

16th STS-AIChE Southwest Process Technology Conference

► Use of dewaxing catalyst to expand
feedstocks option in naphthenic lubes

► Scott Sayles – Ivan Parra Tepedino

► Becht 



Sept 22-23, 2025, University of Houston

16th STS-AIChE Southwest Process Technology Conference

Scott Sayles

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Manager of Renewable Feeds and Alternate Fuels



Vita

Nearly 50 years in the oil refining from operations to senior management.

Ivan Parra Tepedino

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EMEA Strategic Business Planning

Vita

40 years' experience in the hydrocarbon (mainly downstream R&M) industry

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Situation

Challenge

- European refiner producing naphthenic lubricants specialty products (NSP) facing changes in feedstock supply availability and margin pressure
- Needed to expand feedstocks slate, keep profitable margins, maintain specialty products quality and protect market reputation.
- Becht was engaged to provide opportunities and implementable solutions

Background

- Lubricants have strict viscosity/density relationships
- These are inherent in the crude oil entering the refinery; not all crude oils are readily suitable to produce NSP
- To enable production of NSP from certain crude oils, the relationships are modified to meet specifications by using a process called dewaxing
- Dewaxing in its simplest form changes linear paraffins into branched chains
- The client was interested in increasing existing unit capabilities by adding catalytic dewaxing



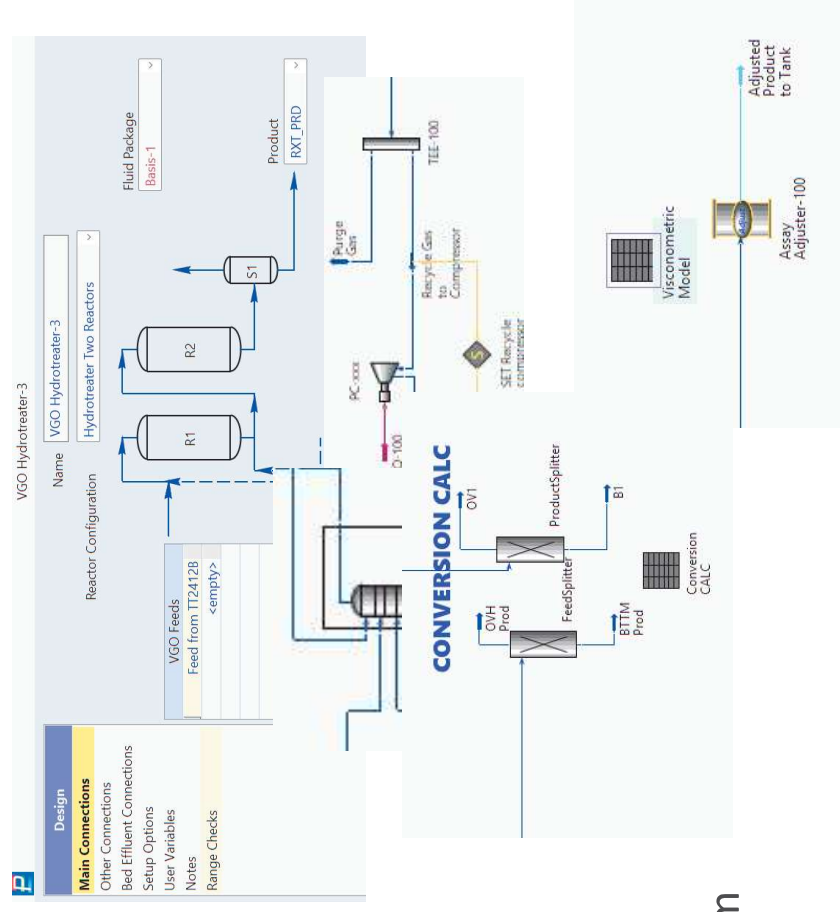
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Situation

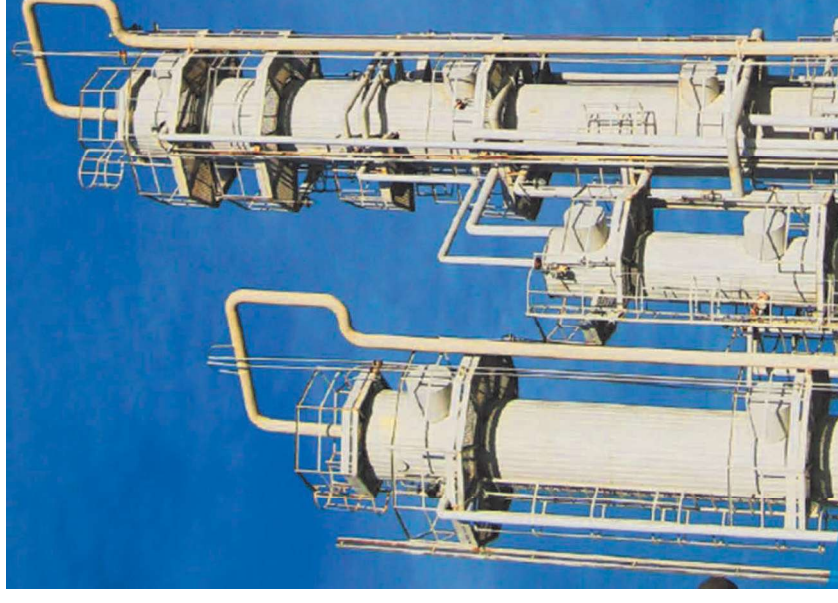
Approach

- To find a solution we assessed the feasibility of converting one of three reactor beds in a VGO HDT lubes train to dewax distillate cuts to enable an expanded set of options of alternative feedstock to reduce pressure on margins and manage risk
- Design cases were developed from pilot plant run data from different heavy crude distillate cuts using dewaxing catalysts. Kinetic modeling was used to check equipment and evaluate options.
- The 1st principle kinetic model was augmented by developing dewaxing and viscometry correlations from crude and pilot plant data.





