

Course Content**Title:** Crude Oil Desalting**Potential PDH:** 16**Code:** BTT042**Description:**

The desalting of crude oil is a process that does not have a high profile, but is vital to the operation of the modern petroleum refinery. Desalters provide more protection to costly refinery equipment than any other single piece of process hardware. Refining Process Services and Nalco Water (formerly Nalco Champion) have developed this program to provide an in-depth, yet practical review of both the art and science of crude oil desalting. Maintaining smooth operation of crude oil desalting units is both critically important and quite difficult. Since there are so many significant variables to control, desalter operation must constantly be adjusted to maintain optimum performance with the ever-changing sources of crude oil.

The program's content is both comprehensive and wide-ranging. Sessions begin with a discussion of the fundamentals of the desalting process including crude oil quality impact, the operating variables, key equipment, various design options and major process variables. Once the fundamentals are established, discussion moves into the topics of unit operations, monitoring, and process troubleshooting. An experienced group of industry professionals has been assembled for the presentation of this program. The speakers are Mr. Dennis Haynes and Mr. Edgar Villoria of Nalco Water, and Mr. Tom Collins, an independent consultant, recently retired from of Forum Energy Technologies.

Outline:**BENEFITS OF CRUDE OIL DESALTING**

- General Overview

IMPACT OF CRUDE OIL QUALITY ON DESALTER PERFORMANCE

- Introduction to Desalting
- Crude Oil Impurities: Water, Salt and Solids
- Impact of Organic Acids, Asphaltenes
- Desalting Heavy and Opportunity Crudes
- Tankage Dehydration

FUNDAMENTALS OF ELECTRICAL DESALTING

- Wash Water Addition
- Rate and Wash Water Quality
- Mixing / Contact
- Coalescence
- Performance Control Variables
- Dehydration Efficiency vs. Salt Removal Efficiency

TYPES OF DESALTING SYSTEMS

- Single-Stage Dehydrator
- Single-Stage Desalter
- Two-Stage Desalter
- Three-Stage Desalter
- Typical Operating Conditions and Performance

DESALTER COMPONENTS

Course Content

- Process Vessel
 - Distribution System
 - Electrodes and Transactors
 - Mud Wash
- LEVEL CONTROLLERS
- Traditional, Microwave, Sonar, Radiation
 - Radiation / Neutron Backscatter Devices Available
- DESALTER DESIGN CONSIDERATIONS
- Vessel Size
 - Number of Stages
 - Transactor Size and Power Consumption
 - Crude Properties
- COMMERCIAL DESALTER DESIGNS
- Cameron
 - Forum
- FACTORS THAT AFFECT DESALTER OPERATION AND PERFORMANCE
- Crude Oil Feed Rate and Quality
 - Temperature / Viscosity / Density Relationships
 - Electrical Field Intensity
 - Wash Water Rate, Quality and Flow Configuration
 - Emulsion Formation (Pumps, Exchangers, Valves, Mixers)
 - Control of Water Level and Emulsion Layers
 - Demulsifier Technology and Addition Rate
 - Mud Washing and Brine Recycle
- TYPES OF DESALTING APPLICATIONS
- Heavy Crude Desalting
 - FCC Feed Desalting
 - Distillate Treating
- DESALTER TROUBLESHOOTING
- Oily Effluent
 - Poor Dehydration and/or Desalting
 - Workshop
- ECONOMIC IMPACT

Instructor:

Tom Collins is President of NEET Corporation. He retired in 2019 as Vice President- Electrostatic Process at Forum Energy Technologies in Houston, Texas. His responsibilities have included technical sales, process review, desalter design, troubleshooting, training, optimization and business development. Tom started in the Technical Service Department at Petreco in 1980, servicing desalters worldwide. He spent his career in the field of desalting and has over 42 years experience in this area. Tom has authored and co-authored papers on desalting for the American Institute of Chemical Engineers, and has been active in the AFPM, formerly the NPRA, for over 30 years.

Brad McCauley is an Industry Technical Lead for Nalco Water in Sugar Land, Texas. Brad has over 33 years of experience in the hydrocarbon processing industry. He has experience in refineries in North America specifically servicing refineries in California, Texas, Louisiana, Oklahoma and Montana. He is involved with training of new representatives within Nalco Water and is involved with in NACE, AFPM,

Course Content

Page 3 of 3

and CCQTA. Brad holds a B.S. degree in Petroleum Engineering from Montana Technological University in Butte, Montana.

Edgar Villoria is a Senior Industry Technical Consultant for Nalco Water. He has over 30 years of experience with a solid technical knowledge withing Refining/Upgrading downstream industry. He is responsible for technical support, start-up, troubleshooting and chemical program selection and optimization for the company's refinery process chemical programs. He worked in various sales, marketing and technical positions at Nalco and has extensive experience in refineries and Upgraders in Canada, Mexico, USA, Latin America and Spain. Prior to Nalco, Edgar was employed as a Process and Corrosion Engineer in Venezuela during his 6 years at PDVSA's Amuay Refinery. He holds a degree in Chemical Engineering (B.Eng) and a post graduate degree as a Specialist in Process Engineering (M. Eng.).