

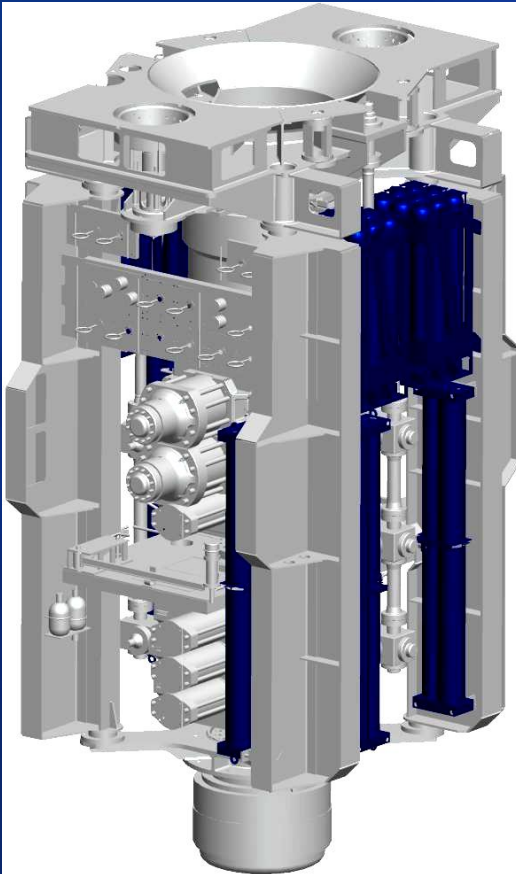
# API Standard 53

- API Standard 53 *Blowout Equipment Systems for Drilling Wells* was developed using the API ANSI accredited standards development process based on openness, balance, consensus and due process
- The current edition was published November 2012
- This Standard is the product of two plus years of SMEs work and has now been in use for nearly 3 years
- Industry fully supports IBR of API 53 in its entirety

# Deviations from API 53

- Accumulator Capacities
- All at once inspection of the BOP
- Hydraulic Locks on Surface Stacks
- ROV Intervention Functions
- Shear/Seal under flowing conditions
- Shear Sequences
- Testing
- Training and Qualification



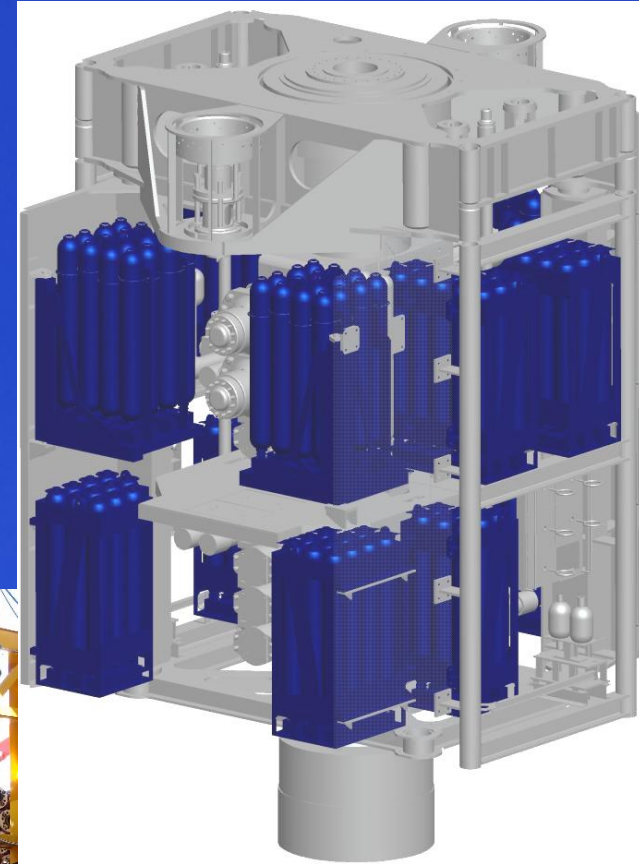


Typical Stack Today

To comply with proposed rule,  
one Drilling Contractor's stack  
would require :

