IADC WellCAP Drilling/Workover Surface/Subsea Contract Supervisor Well Control

4 Day
Location: SRTCC or Onsite
Contact: SRTCC Staff, Mark Venettozzi, 985-543-1277 or 504-728-1277

Course Overview:

This IADC WellCAP approved course is designed to discuss the theory, calculations, and procedures associated with supervising the well control aspects of surface and subsea stack drilling and workover(completion) operations. The course consists of lecture and classroom calculations as well as several simulator exercises using rig floor and portable surface / subsea drilling simulator, and our workover(completion) simulator. In addition, emphasis is placed on safety aspects, job assignment coordination, and equipment limitations.

Designed For:

This course is designed for contract Supervisors of land, platform, or subsea stack drilling operations or workover(completion) operations. These personnel would include such job positions as toolpushers, drillers, or assistant drillers.

Prerequisites:

Objectives:

Upon completion of this course participants should be able to:

- Perform hydrostatic, formation, and force/pressure calculations.
- Specify the equipment requirements/limitations for well control equipments for drilling or workover operations.
- Select the best type kill procedure for given circumstances.
- Maintain constant bottomhole pressure during a well kill
- Competently supervise the well control related aspects of surface or subsea stack drilling and workover(completion) operations.

Outline:

Day 1 (8.5 Hours Instruction)

Course Overview
Primary Well Control

- Overview of Well Control Methods
  - Primary Well Control
  - Secondary Well Control
  - Tertiary Well Control
- Use of Primary Well Control
  - Mud and Pressure Gradients
  - Mud Weights
  - Basic Calculations
  - Hydrostatic Pressure
  - Formation Pressure
- Loss of Primary Well Control (Kick Causes)
  - Abnormally Pressured Zones
  - Lost Circulation and Surging
  - Swabbing
  - Hole Not Full of Mud
  - Low Mud Weight
- Drilling Kick Warning Signs
  - Drill Rate Change
  - Increase in Flow
  - Pit Gain
  - Pump Pressure Decrease
  - Pump Stroke Rate Increase
  - Gas-cut Mud
  - Well Flows
  - Other Kick Indications
    - Trip, Connection, and Background Gas
    - Water Cut Mud and/or Chlorides Change
    - Sloughing / Changes in Shale Properties
    - Change in Mud Properties
- Tripping Kick Warning Signs
  - Improper Hole Fill
  - Trip Tanks and Fill Volumes

Secondary Well Control

- Shut-In Procedure while Drilling
  - Hard Shut-In
  - Soft Shut-In
- Shut-In Procedure while Tripping
  - Hard Shut-In
  - Soft Shut-In
- Well Control Mechanics
  - Significance of Drill-Pipe and Casing Pressure
    - Valid Drill-Pipe Pressure
    - Valid Casing Pressure
    - Differences with Gas, S.W., and Oil Kicks
  - Calculations
    - Formation Pressure from SIDPP and HSP
    - Kill Weight Mud
    - U-Tube Principles
    - Equivalent Mud Weights and ECD's
    - Gas Bubble Migration and Expansion
• Bleeding Procedures
• Bleeding Rates
• Pressure Limitations
• Casing Limits
• Lost Circulation
• Surface Equipment Limitations

Volume Calculations
• Use of Halliburton Books
• Capacity Section
• Displacement Section
• Annular Volume Sections
• Dimensions & Strengths Section
• Volume Formulas
• Capacity Formula
• Displacement Formula
• Annular Volume Formula

Simulator Exercise (Surface/Drilling)
• Pre-Kick Calculations
• Pressure Measurements
• Drill into Kick and Shut-in
• Kill Sheet Calculations

Compare/Contrast Constant BHP Kill Methods
• Wait and Weight Method
• Driller’s Method
• Concurrent Method
• Other Methods

Simulator Exercise (Continued)
• Kill Operation Start-Up
• Pump and Choke Operation
• Constant BHP Kill Procedure

Hazards and Control of Shallow Gas
• Detection of Shallow Gas
• Shallow Gas Shut-in Procedures
• Diverting Shallow Gas Blows
• Hole Filling Procedures

Abnormal Pressure Zones
• Definition
• Natural and Induced Causes
• Detection Methods / Trends

DAY 2 (8.5 Hours Instruction)

Well Control Equipment
• Blowout Preventer Units
  • Purpose of BOP’s
  • Equipment Installation
  • Maintenance of BOP Equipment
- BOP Operating Units
  - Precharge/Operating pressures
  - Volumes - req'd & usable
  - Fluid Pumps
  - Maintenance
- Auxiliary Well Control Equipment
  - Pit-level Indicator
  - Pit-volume Totalizer
  - Flow-show Indicator
  - Gas Detector
  - Trip Tank
  - Mud-gas Separator
  - Degasser
  - Chokes / Manifolds
- Wear and Pressure Limitations of Equipment
- BOP Testing Procedures
- BOP Drills

