

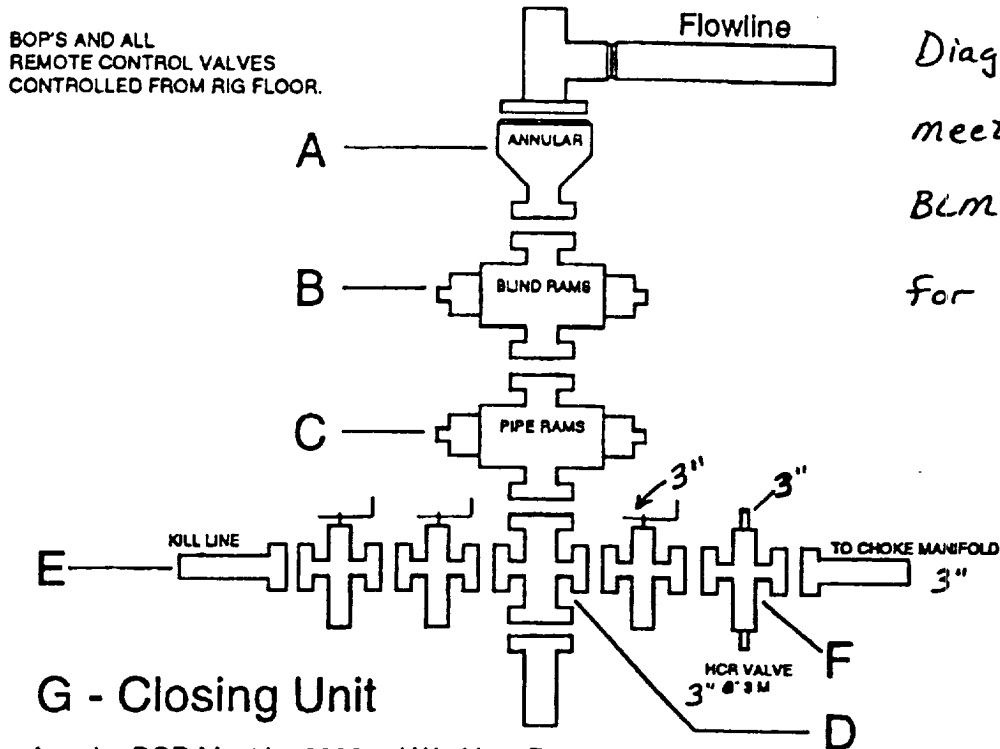
SONAT EXPLORATION**West ~~SONAT~~ TEXAS BUSINESS UNIT****Minimum Requirements for a 3,000 psi BOP
Stack Manifold & Closing System**

Diagram as shown
meets the minimum
BLM requirements
for a 3M stack.

