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With cutting-edge software, global refineries can now manage movements more effectively, reduce errors, save time and increase visibility within the refinery schedule says OSSAMA TAWFICK, regional vice president, sales, Mena, AspenTech

Managing crude through automated scheduling

INFORMATION is power – mastering dynamic information delivers a competitive edge. Automated scheduling with refinery-wide visibility helps to mobilise crude oil through production to refined products, enabling companies to optimise operational efficiency and maximise profitability.

Saudi Arabia has earmarked \$91 billion over the next decade to build new petrochemical plants and expand existing ones, along with integrating refineries with new or existing units in the kingdom. The GCC nations also aimed to achieve a production capacity of over 100 million tonnes of petrochemicals per annum by 2015.

As new feedstock becomes available on the market and petroleum supply chain complexity increases, having a comprehensive overview of the process is vital in today's marketplace. Tracking crude and product movements from a single platform is necessary to master multiple events occurring within the refinery, via pipelines, dock operations down to ancillary terminals. With cutting-edge software, global refineries can now manage movements more effectively, reduce errors, save time and increase visibility within the refinery schedule.

BRIDGING THE GAP

Scheduling bridges the gap between the monthly plan and daily operations. Where planning determines 'what is to be done' (that is – what crude to buy and what products to make), scheduling determines 'how and when' products must be produced. Tankage and storage is not only expensive it is also frequently one of the biggest constraints within the supply chain. Hence, understanding where things are and being able to minimise holding costs is essential to maximise production. The challenge is being able to streamline the process and execute the



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plan as efficiently as possible. Technology is a lifeline. The adoption of automated cutting-edge petroleum supply chain software extends the refinery scheduling capability beyond the refinery gate to include pipeline movements and dock operations. Refineries, therefore, can increase agility and perform all key scheduling activities within the same platform. The software helps to streamline production, respond quickly to disruptions, and improve inventory and transportation assets.

TRACKING CRUDE MOVEMENTS

Pipelines provide an economic method to

transport petroleum, especially when huge volumes of petroleum derivatives have to be pumped across long distances. In practice, the pipelines are sectioned into many parts and require experienced operators to manage the oil transfer between different parts. Usually, crude oil and refined products are transported via different lines. Therefore, managing the overall pipeline network presents many challenges.

Schedulers sit at the heart of the plant and a key part of their role is to accurately track incoming and outgoing movements via pipelines down to the ancillary terminals, enabling more accurate crude unit scheduling. Managing multiple and bi-directional pipeline segments with injection points and pipeline fill is a complex task. Dock scheduling is an equally complicated affair, especially trying to take all unassigned ships and assign each to a legal berth, as well as taking into account economic feasibility and the physical characteristics of both ships and berths. Managing the daily operation of a refinery, its pipeline and dock operations using Excel spreadsheets is now widely recognised as inadequate.

The use of traditional tools is an inefficient way of handling highly complex scenarios in the dynamics of today's petroleum environment. Using such tools as Excel spreadsheets, costs are immediately incurred when essential information is delayed to Schedulers. Dedicated advanced petroleum supply chain software, however, enables Schedulers to optimise the process from crude feedstock to the refinery through production of refined products. Pipeline Schedulers need the cutting-edge tools to schedule batch injections to and removals from the pipeline along with tank loading or unloading operations. Tracking movement in the pipeline and having up-to-date data on the status of the product movements to shippers and the refinery significantly helps optimise production.

ONE SCHEDULING PLATFORM

Now refineries can schedule from a single platform – crude receipts through refined products shipments. Dedicated software, such as Aspen Petroleum Scheduler (APS), enables fast, accurate and collaborative creation of the refinery schedule with integration to refinery planning, blending, pipeline and dock operations. As an event-based, single-blend optimisation solution, the tool supports the scheduling of all refinery scheduling activities for over 45 per cent of global refineries.

Unlike traditional tools, a key advantage with the APS tool is that it provides greater accuracy and predictability for yields and product properties allowing the Scheduler to understand what is being made over longer time horizons. The Scheduler can easily generate reports giving greater visibility of the schedule and reconciles data quickly when any changes may occur to the plan. It seamlessly integrates with Aspen PIMS planning software to achieve greater profitability through more accurate planning and scheduling.

The integrated software provides crucial benefits to Schedulers, including the ability to:

- Avoid disconnect between refinery operations, pipelines and dock operations;
- Eliminate product downgrades and unplanned blends;
- Predict yields and product properties accurately over longer time scales (medium to long-term);
- Reduce demurrage costs by as much as \$60,000 per day for a single supertanker;
- Easily manage incoming and outgoing shipments all the way down to the docks;
- Easily manage multiple and bi-directional pipeline segments with injection points and pipeline fill management;
- Track crude and product movements via pipelines;
- Manage in-transit inventory to assist material balance management outside the refinery fence, including ancillary terminals; and
- Minimise wasteful man-hours by eliminating the need for inefficient spreadsheets and other external pipeline scheduling tools.

Automated petroleum supply chain software also helps schedulers anticipate issues before they occur and, in turn, enables better decision-making in the overall management of the refinery. Hence, transparency maximises profitability and dramatically improves the ability to meet customer demand.

VISIBILITY, VOLUMES AND VALUE

Scheduling all activities from one platform provides greater visibility of the entire petroleum supply chain. Implementing an effective automated scheduling software solution improves coordination and results in increased margins. A single standardised platform helps to optimise feedstock volumes, respond quickly to disruptions, and optimise inventory and transportation assets.

So, moving away from traditional tools is a major step to achieving a comprehensive refinery-wide view of the operation. By adopting automated scheduling software, refineries can gain a better understanding of feedstock management, efficiently schedule crude through refined products and deliver optimal results across the entire petroleum supply chain.



Automated petroleum supply chain software helps to streamline production