

EVALUATION PROGNOSIS – FEDERAL 15-40-17 #1X

CURRENT WELLBORE

WELL: McElmo Dome Federal 15-40-17 #1X

FIELD: McElmo Dome

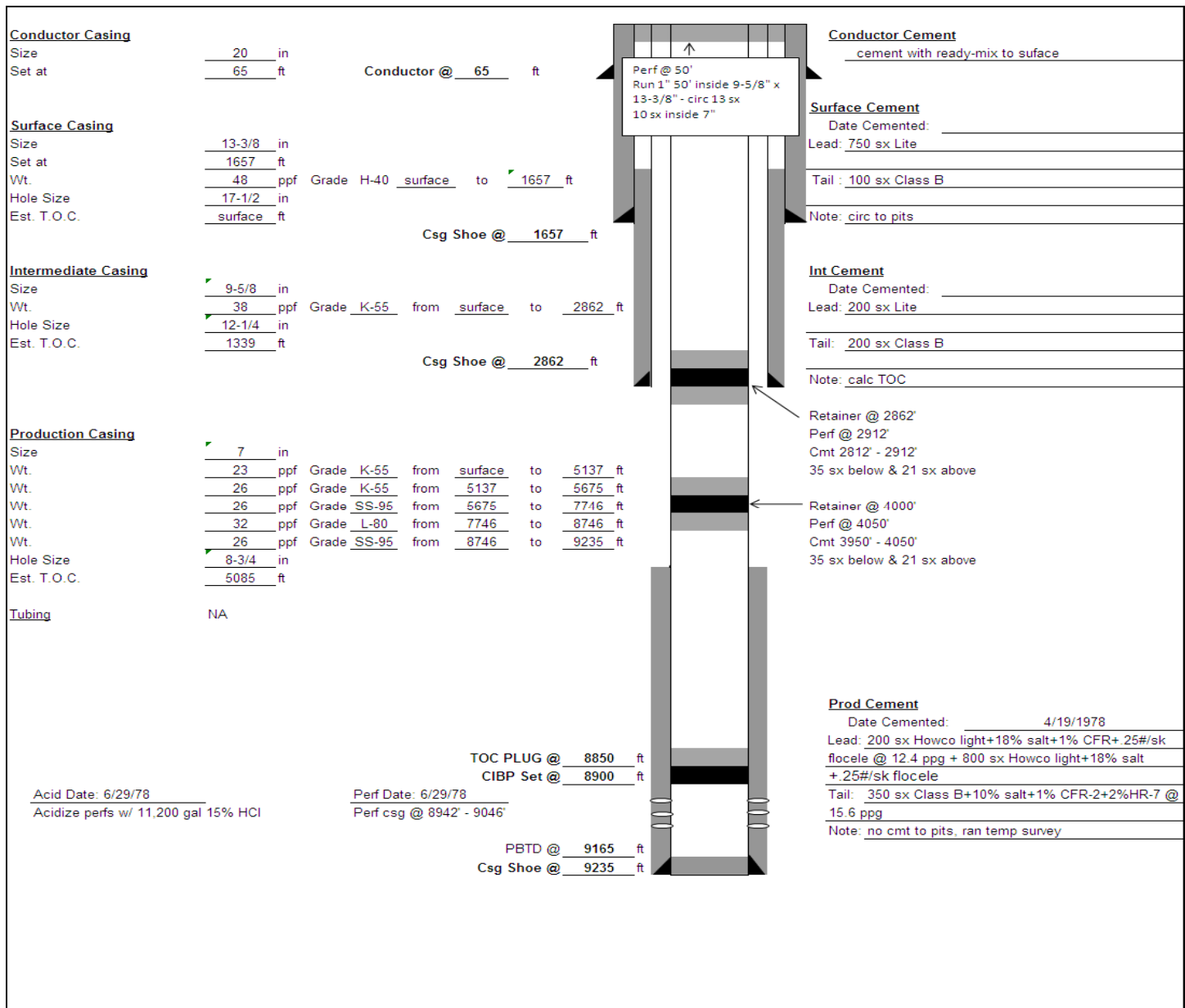
LOCATION: SHL: 2265' FNL, 1655' FEL Section 15, T40N R17W NMPM
DOLORES COUNTY, COLORADO

OBJECTIVE: LEADVILLE FORMATION

ELEVATION: GL = 7788'

A FOCUSED EFFORT WILL BE EXPECTED BY ALL PARTIES TO ELIMINATE ANY / ALL ACCIDENTS DURING THE EXECUTION OF THIS DRILLING PROJECT. H2S IS NOT ANTICIPATED DUE TO CASED HOLE CONDITIONS ACROSS THE KILLER SHALES. THEREFORE, THE H2S HAZARD IS REDUCED SIGNIFICANTLY.

