Well Control Course Outline
IADC

**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

**SURFACE:**

**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

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

**Shallow Gas, Water Flows and Tophole Drilling**
- Definitions and causes of pressure in tophole formations
- Causes of underbalance tophole
- Diverting practices
- Tophole drilling practices and causes of kicks

**Abnormal Pressure Warning Signs**
- Abnormal pressure
- Shaker evidence
- Changes in mud properties
- Changes in drilling data/parameters

**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.)
- 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
Well Control Course Outline
IADC

- 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 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**

**SUBSEA:**
Learning Objectives
- Subsea well control concepts
- Pre-recorded data
- Well control methods
- Kick awareness
- Barriers
- Kick detection
- Tophole drilling and shallow gas
- Shut-in procedures
- Risk management

**Subsea Well Control Concepts**
- Downhole pressures
- Downhole temperatures

**Pre-Recorded Data**
- Choke-line friction pressure (CLFP)
- Subsea killsheet
- Subsea simulation
  - Kick detection
  - Well shut-In
  - Killsheet data

**Well Control Methods**
- Driller’s Method
- Wait & Weight Method
- Pump startup
- Sweeping the stack
- Risk of gas in riser

**Kick Awareness**
- Ballooning
- Riser margin
- Swabbing and surging

**Barriers**
- Subsea BOP stacks
- Lower marine riser package (LMRP)
- Risers
- Valves
- Connectors
- Control systems

**Kick Detection – Review Of Warning Signs**

**Tophole Drilling And Shallow Gas**

**Shut-In Procedures**

**Risk Management**
- Emergency disconnect system (EDS)
- Emergency backup system
- ROV intervention
- Riser gas

**Computer-Based Wellsharpe Exam**