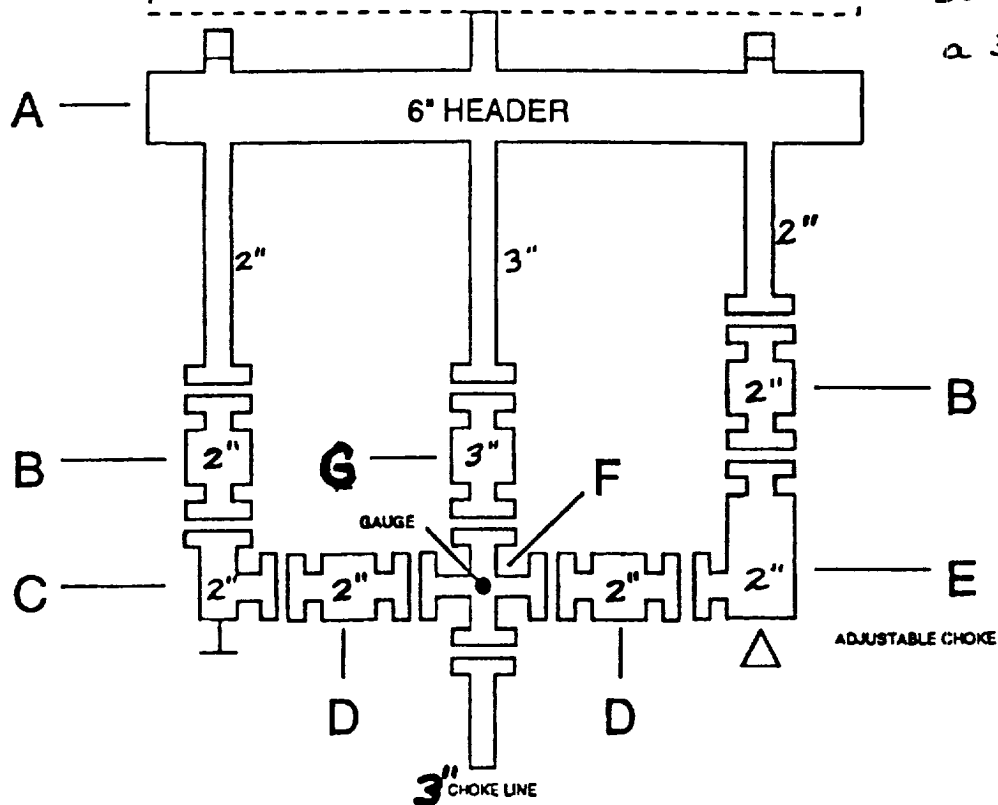
- A. Annular BOP Must be 3000 psi Working Pressure.
- B. Blind Rams Between Annular & Pipe Rams w/ 3000 psi Working Pressure.
- C. Pipe Rams Below Blind Rams w/ 3000 psi Working Pressure.
- Note: All Rams & Spools Must Meet Required I.D. for Hole Size.
- D. Drilling Spool w/ 2 Outlets for Choke Line & Kill Line
- E. Kill Line 2" 3 M w/ 2 Manual Valves Bolted & Flanged Below Bottom Pipe Rams. Either a Drilling Spool or the Outlet on the BOP Stack can be Used to Accommodate Kill Line and Choke Line.
- F. Choke Line w/ 3" 3 M Valves. Inside Valve can be Manual but the Outside Valve Must be Hydraulic (HCR). Choke Line Must be 3" 3 M.
- G. Closing Unit (Kookey) w/ a Primary & Secondary Pressure Supply to Operate the BOP Stack. Also a N₂ Supply will be Provided as a Final Source of Operation to Close the BOP Stack. This Unit is Required to Contain a minimum of 1 1/2 Times the Needed Volume to Operate the BOP Stack at All Times. The Precharge of N₂ will be Checked Prior to Commencing Work for SONAT.

