WellSHARP Drilling Surface - Driller

Surface Drilling Well Control Course Outline IADC

3.5 DAYS - DRILLER

Interactive Study Tools

- Provide students with over 600 pages of pre-course study materials at wildwell.com
- Provide students with study guide that covers up to 150 interactive well control questions and answers.
- Provide students with a 50 question test to determine their well control knowledge gaps.

Preliminary Items

- Safety: escape routes, muster points, etc.
- Discussion of special needs
- Introductions
- Class paperwork

Serious Well Control Problem From the Wild Well Library

- Students form teams
- Team discussion of the potential lateral 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

Barriers

- Philosophy and operation of barrier systems
- Number of barriers for safe operation
- Testing barriers

Shallow Gas, Water Flows and Top-hole Drilling

- Definitions and causes of pressure in top-hole formations
- Causes of under-balance top-hole
- Diverting practices
- Top-hole drilling practices and causes of kicks

Abnormal Pressure Warning Signs

- Abnormal pressure
- Shaker evidence
- Changes in mud properties
- Changes in drilling data/parameters

Kick Detection

- Well flow with pumps off
- Pit gain
- Flow return rate increase

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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 and verification
  - Drilling
  - Tripping
  - Out of hole
  - Running casing and cementing
  - Wireline
  - Shut-in methods
  - Blind and blind shear rams
  - Diverting
- Post shut-in monitoring and activities
  - Kick log
  - Gas migration
  - Trapped pressure
  - Handling ballooning
  - Bumping the float
  - Line-up
- 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.)
- 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

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

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Well Control Drills

- Pit drills
- Trip drills
- Stripping drills
- Choke drills
- Early response and empowerment to act

Completing the well and post-completion activity: short discussion

- Completions
- Differences between drilling and workover

Final simulator exercise (if time allows)

- 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