Utilizing Mobile Treatment Systems to Capture Lost Profits Resulting from Flared or Reprocessed Fuels

Jeff St. Amant
President/CEO

Bryant Woods
Lead Project Engineer
Objectives

• Executive Overview
• Review of New Impacts
• Technology Overview
• Case Study
Executive Overview

• Operational shortfalls and maintenance activities can create a need for the reduction/removal of hydrogen sulfide and other sulfur compounds from fuels that are downgraded, flared, and reprocessed.

• A need exists to economically assist in the treatment of certain sulfur compounds from fuels.

• Vapor Point’s modular and mobile treatment approach has proven successful in helping recapture lost profits.
Impacts Review

Several factors have created the need for fuel treatment:

• Tier III Fuel Standards (gasoline total sulfur down to 10 ppm)
• Off spec product specifications (downgraded products)
• Maintenance activities where plant treatment processes are offline
• Overcapacity of internal treatment processes
Technology Overview

- Vapor Point’s core VOC recovery technology, the VaporLock™, provides an efficient system for contacting and disengaging fuel and targeted selective chemistries.

- Our partnership with Baker Petrolite (BHGE) provides for the development of specialized chemistries only useable in the VaporLock™.
Keys to Effectiveness

- Mixing energy created by VaporLock™
- Mixing disengagement and separation effectiveness of VaporLock™
- Chemistry selection and effectiveness
Case Study

• Gulf Coast Refiner had a pressure relief valve, that when over pressured, would route off spec Y-Grade high in \( \text{H}_2\text{S} \) and other sulfur compounds to the plant flare.

• Client originally believed vent gas was comprised totally of Y-Grade mix.

• Y-Grade was routinely sold as downgraded product resulting in lower profitability for the client.

• Regulatory driven issues resulted in the recovery of high value on spec Naphtha and Y-Grade.

• Vapor Point solution solved client’s product quality issues, resulting in improved profitability to client.
Client Challenges/Criteria

Original Defined Client Criteria:

- Maintain safe working environment for all employees
- Meet sulfur reduction requirements for flare emissions
- Manage process to minimize impact on operations

Current Defined Client Criteria:

- Priority 1 = Safety
- Recovery of naphtha
- Reduction of Sulfur in both Naphtha and Y-Grade Streams
- Maintain copper strip test of 1A or 1B
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Case Study Results

Y-Grade (Gas Phase)

- $\text{H}_2\text{S}$ concentrations ranged from 300-880 (avg. of 450) resulting in a copper strip test of 4.
- Post treatment $\text{H}_2\text{S}$ is less than 1; while copper strip test of 1a or 1b.

<table>
<thead>
<tr>
<th>Y-Grade Treatment</th>
<th>$\text{H}_2\text{S}$</th>
<th>Mercaptan</th>
<th>Carbonyl Sulfide</th>
<th>Copper Corrosion</th>
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<tbody>
<tr>
<td>Inlet</td>
<td>482.2</td>
<td>81.3</td>
<td>4.2</td>
<td>4</td>
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<tr>
<td>Outlet</td>
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<td>25.6</td>
<td>ND</td>
<td>1</td>
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Case Study Results

Naphtha Treatment (Liquid Phase)

- Approximate treatment flow of 485 bbd.
- $\text{H}_2\text{S}$ and other sulfur contaminates in product resulted in copper strip test of 3-4 typically.
- Treatment resulted in copper strip of 1a or 1b.

### Y-Grade Treatment

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Other Design Considerations

• Upstream contaminates from carry over amine, merox, or other treatment processes can lead to fouling.

• Defined sulfur species can result in a multi-stage process for the conversion/extraction/absorption of different sulfur compounds.

• Contaminated fuel gases used in process can lead to negative impacts on product quality and process infrastructure.
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Questions?