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Objective

Provide support to client to perform a Catalytic Dewaxing Front End Loaded (FEL-1) study package, working together with the client's engineering team. The study will be the basis for the basic engineering and implementation of catalytic dewaxing of intermediate distillates with wax content at client's refinery in to enable their use in NSP manufacturing.

Guidelines/Premises:

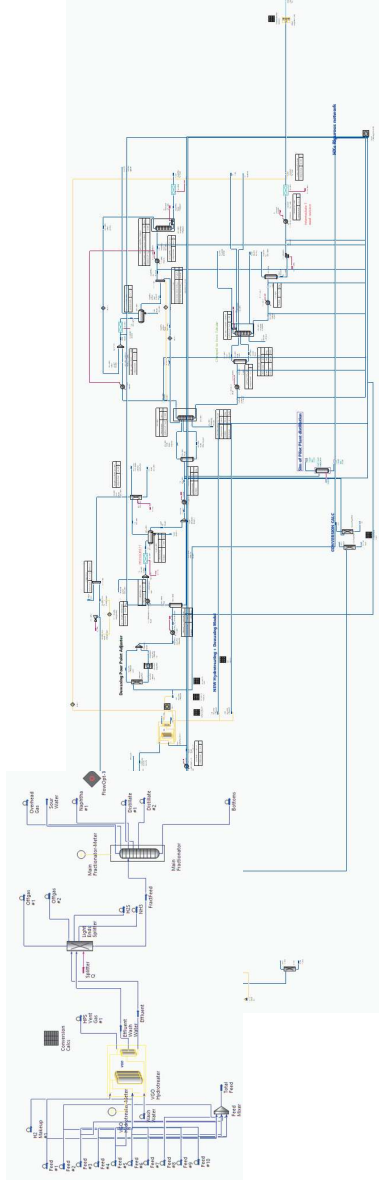
- Technical High-level assessment to suggest technical solution for the hydrotreater set up
- Heat and material balance
- Check existing major equipment for new conditions, (air coolers, heat exchangers, towers, compressors etc.)
- Update existing PFD (Process Flow Diagram)
- +/- 50% cost estimate
- Major equipment list with preliminary sizing of new equipment



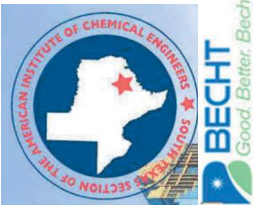
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Approach

- **Phase 0 &1 – Review and validation of Client’s existing Petro-SIM[®] model**
 - Petro-Sim[®] models of the commercial and pilot plant data were developed to simulate the process
 - Correlations for viscosity shifts, other product quality shifts, hydrogen consumption, and light ends yields were created based on various pilot plant data supplied by client and were used to adjust Petro-Sim[®] model results to match client data



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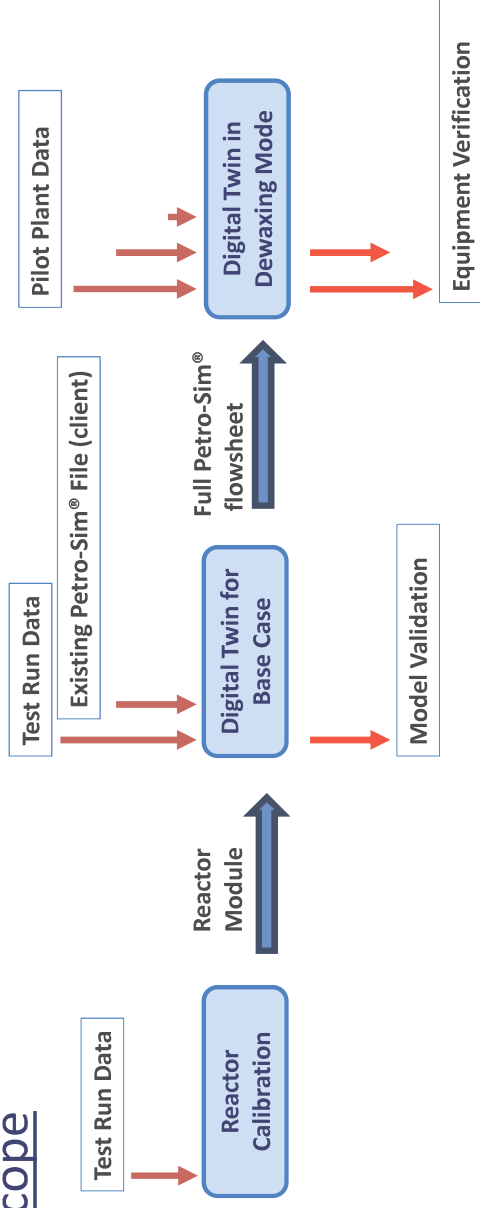


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Petro-Sim[®] Workflow



Scope



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BECHT
Good. Better. Becht.

- [illegible]

- Shell and tube Exchangers

All under design conditions.

- Airfins

All under design duties.



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Questions

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