CURRENT WELLBORE SCHEMATIC



OBJECTIVES: 1) Focused effort by all parties to eliminate all accidents during the drilling operation.
2) Drill out cement plugs and evaluate the Federal 15-40-17 #1X at a cost below the approved AFE.

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PROPOSED WELLBORE

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FIELD: McElmo Dome

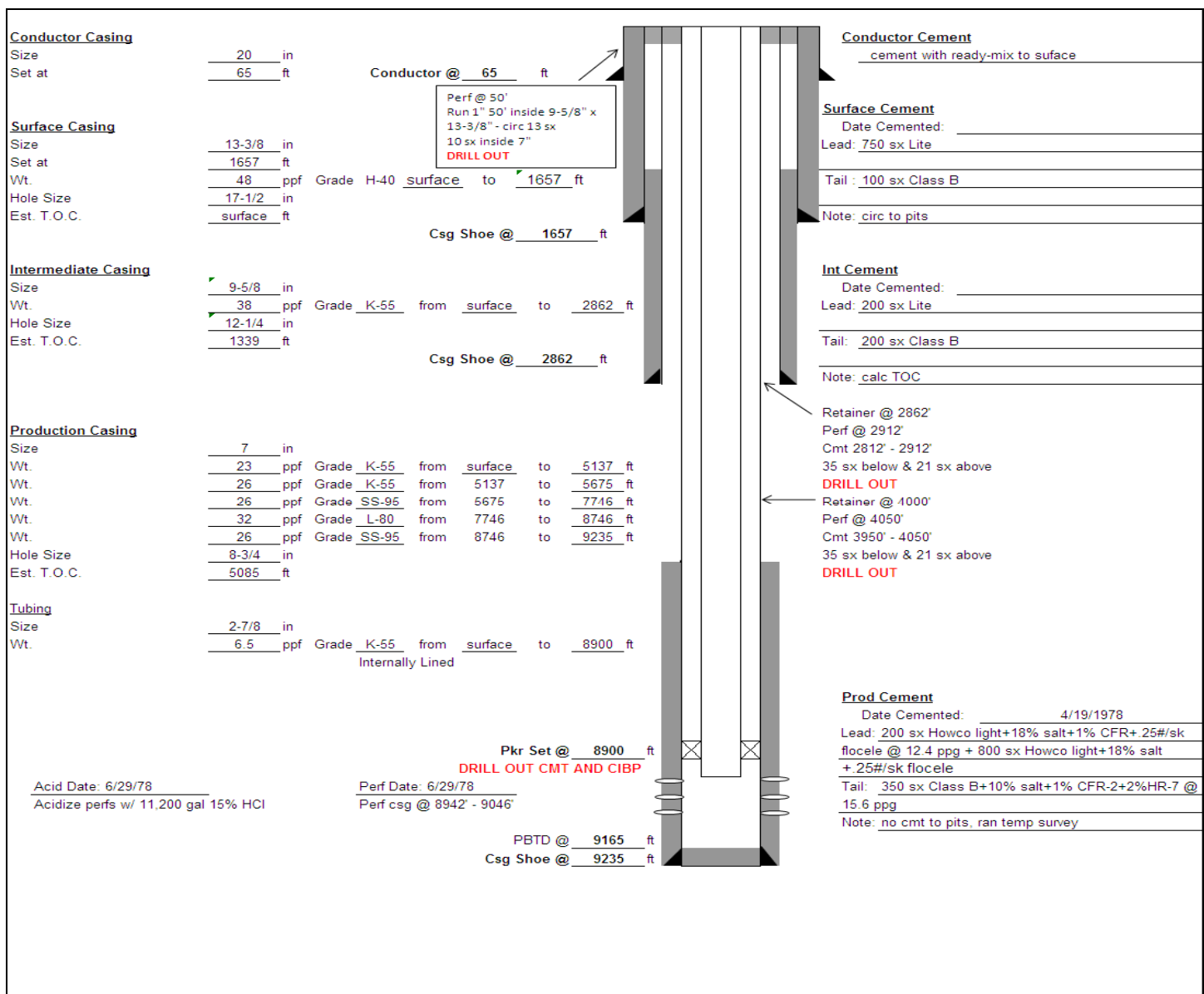
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SECTION 1 & 2 – Estimated Geologic Markers/Formations, Anticipated Fluids, and Isolation Plan

