Preparing for the Unexpected Lessons from Decommissioning

Tulane Engineering Forum
Introduction

- Amoco, BP, Apache – GoM Shelf
- Over 250 Platform Removal and Reefing Projects to Date
- Over 1200 GoM Shelf Well P&As to Date
  - 400 Wells Were Good Practice
  - 600 Wells Had Minor Problems
  - 180 Wells Had Major Problems
  - 20 Wells Tried to Kick My . . .
  But I Learned the Most from Those
Motivation for This Presentation

• 2016 Deepwater Decom. Conference
• 4 Technical Presentations
  – Very Bright People with Whiz Bang Technology
• 2 Issues
  – Assuming Their Approach Would Work
  – Assuming That the Wells Would Cooperate
• Presenters Hadn’t Seem to Ask “What If Things Don’t Go As Planned?”
Agenda

• Thoughts About Wisdom vs. Understanding
• Example Decommissioning “Surprises”
• Getting Prepared for the Unexpected
  – Mindset
  – Personnel / Contracting Strategy
  – Data Retention
  – Safety / Regulatory
  – Legal / Financial
  – Leadership
Wisdom vs. Understanding

• Proverbs 4:7 Wisdom is supreme; therefore get wisdom. Though it cost all you have, get understanding. (from New International Version)
Wisdom vs. Understanding

• Proverbs 4:7 Wisdom is supreme; therefore get wisdom. **Though it cost all you have**, get understanding.

Tulane Engineering Degree
Wisdom vs. Understanding

- Understanding Is What They Teach in School
- Wisdom Comes One of Two Ways
  - Learning from Someone Else’s Mistakes
  - Learning from Our Own Mistakes
  - Easy Way or Hard Way, the Choice Is Ours
Examples of Surprises
Technical Surprises

• East Cameron Intersected Wells
  – Working on Well B-13
    • Encountered Obstruction
    • Needed to Mill Out Obstruction
    • Set Up BOPs, Milled 6 Inches, Hit Pressure
    • Stopped the Job to Figure Out What Was Going On
    • The Critical Question That Richard Asked
      • Found Matching Pressure on B-15 Casing
      • Watch for Bubbles Guys!
20”, 3/4” wall DP @ 500’

16”, 65# H-40 @ 915’

20”, 3/4” B DP @ 475’

16”, 65# H-40 @ 900’

B-13 Cut by B-15 well @ ±1,500’

Flat Bottomed Mill on Workstring

Holes in LS & SS Tubing

10 3/4”
40.5# K55 @ 3,419’

B-13 Depleted and Shut-In Before B-15 Drilled

No Indication in B-15 Drilling Files of Hitting Anything
Technical Surprises

• **Vermillion Well Re-Pressuring**
  – Depleted Gas Well with 115 ft of Perfs at 14,860 ft
  – Well Was So Old There Were **No SCSSVs** in the “Production String” and “Kill String” in This Dual Tubing Well
  – Already **Had Rig** on Location for This Problem Well
Technical Surprises

• Vermillion Well Re-Pressuring
  – Maximum Anticipated Surface Pressure from the “Depleted” Reservoir Was 1500 psi
  – Pulled Plug and Encountered 9800 psi at Surface
  – 15K Wellhead Started Seeping Gas
  – “I Suggest You Call Boots & Coots”
  – Well Plugged 120 Days and Over $XX MM Later
Technical Surprises

• High Island P&A’d Well Blow Out
  – Wednesday Night Before Thanksgiving Holiday
  – “Mr. Hunger  This is the MMS.  You have a blowout in the GoM in Block XX.”
  – “But sir, we don’t even have an operation ongoing in that block.”
Technical Surprises

• High Island P&A’d Well Blow Out
  – Turnkey Drilled Well
  – “Dry Hole” High Pressure Non-Commercial Gas
  – Original Producer Took Charge of P&A
  – Original P&A Was a “Perf and Circulate” Design That Avoided the Best Practice of Cutting and Pulling Casing Strings
  – Over $ XX MM Intervention to Re-P&A
Technical Surprises

• **Wells with No Integrity Remaining**
  
  – Holes in Tubing, Production Casing, Surface Casing, and Conductor
  
  – No Opportunity for Well Control Prior to Pumping Cement
  
  – The Pre-Job Discussion About the Potential Need to Abandon Location
Natural Disasters

• Apache Eugene Island Burned Platform
  – Hurricane Ike 2008
Changing Conditions

• High Island 24 L Shorebase, Texas
  – Road Had Disappeared from Coastal Erosion
  – Worked Down the Beach for 8 Miles Inside a Wildlife Refuge and State Park

• Subsidence
  – At the Surface (Sulphur Mines)
  – Subsurface (MI 623 Field)
    • Faults Moved / Casings Failed / Very High Sustained Casing Pressure from Stray Gas Zones
Getting Prepared for The Unexpected
Beyond Just Pre-Job Planning & HAZIDs
Mindset

• “If It Ain’t Broke, It Ain’t Ours”  Terry Costlow
• “You Don’t Know What You Don’t Know”  Donald Rumsfeld 2002
• “Plan Your Work and Work Your Plan”  
  –But Expect Surprises
Mindset

• Look Past the Obvious
• Clarify and Confirm . . . What You Think That You Have Heard
• Avoid the Mentality of “We Are Going to Save Money No Matter How Much It Costs.”
• “Know When to Say When” Budweiser
Mindset

• Don’t Assume That the Responsible Parties Really Know Their Business
  – Cementing Training Example
  – Resin Plugs in Cool Temperature Example

• From Tom Straub
  – What Do You Know?
  – How Do You Know?
  – Show Me?
Personnel

• Wisdom from My Father, Andrew Hunger
  – “Surround Yourself with Gray Haired Old Men. They Will Keep You Out of Trouble.”
• Hire the People Who Put It in to Take It Out
Personnel

- Semi-Retired Consultants Are Priceless
- Blend in Youth for Energy and Fresh Ideas
- **Hire for Personality Fit with Your Team**
  - You Can Always Find Technical Talent
  - Everyone Has to Pull Together in a Crisis
Contracting Strategy

• Recent Comment Made About “No Subjective Judgement” ???

