Optimising crude desalters to ensure optimum FCCU and DCU performance

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What we do...

“We create ingenious ways to measure the difficult-to-measure, so that customers have the insights they need to make better decisions.”
Why Desalting?

“Desalting is the first defence against corrosion – poor desalting will impact on refinery reliability and costs.”
Desalting process problems

Typical challenges

- Flexibility – inability to diversify with crude blending
- Unit reliability – increased costs and lower operating margins
- Corrosion in overheads - fouling and damage
- Process control – unplanned trips and shutdowns
- Chemical usage – impurity removal and emulsion/chemical control
- Downstream process – impact on FCC and other units
Desalting process problems
Profiler™

Reliable multi-phase control, in real time
Tracerco Profiler™

It is the only instrumentation designed to measure the vertical distribution of oil, emulsion, water and mud in real time at high resolution.
Desalter Improvement Challenge

BP Cherry Point
BP Cherry Point Challenge

Reduce Upsets / Trips
Poor level control from existing instrumentation

Optimize chemical use
Reduce chemical costs and product quality

Improve crude flexibility
Increasing refinery profitability

Reduce Corrosion
Corroding overheads due to increased chlorides
Solving our customers problems!
Summary

Improved unit flexibility
Crude blend increased
from 30kbb/d to
50kbb/d

Reduced corrosion
(Chloride levels reduced
from 4 ppm to 2ppm).

Reduced demand on
distillation pre-heat

Process control Improved
Interface level now
operated with confidence

Refinery profitability
improved
Reduced trips / Process
upsets

Reduction in chemical
dosing
Summary - The Numbers

Increased refinery profitability by 1M USD / d

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Annual Savings $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demulsifier</td>
<td>200,000</td>
</tr>
<tr>
<td>Neutraliser</td>
<td>75,000</td>
</tr>
<tr>
<td>Water Clarifier</td>
<td>130,000</td>
</tr>
<tr>
<td>Asphalante Stabiliser</td>
<td>100,000</td>
</tr>
<tr>
<td>Maintenance/production</td>
<td>330,000</td>
</tr>
<tr>
<td>losses (3 trips previous</td>
<td></td>
</tr>
<tr>
<td>year)</td>
<td></td>
</tr>
<tr>
<td><strong>Total Improvement</strong></td>
<td><strong>$835,000</strong></td>
</tr>
</tbody>
</table>
Desalter performance Challenge

Middle East Refinery

PTQ Q3 2019
Analysing desalter performance and improving crude blending capacity with multi-phase instrumentation and control
Reduce Upsets / Trips
Improve plant reliability and increase operational days

Reduce Carry-over
Carryover of emulsion (H₂O, NaCl) in the oil stream to the distillation columns and FCCU

Improve crude flexibility
Increasing refinery profitability

Improve level / Interface Control
Poor level control from existing instrumentation
Tracerco Solutions
Supporting clients using a solutions based approach

**Process Review**
Using Process Diagnostic technologies to understand the process problem.

**Feedback**
Results fed back to the client.

**Solution**
A full understanding of the process problem allows the optimum solution to be recommended.

**LCM**
Full Life Cycle Management to ensure optimum performance.
Tracerco Process Review
Onsite scanning services

- Level and interface measurement in storage tanks
- Deposit/vapour profile in pipelines
- Foam heights in tower downcomers
- Liquid levels in tower distributors, chimney trays and draw sumps
- Interface/emulsion detection in separators
- Levels in reboilers/heat exchangers
PhaseFinder™
Neutron Backscatter Application
PhaseFinder™
Neutron Backscatter Application

Phase height identification for storage tanks
PhaseFinder™
Neutron Backscatter Application

Actual Scan Results
Middle East Refinery Challenges

• Operational days before the profiler = 27 days / Month
• Operational days **AFTER** the profiler = 30 days / Month
## Summary

<table>
<thead>
<tr>
<th>Enhanced understanding of process</th>
<th>Reduced corrosion</th>
<th><strong>Increased operational days</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Salt Removal efficiency</td>
<td>Reduction in BS&amp;W</td>
<td>Now 30 days / Month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduction in chemical dosing</td>
</tr>
</tbody>
</table>
Why Use a Tracerco Profiler™
Why Use a Tracerco Profiler™?

- Give operators the confidence to run the interface close to the electrostatic grid (within the design guideline) thus optimising separation.
- Increased upstream desalter mixing to enhance removal of chloride carry over to downstream vessels thus reducing corrosion and fouling issues. This has reduced carry over of chloride levels from 3-4 ppm to 1-2 ppm
- Increased blending ratios of lower quality crudes with enhanced margin of refined products
- Optimisation of emulsion and asphaltene reducing chemicals within the desalting process leading to considerable cost savings
- The elimination of process upsets resulting from water carryover or oil carry under from the desalter vessel.
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