

BSEE

**Forum on Next-Generation BOP and Control Systems
Technology,
Management, and Regulations**

May 22, 2012

U.S. Dept. of the Interior
South Interior Building Auditorium
1900 Constitution Avenue, NW
Washington DC 20245

Next-Generation BOP and Control Systems Technology, Management and Regulations.

- Panel #4 – What real time technologies are available to measure the “health” of BOPs in service and aid in the detection and response to “kicks”?
 - Moderator – Pisces Carmichael, Project Manager, Lloyds Register
 - Garry Davis- Group Manager, Center of Excellence Well Control Equipment, Moduspec USA
 - British Petroleum, Global Wells Senior Manager
 - Frank Chapman, President, Ashford Technical Services
 - Tony Hogg, Director of Subsea Engineering, Ensco

Next-Generation BOP and Control Systems Technology

- What real time technologies are available to measure the “health” of BOPs in service and aid in the detection and response to “kicks”?
- (I believe) This should be two questions:
 - What real time technologies are available to measure the “health” of BOPs in service?
 - What real time technologies are available to aid in the detection and response to “kicks”?
- The first question is clearly focused on BOP and BOP control systems, the second question should be addressed to a related, but different, audience.

What real time technologies are available to measure the “health” of BOPs in service?

- Redundant control panels.
 - As a minimum, every BOP control system has two places from where the system can be fully controlled and monitored:
 - The Driller’s House where the Driller’s Control Panel is located. This space is always occupied whenever the rig is connected to the well.
 - The Rig Office where the Toolpusher’s Control Panel is situated. The office is most times, but not always, occupied.
- The HPU panel, on conventional systems, and the event logger, typically only on multiplex rigs, provide further place(s) from where the ‘health’ of the system can be assessed offshore.

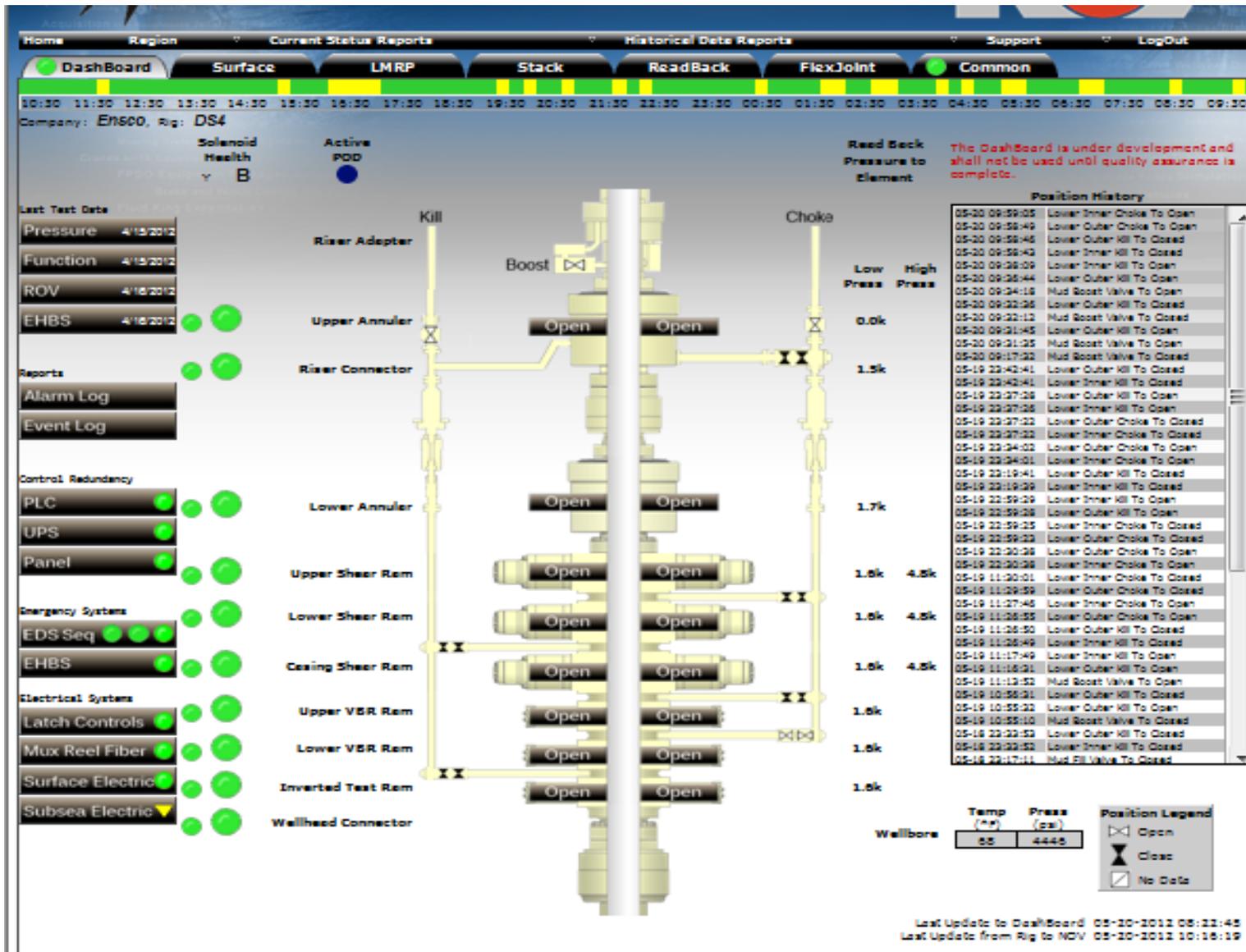
What real time technologies are available to measure the “health” of BOPs in service?

