“Real Time” Monitoring Production Operations
(Amro Hamza)
Agenda

- Anadarko GOM Operations Overview
- Reply to BSEE Questions
- Summary
- Head office - The Woodlands
- 7 offshore facilities (not inc Heidelberg in 2016)
- Offshore control room manned 24/7
Q1 - Does your company use real-time monitoring for its offshore operations? If not, why?

- If your company does use real-time monitoring, what are the critical operations and specific parameters that your company monitors?
- Are there specific criteria or risk thresholds that your company uses to prompt real-time monitoring requirements (e.g. factors such as well or water depth, frontier area, HP/HT wells, or well complexity)?

- If RTM – staffed 24/7 by experienced personnel?...No
- All our offshore facilities are staffed and control room manned 24/7.
- Accountability needs to reside offshore.
- Limited visibility of offshore activity from onshore.
- Anadarko limits maintenance activity to daytime.
- Facilities are designed to fail safe.
Operations Monitoring Room

Wonderware InTouch Remote HMI Applications

- Operations Monitoring Room - The Woodlands
- Room is NOT staffed continuously
- Web based connection also available
1) Latency from the SCADA Room Mimic HMI and the Anadarko Data Center to the MPLS edge router HOURT15 is 0 MS (milliseconds)

2) Latency from Anadarko to Harris CapRock through the MPLS cloud is 4 MS

3) Latency from the Harris CapRock Teleport to the Anadarko Facility Harris CapRock network is 533 MS

4) Latency from the Anadarko Facility Harris CapRock network to the Facility Control Network is 7 MS

So the average latency between the Anadarko Tower and the Facility Control Network is between 536 MS to 690 MS
Operations Real Time Monitoring

Wonderware InTouch Remote HMI Applications

Typically utilized by Production Engineers
- Operational issues and well start up
- Hydrate and chemical injection issues
- Well unloading, plugging issues
- Support discussions between office and field on rates, temperatures, pressures
  - Engineers in office view the same HMI information as the field personnel

Other Uses
- Technical Services Group
  - Rotating Equipment
  - Vessels
- Facilities Engineering Group
  - Mooring System
  - Void Leak Detection System
Q2 - Does your company rely on any **automation** and **predictive software** in real-time monitoring?

- Automation and safety system separate
- Most safety switches are now analog, allowing visibility of operating conditions
- Predictive software only used for maintenance activity (condition based maintenance/monitoring).

Q3 - 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 needed.

- As such, what role could condition-based monitoring play in real-time monitoring?
- Describe how operating equipment using condition-based monitoring could be tailored and/or used for real-time monitoring.
Production Operations Real Time Monitoring

Caterpillar InSight Remote Monitoring and Diagnostics

Monitors Solar Turbine Compressor & Generator Packages
- Turbine Packages are monitored remotely by Solar Turbines in San Diego, CA
- Parameters and triggers are monitored to provide advanced diagnostics, condition monitoring, and predictive recommendations
- In House and Remote Solar Representatives can access the equipment and data to assist field personnel with diagnostics and repairs
- Operations maintenance personnel can also access reports and technical data via a web portal

BMT Independent Remote Monitoring System (IRMS)
- Provides key data related to environmental and physical conditions of the facility while unmanned during a storm event
- Deepwater facilities are rendered “invisible” to onshore monitoring due to need to power down and secure satellite systems
  - IRMS system allows ability to check status and stability of facility
  - Provides data to analyze need for support vessels and equipment
  - Provides data to confirm safe wind speeds and visual confirmation of helipad conditions
  - GPS data can be analyzed to determine offset of facility due to mooring failure or changes in draft
Production Operations Real Time Monitoring

IRMS System

► Totally self-contained, self powered, stand-alone remote monitoring system that requires no support or services from the facility during hurricane operation
► Integrated stabilized satellite communication system independent of any company network or communications services
► Allows monitoring of environmental conditions and facility motions remotely via the internet
► Focus of usage is the period prior to, during, and immediately after a hurricane event
**Production Operations Real Time Monitoring**

- **IRMIS System**
  - **Parameters**
    - Platform motions and responses (6DOF)
    - Wind, Temperature, Barometric Pressure
    - GPS data
    - Video and Pictures
### Production Operations Real Time Monitoring

**IRMS System TS IDA 11/9/2009 Advisory**

#### STA IRM 11/09/09 13:00:00

**Time:** 11/09/09 13:00:00 to 11/09/09 13:20:00

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Q4 - BSEE would like to use real-time monitoring technologies to accomplish many of its safety and environmental protection responsibilities.

- Real-time monitoring technologies could be incorporated into BSEE’s existing safety and environmental regulations in order to replace or supplement its on-site inspection program.
  - *Can not replace and opportunities to supplement inspection program from onshore are very limited.*
- How could BSEE leverage such technologies?
- Which 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?
- What would you recommend that BSEE do in the real-time monitoring area?
  - *RTM for production operations is an operational tool to help support offshore staff. Using RTM as an oversight tool does not add any value except to give people a false sense of security.*
Summary

RTM

- Production facilities are designed to fail SAFE.
- Anadarko does not have staffed onshore RTM centers for Production Operations.
- Offshore facilities are shut-in prior to hurricane evacuations.
- RTM (i.e. IRMS) used to monitor environmental conditions around the facility.
- Ultimate control resides with OIM (Offshore Installation Manager).
- Mimic stations are available onshore and are used by support staff for troubleshooting and support NOT oversight.

Condition Based Monitoring

- RTM for condition based monitoring only for large rotating equipment to improve uptime and minimize maintenance costs.
- Example of other condition based monitoring activity (non-RTM);
  - Flow assurance modeling
  - Mechanical integrity program
  - IR (infra red) inspection