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Reviewed: Spring 2019
Textbook update: Fall 2019
C & G Ed approval: October 18, 2019
Board approval: November 13, 2019
Semester effective:

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

D. Circulation pressure

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 Bureau of Safety and Environmental Enforcement (BSEE) Drilling – Subparts C, E, G, H, & O
 - 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:

TOP Code:	095430: Petroleum Technology
SAM Priority Code:	C: Clearly Occupational
Distance Education:	Not Applicable
Funding Agency:	Y: Not Applicable(funds not used)
Program Status:	I: Program Applicable
Noncredit Category:	Y: Not Applicable, Credit Course
Special Class Status:	N: Course is not a special class
Basic Skills Status:	N: Course is not a basic skills course
Prior to College Level:	Y: Not applicable

Cooperative Work Experience:	N: Is not part of a cooperative work experience education program
Eligible for Credit by Exam:	NO
Eligible for Pass/No Pass:	C: Pass/No Pass
Taft College General Education:	NONE
Disciplines:	Mining and Metallurgy