ABB ADVANCED DIGITAL SERVICES

NGL Fractionation Advanced Process Control

Increase throughput, maximize production of higher-valued products, reduce energy costs

Take advantage of product pricing differentials with an APC solution for Natural Gas Liquids Fractionation. APC keeps product compositions close to optimum targets that provide greater economic benefit, without causing any operational or product quality problems and while maintaining stable plant operations.

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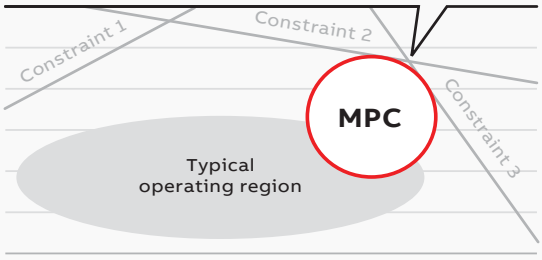
01. Model predictive control (MPC) allows plant equipment to operate at constraint limits, leading to increased throughput, and reduced energy and material costs.

Operate close to multiple constraints limits and economic optimum



Advanced Process Control (APC) is a supervisory control solution that communicates with installed level 1 DCS controllers. APC can be implemented within the DCS as level 2 advanced regulatory controls and as a software solution running on a dedicated PC and communicating to the DCS through an OPC server.

Application of APC controls often includes a combination of advanced regulatory control and multi-variable model predictive control (MPC) with ABB's APC software solution. Advanced regulatory controls often include controls based on temperatures and pressures to maintain stable operation and reduce variability within the towers by rejecting disturbances, such as changes in feed composition. MPC is often utilized for slower composition controls by including models that account for the dynamics and process interactions. MPC can provide substantial performance improvements compared with traditional single-input, single-output control strategies.

Typical situations remedied with the APC solution for NGL fractionation from ABB
Composition controls not running in Automatic
Feed composition changes and process interactions cause tuning problems leading to oscillations or slow responses
Controls do not include all of the necessary constraints
Significant losses of higher-valued products
Production rates are limited
Excessive energy usage
Existing controllers not able to increase benefits.
Savings opportunities from $300K to $3M depending on initial status of controls and operations

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02: Variability is reduced with APC On through the use of models and multivariable predictions that allow the controller to plan its moves taking into account their effects on process dynamics.
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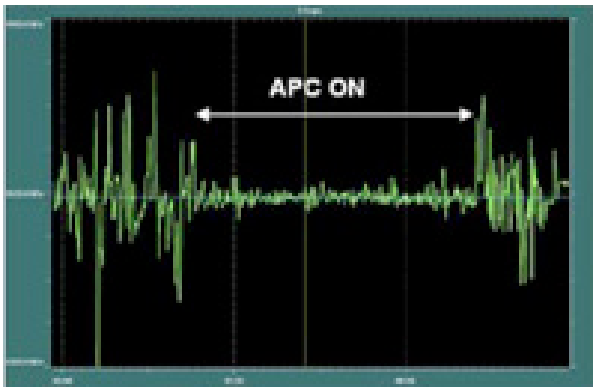
03: Control setpoints are adjusted to reduce losses and increase production of high valued products. NGL Fractionation APC can help create annual savings from $300K to $3M depending on initial status of controls and operations.



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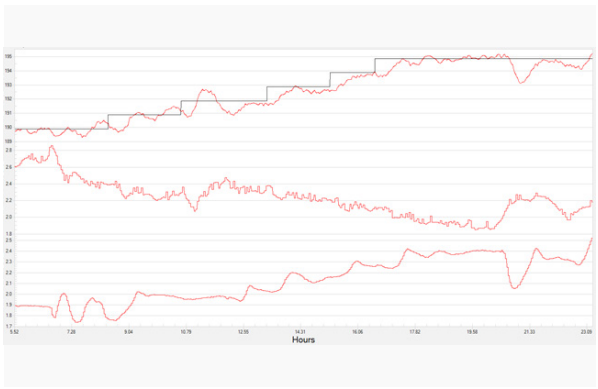

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A feature of MPC is the ability to effectively manage multiple operational constraints (Fig. 01). Without MPC, variability within the typical operating region does not allow the plant to operate close to constraint limits (such as flooding, max reboiler duty) or economic optimums. With MPC, the variability is significantly reduced, then benefits can be increased by increasing throughput, maximizing production of higher-valued products, reducing energy costs, etc.

Implementation process

- Develop APC design
- Assess and improve existing DCS controls with advanced regulatory controls
- Perform plant step/bump tests to gather data and build process models
- Configure APC software and DCS logic for supervisory control
- Commission APC control solution
- Monitor APC performance and update as needed

Scheduled periodic or continuous monitoring services ensure APC continues to deliver the highest value over time and alerts engineers to additional model updates and/or APC tuning that may be beneficial.
To maximize the benefits of APC, additional corrective activities may be required to ensure the control system and instrumentation are functioning at a level that is able to take advantage of APC implementation. This may include control loop performance optimization, instrumentation maintenance, and/or other process specific improvements.

ABB experience

ABB has worked in the field of advanced process control (APC) and optimization since the 1980s, working with innovative technologies that range from advanced regulatory controls to multi-variable model predictive control to real-time optimization. Our software tools and services deliver the most effective and advanced solutions for any process problem. ABB installations continue to deliver benefits to numerous plants around the world.

Additional services from ABB

ABB provides many types of diagnostic fingerprint and control implementation service activities:

- Control Loop Optimization
- Alarm Management
- Boiler Optimization

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