API’s 2015 Exploration and Production Winter Standards Meeting

Emerging Technologies Branch
Systems Reliability Section
Evaluations
BSEE: Mission

To promote safety, protect the environment, and conserve resources offshore through vigorous regulatory oversight and enforcement.
BSEE: History

Minerals Management Service (MMS) → Bureau of Ocean Energy Management Regulation and Enforcement (BOEMRE) → Bureau of Safety and Environmental Enforcement (BSEE)

Bureau of Ocean Energy Management (BOEM)

Office of Natural Resources Revenue (ONRR)
BSEE: Who We Are

• Staffing: 700 Employees
  – 200 engineers
  – 105 inspectors

• Locations
  – Headquartered in DC & Herndon, VA
  – Three regional offices
    o Gulf of Mexico – New Orleans, LA
    o Pacific – Camarillo, CA
    o Alaska – Anchorage, AK
New Regulatory Approaches

• A hybrid of performance and prescriptive requirements

• Life cycle approach toward critical equipment

• Third party certification

• Use of consensus standards as baseline
SRS – Purpose and Function

Formed in February 2013

Functions

- Establish meaningful, on-going communication with original equipment manufacturer (OEM)
- Conduct quality assurance (QA)/quality control (QC) evaluations on manufactured equipment
- Evaluate “Fitness for Service” capabilities of equipment
- Identify gaps in industry practices or standards

SRS technical assessments evaluate issues that have potential industry wide impacts
SRS Evaluations To Date

Four evaluations since February 2013

- Connector and Bolt Failures
  - Completed August 2014

- Seal Assembly and Cement Failures
  - Completed January 2015

- Two evaluations in progress
  - Wing-valve Assembly
  - HC Connector
Connector and Bolt Failures History

December 2012

During drilling operations, H4 Connector Bolts failed on LMRP

- 432 barrels of synthetic-based mud released

Initial evaluation identified a global concern affecting

- ~ 10,982 replacement bolts
- ~ 361 LMRP connectors
Connector and Bolt Failures Evaluation

- **Initial Industry Findings**
  - Root Cause – Hydrogen Induced Stress Corrosion Cracking

- **Additional Concerns Identified by BSEE**
  - Material Properties (Hardness, YS, UTS)
  - Coatings
  - QA/QC, Quality Management System (QMS)
Material Property Concerns

- Inconsistencies across industry standards for material properties requirements related to fasteners (bolts/ connectors)
  - Hardness, YS, UTS

Standards with different material property requirements for subsea operation include:

- API 6A; API 16A; API 16F; API 17A; NACE MR0175; NORSOK-M001
- Fastener Coatings - ASTM B633; ASTM B849; ASTM B850; ASTM F1941; ASTM F1137
Coatings


- Bolts did not receive required post bake electroplating treatment per the latest 2007 edition

Interpretation of ASTM B633

- Concerns between OEM and industry on the appropriate application for Service Class 2

What is the appropriate material design selection and application for marine service?
Connector and Bolt Failures Evaluation

QMS

➢ OEM’s QMS qualified/audited only first-tier suppliers
  ▪ OEM QMS did not require qualification and audit of second, third tier subcontractors
  ▪ Neither operator nor contractor detected an issue with the sub-tier supplier during their assessment of the OEM
  ▪ Need improved oversight of second and third tier subcontractors (Quality Standards)
Path Forward

BSEE to work with industry on developing standards to address the following:

- Consistent material property requirements for fasteners among standards
  - Material Properties (Hardness, YS, UTS)
  - Coatings
  - OEM QMS
Path Forward

Two options available to BSEE to address issues on Connector/Bolt

- Standards
- Regulation
Follow-Up

BSEE International Standards Workshop – May 2015

- Friday, May 8, 2015 (OTC Week)
- University of Houston Hilton
- Four concurrent sessions on
  - Quality Management and Equipment Reliability
  - Cementing
  - Emergency Disconnects (Dynamic Positioning and BOP)
  - High Pressure High Temperature

International Regulators Forum – October 2015
Comments or Questions?
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