



## **SUCKER ROD PUMPING SYSTEM** **Design, Analysis and Optimization**

### **2020 Spring Schools**

**Calgary, AB**  
**May 5-6-7**

**Estevan, SK**  
**May 26-27-28**

**This School** will be of great interest to anyone involved with rod pumping systems including engineers, production technologists, production superintendents, field foreman, and service personnel.

**Course Description:** This course covers the necessary skills to enable you to maximize your rod pumping efficiency. (As per course outline on reverse)

**Instructor: Fred Morrow**, Registered Professional Engineer. Graduate of Texas A&M University. Member of SPE. Fred has enjoyed a career closely involved with the design and manufacture of various components of sucker rod pumping systems. Author and co-author of numerous papers on artificial lift technology Fred has taught related courses worldwide including Canada for the last 25 years.

Fred was awarded the “J.C. Slonneger Award” for his outstanding contributions in Petroleum production technology and its dissemination.

**Location:**

Ramada Hotel  
708 – 8<sup>th</sup> Avenue S.W.  
Calgary, Alberta  
Reservations: 1-800-661-8684

Penta Completions  
58 Devonian St  
Estevan, SK

**Tuition Fee:** 3-Day school \$997.50 CDN + GST

Includes: Tuition, course manual, continental breakfast and coffee/juice.

**Refund or Cancellation Policy: Cancellations** less than 2 weeks prior to school will be subject to \$250.00 cancellation fee. No refund made for cancellations less than 3 working days prior to course beginning.

Penta Completions reserves the right to cancel the course for insufficient enrollment, should this happen a full refund would be issued.

# COURSE OUTLINE

## **I. Wellbore Characteristics**

- A. Geological and reservoir concepts related To vertical and horizontal wells
- B. Porosity and Permeability
- C. Reservoir Pressure and Bubble Point Pressure
- D. Vogel's and Linear Inflow Performance Relationships (I.P.R. Curves)
- E. Pressure Decline and Pressure Maintenance

## **II. Beam Lift System Components**

- A. Down hole Rod Pumps
  - 1. API Types
  - 2. Specialty Pumps
  - 3. Classifications
  - 4. Fluid Load and Pressures
  - 5. Proper Spacing and Fit
- B. Rods and Tubing
  - 1. API Steel Designs
  - 2. Special "High Strength" Rods
  - 3. Fiberglass Rods
  - 4. Continuous Rods
  - 5. Tubing Anchors and Packers
- C. Unit Pumps
  - 1. Types of Pump Jacks
  - 2. Counterbalance
  - 3. Load Range Diagrams
- D. Prime Movers
  - 1. Electric Motors
  - 2. Electric V.F.D.
  - 3. Single Cylinder Gas Engines
  - 4. Multi Cylinder Gas Engines

## **III. Design of Beam Pumping Systems**

- A. Design Guidelines Utilizing
  - 1. Plunger Constants
  - 2. Fluid Load
  - 3. Pump Stroke and Efficiency
  - 4. Impulse Factors
  - 5. Pumping Speeds
  - 6. Rod and Tubing Stretch
  - 7. Gearbox and Structure Capacity
  - 8. Prime Mover Selection
- B. Deviated or Horizontal Rod String Design
  - 1. Use of Guides and Roller Couplings
  - 2. Bottom Hole Pump Guidelines

## **IV. Dynamometer Analysis of Existing Wells**

- A. Dynamometer Card Interpretation
  - 1. Surface Cards
  - 2. Down Hole Cards
  - 3. Dynamometer Card Shapes
- B. Fluid Levels
- C. Depression Tests and Pressure Build-ups
- D. Optimizing Existing Wells

## **V. Rod Pumping "Challenges"**

- A. Gas Interference
  - 1. Cause, prevention and solutions
  - 2. Gas Separators
- B. Fluid Pound
- C. Well Problems
  - 1. Paraffin Build-up
  - 2. Back Pressure Valves
  - 3. Intermittent Pumping
- C. Gearbox Overload
- D. Sucker Rod Failures
- E. Pump Off Control

# REGISTRATION FORM

NAME: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

COMPANY REPRESENTED: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

BUS PHONE: ( ) \_\_\_\_\_

FAX: ( ) \_\_\_\_\_

EMAIL: \_\_\_\_\_

PREFERRED SCHOOL DATE: \_\_\_\_\_

Payment \$997.50 + GST  
GST #868805847

\_\_\_\_\_ **Credit Card**

\_\_\_\_\_ **Cheque (Payment Enclosed)**  
Cheques payable to Penta Completions Supply & Services  
610, 910-7<sup>th</sup> Ave SW  
Calgary, Alberta  
T2P 3N8

\_\_\_\_\_ **Invoice Company**  
**P.O. #** \_\_\_\_\_

SIGNATURE \_\_\_\_\_