



Global Oil and Gas Refiner Goes Beyond Linear APC with AIO

MAIN CHALLENGE

To capture untapped value through improved yield management

A global Houston-based refiner running a hydrocracker unit sought to capture untapped value beyond existing Advanced Process Control (APC) through optimal yield management.

Their APC solution was used to maximize feed and optimize backend fractionation. Weighted Average Bed Temperature (WABT) targets, one of the key handles in determining yields, were manually adjusted through changes to APC limits. These adjustments were driven by weekly manual runs of the economic Linear Program (LP) model.

SOLUTION

AIO Goes Beyond Existing APC to Manage Lower-level Constraints.

Imubit's Closed Loop AI Optimization (AIO) solution uses Deep Learning Process Control (DLPC) to manipulate 1st and 2nd stage WABTs to optimize product yields while respecting key process constraints to maximize the objective function. The DLPC is integrated with the existing APC to manage lower-level constraints.

With AIO running in closed loop, a total annualized value of \$8-12 MM (at 80% engagement) was captured over two months, in comparison to a baseline period with similar operational constraints. With new WABT targets calculated dynamically, DLPC was able to increase volume swell by 0.6% which translated to an increase in incentive by almost \$1.5/BBL, on top of the existing APC. The yield shift illustrates AIO's ability to understand the dynamics of the hydrocracker and create the most optimal yields based on prices defined in the objective function.



Every 5 minutes our variables are being manipulated to **keep our process where it needs to be.**

RESULTS

Realtime Performance

\$1.5/BBL

Beyond Existing APC with AIO

\$20K

Average daily margin increase after implementing AIO

Why Imubit?

Imubit's Optimizing Brain™

AIO solution is trusted by 7 of the 10 largest US refiners

to optimize collaboration and unlock untapped value. Imubit offers the only AIO solution that uses your plant's data combined with deep reinforcement learning to maximize profit while meeting sustainability commitments.

Accelerate your digital transformation journey and take process optimization to the next level with AIO.

Learn more at imubit.com/AIO

Prior to implementing Imubit's AIO solution, the client's APC relied on operators to manually adjust WABT targets based on operating orders as defined per the weekly LP run. While APC managed backend fractionation, it could not optimize the yield output from the reactors. With AIO engaged, the WABT targets are consistently adjusted to capture the optimal yield from the dynamic feed composition and therefore maximizing the objective function. The objective function in this window of time increased by \$20k/day.

AIO solution development includes scoping, data cleaning, and model training, and includes customer approvals throughout the entire process. Client resource requirements during development include defining scope, sharing data with Imubit, and approving DLPC models during various milestones throughout Imubit's project workflow. Commissioning requires the greatest degree of support as it includes implementation, operations training, and building confidence with entire organization. Once DLPC is in closed loop and performing, continuous improvement effort required is minimal and can increase based on the desire of the client to be more involved in the process of maintaining the AIO solution.

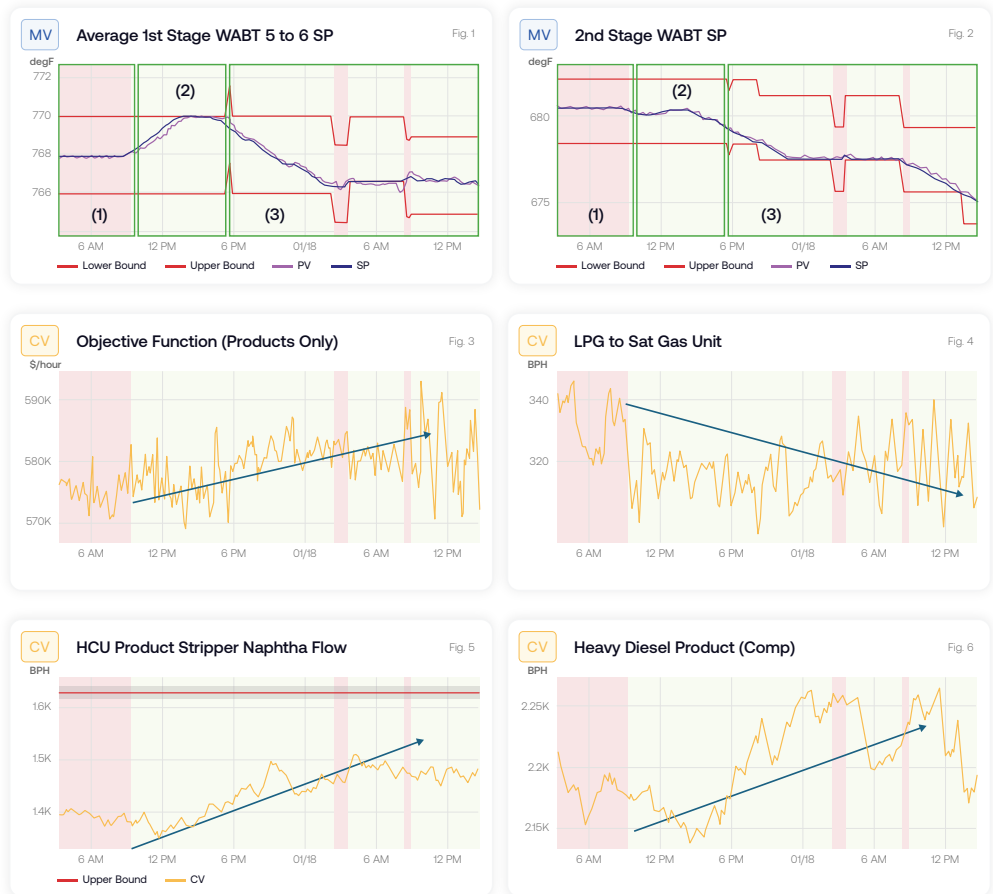


FIGURE 1-6 1. First Stage WABT, 2. Second Stage WABT, 3. Objective Function, 4. LPG, 5. Naphtha, 6. Diesel

FIGURE 1 & 2 (1) Before Imubit is engaged, WABT targets are infrequently adjusted (2) Once Imubit is engaged, WABT targets are consistently adjusting to increase product yield and maximize the objective function. (3) Imubit is responding to disturbances in the process, while still maximizing the objective function.