SONAT EXPLORATION**West [REDACTED] TEXAS BUSINESS UNIT**

Minimum Requirements for a
3,000 psi BOP Stack Manifold

A Gas Buster is Preferred but not
Necessary on a 3,000 psi System

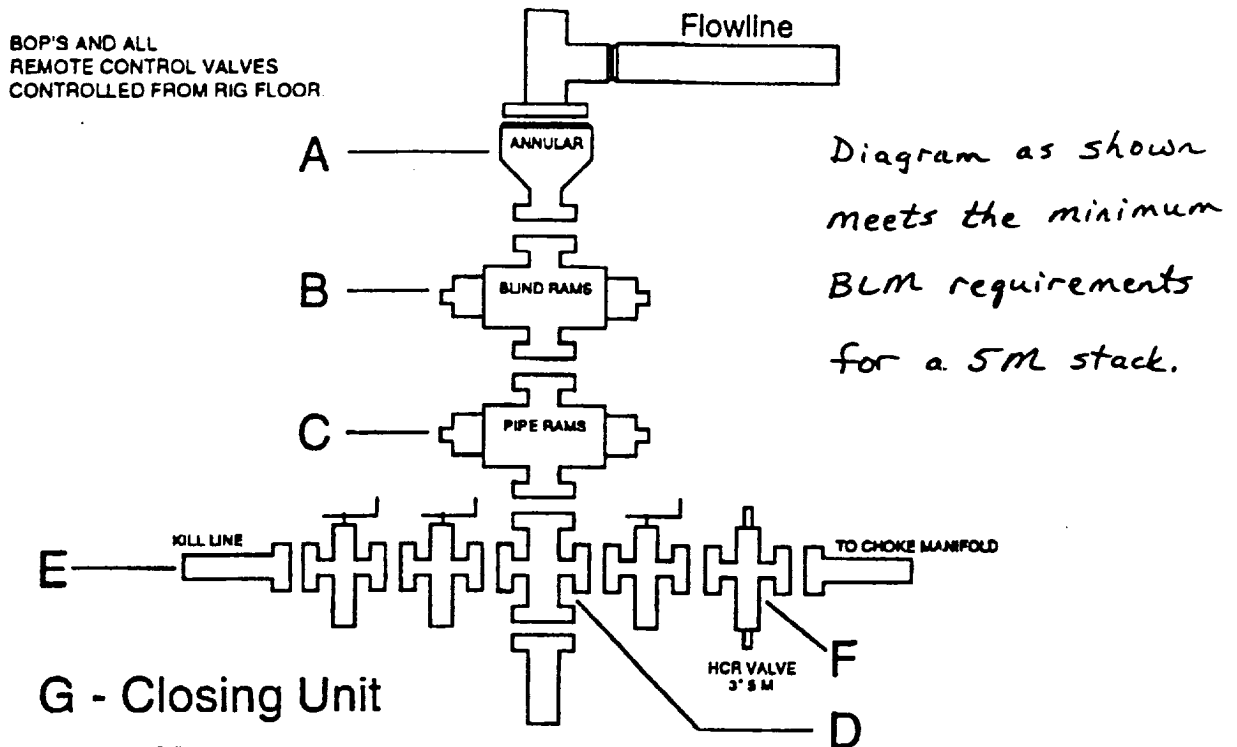
Diagram as shown
meets the minimum
BLM requirements +
a 3M stack.



- A. Header for Gas Expansion 6" O.D. Tube.
- B. 2" 3 M Manual Valves on Down Stream Side of Choke.
- C. 2" 3 M Manual Adjustable or Positive Choke.
- D. 2" 3 M Manual Valve
- E. 2" 3 M Adjustable w/ Remote Station
- F. 3" 3 M Tee w/ Gauge in Top Side 3" Choke Line

Note: All Pipe Will be Flanged & Welded. No Screwed Connections.

G. 3" 3m Manual Valve

SONAT EXPLORATION**West ~~SONAT~~ TEXAS BUSINESS UNIT****Minimum Requirements for a 5,000 psi BOP
Stack Manifold & Closing System**