Formation	Top (MD, ft)	Bottom (MD, ft)	Composition	Anticipated Fluids
Entrada	1072	2027	Sandstone	Fresh Water
Chinle	2027	2683	Sandstone	Fresh Water
Shinarump	2683	2758	Sandstone/Shale	Fresh Water
Cutler	2758	4635	Shales	None Anticipated
Upper Hermosa	4635	5444	Carbonate	None Anticipated
Paradox	5444	5821	Carbonate/Anhydrite	None Anticipated
Desert Creek	5821	6012	Carbonate	Gas
Paradox Salt	6012	6522	Carbonate/Anhydrite	None Anticipated
Killer Shales	6522	7936	Shales	Gas, Hydrogen Sulfide
Base Salt	7936	8595	Carbonate/Anhydrite	None Anticipated
Lower Hermosa	8595	8800	Carbonate/Shale/Anhydrite	None Anticipated
Molas	8800	8865	Siltstones/Shale	None Anticipated
Leadville	8865		Carbonate	Gas, Carbon Dioxide

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SECTION 3 – Pressure Control Equipment

A 3M system will be utilized. The following procedures, diagrams, and guidelines are included for review with all personnel, and MUST be adhered to at all times:

- Kinder Morgan 3M BOP and Associated Equipment Installation and Testing Procedure for Re-completed Wells.
- Kinder Morgan BOP and Choke Manifold diagrams including minimum requirements.
- BLM 43 CFR 3160 Section III-A 3M specifications for pressure control equipment including minimum requirements.

3M BOP and Associated Equipment Installation and Testing Procedure

Kinder Morgan CO₂ Company, L.P.

