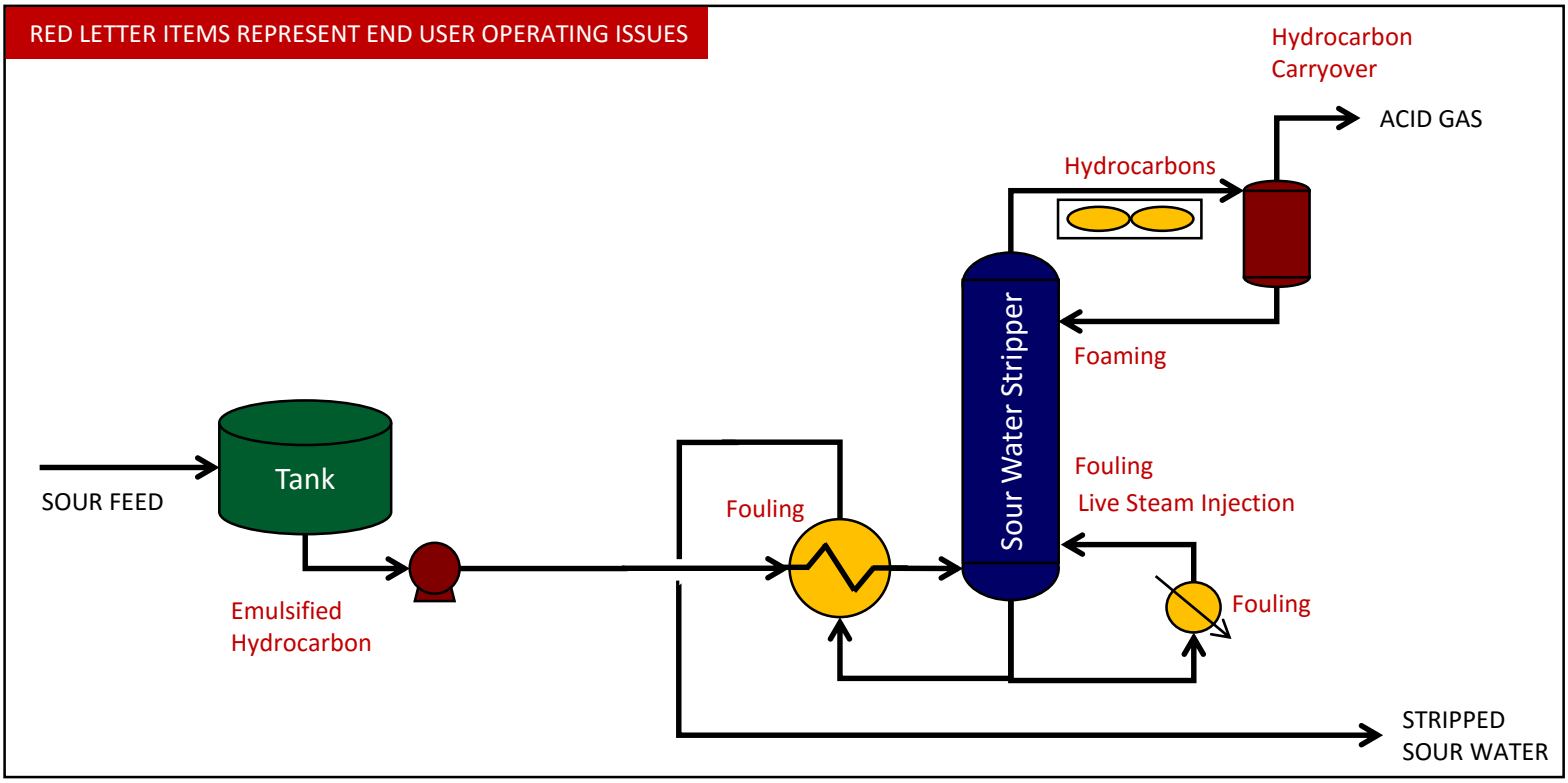
Transcend IDEA ™ Update – Sour Water Unit Optimization

Sour water units suffer from hydrocarbon and particulate fouling, tower instability and hydrocarbon carryover to the sulfur plant. These costs and throughput constraints can be solved by better separations technology.



TYPICAL OPERATING ISSUES

Refinery sour water streams contain free and emulsified hydrocarbons. These hydrocarbons are difficult to settle out, despite 3-5 day residence time tanks. As a result, refineries are faced with:

- Heat Exchanger fouling
- Energy costs caused by inadequate heat exchange
- Tower fouling
- Hydrocarbon ingress to the sulfur plants
- Increased oxygen demand in the sulfur plant

ECONOMICS

The opportunity cost of hydrocarbon dispersion in Sour Water system feeds is >$4MM per year. For a 500 gpm unit:

- 1% hydrocarbon is ~ 170 bbl/day of lost hydrocarbon
  - Estimated at $2MM at $50/bbl
- Oxygen demand increases by >100 ton/day in the SRU
  - Estimated at $1MM at $35/ton O_2
- Increased SRU O_2 demand causes refinery bottlenecks
  - Reduced crude throughput >$1MM/yr
- Exchanger fouling results in increased energy costs
  - Estimated at $0.5MM/yr

KEY INSIGHT

Development of advanced media and element technology that allows the removal of hydrocarbon dispersions, without incurring high costs due to particulate contamination is critical to solving this problem

ROOT CAUSE APPROACH: SEPARATIONS

Contamination control is the key parameter that defines efficient system operation. Elimination of the critical fouling agents before they enter the system, results in a dramatic impact on operating profitability. The root cause solution is to effectively remove oil emulsions from sour water

PRACTICAL IMPACT

- ☑ Improved stripper column performance
- ☑ Reduced hydrocarbon carryover to SRU
- ☑ Reduced SRU excursions caused by hydrocarbons
- ☑ Reduced parasitic O_2 demand at SRU
- ☑ Reduced throughput constraint caused by "lost" O_2
- ☑ Reduced fouling of exchangers
- ☑ Reduced energy cost at sour water unit
- ☑ Reduced maintenance costs at sour water unit

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