Crude Quality and Contaminants

Impact on Desalting Operations

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COQA Meeting
Houston, TX
Value of the Desalting Process
Contaminants

- Salts
  - Extractability
- Amines
- Water
- Solids
- [slop]
Brine Removal

- Tankage
  - Residence Time
  - Treatment

- Wash Water
  - Quantity
  - Location

- Mix Valve
  - Position
  - dP

- Temperature
  - Upper Limits
  - Lower Limits
Amine Contamination

- Chlorides
- Amines
- Acidification
  - # of Desalter Stages
  - Wash Water (%), pH
  - Mix Valve

Diagram:
- Corrosion Probe
- pH Probe
- Acid Additive
- Corrosion Inhibitor

Technical Innovation
Improved Reliability
Customer Profits

NALCO Champion
An Ecolab Company
Films

Treating Oil Field Emulsions, PES (UT) and API, 1974
Molecules

Water drop in 0.1% bitumen


Drainage

- Surface instability forming on the lower drop.
- A jet moves up towards the falling drop and initiates coalescence.

Source not known
Asphaltenes

bulk asphaltenes

diffusion

Near-interface asphaltenes

adsorption

adsorbed, unconsolidated asphaltenes

consolidation

adsorbed, consolidated asphaltenes

Source not known
Asphaltenes?

bulk asphaltenes → diffusion → near-interface asphaltenes → adsorption

adsorbed, unconsolidated asphaltenes → consolidation → adsorbed, consolidated asphaltenes

Source not known

Unstressed     Stressed

Technical Innovation  Improved Reliability  Customer Profits
Surface of Droplets in Emulsion

Source: Andrew Eisenhawer
Contaminants

- Salts
- Water
- Solids
LTO Related Deposit

<table>
<thead>
<tr>
<th>Element</th>
<th>Weight %</th>
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<tbody>
<tr>
<td>C</td>
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<tr>
<td>O</td>
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<tr>
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</tr>
<tr>
<td>Al</td>
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<tr>
<td>S</td>
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<tr>
<td>Cl</td>
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LTO Related Deposit

<table>
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# LTO blend Related Deposit

![Image of LTO blend Related Deposit](image_url)

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An Ecolab Company
LTO blend Particle Size

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<tr>
<th>Area</th>
<th>0.00-3.00</th>
<th>3.00-5.00</th>
<th>5.00-10.00</th>
<th>10.00-15.00</th>
<th>15.00-20.00</th>
<th>20.00-25.00</th>
<th>25.00-50.00</th>
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<td>All Particles</td>
<td>1097</td>
<td>40</td>
<td>31</td>
<td>14</td>
<td>2</td>
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<td>7</td>
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Alternatives

- **Precondition in Tankage**
  - Enhanced Salt Removal
  - Improved Desalter Interface

- **Brine pH Adjustment**
  - Amine Removal
  - Metals Removal

- **Brine Corrosion Control**
  - Low pH sources

- **Asphaltene Stabilizer**
  - Desalter purpose
  - Injected in Tankage
Alternatives

- Advanced Emulsion Breakers
  - Crude Oil Types
  - Crude Oil Ranges

- Solids Removal Chemistries
  - Oil-phase removal
  - Rag-layer removal
  - Water-phase removal

- Analysis and Automation
  - Amine testing
  - Desalter Inlet/Outlet Salt
  - Brine Quality (pH, solids, etc.)
Changes and Improvements