

Interview with an Expert

Crude Scheduling at an Independent Refiner and Marketer

Featuring

Celso Flores, Senior Principal Consultant Engineer at Aspen Technology, Inc.

Refiners and marketers of petroleum products benefit from using a scheduling solution to better manage their crude operations. Today's refineries are faced with many different challenges when it comes to downstream scheduling, while striving to maximize margins and meet market and regulatory requirements. Celso Flores shares his insights related to an Aspen Petroleum Scheduler project that he recently completed.

What key scheduling issues does a company face in the refining industry?

I recently implemented Aspen Petroleum Scheduler (APS) for an independent refiner of petroleum products. Previously, the customer was using a scheduling tool at their refinery, therefore they fully understood the importance of using an automated refinery scheduling solution as opposed to spreadsheet scheduling.

This particular refiner received their crude over a common carrier pipeline, so the scheduler had little influence on when the pipeline was going to deliver their crude. Every time the pipeline schedule changed, the scheduler would spend up to three hours a day realigning the schedule to ensure there were no inventory containment issues or disruption of feedstock to the crude distillation unit.



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Additionally, given the limited tankage within the refinery, the scheduler needed to move crude often offsite to shore tankage over a pipeline that was shared with the dock, thus the scheduler needed better visibility of what was in the pipeline at any given point. This required the scheduler to consistently communicate with operations to plan any offsite movements. However, operations could only tell the scheduler what was in the pipeline at that particular point, and could not view what would be in the pipeline in the future.

By using the pipeline simulation feature in Aspen Petroleum Scheduler, the scheduler can plan movements on the pipeline and accurately see what the contents of the pipeline will be at any given point thus helping them quickly identify pipeline conflicts, as well as plan line flushes more accurately.

Were there any unique aspects of Aspen Petroleum Scheduler that the customer needed to address in the scheduling model?

In the overall scheme of things, the customer's needs were relatively standard. However, the scheduler wasn't only interested in how he could better manage shared lines, but also how to better manage and adjust their crude schedule. Crudes are by far the single biggest operating expense for any refinery. Managing and creating an optimum crude schedule is a constant challenge for schedulers with the ever changing market and environment.



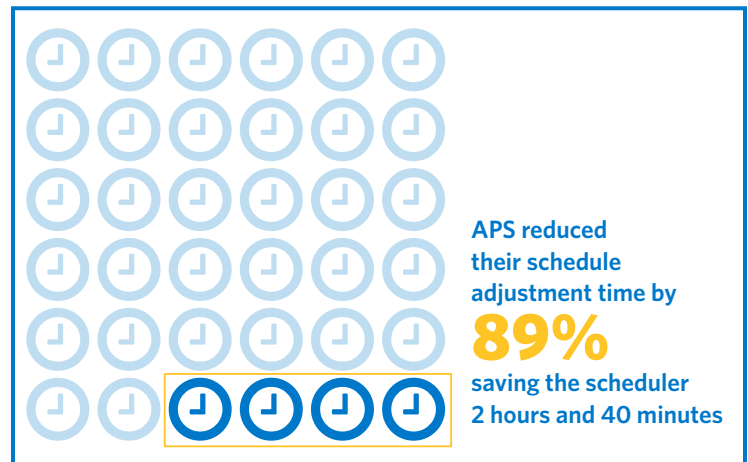
Celso Flores

Senior Principal Consultant Engineer, