Case Study: Planning a Deepwater P&A

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Agenda

- Safety Moment
- Case Study Background Info
- Initial Discussion w/ Asset Team
- Data Mining
- Developing a P&A Design
- Intervention Alternatives & Vessel Selection
  - RLWI
  - IRS
  - Rig based
- Detailed Planning
- Execution
Safety Moment

Operational Excellence
Tenets of Operation

Gulf of Mexico Business Unit

We Believe:
- All incidents are preventable

Two Key Principles:
- Do it safely or not at all.
- There is always time to do it right.

We ALWAYS:
1. Operate within design and environmental limits.
2. Operate in a safe and controlled condition.
3. Ensure safety devices are in place and functioning.
4. Follow safe work practices and procedures.
5. Meet or exceed customer’s requirements.
6. Maintain integrity of dedicated systems.
7. Comply with all applicable rules and regulations.
8. Address abnormal conditions.
9. Follow written procedures for high risk or unusual situations.
10. Involve the right people in decisions that affect procedures and equipment.
Project Background

- 2 wells located in approximate 1,350’ water
- Wells Approximately 35 feet apart
- Vertical Subsea Trees
  - Subsea infrastructure in place
  - Uneconomical to replace failed SCM to continue production
- Decision to P&A
- Regulatory commitments and deadlines
Initial Discussion with Asset Team

• Why well is shut-in?
  – Sanded up
  – Watered out
  – Completion failure
  – Subsea Control Failure
  – Uneconomical

• Prior regulatory obligations
  – Timeline of activities
    • APM submittal deadline
    • Mobilization to location
    • Overall field abandonment scope

• Well Data
  – Production History
  – Pressure
    • SITP
    • SICP
    • BHP
Data Mining

Important Data to Locate

Tree / Wellhead Details

Casing / Tubing Design

Drilling & Workover Reports

Interfacing

MW

Cement jobs

Well Control

Wellhead / hanger & seal assy.

Directional Survey

Fish
Data Mining

• Where to locate the data?
  – Well files
    • WellView or similar database
    • Hard copy
    • Electronic well files
  – Business Partners
    • Job reports
      – Compare as run drawings w/ job reports
What affects a P&A Design?

- Government Regulations
- SOPs
- Well Conditions
- Exposed Casing Annuli
- Production Zone Isolation
Isolating Casing Annuli

• Different methods
  – Block squeeze
  – “Circulate” cement
  – Cut & Pull casing

Exposed Casing Annuli
Block Squeeze

• Squeeze cement into casing annuli to casing shoe
  – Control perforate one string of casing
  – Set inflatable or CICR
  – Establish injection
  – Squeeze cement away
• Things to consider
  – Top of Solids
  – ETOC calculations
  – Injectivity
  – Perforation
“Circulate” Cement

- Circulate cement into casing annuli
  - Control perforate one string of casing low and high
  - Set inflatable or CICR
  - Establish circulation
    - Confirm volume
    - Circulate annulus clean
  - Circulate cement into annulus
- Things to consider
  - Circulation
  - Perforation
Cut and Pull Casing

• Cut and Pull casing
  – Annular isolation
  – Cut and pull casing
  – Set stub plug
• Things to Consider
  – ETOC calculation
    • CBL
  – Top of Solids
  – POS of cutting & pulling casing
  – Annulus isolation
  – Seal Assemblies
Intervention Alternatives & Vessel Selection

- Project Kickoff
- Data Mining
- Developing a P&A Design
- Intervention Alternatives & Vessel Selection
## Intervention Alternatives & Vessel Selection

### Lightweight Intervention
- Riserless
- Slickline
- E-line

### Medium Intervention
- Intervention Riser System (IRS)
  - CT
  - Slickline
  - E-line

### Heavy Intervention
- MODU
  - 18 ¾” BOPs
Intervention Alternatives & Vessel Selection

- Subsea Structure
- Intervention Alternatives & Vessel Selection
- Time Schedule
- P&A Design
- Vessel / Equipment Availability
- Wellbore / Tree / Wellhead Design
# Intervention Alternatives & Vessel Selection

## Alternative Selection for P&A project

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
<th>Spread</th>
<th>Execution Duration A (Fev Days)</th>
<th>Execution Cost A (Fev $MM)</th>
<th>Execution Duration B (Fev Days)</th>
<th>Execution Cost B (Fev $MM)</th>
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## Rewards

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Detailed Planning

• BOD
• Gap Assessments
• Global Riser Analysis
• Risk Assessments / FMECA / HAZID
• Peer Reviews
• Regulatory Communication and Permitting
• Systems Integration Testing
• QA/QC Process
• Detailed Procedures
  – Contingency Planning
• Long Lead Items
  – Identify as early in planning stages as possible
  – After Market Equipment
    • Availability of Equipment
• Leverage Lessons Learned / Best Practices
Execution

- Project Kickoff
- Data Mining
- Developing a P&A Design
- Alternative & Vessel Selection
- Detailed Planning

Execution
Summary

• Quality Data
  – Is it correct?
• Quality P&A Design
  – Several methods to address casing annuli isolation
    • Keep P&A in mind when designing wells
  – Lock down general design as early as possible
• Intervention Alternative & Vessel Selection
  – Many methods and different technology
  – Economical & Practical
• Detailed Planning
  – Identify Long Lead Items early
    – Junk in = junk out
• Execution
  – Incident Free Operations
Questions???