- Competent crews.
 - The information provided by these panels is normally sufficient to allow the subsea engineer, and others, to monitor the current ‘health’ of the fully redundant BOP control system at any time.
 - The front line will remain offshore where both the equipment and the crews who follow the operational and maintenance plans are located.
 - Support for these crews is provided from both Business Unit and Corporate offices as required.

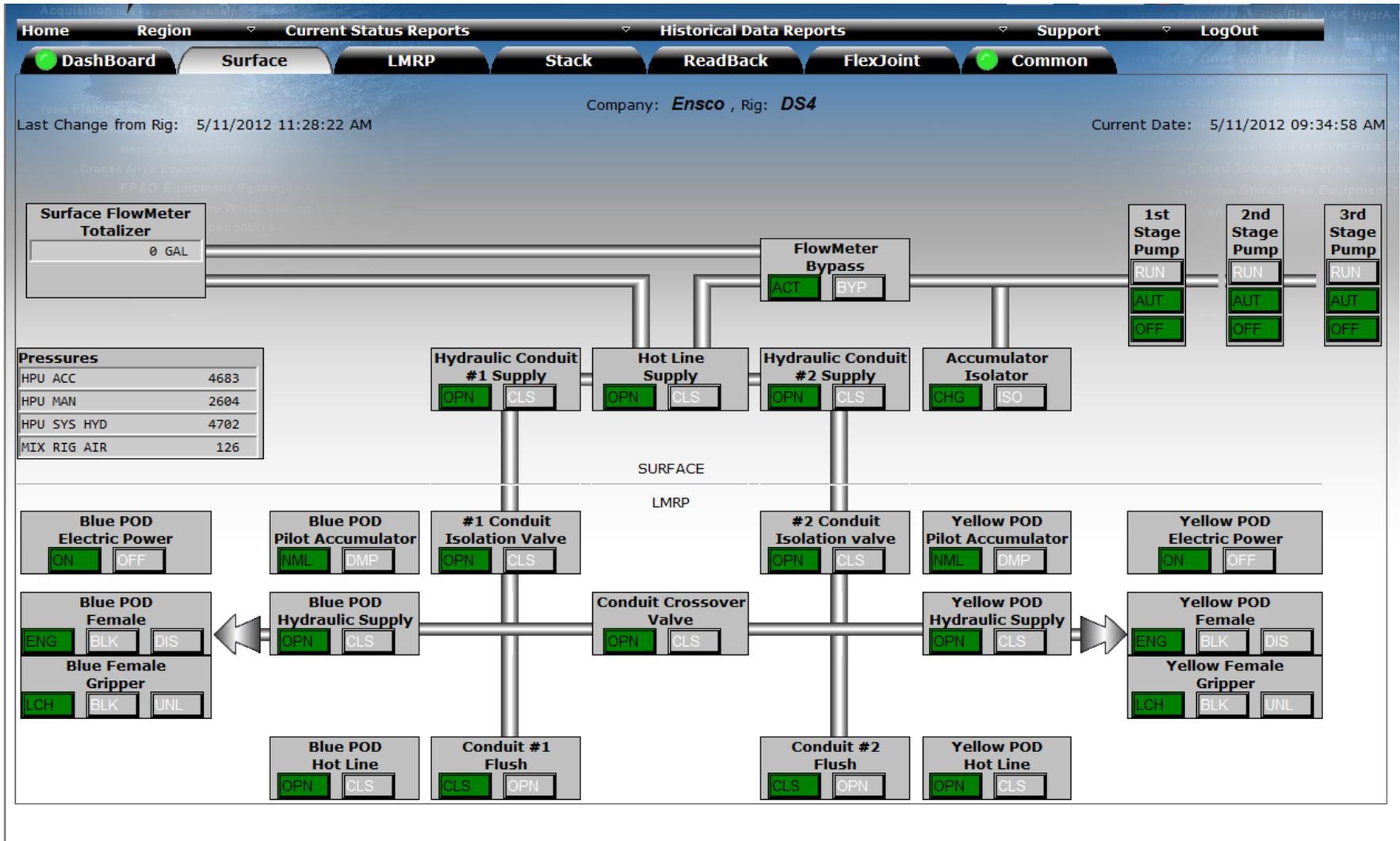
What real time technologies are available to measure the “health” of BOPs in service?

