

Drilling Safety: Off-Rig BOP Monitoring

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Drilling Safety: Off-Rig BOP Monitoring Today's Technology and Beyond

- Briefly summarize Ashford's Rig Watcher™ BOP Monitoring System – proactive maintenance, early identification of problems.
- Summarize some of our experience over the last three years – lessons learned, feedback from users, etc.
- What's possible in the future.

Technology Overview



Remotely Monitor
the BOP
Anytime, Anywhere

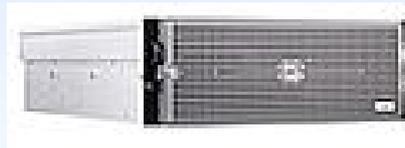
← - - - - -
Both Current and Historical
Status



Satellite
Link

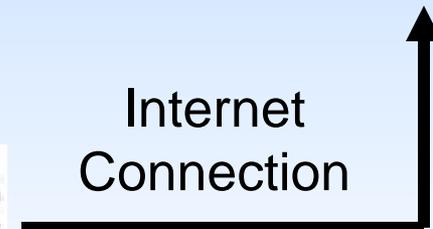


Collect raw BOP **Data** from
pressure switches,
solenoids, pressure
transducers and flow meters



Onshore
Web Server

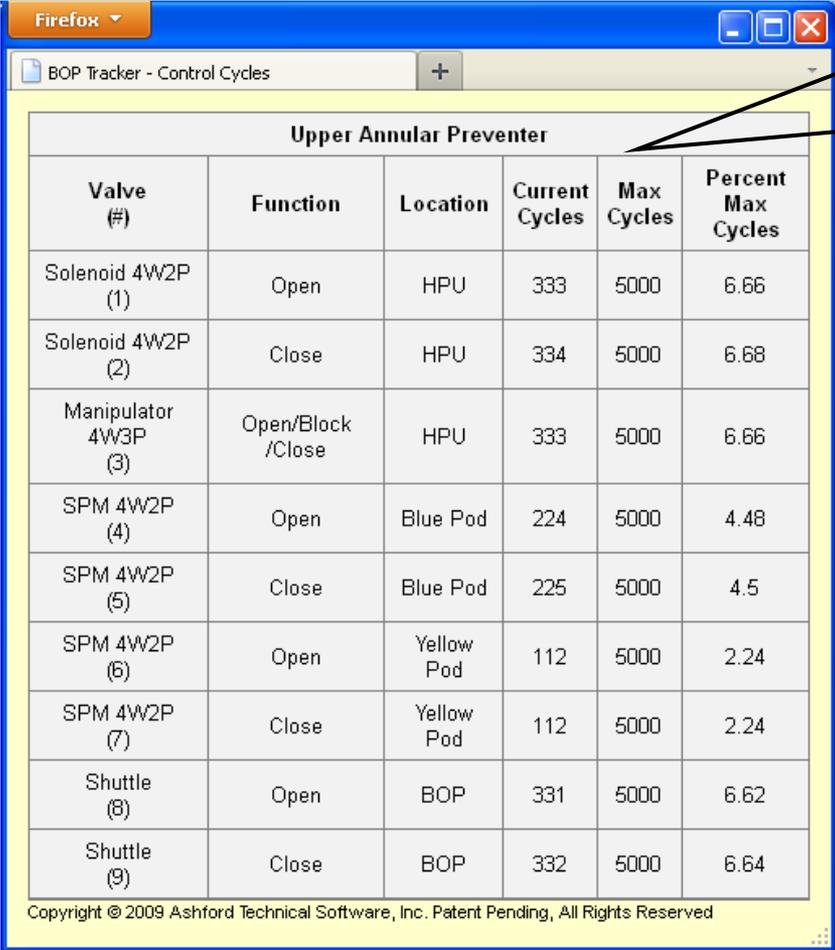
Internet
Connection



Turn raw BOP data into
useful **Information**
made available via the
Internet

Preventive Maintenance Tracking Usage - Cycles

Cycle report for
all valves
associated with
Opening and
Closing the
Upper Annular



