Real-Time Monitoring (RTM) Workshop For the National Academies of Science

Drilling Contractor & Equipment Manufacturers Sub-Group

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What is the scope of your services?

- Drilling contractors own and operate MODUs, and perform drilling, completion and well-test services for Operators.

What's the relationship between your company and an operator?

- Drilling Contractors are contracted by the Operator to perform drilling, completion and well test services.
- We are responsible for the safety of the rig and all personnel on board.

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

- On-rig automation is commonplace, e.g. pipe racking, power management, station-keeping (DP) , EDS.
- Additional on-rig automation is continuously adopted as it matures and offers clear improvements in safety and/or efficiency.
- **To our knowledge, there is no automation or remote control of *any system on any drilling rig* from shore.**

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

- **Any "remote oversight" must be completely subordinate to the existing Chain-of-Command on the rig.**
- "Where high-level commanders *possess the capability* to engage in evaluation at the on-scene commander level, **erosion of authority of the on-scene commander will take place**."

  Fundamentals of Naval Weapons Systems, Chapter 20, Command and Control Weapons and Systems Engineering Department, US Naval Academy

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Does your company use [remote] real-time monitoring for its offshore operations? What are the critical operations and specific parameters that your company monitors?

- Drilling contractors typically provide real-time data to operators, which may be monitored remotely at their discretion.
- Some Drilling Contractors monitor equipment parameters via remote RTM for maintenance purposes.
- Typically, there is no technical barrier to monitoring rig data via remote RTM; if there's a transducer, it can be monitored.

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Are there specific types of wells or operations and parameters that always should be monitored with remote RTM?

Are there specific criteria used to prompt RTM requirements (e.g. well/water depth, rank wildcats, HP/HT, "complexity")?

- **Data monitored with Remote RTM will not change well-to-well or operation-to-operation.**
- **All wells and offshore operations are critical;** they have the potential for major safety, environmental or cost issues.
- **"Critical activities" are already defined in 33 CFR 140.305** See Supplemental Information.

Does your company rely on any automation and predictive software in [remote] real-time monitoring? What role could automation and predictive software tools or condition-based monitoring play in [remote] real-time monitoring?

- Drilling contractors typically use predictive software *on the rig* for Condition-Based Monitoring (CBM) and Preventive Maintenance (PM).
- Where PM and CBM data is transmitted to shore via Remote RTM, it is typically for fleet-wide analysis and archival.

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How could BSEE leverage RTM technologies? Which BSEE activities could real-time monitoring supplement or replace? What opportunities do you see for BSEE to use real-time monitoring to provide timely, functional, and value added inspections?

- We suggest that any attempt to "leverage" Remote RTM should be prototyped extensively before implementation. (e.g. body cameras on BSEE inspectors during BOP tests)

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Additional Issues & Risks with "Oversight" via Remote RTM

(1) Divergent agency standards, e.g. "critical operations"

(2) Cyber Security, bandwidth, up-time and service interruption issues for SatCom links.

(3) Training and experience requirements for on-shore "Oversight" personnel

(4) Legal liability implications of BSEE oversight of drilling operations, particularly during "critical operations".

(5) Incomplete accounting for putative cost savings, e.g. remote witnessing of testing.

Supplemental Information

- **ISO 17969 Guidelines on Competency for Well Operations Personnel.**
- **Advanced Well Control Simulators are in place in the industry**; NAS and BSEE personnel are strongly encouraged to participate in industry well control training.
- **USCG seeking input on Cyber Security** (Docket USCG-2014-1020), specifically identifying and mitigating "potential vulnerabilities to (maritime) cyber-dependent systems".
- **Homeland Security offers training in Cyber Security for Industrial Control Systems** through ICS-CERT (Industrial Control Systems Cyber Emergency Response Team.

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Supplemental Information: Definition of "Critical Activities"

(a) USCG *Requirements for MODUs… Conducting OCS Activities with Dynamic Positioning Systems,* Federal Register Vol. 79, No. 229

(b) **Definition of "Critical OCS Activities" 33 CFR 140.305:**

Critical OCS Activities on a MODU means OCS activities where a loss of position could cause a major process safety incident, such as a loss of well control where flow reaches the MODU, or water. These OCS activities include but are not limited to: Well test and completion operations; running non-sheareables such as drill collars through the Blowout Preventer (BOP); and an OCS activity on a well where hydrostatic balance is lost and BOP rams are used to maintain well control.

Q&A and Comments