Re-completion Wells: McElmo Dome

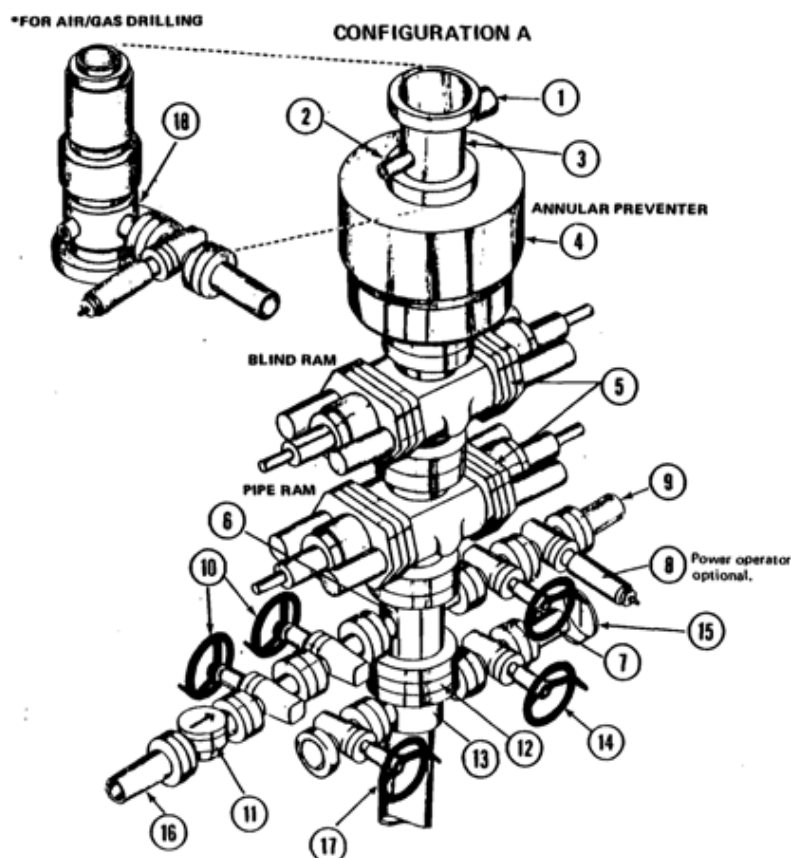
1. NIPPLE UP ON 9-5/8" X 9" 3000# SCREW ON WELLHEAD
2. INSTALL 9"X 9" 3000# SPOOL W/ TWO SIDE OUTLET (2" OUTLET & 2" OUTLET)
3. INSTALL 9" 3000# DOUBLE RAM BOP (BLIND RAMS ON TOP, PIPE RAMS ON BOTTOM)
4. INSTALL 9" 3000# HYDRIL ANNULAR BOP
5. INSTALL 7-1/16" TO 9" SPOOL
6. INSTALL 7- 1/16" 3000# ROTATING HEAD
7. NIPPLE UP FLOW LINES TO ROTATING HEAD
8. FUNCTION TEST BLIND RAMS, PIPE RAMS, (USE CLEAR WATER TO TEST AND MAKE SURE ALL BOP's ARE HOOKED UP TO ACCUMULATOR AND ALL RAMS, HYDRIL AND FUNCTION PROPERLY)
9. CLOSE BLIND RAMS AND TEST 7 5/8" CSG & BLIND RAMS TO 300# & 1000# PSI 30 MIN. FOR A TEST NOT UTILIZING A TEST PLUG. (IF A DECLINE OF MORE THAN 10% PERCENT IN 30 MINUTES OCCURS, THE TEST SHALL BE CONSIDERED FAILED)
10. INSTALL TEST PLUG IN 10-3/4" X 9" 3000# WELL HEAD (WITH ALL VALVES OPEN BELOW TEST PLUG)
11. MAKE SURE BOP's ARE FULL OF WATER AND VALVES SHALL BE TESTED FROM WORKING PRESSURE SIDE DURING BOP TEST
12. CLOSE PIPE RAMS (TEST TO 300 PSI FOR 10 MINUTE LOW PRESSURE TEST AND 3000 PSI FOR 10 MINUTES FOR HIGH PRESSURE TEST WITH NO PRESSURE LOSS)
13. REMOVE DRILL PIPE WITH TEST PLUG IN PLACE
14. CLOSE BLIND RAMS (TEST BLIND RAMS TO 300 PSI FOR 10 MINUTE LOW PRESSURE TEST AND 3000 PSI FOR 10 MINUTES FOR HIGH PRESSURE TEST WITH NO PRESSURE LOSS))
15. OPEN BLIND RAMS, INSTALL DRILL PIPE
16. CLOSE HYDRIL (TEST HYDRIL TO 300# PSI & 1500# PSI FOR 10 MINUTES EACH WITH NO LOSS IN PRESSURE)

*******CALL CO&G & BLM FOR ALL BOP TESTS*******

*******ALL TESTS MUST BE CHARTED FOR CO&G & BLM*******

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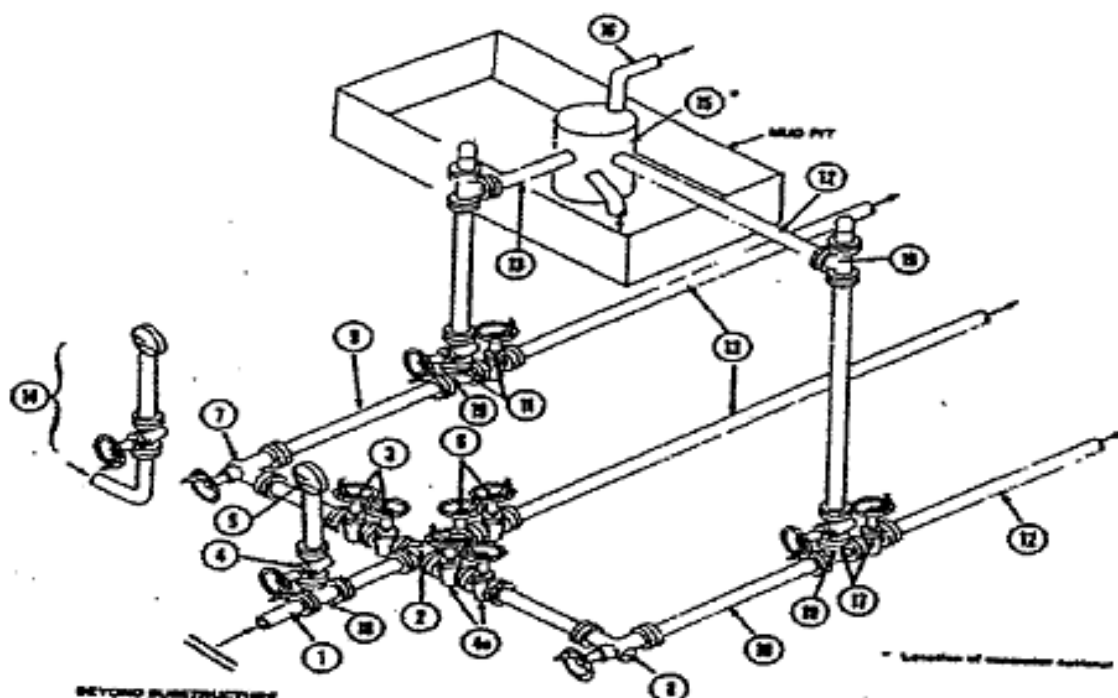
BOP CONFIGURATION