Upper Annular Preventer					
Valve (#)	Function	Location	Current Cycles	Max Cycles	Percent Max Cycles
Solenoid 4W2P (1)	Open	HPU	333	5000	6.66
Solenoid 4W2P (2)	Close	HPU	334	5000	6.68
Manipulator 4W3P (3)	Open/Block /Close	HPU	333	5000	6.66
SPM 4W2P (4)	Open	Blue Pod	224	5000	4.48
SPM 4W2P (5)	Close	Blue Pod	225	5000	4.5
SPM 4W2P (6)	Open	Yellow Pod	112	5000	2.24
SPM 4W2P (7)	Close	Yellow Pod	112	5000	2.24
Shuttle (8)	Open	BOP	331	5000	6.62
Shuttle (9)	Close	BOP	332	5000	6.64

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Max Cycles
Currently no good
data, using 5000
as a placeholder

Monitoring Operations

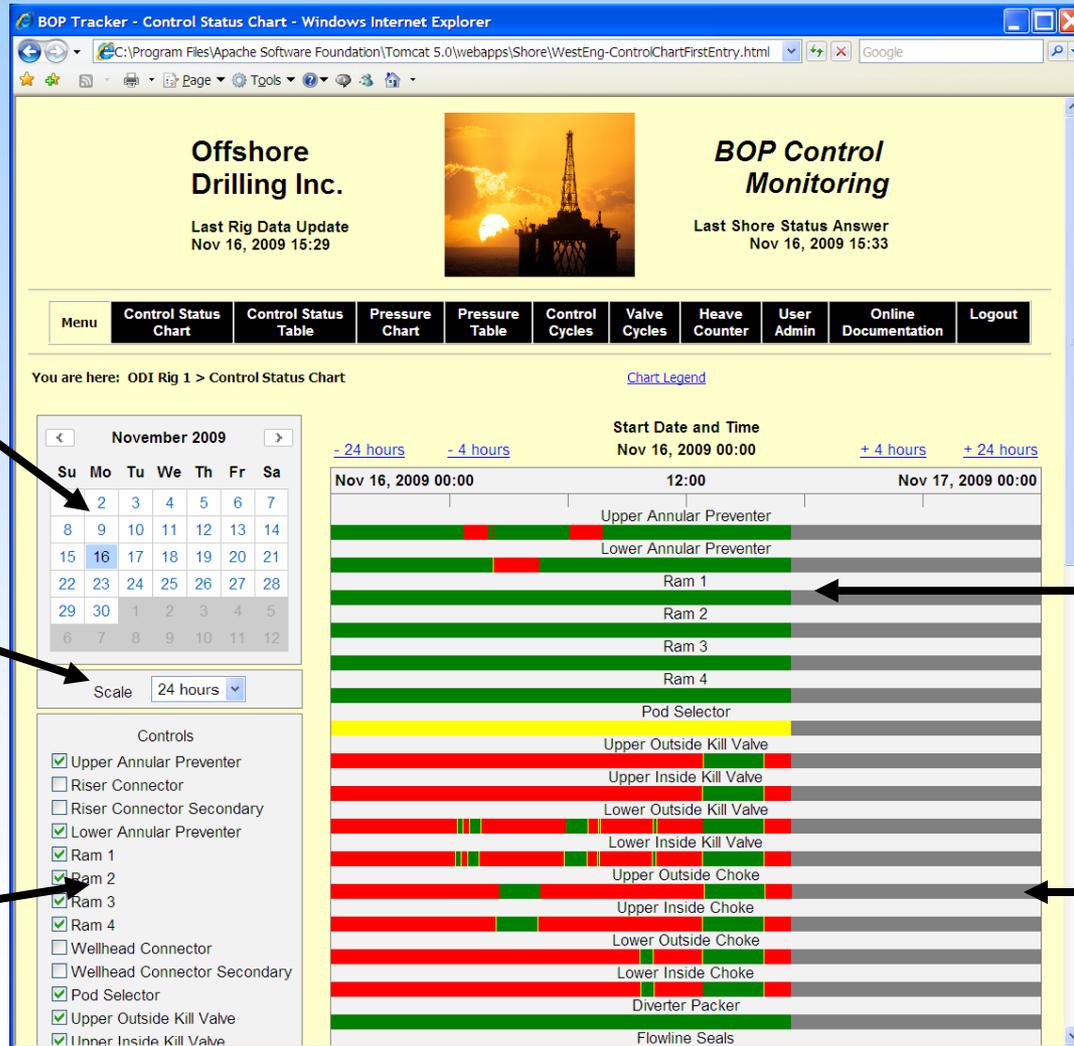
Tracking Operations, Providing Guidance

Detailed
24-hour
summary
of all major
BOP
functions



Color
Coded
to
Tool
