Iran section

SPE-Iran Section Technical Workshop

Asphaltene, Wax and Hydrate Formation and Deposition in the Oil and Gas Industry

اهداف دوره

- To understand the nature, chemistry and constituents of asphaltenes, resins, waxes and hydrates in petroleum and gas reservoir fluids.
- Problems associated with solid deposits in petroleum and natural gas production, transportation and processing.
- Mechanisms and conditions for formation and deposition of asphaltene, wax and hydrates.
- Properties and phase behavior of asphaltene, wax and hydrates
- Optimum operating conditions to minimize sold deposits
- Laboratory experiments and analysis regarding asphaltene, wax and hydrates.
- Prevention methods for remediation of heavy organic deposits

اهمیت دوره

Blockage of conducts, pores, pipes and production well in petroleum industry is mainly due to the deposition of heavy organics such as, wax, resin, asphaltene, diamondoid, mercaptanes and organometallic compounds that may exist in crude oil in various quantities and forms. For natural gas under certain conditions of temperature and pressure hydrates may form. All of these organic materials may precipitate under certain conditions or changes in concentration of oil / natural gas in solid or semi-solid forms. Solid particles suspended in crude oil may stick to the walls of the conduits and asphaltene may work as a glue to harden the deposits. Resins do not precipitate on its own but can play a significant role on asphaltene precipitation and the amount of precipitation.

Heavy organics problems in some fields range from deposition during early oil production and deposition resulting from well acidizing or CO2 injection. Solid deposition problem may extend after production wells to pipes, pumps, separators

and processing equipments causing significant economical damage and costs for the industry.

In this course we review and discuss nature of these solids, causes of their precipitation, predictive methods and simulation models for the possibility and amount of solid precipitation as well as methods of prevention and cleaning agents.

سرفصل دوره

CHEMICAL NATURE AND CHARECTERISTICS OF ASPHALTNE, WAX and HYDRATES

- Theories of formation of oil and hydrocarbon reservoirs
- Reservoir Conditions and Reservoir Characteristics
- Nature and types of crude oils and reservoir fluids, heavy oils, waxy and asphaltic oils
- Characterization and properties of various types of reservoir fluids, crude oil and natural gas.
- Chemistry and nature of asphaltene, wax and hydrates
- Laboratory measurement and analysis

PROBLEMS CAUSED BY ASPHALTNE, WAX and HYDRATES FORMATION AND DEPOSITION

- Problems caused by asphaltene, wax and hydrate formation, precipitation in petroleum and natural gas production, transportation and processing
- Role of asphaltene in primary depletion
- Role of asphaltene in gas injection
- Role of asphaltene in well stimulations, and performance
- Role of asphaltene, wax and hydrates in transportation pipelines, tankers and storage facilities.
- Role of asphaltene in petroleum processing and asphaltene crackings and conversions
- Parameters and factors that promote formation of heavy organic deposits

PROPERIES, PHASE BEHAVIOR AND PREVENTION METHODS

- Physical properties of asphaltene, wax and other heavy organic materials.
- Modeling and simulation approaches
- Measuring and predicting onset of asphaltene, wax and hydrate formation.

- Phase behavior and effects of composition, temperature and pressure on asphaltene, wax and hydrates formation.
- EOS models for simulation of asphaltene, wax and hydrate formations
- Preventing solid deposits by adjusting operating conditions
- Preventing asphaltene, wax and hydrates formation by chemical inhibitors
- Cleaning methods to remove solid deposits
- Recent developments
- Summary and concluding remarks

زمینه فعالیت شرکت‌کنندگان

The course is particularly useful for:

- Chemical engineers
- Petroleum engineers
- Reservoir engineers
- Mechanical engineers
- Process engineers
- Chemists and Physicists
- Petroleum geologists
- Operators
- Computer engineers

who are working in petroleum and natural gas exploration production and field processing, reservoir modeling and simulation. Participants should have at least a BSc degree in one of engineering or science fields.