Drilling Safety:
Off-Rig BOP Monitoring

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Drilling Safety: Off-Rig BOP Monitoring Using Today’s Technology

- Share with you some of the things Ashford Tech is doing using today’s technology to monitor the BOP.
- Summarize how this can help improve drilling safety.
- Additional monitoring and data analysis that can be done in the near term.
Technology Overview

Remotely Monitor the BOP Anytime, Anywhere
Both Current and Historical Status

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

Onshore Web Server

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

Satellite Link

Internet Connection

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Technology Overview

--- Satellite Link ---

Raw Data

Jackup Rigs 350 ft Water Depth
Surface BOP

Raw Data

Semi-submersible Rigs
3K to 5K ft Water Depth
Hydraulic BOP Control System

Raw Data

Drill-ship 5K-10K ft Water Depth
MUX BOP Control System

--- Internet Connection ---

Partial Day
Real-time

Convert
Rig Information to a
Common Visual
Presentation for
all Rigs

Full Day
Historical Information

Database
All Rig
Information in a
Common Format

Translate
Rig Data to a
Common Information
Format for all Rigs
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.
  – 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).
What does the technology do?

• Collects equipment data for input to preventive maintenance systems.
• Allows monitoring of operations for adherence to company and regulatory standards.
• Provides information to diagnose equipment failures.
• Provides the information so expert onshore can provide guidance to personnel on the rig.
Preventive Maintenance
Tracking Usage

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

Max Cycles Currently no good data, using 5000 as a placeholder
Observations on BOP Usage

• Cycle-based is more appropriate than time-based maintenance.

• BOP functions and valves are cycled more times than previously estimated.
Monitoring Operations
Tracking Operations, Providing Guidance

Detailed 24-hour summary of all major BOP functions
Anytime, Anywhere Access

Website Interface

Color Coded to Tool Pusher’s Panel or a Common Format

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

24-Hour Window

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Something for everyone - regulator, driller, operator

- One person should be able to easily monitor multiple rigs on a regular basis.
  - *Regulators*: Efficient utilization of manpower to insure adherence to regulatory requirements.
  - *Operating Companies*: Oversee drilling and safety operations.
What else can be done today?

- Add monitoring of other drilling and safety equipment.
- Integrate equipment monitoring with well monitoring to build a more comprehensive picture of the drilling process.
- Provide the information required to develop performance-based maintenance.
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