Pusher's
Panel

Control History - Partial Day



Select Date

Select Time Scale

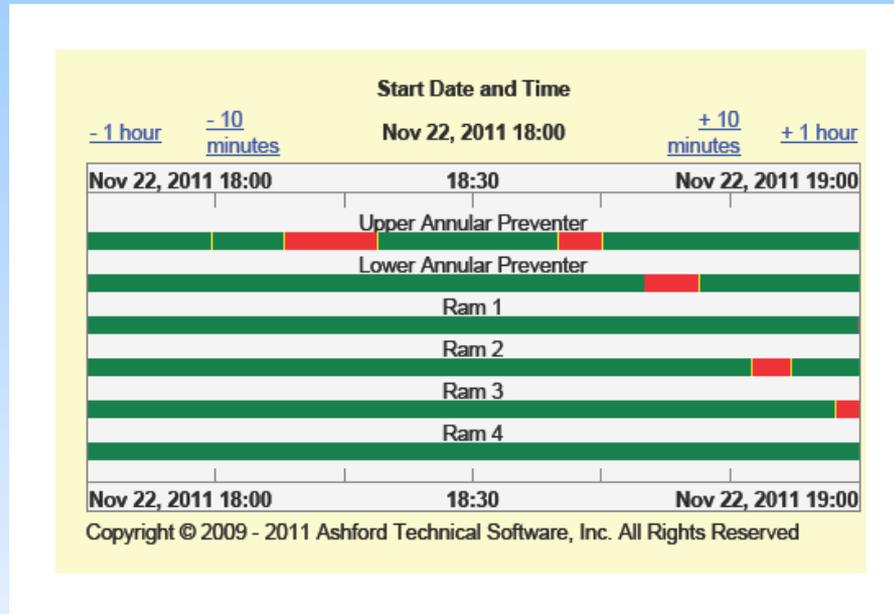
Select Controls to View

Current Date/Time
Nov 16,
2009
3:34 PM

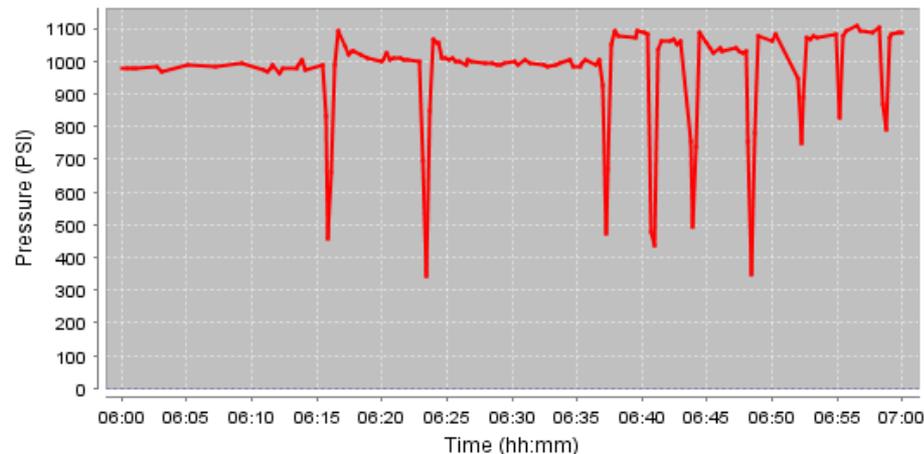
24-Hour Window

Monitoring Hydraulic Pressure

1-hour Window
Annular and Ram
Functions



1-hour Window
Manifold
Read-back
Pressure



What is the technology?

- A Black Box
 - Yes. A tool for doing forensics after-the-fact.
- But more importantly it is a tool
 - To review and monitor drilling and safety equipment on a regular basis. Identify equipment problems before they become critical.
 - To review operational procedures on a regular basis.
- The goal is to improve operations and increase safety (and hopefully reduce the need for a Black Box).

