



BSEE – Sponsor Agency Report

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“To promote safety, protect the environment and conserve resources offshore through vigorous regulatory oversight and enforcement.”

Presentation Overview

- Known Fastener Failures
- BSEE Fastener Initiatives
- Real Time Monitoring (RTM) Requirements
- BSEE RTM Efforts

BSEE Fasteners Failure Engagement

- BP Thunderhorse (4340 Steel)(2003)
- Subsequent fastener failures
 - Blowout Preventer (Inconel 718) (2010)
 - GE H4 (4340 Steel) (2012)
 - Casing Shear Ram (2013)
 - BP Hydraulic Connector (4340 Steel) (2014)
 - Blind Shear Ram (4340 Steel) (2015 & 2016)
- BSEE formed a Quality Control-Failure Incident Team (QC-FIT) to conduct technical evaluations (2012)

BSEE Quality Control Failure Incident Team

Technical Evaluation

- Assess “Fitness for Service” of manufactured equipment
- Identify gaps in industry practices/standards and/or regulations
- Technical Evaluations are fact finding
 - No enforcement actions resulting from the evaluations



Areas of Concern

Design Standards

- Significant Gaps
- Inconsistent Requirements
- Harmonization

Manufacturing Processes/Procedures

- Raw Material Processing
- Machining
- Heat Treatment
- Coating

Quality Control/Auditing

- Second/Third Tier Subcontracted Vendor Oversight
- Specification Compliance
- Management of Change

Operational Procedures

- Assembly
- Installation
- Torque
- Cathodic Protection
- In-Service Inspection

Quality Control Failure Incident Team Technical Evaluations

● H4 Connector fastener failures

- Report posted on BSEE website

- https://www.bsee.gov/sites/bsee.gov/files/bolt_report_final_8-4-14.pdf

● Hydraulic Connector fastener failures

- Report posted on BSEE website

- https://www.bsee.gov/sites/bsee_prod.opengov.ibmcloud.com/files/memos/public-engagement/qc-fit-bp-bolts-report-final.pdf

● Blind Shear Ram actuator fastener failures

- Draft Report in progress

Recent BSEE Fastener Initiatives

- BSEE Bolt Forum (8/2016)
- BSEE Engagement with industry to address inconsistent fastener material properties
 - American Petroleum Institute (API), American Society for Testing and Materials (ASTM), National Association of Corrosion Engineers (NACE) standards committees
 - Updated API 20E and API 20F fastener standards
 - Updates provided more consistency in fastener material property requirements across standards
 - API updating quality standards
 - API Q1, Q2, 18LCM to address second and third tier vendor oversight

Recent BSEE Fastener Initiatives

● Fastener Research

- Argonne National Laboratory – industry standards gap analysis on fastener requirements
- National Academies of Science Root Cause Analysis Bolt Workshop – April 2017

● Interagency Bolt Action Team (IBAT)

- Developing recommendations on optimal materials for fasteners in subsea service

● National Aeronautics and Space Administration

- Independent third party test laboratory

BSEE Information on Fasteners

www.bsee.gov/bolts



Real Time Monitoring

Well Control Rule Requirements

- Well Control Rule published in April of 2016
 - Includes real-time monitoring (RTM) requirements
 - 30 CFR §§ 250.724
- Starting on April 29, 2019
 - Operators must use RTM during well operations
 - With a subsea BOP
 - With a surface BOP on a floating facility
 - When operating in an HPHT environment

Real-Time Monitoring

Well Control Rule Requirements

Requires operators to gather and monitor data from:

- The BOP control system;
- The well's fluid handling system on the rig; and
- The well's downhole conditions from any installed bottom hole assembly tools

Requires operators to develop and implement a real-time monitoring (RTM) plan that describes:

- Their RTM capabilities, methods, etc.
- How BSEE (third parties) can access the data

Real-Time Monitoring

Industry's use of RTM

- Well control purposes
 - Volume and flow management
 - Wellbore: breathing, kicks, integrity
- Performance improvements
 - Trip in/out of hole
 - Rate of penetration
- Condition-Based maintenance
 - Equipment efficiencies
 - BOP health

How operators
use the data
varies greatly

BSEE Real Time Monitoring Efforts

Recent Initiatives

- 838 Inc. report (2014)
 - “An Assessment of the Various Types of Real-Time Data Monitoring Systems Available for Offshore Oil and Gas Operations”
 - TAP 707 (<https://www.bsee.gov/research-record/tap-707-real-time-data-monitoring>)
- National Academies of Science report (2016)
 - “Application of Remote Real-Time Monitoring to Offshore Oil and Gas Operations”
 - TCP 5003 (<https://www.bsee.gov/research-record/regulatory-application-of-real-time-monitoring>)

BSEE Real Time Monitoring Efforts

Recent Initiatives

- Ocean Energy Safety Institute (OESI) Report (2017)
 - “Best Practices for Real-Time Monitoring for Offshore Well Construction”
 - TCP 5001 (<https://www.bsee.gov/research-record/best-practices-for-real-time-monitoring-of-offshore-well-construction>)
- OESI Hosted RTM Workshop (April 17, 2017)
 - <http://oesi.tamu.edu/april-17-2017-discussing-best-practices-for-real-time-monitoring-rtm-of-offshore-well-construction/>

BSEE Real Time Monitoring Efforts

Next Steps

- OESI administered RTM training (Summer 2017)
 - BSEE inspectors and engineers
- BSEE RTM Drilling and Production Pilot Projects
- Work with Industry to develop an RTM Industry Recommended Practice or Industry Specification
- Engage other agencies on Cyber Security
 - United States Coast Guard
 - Department of Energy
 - Department of Homeland Security

BSEE Real Time Monitoring Efforts

Next steps

- Research Interests
 - Cyber Security
 - Sensor data quality
 - Decision making
 - Condition Based Maintenance
 - Next Generation Analytics
 - Prognostics

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