



World Oil[®] HPHT
DRILLING, COMPLETIONS & PRODUCTION CONFERENCE

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Norris Conference Centers – CityCentre, Houston, Texas

HPHTConference.com

Independent Third Party (I3P) Review of HPHT Product Development, an OEM Perspective

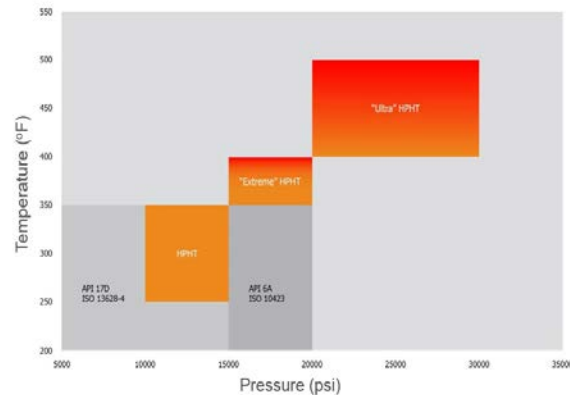
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AGENDA

- Need for I3P
- Overview of 20K - JDA
- I3P Review Process
- I3P Lessons/Challenges

WHY I3P?

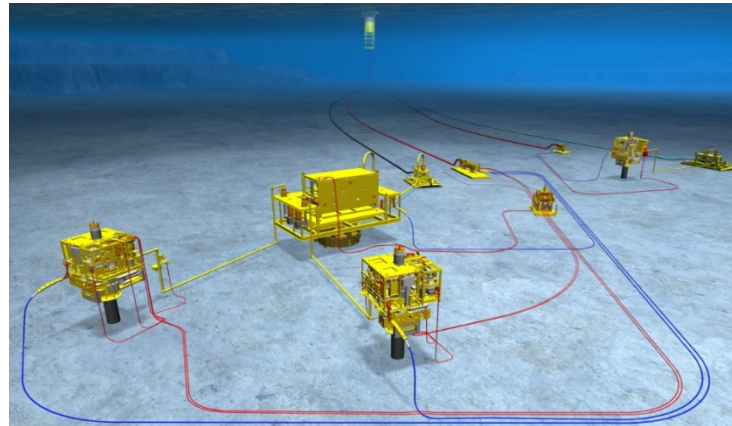
- Lack of prescriptive API Standards
- “Design by Analysis” and not “Design by rules”
- Higher level of scrutiny to insure safety of people and environment – I3P Review
 - Review design verification and validation activity
 - Focus on pressure containing and controlling components



Source: OTC 17927

20K JDA – JOINT DEVELOPMENT AGREEMENT

- JIP program in collaboration with multiple Operators (2014-present)
- Develop a new generation of Subsea Production Systems for pressures up to 20ksi and temperatures up to 350F
- Scope: Wellheads, Trees, Manifold Hardware, Controls & all associated tooling