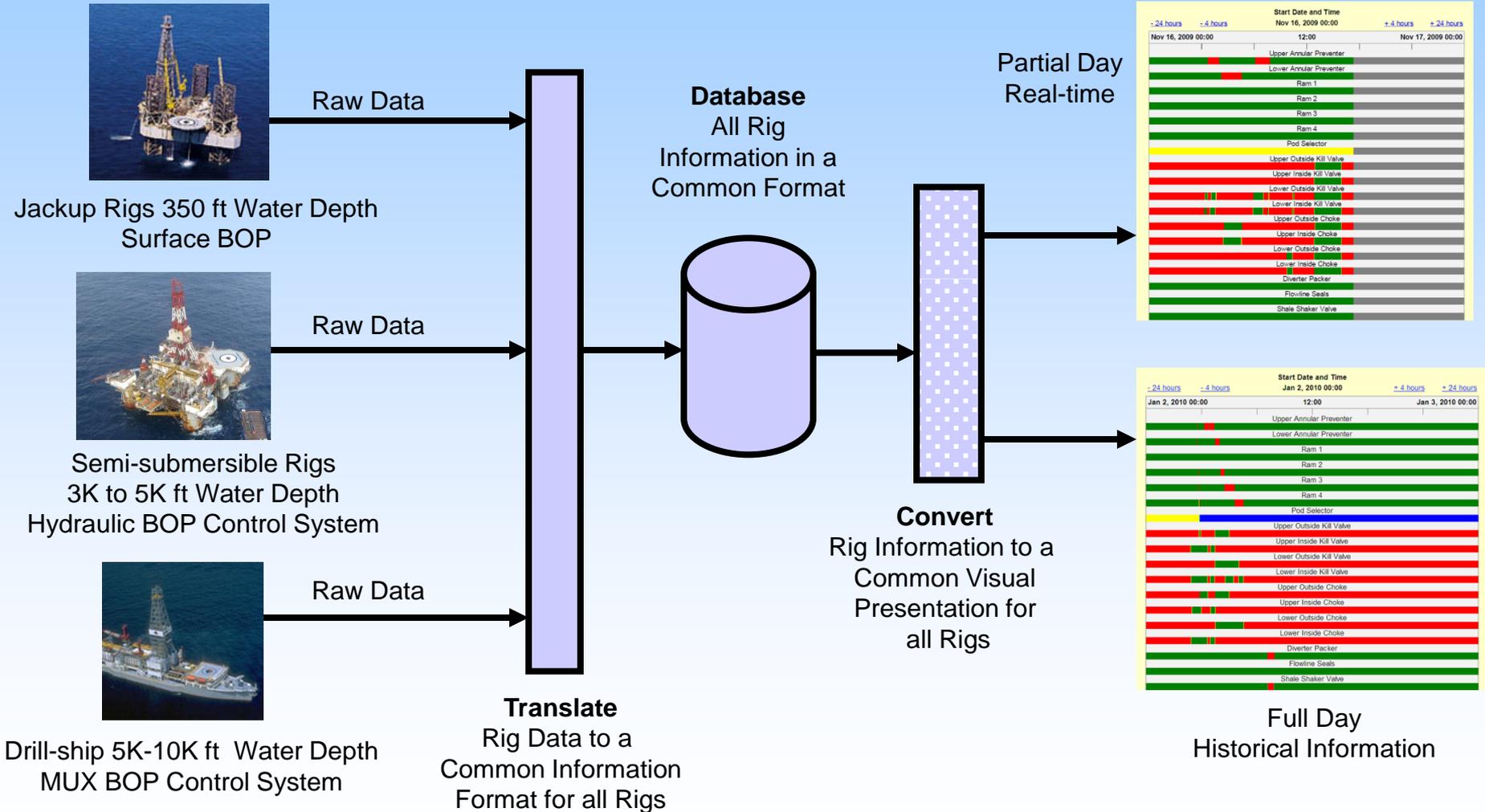
Objectives of BOP Monitoring

- Move from time-based maintenance to cycle-based maintenance:
 - Determine the useful life of BOP components.
- Develop metrics to identify potential equipment problems:
 - Pressure and flow versus time profiles (signature).
- Monitoring is a three part problem:
 - Raw data acquisition and storage.
 - Raw data analysis to create useful information.
 - Present information in a simple common format.

All Rigs – Common Presentation

--- Satellite Link ---

--- Internet Connection ---



Something for everyone - Driller, Operator, Regulator

- One person should be able to easily monitor multiple rigs on a regular basis.
 - *Drilling Contractors*: Preventive maintenance. Monitor and improve operations. Provide expert guidance to personnel on the rig.
 - *Operating Companies*: Oversee drilling and safety operations.
 - *Regulators*: Efficient utilization of manpower to insure adherence to regulatory requirements.

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