TECHNICAL EDUCATION ACADEMY

School of Engineering

COURSE PROGRAMME

000177

HEOP001 - Heavy Oil Production Operations

Heavy oil/in-situ oil sands comprise a large portion of the future of the world's oil reserves.



Learn from the Best in the Business!

Course overview

Intermediate level

Why take this course

Heavy oil/in-situ oil sands comprise a large portion of the future of the world's oil reserves. However, what they offer in size, they lack in the difficulty of production and commercialization.

The course offers an insight on evaluation, development, and commercialization aspects of heavy oil/in-situ oil sands resources. It takes an unbiased practical approach to both non-thermal and in-situ thermal production methods citing benefits and limitations. Participants are to be imparted knowledge on subsurface evaluation, laboratory characterization, production, transportation and refinery/upgrading topics of the heavy crudes.

Who it is for and how it helps

Production, Field or Process Engineers involved in heavy oil production.

What you will learn

- Explain heavy oil fundamental properties
- Explain main reservoir production mechanisms and describe the techniques adapted to heavy crude oil production
- Recognise the reasons for upgrading heavy crude oils
- Assess the various problems that can be induced by unwanted compounds in heavy crude oil streams
- Master oil and water treatment processes, operations and related operating conditions
- Explain the role of different units in a heavy crude upgrading chain
- Acquire a good understanding of the operation of the units related to extra heavy crude oil processing

Curriculum

Modules 01–05

01 Drive mechanisms

- Primary recovery.
- Secondary recovery: water flooding, gas injection, solvent displacement using naphta, DCO, DRU.
- Classic EOR methods: miscible gas injection, chemical flooding.
- Thermal EOR methods: Cyclic Steam Stimulation (CSS), Steam-Assisted Gravity Drainage (SAGD), In Situ Combustion (ISC), Toe-to-heel air injection.

02 Well performance

- Needs for artificial lift.
- Viscosity reduction: dilution/blending, heating, emulsification through the formation of an oil-in-water emulsion, pour point reduction by using Pour Point Depressant (PPD).
- Forecast production of heavy crudes including behavior of horizontal wells.

03 Completion adapted to heavy oil production

- Cold production.
- Hot production: cyclic steam stimulation, steam assisted gravity drainage.

04 Need for oil field processing - quality requirements

- Quality requirements of crude oils.
- Needs for upgrading heavy crude oils.
- Examples of compositions of commercialized crude oils.

05 Crude oil treatment

- Crude stabilization (gas removal) by Multi Stage Separation (MSS):
- operating parameters (number of separation stages, pressures, heating and cooling needs...);
- influence on the quantity and quality (API grade) of the produced oil;
- foaming problems and main available solutions;
- associated gas recovery.
- Crude dehydration (water removal) and desalting:

Curriculum

Modules 05–09 · Module 05 — continued

- emulsion problems in heavy crude oil production and impact of well production techniques on surface facilities;
- asphaltens management in surface facilities;
- dehydration processes for heavy crude oils;
- heavy crude oil desalting.
- Acid crude sweetening (H2S removal): principle of stripping, stripping of heavy crude oils.
- Diluent recovery unit, diluent recovery assessment and maximum recovery diluent.
- Asphaltens precipitation in storage.

06 Production water treatment

- Main treatments.
- Operating principle and required performances.
- Comparison of the different available techniques.
- Selection criteria.
- Examples of production water treatment block flow diagrams.

07 Injection water treatment

- Reasons for water injection.
- Quality requirements and necessary treatments.
- Main operating conditions of each treatment and required performances.
- Examples of injection water treatment block flow diagrams.

08 Upgrader principles & objectives

- Production, fluidification and transportation of extra heavy crude oils.
- Different ways to upgrade heavy crude oils.
- Overview of an upgrader, role and purposes of the different processes.

09 Atmospheric & vacuum distillation

- Upgrader distillation units: principles of distillation, capacity, process flowsheets.
- Atmospheric and vacuum distillation unit: operating conditions, material balance, energy consumption and heat recovery.

Curriculum

Modules 09–12 · Module 09 — continued

- Corrosion and corrosion prevention in atmospheric and vacuum distillation units.

10 Upgrader hydrotreatments to process naphtha & distillate

- Hydrotreatment chemical reactions and hydrogen consumption.
- Hydrotreatment processes: process flow diagram, operating conditions, products characteristics.

11 Thermal conversion units: visbreaking & delayed coking

- Heavy cuts thermal conversion processes.
- Delayed coking process.

12 Other conversion processes

- Deasphalting units:
- vacuum residues structure and properties;
- deasphalting principles: different deasphalting solvents, overall flow sheet, operating conditions;
- integration of deasphating units in conversion schemes.
- Integration of upgrading process with subsurface & surface production

Participation and contacts

Joining the programme

Contact the Academy and quote course code 000177 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

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