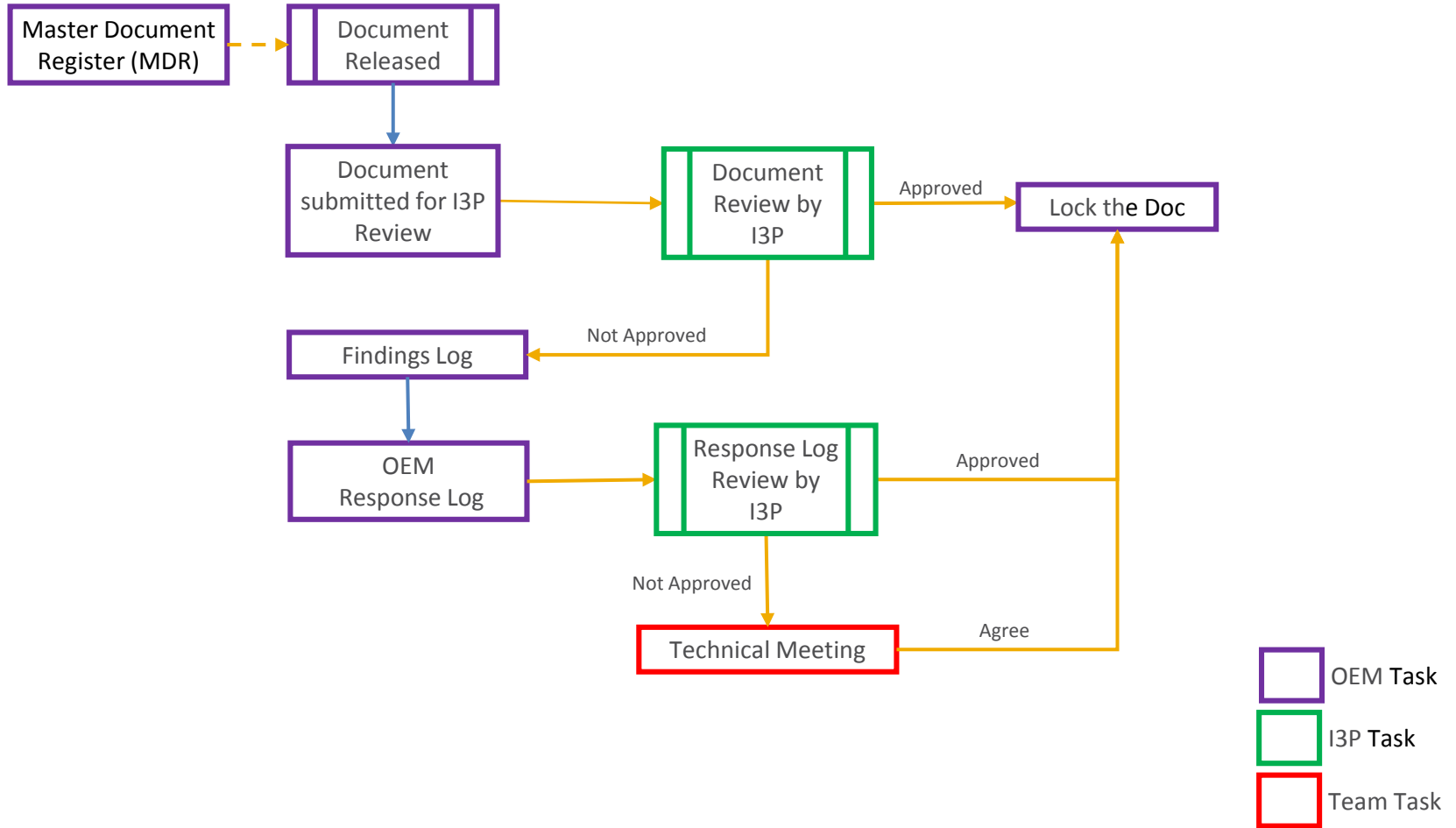
INDEPENDENT THIRD PARTY (I3P) REVIEW

- Collaborative effort of OEM, Operator and I3P
 - Selection & Nomination of I3P - Operator
 - Onboarding of the I3P - OEM
 - Design Verification Review - I3P, OEM & Operator
 - Design Validation - I3P, OEM & Operator
 - BSEE Reports & Review - I3P, OEM, Operator & BSEE

ONBOARDING I3P

- **NDA (Non-Disclosure Agreement)**
 - Define Proprietary & Confidential Info
 - Handling, Dissemination and Retention
- **Info Sessions**
 - Product knowledge
 - Design Philosophy & Methodology
- **Logistics**
 - On-Site Reviews Vs Online Reviews

DESIGN VERIFICATION REVIEW



DESIGN VALIDATION REVIEW

- Submit Qualification Test Procedures to I3P (OEM)
- Identify Surveillance Points (I3P)
- Notify I3P prior to the activity (OEM)
- Attend the test (I3P)

BSEE REPORTS & REVIEW

- **1A - Design Basis**
 - Functional Specs, FMEA/FMECA and HAZID/HAZOP
- **1B - Materials**
 - Material Selection, Qualification and Testing
- **1C - Design Verification**
 - FEA, Structural & Fatigue Analysis and Thermal
- **1D – Design Validation**
 - Qualification Test Procedure and Reports
- **1E – Load Monitoring**
 - Required if fatigue is a potential failure mode
- **1F – Fabrication Documentation**
 - FAT, Quality Management System, and ITP
- **1G – Final Report**
 - Ties 1A through 1F together for a given project

Submitted for
BSEE Review

*** BSEE Approval provided upon submission of site specific 1G report**

I3P – Lessons/Challenges

- Findings Log Management
- Vendor Documentation (IP)
- Personnel Turnover
- BSEE Reporting
- Operator Engagement
- OEM Level of Effort