- 33 additional subsea accumulators
- 62 Surface accumulators
- 19 additional ROV panels

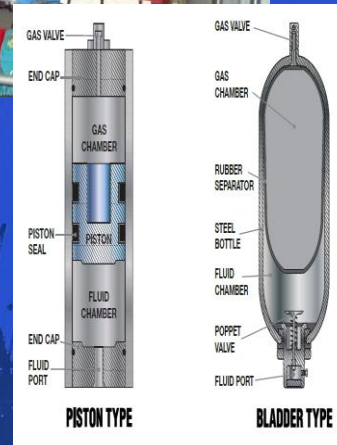
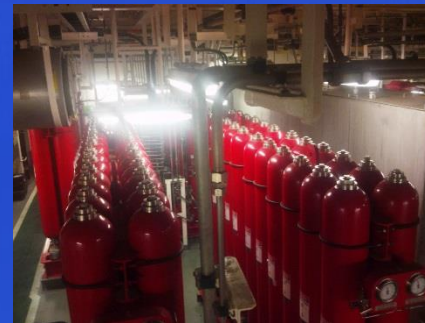
However, it is currently in  
compliance with API specifications.



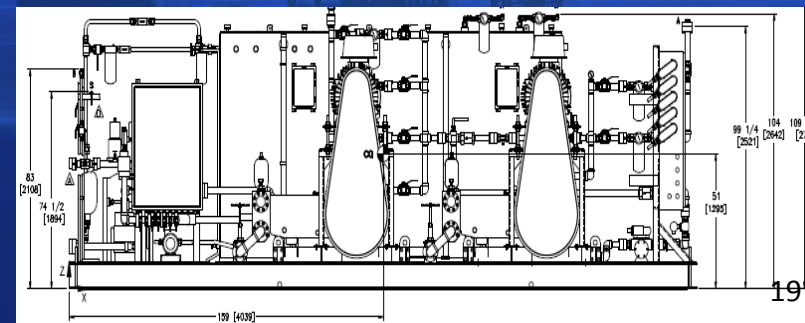
Stack After Proposed Rule

After the proposed rule, BOP Stacks would be significantly heavier, more difficult to handle and maintain, and have ROV visibility obscured. More importantly, they would not be any safer than the ones used today and would become less reliable due to the additional components and leak points.





## Hydraulic Power Unit



Accumulators store energy for use when power source is unavailable or to assist rapid discharge. Basically they compress gas against the power fluid which expands and drives the power fluid to the selected application. All BOP functions are normally powered from surface supply by high pressure pumps that deliver fluid which is stored in accumulator banks which supplement the pumps when a function is operated such as closing a pipe ram.

250.735(a) A surface accumulator system that provides 1.5 times the volume of fluid capacity necessary to close and hold closed all BOP components against MASP.





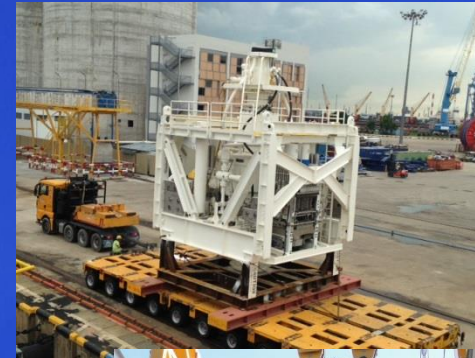
The modern subsea BOP stack is fifty plus feet tall, weighs 460 - 500 short tons and, in 2011, cost in the region of \$40,000,000.

### API S 53 section 7.6.9.3.1

At least every 5 years, the well control system components shall be inspected for repair or remanufacturing, in accordance with equipment owner's PM program and the manufacturer's guidelines.

