Third-Party Real-Time Monitoring Providers Panel

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- Business Manager, Real Time Solutions; 12 months with Halliburton
- Previous: Nabors Drilling, Baker Hughes, Consulting—15 years relevant experience
- Marketing, product management, and technology
- B.S. Mechanical Engineering, Masters Business Administration
- Published ten combined real-time-related SPE technical papers and industry periodical articles
Real Time (RT) Monitoring at Halliburton

An *integral capability* for our product service lines (PSLs) to deliver superior oilfield services
RT Centers

- An integral part of the continuous improvement process. Standard operating procedures (protocols based on best practices) can be implemented and supported remotely across global operations.

- Supports 24/7 surveillance for RT drilling decisions.

- Integrate people, process, and decision support technology.
  - Drilling mechanics
  - Hydraulics
  - Geomechanics

- Document and share lessons learned
RT Decision Support

- Surveillance crew observes prescribed parameters, comparison with predetermined conditions
- Indirect parameters measured through modeling applications
- Information distribution through prescribed protocols
- Interventions based on RT observations, defined protocols, which helped identify and prevent potential problems
Role and Relationship

How to describe the role of third-party providers

- Provide specialized services at the direction of the operator
- Based on tender request and awarded contracts

How to interface with industry customers and how to view this relationship

- Provide service as requested
- Contracted by the operator in the role of a vendor
RT Services

What services are provided?
- Data collection, processing, aggregation, and transmission/distribution
- Data visualization, reporting, and RT data access
- Solutions-based applications
- RT centers
- Consulting services
  - Drilling mechanics
  - Hydraulics
  - Geomechanics

How do the services lend themselves to operational decision making?
- Integrates FE and drilling data
- Provides operational details and situational awareness
- Supply operating teams as much timely info as possible to make more informed decisions
Accountability and Automation

What about accountability between the operator and the firm?

- Varies based on operational contract under the direction of the operator
- Decision making and accountability belongs to operator or client

What level of automation and remote control is appropriate to balance accountability, responsibility, and operational efficiency?

- Should be limited to basic data alarms and alerts
  - Data latency and communications reliability
  - Limited operational context from remote locations
  - Information security
Protocols and Parameters

What are the suggested protocols for remote oversight and the established chain of command?

- Select prescription-based protocols based on best practices
- Will ultimately be based on contract and service type defined before a job
- Each operator can specify different protocols

Are there critical operations and specific parameters that are typically monitored?

- Monitored operations: drilling, circulating, reaming, tripping, logging, and cementing
- Revolutions per minute (RPM), torque, hookload, pump strokes, surveys
- Pit volume, flow, temperature, fluid density, pump and casing pressure, total gas, H₂S, and CO₂
Automation and Predictive Software

Does the company rely on any automation and predictive software in RT monitoring?

- RT service quality, data quality assurance/quality control (QA/QC), alarms, and alerts
- Engineering models—PPFG, WBS, hydraulics, T&D, drillstring and analysis
- No predictive software

What role could automation and predictive software tools play in RT monitoring?

- Help to improve data and decision workflows
- Enable manpower to focus attention, expertise on higher-level activities
Condition-Based Monitoring

Condition-based monitoring is viewed by BSEE as monitoring the operating condition of critical equipment and using any generated data to predict and proactively intervene when necessary. As such, what role could condition-based monitoring play in RT monitoring? Describe how operating equipment using condition-based monitoring could be tailored and/or used for RT monitoring.

- Monitor the performance of equipment for service quality assurance
- Downhole temperature and pressure, shock and vibrations, out of spec operating conditions

RT monitoring technologies could be incorporated into BSEEs existing safety and environmental regulations to supplement its inspection program.

- Potentially, based on their needs, requirements, and the maturity of technology available
Leveraging RTM Technologies

How could BSEE leverage such technologies? What advice could be given to BSEE?

- Understand needs and what is available in the industry and associated applications
- Consider workflows, escalation protocols, expertise, and monitoring tools available
- Understand challenges for information distribution, management, and security
- Transform data into information and the ability to communicate actionable insights

Which activities could RT monitoring supplement or replace?

- Exposure to various types of operations concurrently with broader scope of potential problems
- Ongoing training, targeted, wider and deeper coverage of operations, when not on location
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