KINDER MORGAN MINIMUM BOP STACK REQUIREMENT			
No.	Item	Min.I.D.	Min. Nominal
1	Flowline		7"
2	Fill up line		2"
3	Drilling nipple		
4	Annular preventer		
5	Two single or one dual hydraulically operated rams		
6	Drilling spool with 2" and 3" outlets		
7	Gate valve	3-1/8"	
8	Gate valve-(power operated optional)	3-1/8"	
9	Line to choke manifold		3"
10	Gate valve	2-1/16"	
11	Check valve	2-1/16"	
12	Wear Flange or Bore Protector		
13	Casing spool		
14	Gate valve	1-13/16"	
15	Compound pressure gauge connector		
16	Kill line to rig mud pump manifold		2"
17	Gate valve (optional)	3-1/8"	
18	Auxilliary Choke line (optional)		3"
19	Flanged control plug or valve (optional)	1-13/16"	
20	Rotating head (optional)		
21	Gate valve (power operated-optional)(optional)	6"	

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CHOKE MANIFOLD



KINDER MORGAN CHOKE MANIFOLD REQUIREMENTS

No.		Class 3M			Class 5M			Class 10M		
		I.D.	Nominal	Rating	I.D.	Nominal	Rating	I.D.	Nominal	Rating
1	Line from drilling spool		3"	3000		3"	5000		3"	10000
2	Cross 3"x3"x3"x2"			3000			5000			10000
	Cross 3"x3"x3"x3"			3000			5000			10000
3	Gate valve	3-1/8"		3000	3-1/8"		5000	3-1/8"		10000
4	Gate valve	1-13/16"		3000	1-13/16"		5000	1-13/16"		10000
4A	Valves	2-1/16"		3000	2-1/16"		5000	2-1/16"		10000
5	Pressure guage			3000			5000			10000
6	Gate valve	3-1/8"		3000	3-1/8"		5000	3-1/8"		10000
7	Adjustable Choke	2"		3000	2"		5000	2"		10000
8	Adjustable Choke	1"		3000	1"		5000	1"		10000
9	Line		3"	3000		3"	5000		3"	10000
10	Line		2"	3000		2"	5000		2"	10000
11	Gate valve	3-1/8"		3000	3-1/8"		5000	3-1/8"		10000
12	Line		2"	3000		2"	5000		2"	10000
13	Line		3"	3000		3"	5000		3"	10000
14	Remote reading standpipe compound pressure guage, valve and line			3000			5000			10000
15	Gas separator		16"	3000		16"	5000		16"	10000
16	Line		4"	3000		4"	5000		4"	10000
17	Gate valve	2-1/16"		3000	2-1/16"		5000	2-1/16"		10000
18	Tee 3"x3"x2"			3000			5000			10000
19	Tee 3"x3"x3"			3000			5000			10000

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BUREAU OF LAND MANAGEMENT
43 CFR 3160

Federal Register / Vol. 53, No. 223
Friday, November 18, 1988
Effective date: December 19, 1988

Onshore Oil and Gas Operations; Federal and Indian Oil and Gas Leases;
Onshore Oil and Gas Order No. 2, Drilling Operations

