



Crude Oil Desalting

Potential PDH: 16

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 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

- 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





Who Should Attend:

Program participants will have the opportunity to obtain a broad working knowledge of desalter operations, to gain insight into advancements in the field, and to interact with others working in this area. The program is ideal for personnel involved in refinery process engineering, plant operations, and technical service. Process engineers from design and construction companies as well as those providing services to the petroleum refining industry should also find this program very beneficial.

Subject Matter Expert (SME):

Tom Collins is an independent consultant who recently retired as Vice President- Electrostatic Process Certified Technical Services at Forum Energy Technologies in Houston, Texas. His responsibilities at Forum Energy Technologies 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 39 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.

Sam Lordo is a recognized industry expert and has over 45 years' experience in refinery process chemistry/chemical treatments, opportunity crude processing and crude desalting. During his 45 years of corrosion / refining / petrochemical experience, he has been involved in all aspects of managing risk due changing crude slates and process conditions; including corrosion prevention, fouling prevention and control, failure analysis, and crude desalting.

He also directed research and provided technical support to sites in the areas of:

- Desalting operations and chemical additive strategies
- Aqueous corrosion control and chemical additive strategies
- Non-aqueous corrosion control strategies and risk assessments (eg., naphthenic acid, high temperature sulfidation)
- Fouling control strategies for various Refinery and Chemical Plant processes
- Antifoulant applications and treatment strategies
- Developed strategies to mitigate of risks due to various crude contaminants
- Sam worked as a member of a member of several multi-disciplinary teams that developed tools to assist refining sites in managing crude desalting, CDU overhead corrosion, non-aqueous erosion-corrosion, unit fouling, and opportunity crude processing. These efforts resulted in several software tools and key recommended practices to improve reliability and reduce integrity risk.
- Developed a number of Best Practices around chemical treatment

Sam has participated in the development of 4 patents. Sam has been a member of NACE for >20 years, author of several papers on corrosion control, desalting, crude oil management. With NACE Sam



participated in a number of Task Groups contributor.

Sam is active in Crude Oil Quality Association (COQA) and the Opportunity Crude Conferences presenting on a wide variety of topic regarding crude oil processing. He is an active member of and American Fuels and Petrochemical Manufacturers (AFPM). At AFPM was a member of the 2002 AFPM Q&A Panel, worked on the screening committee (>20 years) and received the 2016 AFPM Lifetime Achievement Award. Education: University of Missouri Columbia, BS Chemical Engineering.