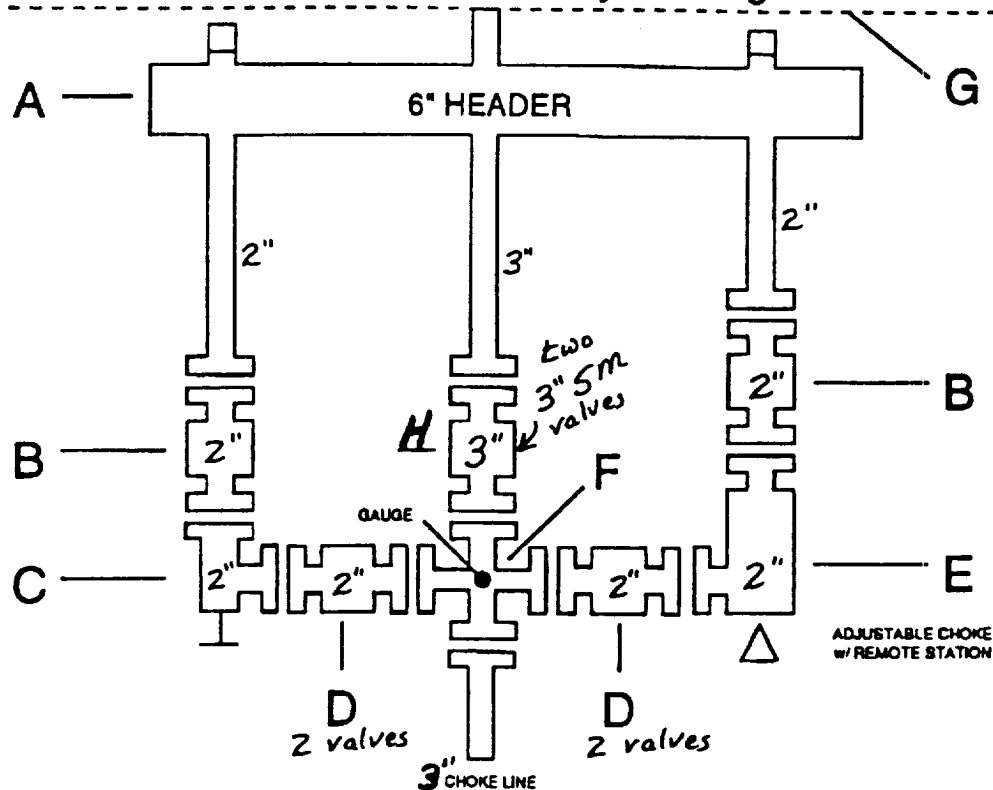
*Diagram as shown
meets the minimum
BLM requirements
for a 5M stack.*

- A. Annular BOP Must be 5000 psi Working Pressure.
- B. Blind Rams Between Annular & Pipe Rams w/ 5000 psi Working Pressure.
- C. Pipe Rams Below Blind Rams w/ 5000 psi Working Pressure.
Note: All Rams & Spools Must Meet Required I.D. for Hole Size.
- D. Drilling Spool w/ 2 Outlets for Choke Line & Kill Line
- E. Kill Line 2" 5M w/ 2 Manual Valves Bolted & Flanged Below Bottom Pipe Rams. Either A Drilling Spool or the Outlet on the BOP Stack can be Used to Accommodate Kill Line and Choke Line.
- F. Choke Line w/ 3" 5 M Valves. Inside Valve can be Manual but the Outside Valve Must be Hydraulic (HCR). Choke Line Must be 3" 5 M.
- G. Closing Unit (Kooimey) w/ a Primary & Secondary Pressure Supply to Operate the BOP Stack. Also a N₂ Supply will be Provided as a Final Source of Operation to Close the BOP Stack. This Unit is Required to Contain a Minimum of 1 1/2 Times the Needed Volume to Operate the BOP Stack at All Times. The Precharge of N₂ will be Checked Prior to Contractor Commencing Work for SONAT.

SONAT EXPLORATION**West [REDACTED] TEXAS BUSINESS UNIT**

Minimum Requirements for a
5,000 psi BOP Stack Manifold

A Gas Buster is Necessary and Must be 16" O.D. x 14' Tall.
A Flare Line to Vent the Gas Away from Rig is Needed.



- A. Header for Gas Expansion 6" O.D. Tube.
- B. 2" 5 M Manual Valves on Down Stream Side of Choke.
- C. 2" 5 M Manual Adjustable ~~on~~ Positive Choke.
- D. 2" 5 M Manual Valve (2 valves on each side of cross)
- E. 2" 5 M Adjustable w/ Remote Station
- F. 3" 5 M Tee w/ Gauge in Top Side 3" Choke Line
- G. Gas Buster 14" O.D. x 12' tall w/ Flare Line to Vent Gas Away from Rig.

Note: All Pipe Will be Flanged & Welded. No Screwed Connections.

H. two 3" 5 M manual valves