



Your Next Generation Driller

API Standard 53

Understanding the implications

OISD Workshop – November 2013



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Objectives

- ◆ Introduce new requirements of API STD 53 for well control systems
- ◆ Present technical challenges the industry will face, specifically for floaters, in those areas where API S53 is adopted as a standard.

Content

- ◆ Introduction to the standard
 - ◆ Significant changes
 - Implications and Impact
 - ◆ Implementation of API Standard 53
 - ◆ Summary
 - ◆ Transocean Actions
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Background and Relevant Information

- ◆ **API STD 53 was released in November 2012, replacing API RP53, after being revised during 2 years by its committee composed of representatives from the main Oil Companies, Drilling Contractors, Equipment Vendors and Third Party Surveyors.**
 - ◆ **API STD 53 is intended to establish requirements for the installation and testing of Well Control Equipment. Other systems such as diverters, riser and etc are not covered in this standard.**
 - ◆ **It is no longer a RP (Recommend Practices) document but a STANDARD and applicable in those areas where it is integrated regulatory requirements and/or if required by the customer.**
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Overview

- ◆ **The API S53 presents new requirements not only for equipment functionality and configuration but also for the testing and maintenance of well control equipment.**
 - ◆ **Some equipment requirements will cause technical challenges that will affect the whole industry.**
 - ◆ **This presentation focuses on the most challenging aspects of API STD53.**
 - ◆ **Floating rigs are primarily affected by API S53 whereas Jack Up requirements are not as challenging as floater's.**
 - ◆ **Enforces the latest revision of specific API specifications on all rigs**
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New Functionality Requirements - Floaters

1) Minimum 2ea shear rams of which at least one capable of sealing – API STD 53 Section 7.1.3.1.6.

- ◆ For Moored rigs a minimum of one set of BSR capable of sealing the well may be used after conducting a risk assessment of the rig's station keeping capability – API Section 7.1.3.2.
 - ◆ This requirement will drive implementation of 5 rams stack due to operational flexibility.
 - ◆ For older rigs that were built with only 1 set of shear rams, this item presents technical challenges such as: increase of BOP weight requiring upgrades to the handling system due to the addition of one cavity and bigger frame; space out in the moonpool area will need to be reviewed due to the additional height in the BOP stack;
 - ◆ Long lead times for purchase and delivery of these equipment is an issue;
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New Functionality Requirements - Floaters

2) Emergency back up systems with dedicated accumulators in all floating rigs (Deadman and Autoshear) – API STD 53 Sections 7.3.18.2; 7.3.19.2; 7.4.14.2 and 7.4.15.2)

- ◆ Typically moored rigs are not compliant with this requirements introduced in API S53.
 - ◆ The installation of DMAS with dedicated accumulators will increase the weight of the BOP requiring upgrade to the handling system, possibly frame modifications and BOP area structure assessment. (space constraints)
 - ◆ Long lead times for purchase and delivery of these systems is an issue.
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Average Delivery Times for Well Control Equipment

Equipment Name	Average Lead Time (in weeks)
Complete BOP Stack	156
Annular BOP	140
Ram BOP	140
Ram BOP Bonnets	140
Wellhead/LMRP Connector	104
Diverter	104
Riser Joint	90
BOP Control Pods	64
Coflexip Hose	48
C&K Manifold	40
MUX Reel	36
Flex Joints	32
Hose Reel	10

New Functionality Requirements – Floaters

3) Accumulator sizing for back up systems must comply to API Spec 16 D rev2 – API STD 53 Section 7.6.8.1.2

- ◆ Dictates that Method C for volume calculation shall be used for accumulator sizing for emergency systems (increases required stored volume to achieve the same result).
 - ◆ Substantially increases the number of accumulator bottles of the system for deepwater and ultra-deepwater activities leading to increase of weight and consequently upgrades to the handling system, possible modifications to the frame work and assessment of BOP area structure.
 - ◆ Long lead times for purchase and delivery of accumulator bottles is an issue.
 - ◆ Emergency systems and secondary control systems (DMAS, ROV Intervention and acoustic) can have shared accumulators
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New Functionality Requirements – Floaters

4) Shearing capability verification to consider maximum expected wellbore pressure – API STD 53 Section 7.6.11.7.5

- ◆ Previous requirement didn't take in consideration wellbore pressure. This will drive a need to increase existing shearing capabilities.
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Accumulator Requirements