• Disregard Size of the Company, the Sales Pitch, and the “Up Front” Price

• Look for Relevant Experience and “Bench Strength” to Compliment Your Internal Team
  – Leverage That to Lower Your Cost by Preventing and/or Properly Responding to Surprises

• Supply Chain Spreadsheets Can’t Replace Engineering and Operational Judgement
Data Retention

• **Take “Pictures” And Save Them**
  – Compare Past and Present
  – 4D Technology
  – Laser Scanning Technology

• **Keep All the Project Records !**
  – Manager in 2001 “Let’s throw all of the paper away. We have everything important electronically now right ?”
Manager’s Heart to Worker’s Brain with No Breaks In Between

First Level Leaders Are Often the Ones Who Feel the Pressure to Save Time and Reduce Costs . . . And Then Make the Decisions That Lead to Incidents.  Ed Jarveaux
Safety Preparation

Strong Emphasis on Behavior Based Safety, Hazard Recognition, and Stop the Job

“We Need You More Than Just From the Neck to the Deck.”
Jerry Cooper

Less Emphasis on Huge Rule Books Because “The More You Write, the Less Anyone Reads.”
Drew Hunger
Learn from Our Industry Mistakes

• Read at Least the Summary Reports of Major Industry Incidents
  – Piper Alpha, Texas City, Macondo
• Generate and Share Safety Alerts
• Understand the Swiss Cheese Model

Learn from Our Industry Mistakes

• Don’t Ever “Explain Away” What the Instruments and Data Are Telling You

• Don’t Be Afraid to “Over React”
  – Be Willing to Stop the Job
  – Be Willing to Shut in Production
  – Be Willing to Call for Help
Prepare for Tougher Regulatory Env.

• Regulators Are Getting Less Experienced
• Often No Prior Industry Experience
• Occasionally Seem Anti-Industry
• Inconsistent Interpretations of Regulations

• Response
  – Communicate Clearly and in Advance
  – Do What You Say You Are Going to Do
  – Offer to Teach and Assist
  – **Build a Trusting Relationship**
Work Ahead of the Regulation Changes

• **Do the Right Thing Now $** Instead of Waiting for the Government to Tell You When $$ and How $$$ Later
  – Amoco Asbestos Removal Example 1980’s
Minimizing Impact of Natural Disasters

- **Hurricane Andrew – Amoco ST 161 A Success Story**
  - Hurricane Risk Modeling in Prior Years
  - Stripping the Platform in Response to Above

- **Hurricane Rita – BP Western GoM Proactive Decommissioning – Success Story**
  - Began Intensive Decommissioning Campaign 2002
  - Rita Hit 2005
  - Minimal Damage in Western GoM
  - Significant Damage in Eastern GoM from Katrina
Legal Preparation

• The Best Lawsuit Is One That Is Avoided
• Take a Law Course (Contracts Emphasis)
• Learn to See / Read “Gray”
  – Not All “Black and White” Like Engineers See
  – 2 + 2 Does Not Necessarily Equal 4 in Court
• Get to Know Your Company’s Attorneys
• Get Involved in Writing the Contracts for Your Projects
  – “You Dropped It. You Go Get It.” Example
Financial Preparation

• **Run Robust Economics**
• **What If Costs Increase?**
• **What If Revenue Goes Down?**
  – Good Guess That 50% of the Leases in the GoM Changed Hands Between January 2013 and the First Half of 2014 Right Before Oil Prices Plunged
• **What If Both Happen Simultaneously?**
• **Know the Exit Strategy**
  – Chenier LNG Plant – Import to Export Conversion
Leadership

• **Have Your Own Written Team Principles**
  – Repeat Them in Your Daily Conversations Until They Are an Imbedded Part of Your Team’s Culture
  – Helps to Avoid Unexpected Events
  – Keeps Team on Track When the Unexpected Happens
Leadership

• The Leader Must Be Capable of Remaining “Cool Under Fire”
  – Your Staff Will Follow Your Moods As Much As They Will Follow Your Direction
Summary

• No Plan Survives Contact with the Enemy
  – Helmuth von Moltke the Elder

  – Field Marshall Helmuth Karl Bernhard Graf von Moltke (26 October 1800 – 24 April 1891) was Chief of Staff of the Prussian General Staff from 1857 to 1871 and then of the Great General Staff (GGS) from 1871 to 1888. He was an architect of Germany's Wars of Unification (1864–71). He is often referred to as Moltke the Elder to distinguish him from his nephew, Helmuth Johann Ludwig von Moltke.
Questions?
Back Up Slides
**Per Well P&A Cost – Actual Spread**

5 Years of Data – 861 Wells Total
Being Realistic with Decom Cost Estimates

• There Is Not a Single Number That Represents the Cost to P&A a Well
  – It Is a Bell Curve with a Very Long Tail

• It Is Because of All of the Nasty Surprises That Await in These Wells
  – Sand, Scale, Paraffin
  – Shallow “Fish”
  – Holes in Tubulars
  – Gas Coming Through Cemented Annuli

• Thus Don’t Waste Too Much Time and Effort on Pre-Job Estimates