### 250.739 What are the BOP maintenance and inspection requirements?

A complete breakdown and detailed physical inspection of the BOP and every associated system and component must be performed every 5 years. This complete breakdown and inspection may not be performed in phased intervals. A BSEE-approved verification organization is required to be present during the inspection







Diverter Housing



Riser joints are 75 – 90 feet long and with buoyancy weigh up to 40 Tons each. A Deepwater rig owns about 120 joints



BOP control pods distribute control fluid with over 110 functions and weigh about 27 tons each

***Are all these associated systems to be removed and returned to OEM every 5 years?***



Choke & Kill Manifold



BOP Control Panel

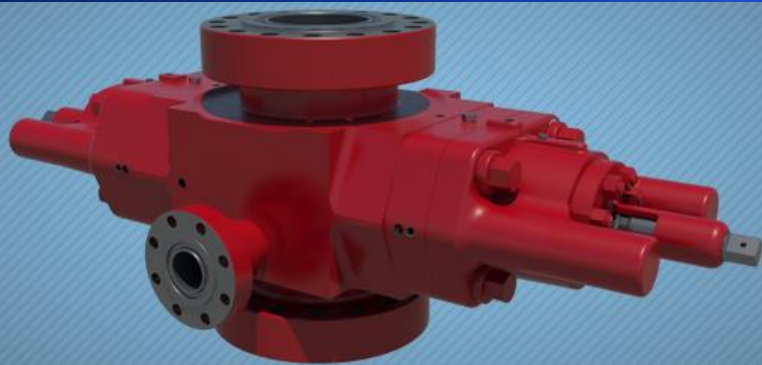


Central Control Console

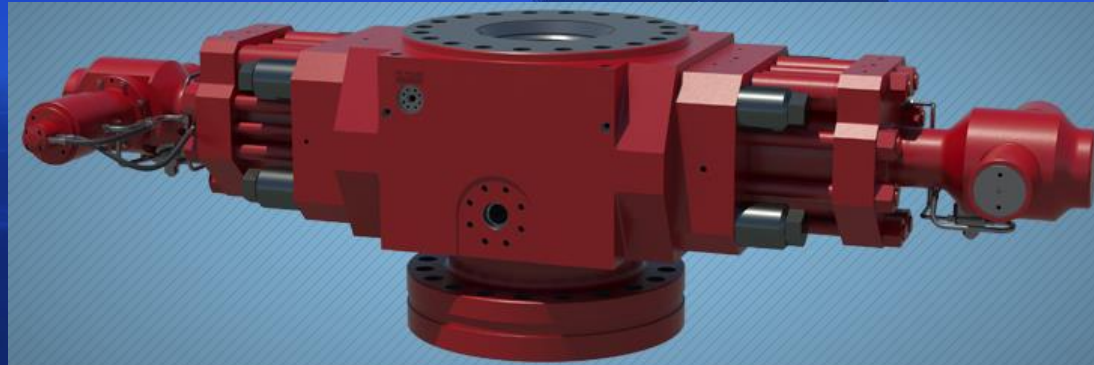


# Hydraulic Locks on Surface Stacks

- Manual locks have been reliably and safely used for many years
- The need for hydraulic locks was driven by the application of a subsea BOP which doesn't lend itself to manual locks as it is physically located subsea
- During the latest revision of API 53, there was insufficient data to require the use of hydraulic locks on surface BOPs
- Manual locks are more reliable than hydraulic locks due to their simplified design and inherent manual operation
- Increase in control system complexity
- Operating the equipment under high pressure has successfully been accomplished using proven safe operational procedures



BOP with Manual Locks



BOP with Hydraulic Locks

- API 53 identifies the critical functions which require ROV access
- The BOP is equipped with accumulators for *emergency* functions such as Deadman and Autoshear systems
- ROV Panels are *secondary control systems* currently assigned to critical functions only
- Many additional ROV panels would be required to comply to the proposed rule
- This would result in additional leak paths, and require more space / real estate on the stack
- The additional equipment would obscure the ROV's view



Existing ROV Panels and Visibility

Existing Valve and Plumbing



# BOP Equipment Summary

- Industry fully supports the IBR of API 53, but does not support those requirements that deviate from those found in API 53
- API 53 was developed and published in November 2012 through a comprehensive, accredited process to address BOP equipment systems for drilling wells and should be the basis of the new rule
- Deviations from API 53 in the Proposed Rule may:
  - increase risk and complexity;
  - decrease overall system reliability and safety;
  - not be technically feasible; and
  - risk US global competitiveness