**Simulator Exercise (Drilling -Surface)**
- Well Data and Background
- Pre-Kick Calculations
- Pressure Measurements
  - Circulating Pressures
  - Drill into Kick and Shut-in
  - Kill Sheet Calculations
  - Kill Operation Start-Up
  - Pump and Choke Operation
  - Constant BHP Kill Procedure

**Unusual Well Control Situations**
- Bit Off Bottom
- No Pipe in Hole
- Lost Circulation
- L.C. During Kill Operations
- Barite and Cement Plugs
- Plugged Drill Pipe
- High Casing Pressure
- Hole in Drill Pipe
- Multiple Open Zones
- Hole in Casing
- Hydrogen Sulfide Hazards
- Trapped Pressure
- Underground Flow

**Drilling Fluids**
- Drilling Mud
  - Density
  - Viscosity
  - Fluid Loss
  - Salinity
  - Gas Cutting
  - Weight Up
- Completion Fluids
- Gases
- Water-base Systems
- Oil-base Systems
- Packer Fluids
- Functions of Workover Fluids
  - Well Killing
  - Cleanout
  - Plugging Back
  - Bridging Agents
- Flow Properties of Workover Fluids
  - Density & Temperature Effect
  - Viscosity
  - Weight Up
  - Gas Cutting
  - Fluid Loss
  - Salinity
  - Solids Content
  - Gel Strength
  - Crystallization
  - Caustic Effect/Safe Handling of Brine

**Lecture / Simulator Exercise - Volumetric Kill**
- Volumetric Principles
- Volumetric Calculations
- Simulator Exercise/Demonstration

**DAY 3** (8 Hours)

**Written Test (Drilling Well Control)**

**Simulator Testing (Surface Stack)**
- Well Data and Background
- Pre-Kick Calculations
- Pressure Measurements
  - Circulating Pressures
- Drill into Kick and Shut-in
- Kill Sheet Calculations
- Kill Operation Start-Up
- Pump and Choke Operation
- Constant BHP Kill Procedure

**Surface Curriculum Debriefing**

**Subsea Overview**

**Subsea BOP Stack Considerations (Subsea candidates only)**
- Subsea Operations / Equipment Overview
- Use of Marine Riser
  - Riser Collapse
  - Trapped Stack Gas
- Choke Lines
  - Choke Line Friction Pressures
  - Gas in Choke Line
• Gas Hydrates
• Diverter Systems

**Simulator Exercise (Drilling – Subsea Stack)**
• Well Data and Background
• Pre-Kick Calculations
• Pressure Measurements
  • Circulating Pressures
  • Choke and Kill Pressure Losses
• Drill into Kick and Shut in
• Kill Sheet Calculations
• Kill Operation Start-Up
• Pump and Choke Operation
• Constant BHP Kill Procedure
• Handling Trapped Stack Gas
• Circulation of Riser

**Subsea Written Testing**

**Subsea Stack Simulator Testing**

**Subsea Curriculum Debriefing**

**Day 4 (8 Hours Total)**

**Well Completions**
• Introduction to Well Completions
• Types of Completions
• Multiple Completions
• Reasons for Completions
  • Control Water/Gas Entry
  • Complete New Reservoir
  • Perforating
• Other Operations
  • Backsurguing Perforations
  • Displacement of Fluids
  • Plug and Packer Milling
  • Stimulation and Flowback
  • Water Coning in Gas and Oil Wells
  • Repairing Mechanical Failures
• Other Operations
• Drill Stem Tests
• Flow Check after Cementing

**Simulator Exercise (Workover/Reverse Circulation)**
• Well Data and Background
• Pre-Kick Calculations
  • Temperature correction
  • Crystalization Temperature Effect
• Workover Kill Sheet Calculations
• Constant BHP Kill Procedure

**Workover/Completion Well Control**
• Equipment on Workover/Completion Rigs
• Surface Equipment
• Downhole Tools & Tubulars
• Packers
• Preparing Well for Entry
  • Back-Pressure Valves
  • Surface/Subsurface Safety Systems
  • Tree & Tubing Hanger Removal
  • Install/Test BOP's
  • Ring Gaskets
• Killing a Producing Well
  • Reverse Circulation
  • Bullheading
  • Lubricate & Bleed
• Drilling/Workover on Same Platform

**Simulator Exercise (Workover/Bullhead Kill)**
• Well Data and Background
• Bullhead Calculations
• Bullhead Kill Operation
• Constant BHP Circulation of Annulus

**Workover/Well Completion Written Testing**

**Workover/Well Completion Simulator Testing**
• Well Data and Background
• Kill Sheet Calculations
• Kill Operation Start-Up
• Pump and Choke Operation
• Constant BHP Kill Procedure

**Workover Curriculum Debriefing / Dismissal**