III. Requirements

A. Well Control Requirements

1. Blowout preventer (BOP) and related equipment (BOPE) shall be installed, used, maintained, and tested in manner necessary to assure well control and shall be in place and operational prior to drilling the surface casing shoe unless otherwise approved by the APD. Commencement of drilling without the approved BOPE installed, unless otherwise approved, shall subject the operator to immediate assessment under 43 CFR 3163.1(b)(1). The BOP and related control equipment shall be suitable for operations in those areas which are subject to sub-freezing conditions. The BOPE shall be based on known or anticipated sub-surface pressures, geologic conditions, accepted engineering practice, and surface environment. The working pressure of all BOPE shall exceed the anticipated surface pressure to which it may be subjected, assuming a partially evacuated hole with a pressure gradient of 0.22 psi/ft.

2. The gravity of the violations for many of the well control minimum standards listed below are shown as minor. However, very short abatement periods in this Order are often specified in recognition that by continuing to drill, the violation which was originally determined to be of a minor nature may cause or threaten immediate, substantial and adverse impact on public health and safety, the environment, production accountability, or royalty income, which would require it reclassification as a major violation.

a. Minimum standards and enforcement provisions for well control equipment.

i. A well control device shall be installed at the surface that is capable of complete closure of the well bore. This device shall be closed whenever the well is unattended.

iii. 3M system:

- Annular preventers*
- Double ram with blind rams and pipe rams*
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)*
- Kill line (2 inch minimum)
- A minimum of 2 choke line valves (3 inch minimum)*
- 3 inch diameter choke line
- 2 kill line valves, one of which shall be a check valve (2 inch minimum)*
- 2 chokes (refer to diagram in Attachment 1)
- Pressure gauge on choke manifold
- Upper kelly cock valve with handle available
- Safety valve and subs to fit all drill string connections in use
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped*
- Fill-up line above the uppermost preventer.

vi. If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

vii. When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridgeplug, or other acceptable approved method to assure safe well conditions.

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b. Minimum standards and enforcement provisions for choke manifold equipment.

- i. All choke lines shall be straight lines unless turns use tee blocks or are targeted with running tees, and shall be anchored to prevent whip and reduce vibration.

Violation: Minor.

Corrective Action: Install the equipment as specified.

Normal Abatement Period: 24 hours.

- ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Attachment 1 of this Order. The configuration of the chokes may vary.

Violation: Minor.

Corrective Action: Install the equipment as specified.

Normal Abatement Period: Prompt correction required.

- iii. All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow (same enforcement as item ii).
- iv. Pressure gauges in the well control system shall be a type designed for drilling fluid service (same enforcement as above).

[57 FR 3025, Jan. 27, 1992]

c. Minimum standards and enforcement provisions for pressure accumulator system.

- i. 2M system accumulator shall have sufficient capacity to close all BOP's and retain 200 psi above precharge. Nitrogen bottles that meet manufacturer's specifications may be used as the backup to the required independent power source.

Violation: Minor.

Corrective Action: Install the equipment as specified.

Normal Abatement Period: 24 hours.

- ii. 3M system accumulator shall have sufficient capacity to open the hydraulically-controlled choke line valve(if so equipped), close all rams plus the annual preventer, and retain a minimum of 200 psi above precharge on the closing manifold without the use of the closing pumps. this is a minimum requirement. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level shall be maintained at the manufacturer's recommendations. The 3M system shall have 2 independent power sources to close the preventers. Nitrogen bottles (3 minimum) may be 1 of the independent power sources and, if so, shall maintain a charge equal to the manufacturer's specifications.

d. Minimum standards and enforcement provisions for accumulator precharge pressure test. This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to precharge):

Accumulator working pressure rating	Minimum acceptable operating pressure	Desired precharge pressure	Maximum acceptable precharge pressure	Minimum acceptable precharge pressure
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

e. Minimum standards and enforcement provisions for power availability. Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

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f. Minimum standards and enforcement provisions for accumulator pump capacity.

