PRESSURE CONTROL EQUIPMENT – Schematic Attached

A. **Type:** Eleven (11) Inch Double Gate Hydraulic BOP with Eleven (11) Inch Annular Preventer. The blow out preventer will be equipped as follows:

1. One (1) blind ram (above).
2. One (1) pipe ram (below).
3. Drilling spool with two (2) side outlets (choke side 3-inch minimum, kill side 2-inch minimum).
4. 3-inch diameter choke line.
5. Two (2) choke line valves (3-inch minimum).
6. Kill line (2-inch minimum).
7. Two (2) chokes.
8. Two (2) kill line valves, one of which shall be a check valve (2-inch minimum).
9. Upper kelly cock valve with handles available.
10. Safety valve(s) & subs to fit all drill string connections in use.
11. Pressure gauge on choke manifold.
12. Fill-up line above the uppermost preventer.

B. **Pressure Rating:** 3,000 psi

C. **Testing Procedure:**

Annular Preventer

At a minimum, the Annular Preventer will be pressure tested to 50% of the rated working pressure for a period of ten (10) minutes or until provisions of the test are met, whichever is longer.

At a minimum the above pressure test will be performed:

1. When the annular preventer is initially installed;
2. Whenever any seal subject to test pressure is broken;
3. Following related repairs; and
4. At thirty (30) day intervals.

In addition, the Annular Preventer will be functionally operated at least weekly.

Blow-Out Preventer

At a minimum, the BOP, choke manifold, and related equipment will be pressure tested to the approved working pressure of the BOP stack (if isolated from the surface casing by a test plug) or to 70% of the internal yieldstrength of the surface casing (if the BOP is not isolated from the casing by a test plug). Pressure will be maintained for a period of at least ten (10) minutes or until the requirmentsof the test are met, whichever is longer.

At a minimum, the above pressure test will be performed:

1. When the BOP is initially installed;
2. Whenever any seal subject to test pressure is broken;
3. Following related repairs; and
4. At thirty (30) day intervals.

In addition the pipe and blind rams will be activated each trip, but not more than once each day. All BOP drills and tests will be recorded in the IADC driller's log.

D. Choke Manifold Equipment:

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

E. Accumulator:

The accumulator will have sufficient capacity to open the hydraulically-controlled choke line valve (if so equipped), close all rams plus the annular preventer, and retain a minimum of 200 psi above precharge on the closing manifold without the use of closing unit pumps. The fluid reservoir capacity will be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir will be maintained at the manufacturer's recommendations.

The BOP system will have two (2) independent power sources to close the preventers. Nitrogen bottles (3 minimum) will be one (1) of these independent power sources and will maintain a charge equal to the manufacturer's specifications.

The accumulator precharge pressure test will be conducted prior to connecting the closing unit to the BOP stack and at least once every six (6) months thereafter. The accumulator pressure will be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limits specified in the *Onshore Oil & Gas Order Number 2.*

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

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems will be capable of closing all preventers. Remote controls for 5M or greater systems will be capable of both opening and closing all preventers. Master controls will be at the accumulator and will be capable of opening and closing all preventers and the choke line valve (if so equipped).

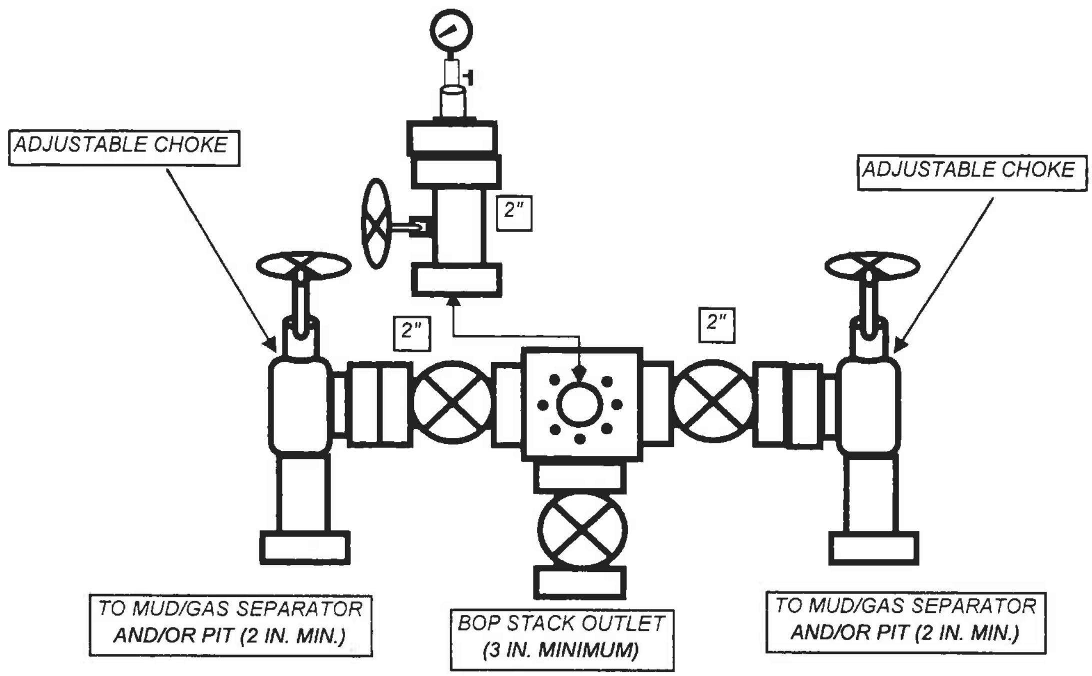
F. Miscellaneous Information:

The Blow-Out Preventer and related pressure control equipment will be installed, tested and maintained in compliance with the specifications in and requirements of *Onshore Oil & Gas Order Number 2.* The choke manifold will be located outside the rig sub-structure. The hydraulic BOP closing unit will be located at least twenty-five (25) feet from the well head but readily accessible to the driller. Exact locations and configurations of the hydraulic BOP closing unit will depend upon the particular rig contracted to drill this hole.

A flare line will be installed after the choke manifold, extending 125 feet (minimum) from the center of the drill hole to a separate flare pit.

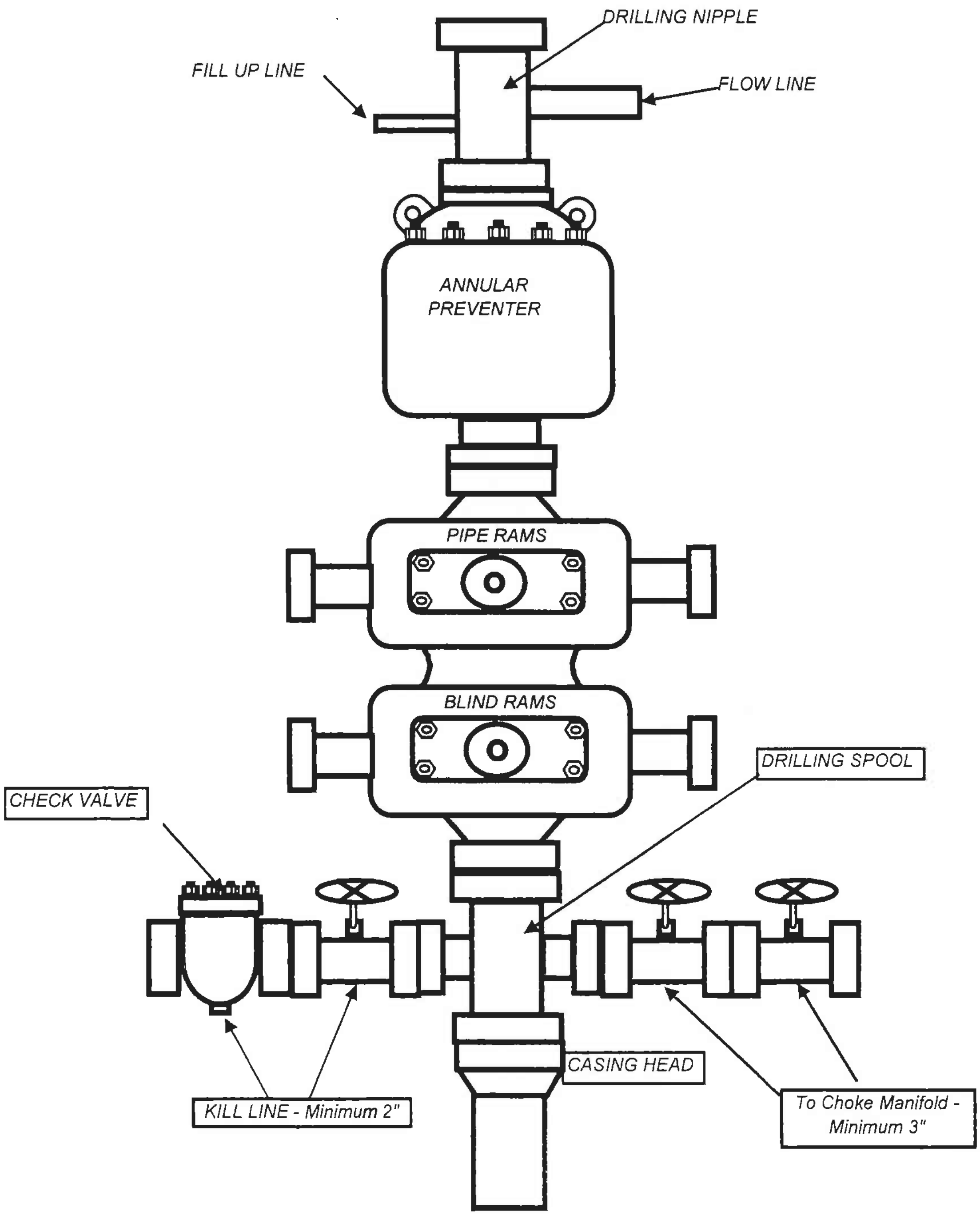
BILL BARRETT CORPORATION

TYPICAL 3,000 p.s.i. CHOKE MANIFOLD



BILL BARRETT CORPORATION

TYPICAL 3,000 p.s.i. BLOWOUT PREVENTER



Well name:	**Piceance General**
Operator:	**Bill Barrett**
String type:	Surface

Design parameters:
<u>Collapse</u>
Mud weight: 9.00 ppg

Design is based on evacuated pipe.

<u>Burst</u>
Max anticipated surface pressure: 444 psi
Internal gradient: 0.22 psi/ft
Calculated BHP 686 psi

No backup mud specified.

Minimum design factors:
<u>Collapse:</u>
Design factor 1.125

<u>Burst:</u>
Design factor 1.00

<u>Tension:</u>
8 Round STC: 1.80 (J)
8 Round LTC: 1.80 (J)
Buttress: 1.80 (J)
Premium: 1.80 (J)
Body yield: 1.80 (B)

Tension is based on buoyed weight.
Neutral point: 954 ft

Environment:
H2S considered? No
Surface temperature: 75.00 °F
Bottom hole temperature: 90 °F
Temperature gradient: 1.40 °F/100ft
Minimum section length: 1,100 ft

Cement top: Surface

Non-directional string.

Re subsequent strings:
Next setting depth: 9,000 ft
Next mud weight: 10.500 ppg
Next setting BHP: 4,909 psi
Fracture mud wt: 12.000 ppg
Fracture depth: 1,100 ft
Injection pressure 686 psi

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft^3)
1	1100	9.625	36.00	J-55	ST&C	1100	1100	8.796	78.3

Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	514	2020	3.928	686	3520	5.13	34	394	11.48 J

Prepared by: Dominic Spencer
Bill Barrett Corp.

Phone: (303) 312-8143
FAX: (303) 312-8195

Date: September 16,2004
Denver, Colorado

Remarks:
Collapse is based on a vertical depth of 1100 ft, a mud weight of 9 ppg The casing is considered to be evacuated for collapse purposes.
Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Engineering responsibility for use of this design will be that of the purchaser.

Well name:	**Piceance General**	
Operator:	**Bill Barrett**	
String type:	Production	

Design parameters:

Collapse

Mud weight: 10.50 ppg

Design is based on evacuated pipe.

Burst

Max anticipated surface pressure: 2,929 psi

Internal gradient: 0.22 psi/ft

Calculated BHP 4,909 psi

No backup mud specified.

Minimum design factors:

Collapse:

Design factor 1 125

Burst:

Design factor 1.00

Tension:

8 Round STC:	1.80 (J)
8 Round LTC:	1.80 (J)
Buttress:	1.80 (J)
Premium:	1.80 (J)
Body yield:	1.80 (B)

Tension is based on buoyed weight.

Neutral point: 7,587 ft

Environment:

H2S considered?	No
Surface temperature:	75.00 °F
Bottom hole temperature	201 °F
Temperature gradient:	1.40 °F/100ft
Minimum section length:	1,500 ft
Cement top:	Top gas - 500'

Non-directional string.

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft³)
1	9000	4.5	11.60	N-80	LT&C	9000	9000	3.875	208.6

Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	4909	6350	1.294	4909	7780	1.58	88	223	2.53 J

Prepared by: Dominic Spencer
Bill Barrett Corp.

Phone: (303) 312-8143
FAX: (303) 312-8195

Date: September 16,2004
Denver, Colorado

Remarks:

Collapse is based on a vertical depth of 9000 ft, a mud weight of 10.5 ppg The casing is considered to be evacuated for collapse purposes.
Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension

Burst strength is not adjusted for tension.

Engineering responsibility for use of this design will be that of the purchaser.