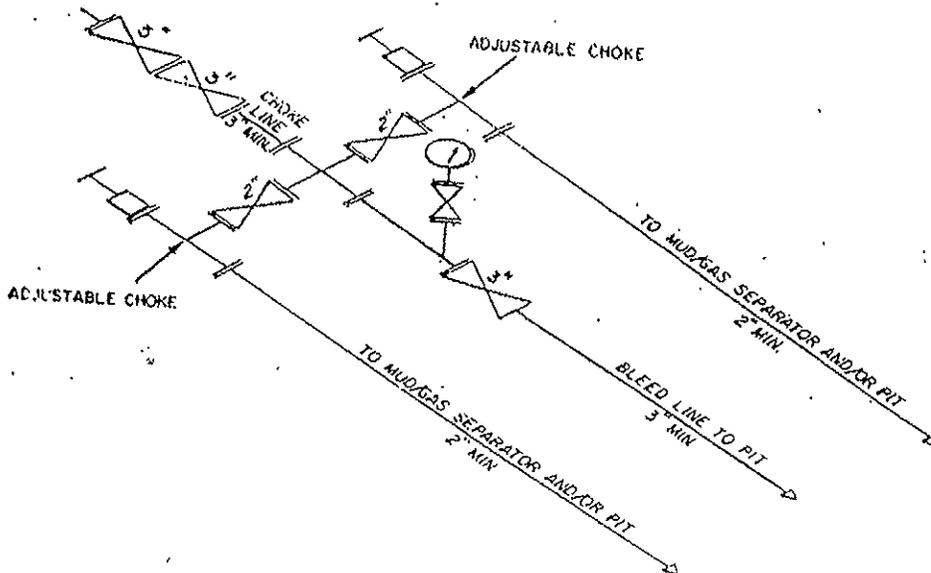
LEAD SLURRY				CU.FT	
ANN	4,800	TO	1,500	0.2278	751.59
	1,500	TO	0	0.3236	485.34
ANN EXCESS				15%	185.54
				1422.46	541 SACKS      1422.459 CU.FT.

TAIL SLURRY				CU.FT	
CSG	9,306	TO	9,261	0.0838	3.77
ANN	9,306	TO	4,800	0.2278	1026.26
ANN EXCESS				15%	153.94
				1183.96	795 SACKS      1183.965 CU.FT.
				DISPLACEMENT	138.2 BBLs

# 3,000 psi BOP Minimum Requirements



**3M CHOKE MANIFOLD EQUIPMENT — CONFIGURATION MAY VARY**  
 46012 Federal Register / Vol. 53, No. 223 / Friday, November 18, 1988 / Rules and Regulations





## Construction

**Tube:** Black, oil and abrasion resistant HNBR for H<sub>2</sub>S service.

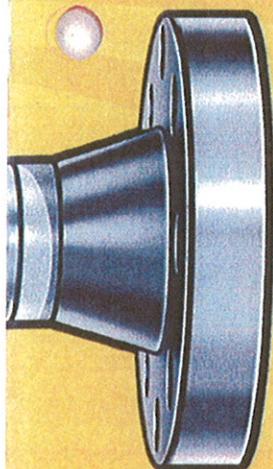
**Reinforcement:** Multiple plies of bias laid textile cord for extra strength and flexibility. Spirally wound, high tensile, multiple strand cables to provide unsurpassed ruggedness and reliability to withstand sudden high pressure.

**Cover:** Special flame resistant red Neoprene (CR) with optional stainless steel armor.

**Fittings:** Integral connection flanged or hubbed.

**Temperature:** -40°F to 212°F.

**Branding:** NRP Choke & Kill Hose. MADE IN USA.



## Specifications

NRP Part Number	Hose ID (in)	Hose OD (in)	Rated WP (psi)	Test Pressure (psi)	Minimum Bend Radius	Weight per Foot (lbs)
5035-32	2.00	4.45	5,000	10,000	44	12.9
5035-40	2.50	4.60	5,000	10,000	48	13.9
5035-48	3.00	5.10	5,000	10,000	52	16.1
5040-32	2.00	4.68	10,000	15,000	48	22.4
5040-40	2.50	5.34	10,000	15,000	52	27.4
5040-48	3.00	5.84	10,000	15,000	56	28.8

## Specifications

NRP Rotary Number	NRP Vibrator Number	Hose ID (in)	Hose OD (in)	Grade	Rated WP (psi)	Test Pressure (psi)	Minimum Bend Radius	Weight per Foot (lbs)	Weight of 2 Cplgs (lbs)	Cplg Thread API (in)
5501-40	5502-40	2.50	4.45	C	4,000	8,000	36	12.9	54	3
5501-48	5502-48	3.00	4.95	C	4,000	8,000	48	14.9	74	4
5501-56	5502-56	3.50	5.45	C	4,000	8,000	54	16.6	94	4
5603-40	5604-40	2.50	4.60	D	5,000	10,000	36	13.6	54	3
5603-48	5604-48	3.00	5.10	D	5,000	10,000	48	15.5	74	4
5603-56	5604-56	3.50	5.75	D	5,000	10,000	54	18.6	94	4