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator precharge pressure.

g. Minimum standards and enforcement provisions for locking devices. A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

h. Minimum standards and enforcement provisions for remote controls. Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.

i. Minimum standards and enforcement provisions for well control equipment testing.

i. Perform all tests described below using clear water or an appropriate clear liquid for subfreezing temperatures with a viscosity similar to water.

ii. Ram type preventers and associated equipment shall be tested to approved (see item I.D.1. of this order) stack working pressure if isolated by test plug or to 70 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.

iii. Annular type preventers shall be tested to 50 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.

iv. As a minimum, the above test shall be performed:

A. when initially installed;

B. whenever any seal subject to test pressure is broken;

C. following related repairs; and

D. at 30-day intervals.

v. Valves shall be tested from working pressure side during BOPE tests with all down stream valves open.

vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.

vii. Annular preventers shall be functionally operated at least weekly.

viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.

ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.

x. Pressure tests shall apply to all related well control equipment.

xi. All of the above described tests and/or drills shall be recorded in the drilling log.

Violation: Minor.

Corrective action: Perform the necessary test or provide documentation.

Normal Abatement Period: 24 hours or next trip, as most appropriate.

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SECTION 4 – Drilling Equipment, Tubing, and Cementing Programs

PROSPECT INFORMATION

The Federal 15-40-17 #1X will be evaluated to determine reservoir quality. This well was drilled in 1977 and is located on the east side of Doe Canyon. Current plans include drilling out the cement plugs and retainers and obtaining pressure readings for an extended period of time.

WELL OBJECTIVE

The main objectives for the re-completion operation on the Federal 15-40-17 #1X are:

1. Focused effort by all parties to eliminate all accidents during the drilling operation.
2. Evaluate the Federal 15-40-17 #1X at a cost below the approved AFE.

POTENTIAL PROBLEMS

The problems for the Federal 15-40-17 #1X should be minimal considering the formations above the Leadville are covered with 7" casing and should remain so during the evaluation operations; however, possible problems do include:

1. **Limited Access:** There is limited access to the location and can pose an issue when bringing in equipment.

GENERAL EVALUATION PROCEDURE

- The well is currently P&A'd and will need multiple cement plugs and retainers drilled to get to TD.
- The perforations will be acidized prior to evaluating the reservoir pressure.
- A string of 2-7/8" internally lined tubing will be run with the packer set at ~8900'.
- A pressure bomb will be left down hole to capture pressure readings for an extended period of time.

SECTION 5 – Evaluation Program

A casing inspection log will be run to ensure the casing integrity. A cased hole log will also be run to determine the depth of the perforations.

SECTION 6 – Expected Pressures and Identified Hazards BOTTOM HOLE PRESSURE

The Leadville formation bottom hole pressure is less than 3,000 psi in the Doe Canyon area. Given the well depths of approximately 9000', a freshwater column provides approximately 3,900 psi for well control.

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WELL PROGNOSIS OVERVIEW

This well prognosis is organized to follow the Bureau of Land Management (BLM) Eight Point Drilling Plan referenced in the Onshore Order #1. The Eight Points correspond to the following Eight Sections of the Prognosis.

1. Estimated Tops of Important Geologic Markers and Formations
2. Estimated depths at which top and bottom of anticipated water (particularly freshwater), oil, gas or other mineral-bearing formations are expected to be encountered and the lessee's or operator's plans for protecting such resources.
3. Lessee's or operator's minimum specifications for pressure control equipment to be used and a schematic diagram thereof showing sizes, pressure ratings (or API series), and the testing procedures and testing frequency.
4. Any supplementary information more completely describing the drilling equipment and casing program.
5. Type and characteristics of the proposed circulating medium to be employed in drilling, the quantities and types of mud and weighting material to be maintained, and the monitoring equipment to be used on the mud system.
6. The anticipated type and amount of testing, logging and coring.
7. The expected bottom hole pressure and any anticipated abnormal pressures or temperatures or potential hazards, such as hydrogen sulfide, expected to be encountered, along with contingency plans for mitigating such identified hazards.
8. Any other facets of the proposed operation which the lessee or operator wishes to point out for BLM's consideration of the application.

Two attachments are referenced in sections of the document.

1. H2S Contingency Plan

CONTACT INFORMATION	OFFICE	CELL	HOME
Drilling Engineer- Valerie Cawthorn	713-369-8509	281-798-8769	
Drilling Manager- Todd Gentles	713-369-8487	713-249-2805	713-249-2805
Drilling Director- Douglas Frederick	713-369-9208	281-413-2333	
Geologist - Jim Wilson	713-369-8866	832-723-0313	

Signed:_____

Douglas A. Frederick
Director of Drilling and Well Operations

Date:_____