Case Study

Wood River Refinery Sustains an Optimal Blending System

“Gasoline blending is the cash register of the refinery – if we give it away at blending, it is gone for good.”

- Yangdong Pan, Phillips 66, Wood River Refinery

Background

Phillips 66 is a growing energy, manufacturing and logistics company. Its refining operations include 15 refineries with a net crude oil capacity of 2.2 million barrels per day.

Located along the Mississippi river, the Wood River Refinery is a 306,000 barrel-per-day (BPD) multiple-train facility. The refinery processes light, low-sulfur and heavy, high-sulfur crude oils.

Wood River’s capabilities include alkylation, catalytic cracking, catalytic hydrocracking, catalytic reforming, desulfurization, hydrogen, delayed coking and vacuum distillation.

In November 2011, a $3.8B expansion project (CORE) to increase the facility’s heavy oil processing capacity and overall throughput was completed.

Benefits

Wood River Refinery has determined that keys to optimal blending include setting up a good gasoline blending work process and utilizing advanced technologies like Near-InfraRed Analyzers (NIR) and Honeywell’s Blend, Blend Ratio Control (BRC) and Blend Property Control (BPC).

With Honeywell’s Blending and Movement Management solution, users can:

- Reduce blend turnaround time and property giveaway, acquiring online blend quality analysis and homogeneous quality in the finished tank
- Improve inventory reconciliation, minimize material downgrades, eliminate data entry, and reduce losses from tank farm incidents
- Increase the effectiveness of operations personnel, thereby reducing incidents
- Optimize the formulation of blend components.

Challenge

Gasoline blending is the “cash register” of the refinery – “if we give it away at blending, it is gone for good.” Small reductions in giveaway yield huge results through scale. Consider that Wood River Refinery makes roughly two billion gallons of gasoline per year.

Wood River Refinery’s gasoline blenders are all in-line – straight to the pipeline, not tanks. So, there is no room for errors. With nine gasoline blending components, there are more opportunities for optimization. Wood River Refinery operates with a “fly-switch” capability – change to a new blend without stopping the blender/pipeline.

Using the concept of segment control, each blend is optimized in 5,000-barrel segments with a given blend. Wood River Refinery produces nearly one thousand gasoline blends per year, ranging from 20,000 to over 200,000 barrels per blend. Roughly 50% is conventional blends (premium, regular, and sub-grade) and 50% is Reformulated Gasoline Blendstock for Oxygen Blending (RBOB) blends (premium and regular).
**Solution**

The Wood River Refinery blending system includes NIR analyzer (hardware) and advanced software applications, including Honeywell’s Blend, BRC and BPC.

BRC/BPC is a highly sophisticated control system with many embedded custom codes, including blender header pressure control, dual valve control for component flows, and analyzer data validation scheme.

**Results**

The NIR analyzers predict 13 key gasoline properties. The system includes online monitoring of NIR diagnostic data for early detection of maintenance needs. The site keeps spares for key parts.

Wood River Refinery utilizes the Benefits Guardianship Program Plus (BGP Plus) as a natural enhancement due to the importance of advanced applications. Use of the features of the support program has increased operator knowledge, efficiency and acceptance. Additionally, through site visit activities as a part of BGP Plus, applications have been reconfigured to reflect current plant operations.

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**About Honeywell Blending and Movement Management Solution and Benefits Guardianship Program**

Honeywell’s Blending and Movement Management solution delivers complete planning, execution, and performance monitoring of off-sites blending and movement operations. At the core of this solution are:

- Blending applications that plan, control, optimize and monitor in-line and batch blending operations.
- Movement management applications that enable operations staff to accept, create, and validate material movement plans, and control and track movements and inventories.

Honeywell Benefits Guardianship protects users’ investments in advanced software applications by providing a cost-effective path to the latest technology while delivering ongoing support for existing applications. This extended investment protection benefit is available for many Honeywell’s advanced software applications.