- Remote Monitoring.
 - Transmitting the event log information ‘live’ to the shore-base, or a dedicated monitoring center, will allow support personnel to see what the rig based subsea engineer can see, and to provide support/advice IF required.
 - Although there is no substitute for competent people offshore, there are times when peer discussions are very beneficial. The availability of real time information onshore will greatly enhance such discussions.
 - In the event of a major issue, the saved data will provide an accurate record to feed the investigation.

BOP Dashboard - system view



BOP Dashboard – surface system



BOP Dashboard- lower stack

Home Region Current Status Reports Historical Data Reports Support LogOut

Dashboard Surface LMRP Stack ReadBack FlexJoint Common

Company: **Ensco**, Rig: **DS4**

Last Change from Rig: 5/6/2012 5:37:19 PM Current Date: 5/11/2012 09:35:01 AM

The dashboard displays the following components and their controls:

- Blue Female Sec Cylinder:** EXT, RET, VNT
- EHBS:** ARM, BLK, DIS
- EHBS Casing Shear:** DIS, ENB, VNT
- EHBS Loss of DDV Output:** ELEC, HYD
- Upper Outer Kill:** OPN, CLS
- Upper Inner Kill:** OPN, CLS
- Lower Outer Kill:** OPN, CLS
- Lower Inner Kill:** OPN, CLS
- Emergency Disconnect Driller's:** RST
- Emergency Disconnect Tool Pusher's:** RST
- Stack Connector Secondary:** VNT, ULK
- Stack Connector:** POCV, LCK, BLK, ULK
- Lower Annular:** OPN, VNT, CLS
- Pipe Ram 1-6:** OPN, VNT, CLS
- High Pressure:** HCL
- Stack FSC Accum:** DMP
- Inner FSC VLV Accumulator:** CHG, ISO
- Outer FSC VLV Accumulator:** CHG, ISO
- High Pressure (3 locations):** HCL
- Upper Inner Choke:** OPN, CLS
- Upper Outer Choke:** OPN, CLS
- Middle Inner Choke:** OPN, CLS
- Middle Outer Choke:** OPN, CLS
- Lower Inner Choke:** OPN, CLS
- Lower Outer Choke:** OPN, CLS
- Emergency Accumulators:** CHG, ISO, DMP
- Shear Accumulators:** CHG, ISO, DMP
- Stack Connector Gasket:** RTN, VNT, RLS

BOP Dashboard - readbacks

Home Region Current Status Reports Historical Data Reports Support LogOut

Dashboard Surface LMRP Stack ReadBack FlexJoint Common

Company: **Ensco**, Rig: **DS4**

Last Change from Rig: 5/11/2012 11:32:38 AM Current Date: 5/11/2012 09:44:13 AM

Surface Feedback		
HPU Accumulator Pressure	4666	PSI
HPU Manifold Pressure	2605	PSI
HPU System Hydraulic Pressure	4686	PSI
HPU Air pressure	126	PSI
Diverter Accumulator Pressure	2640	PSI
Diverter Air Pressure	126	PSI
Diverter Packer Pressure	529	PSI
Diverter Manifold Pressure	1514	PSI
FlowLine Seals Pressure	823	PSI
SlipJoint Packer Pneumatic pressure	82	PSI
SlipJoint Packer Hydraulic Pressure	116	PSI

Blue Pod	SubSea	Yellow Pod		
4922	PSI	Conduit Pressure	4668	PSI
5028	PSI	Pod Pilot Accumulator Pressure	4579	PSI
86	PSI	Supply Pressure	3173	PSI
3014	PSI	Pod Pilot Pressure	2929	PSI
0	PSI	Manifold Pilot Pressure	1479	PSI
19	PSI	Manifold Pressure	1430	PSI
1254	PSI	Upper Annular Pilot Pressure	530	PSI
0	PSI	Upper Annular Pressure	700	PSI
1146	PSI	Lower Annular Pilot Pressure	565	PSI
315	PSI	Lower Annular Pressure	605	PSI
1398	PSI	Riser Connector Pilot Pressure	1371	PSI
0	PSI	Riser Connector Pressure	1428	PSI
1282	PSI	Stack Connector Pilot Pressure	1494	PSI
0	PSI	Stack Connector Pressure	1445	PSI
26	PSI	Shear Pressure	4662	PSI
3925	PSI	Stack Wellbore Pressure	0	PSI
42	*F	Stack Wellbore Temperature	0	*F
51	*F	Can 1 Temperature	50	*F
47	*F	Can 2 Temperature	46	*F
7	%	Can 1 Humidity	16	%
15	%	Can 2 Humidity	17	%