Number of 15 Gallon Accumulators Required

	One Shear Ram Closing @ 3000 psi	Two Shear Ram Closing @ 3000 psi
Method A (Ideal Gas) 7,500 ft water depth	13	26
Method C (Adiabatic) 7,500 ft water depth	45	89
Method C (Adiabatic) 7,500 ft water depth 8,000 psi Well Bore Pressure	66	131

Assumptions:

Hydril 5K bonnet – 40 gallons to close

7,500 psi Accumulator (Rating of the accumulator only)

15 gallon accumulators

Seawater in bore

BOP Control system pressure is 5,000 psi

Operational and Testing Requirements – Floaters

1) Subsea ROV intervention ram closing function to meet API closing time of 45 seconds – API STD 53 Section 7.3.20.1.6 and Table 7.

- ◆ Although BOP systems are designed to comply with API closing times, most of ROV units in the field are not capable of supplying enough flow to the system to comply with this requirement.
 - ◆ Need to demonstrate this capability
 - ◆ Alternatives such as: deployed accumulator skid in the sea bed; flying lead from stack mounted accumulator bank and or surface hot line can be used after a risk assessment is conducted.
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Operational and Testing Requirements – Floaters

2) Subsea Testing of Emergency Systems shall secure the well in 90 seconds – API STD 53 Section 7.3.20.1.5 and Table 7.

- ◆ DMAS and EDS systems shall be capable of shutting the well in 90 seconds.
 - ◆ Functions operated after the well is secured are NOT included in the time specified above.
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Operational and Testing Requirements – Floaters

3) Frequency for accumulator drawdown testing has changed, now requiring the following steps: (API S53 Sections 7.4.6.4 and 7.6.8.2.2)

- ◆ This test shall be performed prior to deployment and upon initial landing the BOPs, after any repairs that required isolation/partial isolation of the system and subsequently every 6 months from previous test.
- ◆ Risk for DP vessels – EDS capability is compromised for the time to recharge the system.

4) For all equipment failures during service, a report must be produced and forwarded to the equipment manufacturer's – API STD 53 7.6.5.7.4.

- ◆ The drilling contractors in the GOM are developing a standardized form to establish a common communication tool
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Implementation of API STD 53

- ◆ **No time frame for implementation given by API.**
 - ◆ **The requirement and timeline for implementation is expected to be driven by regulators and oil companies.**
 - ◆ **If local regulators adopt API S53 as a standard for their specific region, it is expected that a time frame for implementation is given since an immediate requirement for implementation would likely result in operations shut down.**
 - ◆ **The North Sea is the only region so far that is adopting API S53 as a standard and a time frame of 7 years was given by the WLCPF (Well Life Cycle Practices Forum) as of November 2012.**
 - ◆ **A survey is being performed in the GOM to understand the implications of the new standard.**
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Summary of Challenges

- ◆ **Current delivery times from the main manufacturers – Minimum of 36 months for a complete stack. Up to 30 months for most main components.**
 - ◆ **Upgrades will be required to BOP handling systems to handle bigger and heavier BOPs, as a result of compliance with API 16D, and they may require OoS periods**
 - ◆ **New technologies will need to be developed (intensifiers, higher pressure control systems) but it will take time for implementation and acceptance by the industry.**
 - ◆ **The implementation of API S53 will need to be gradual allowing BOP owners to assess their asset strategy, evaluate the impact on the fleet and pursue the required equipment for compliance.**
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Transocean Action Plan

- ◆ **An extensive checklist was completed by all rigs to fully understand where the fleet stands in terms of compliance with the new standard.**
 - ◆ **Transocean is still evaluating fleet strategy and timeline for compliance based on contracts, regulatory requirements and customer expectations. - In the interim, compliance with the new standard will be evaluated in a case by case basis.**
 - ◆ **Although it is not a requirement, the implementation of API S53 will drive a minimum of a 5 ram stack for DP floaters to become the new standard.**
 - ◆ **Development of company equipment standards starting with most demanding requests: Autoshear and Deadman – Hydraulic and Mux systems API Spec 16D compliant; ROV Intervention System; etc.**
 - ◆ **Transocean is exploring alternative technologies to comply with API 16D.**
 - ◆ **Discussions with vendors regarding equipment inspections and certification.**
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