Supervisor Pro
Advanced WellSHARP Drilling

Advanced Surface Well Control Course Outline
IADC

4.5 DAYS

SUPERVISOR

Preliminary Items
- Safety: escape routes, muster points, etc.
- Discussion of special needs
- Introductions
- Class paperwork
- Pre-Course exam. Students who score less than 80% are encouraged to attend a standard WellSharp Supervisor course.

Serious Well Control Problem From the Wild Well Library
- Students form teams
- Team discussion of the potential well control problem
- Simulator exercise demonstrating the well control challenge
- Return to class to discuss the challenge

Well Control Course Objectives
- Formations, pore pressure, fracture gradients
- Killsheet, kick detection, flow checks, well shut-in, and gas behavior
- Well control methods
- Well control equipment (barriers, BOPs, manifolds,
- accumulator, etc.)
- Completing the well and post-completion activity
- Final well control simulation: from kick to kill, with a complication
- Assessments: skills and written

Formations, Pore Pressure, Fracture Gradient
- Formation structure
  - Porosity
  - Permeability
- Fracture gradients, kick tolerance, pore pressures
  - Related formulas/math (hydrostatic pressure, the U tube, force, MAASP, etc.)
  - Equivalent mud weight
  - Kick tolerance
  - Pore pressure vs. fracture gradient (drilling margin/window)
- Simulator exercise demonstrating a FIT; discussion of LOT (if needed, depending upon class knowledge level)
- Discuss casing and cementing program
- Discuss drilling fluids program

Killsheet, Kick Detection, Flow Checks, Well Shut-in, and Gas Behavior
- Related formulas/math (capacities/volumes, strokes, circulation times, etc.)
- Causes of kicks
- Kick signs
  - Overt kick signs
  - Pre-kick signs
- Flow-check procedures
- Shut-in procedures
  - Hard shut-in
  - Soft shut-in
  - Shut-in challenges
- Paper killsheet with preliminary well data
  - Well data, volume calculations
  - Discuss the importance of a killsheet
- Simulator exercises demonstrating hard and soft shut-in
  - Kick detection and shut-in
  - Students complete killsheet with simulator well data (or instructor-given data)
  - Discussion of killsheet calculations:
  - What do they mean? (if needed) Discussion of IADC WellSharp rounding rules
- Gas behavior
  - While drilling
  - In horizontal wells
  - While shut-in

Well Control Methods
- Review of related formulas/math (capacities/volumes, strokes, circulation times, kill mud, MAASP, ICP, FCP, etc.)
- U-Tube
  - Gauge readings – what they represent
    - Static pressures
      - SICP and SIDPP
      - Formation pressure (FP)
      - Bottom Hole pressure (BHP)
    - Dynamic pressures
      - Pressure at the shoe
      - Dynamic BHP
      - Dynamic drillpipe pressure
  - Boyles Law
    - Gas behavior
    - Boyles Law calculations
    - In relation to U-tube pressures
    - In relation to gauge pressure

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- Wait and Weight Method
  - Discussion of Wait and Weight
    - Techniques
    - Skills (pump startup, step-down chart, gauge use, lag time, etc.)
  - Simulator exercise
- Driller's Method
  - Discussion of Driller's Method
    - Techniques
    - Skills (pump startup, capturing pressure after first circulation, lag time, etc.)
  - Simulator exercise

- Volumetric and Lube and Bleed
  - Discussion of Volumetric Method
  - Formulas
  - Understanding the process and technique
  - Skills (use of electronic killsheet or paper graph, managing gas migration)
- Simulator exercise
- Discussion of Lube and Bleed

Stripping Pipe Under Pressure
- Discussion of technique
- Skills (annular pressure, speed of strip, managing wellbore pressures via volumetric method)
- Simulator exercise

Bullhead Method – Discussion and simulator exercise if time allows

Discussion of study guide questions

- Well control equipment (barriers, BOP, manifolds, accumulator, etc.)
  - Philosophy and operation of barrier systems
  - BOP stack, manifolds, and chokes
  - Testing barriers: function and pressure tests
  - Drillstring valves
  - Diverters: shallow gas, water flows, and surface/tophole drilling
  - Accumulator Module
    - Purpose
    - Standards
    - Function
    - Checklists
    - Components
    - Bottle calculations
    - Closing ratios
    - Common failures
  - Mud/gas separators and degassers
- Completing the well and post-completion activity: short discussion
  - Completions
  - Differences between drilling and workover

- Final simulator exercise
  - Abnormal lateral well and kick detection
  - Kill the well with Wait and Weight Method
  - Discussion
    - Ballooning wells vs. kicking wells
    - Fingerprinting

Discussion of Study Guide Questions

Skills Assessment

Computer-Based Wellsharp Exam

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