Petroleum Technology (PETC 1105) Coiled Tubing for Supervisors (1.25)
[Formerly Petroleum Technology 94Y]

Prerequisite: None

Hours and Unit Calculations:
Total Contact Hours: 18 hours lecture (36 outside of class hours); 18 hours lab (72 Total Student Learning hours) 1.25 Units

Catalog Description: This course is designed to provide a working understanding of coil tubing and the problems normally associated with pressure control as related to coil tubing. This course is offered on a pass/no pass basis only.

Type of Class/Course: Degree Credit

Textbook: WESTEC generated, Coil Tubing Workbook.

Additional Required Instructional Materials: Provided by WESTEC.

Course Objectives:

By the end of the course, a successful student will be able to:

1. Perform hydrostatic calculations,
2. Discuss formation pressure and why they occur,
3. Perform shut-in procedures, reading and recording shut-in values
4. Correctly operate blowout prevention (BOP) equipment,
5. Identify and mitigate potential down hole problems associated with well control,
6. Control formation pressure,
7. Understand and use a kill sheet to bring the well back to balance
8. Supervise coiled tubing operations

Course Scope and Content: Lecture

Unit I  Bureau of Safety and Environmental Enforcement (BSEE) – Subpart O
A. Recordkeeping requirements
B. Training requirements

Unit II  Basic Well Control Pressures
A. Hydrostatic pressures
B. Formation pressure
C. Pressure gradient
Unit III Blowout Prevention Equipment (BOP) Design, and Use
A. Basic stack design criteria
B. Types of BOP equipment
C. Quad BOP/coil tubing stack
D. Chokes
E. Safety valves

Unit IV Kick and Blowout Definitions
A. Kick definition
B. Conditions necessary for a kick to occur
C. Causes of kick while drilling and tripping
D. Blowout definition and reason for occurrence

Unit V Shut-in Procedures
A. Diverters
B. Shut-in procedures while drilling and tripping
C. Shut-in tubing/drill pipe/CT pressures
D. Shut-in casing pressure

Unit VI Simulator Exercise: Orientation and Shut-in Procedures
A. Plan and execute a shut-in procedure

Unit VII Bureau of Safety and Environmental Enforcement (BSEE) – Subpart D
A. 30 CFR, Part 250, Subpart D – Oil and Gas Drilling Operations
B. Field rules and how they may modify other requirements

Unit VIII Volume Calculations
A. Single string capacity
B. Pipe between pipe
C. Displacement
D. Tripping pipe for the loss of hydrostatic pressure due to pulling pipe
E. Coil tubing capacity due to wall thickness

Unit IX Fracture Gradient
A. Definition
B. Method of determination – Before and while drilling/workover

Unit X Drilling, Completion, Workover and Packer Fluids
A. Functions of drilling fluids
B. Functions of completion and work over fluids
C. Fluid type

Unit XI Kill Procedures -
A. Methods
   1. Wait and weight
   2. Drillers
   3. Concurrent

Unit XII Kill Sheets
A. Explanation and examples
B. Practice problems
Unit XIII  
Simulator Exercise: Kill Procedures
A. Practice two methods of kill operations
   1. Drillers
   2. Wait and weight

Unit XIV  
Workbook Session: Calculations
A. Workbook exercises for covered subjects

Unit XV  
A. Pollution
B. Completion
C. Abandonment
D. Safety systems

Unit XVI  
Blow Out Prevention Equipment Testing Procedures
A. BOP control
B. Accumulator

Unit XVII  
Abnormal Pressure
A. Causes
B. Detection methods – CT hands
C. Detection methods – Mud loggers
D. Kick tolerance

Unit XVIII  
Well Completion and Well Control Problems
A. Multiple completions (dual strings)
B. Running a drill string test
C. Other completion operations

Unit XIX  
Special Problems
A. Excessive casing pressure
B. Out-of-hole when the well kicks
C. Plugged bit
D. Drill string washout
E. Coil tubing quality

Unit XX  
Simulator Exercise: Work through Multiple Well and Pressure Problems
A. Execute resolution of multiple problems on the simulator

Unit XXI  
Workbook Review Session
A. Review workbooks

Unit XXII  
Bureau of Safety and Environmental Enforcement (BSEE) – Subpart F
A. Work over
B. Field rules and how they may modify other requirements

Unit XXIII  
Reasons for Workover Operations
A. Repair mechanical failure
B. Stimulation to increase production
C. Completing in more than one reservoir

Unit XXIV Live Well Operations
A. Killing a producing well
B. Volumetric kill
C. Lubricate and bleed
D. Coil tubing unit

Unit XXV Small Tubing Operations
A. Applications
B. Equipment descriptions
C. Blowout Prevention equipment
D. Flow string systems

Unit XXVI Well Equipment
A. Surface equipment
B. Downhole tools and tubulars
C. Packers

UNIT XXVII Bureau of Safety and Environmental Enforcement (BSEE) Workover/Completion – Subpart C, D, and E
A. Pollution
B. Drilling
C. Completion
D. Workover

UNIT XXVIII Coil Tubing
A. Definition of coil tubing
B. Reasons for coil tubing operations
C. Coil tubing equipment
D. Coil tubing pressures and calculations
E. Coil tubing string
F. Pressure control equipment

UNIT XXIX Simulator Exercise
A. Practice Kill Operations Utilizing The Drillers Method

Course Scope and Content: (Laboratory)

1. Practice evaluating well conditions using simulator
2. Simulated kill sheet calculations (skills assessment)
3. Simulator kill well exercises (skills assessment)

Unit I Kill Sheets
A. hydrostatic pressure loss sheets
B. bottom hole pressure calculations
C. barite requirements
D. maximum allowable annular surface pressure
E. volumes: tubing/coil tubing/drill string
F. angular volumes
G. pump output calculations
H. pump schedule

Unit II Simulator
A. Hydrostatic pressures
B. Pressure gradient
C. Formation pressures
D. Drillers Method
E. Wait and Weight Method

Learning Activities Required Outside of Class: None

Methods of Instruction:
1. Lecture/discussion
2. Exercises
3. Demonstration on Drilling Rig Computer Simulator
3. Application on Drilling Rig Computer Simulator

Methods of Evaluation:
1. Performance observation of student operation
2. Written examinations

Supplemental Data:

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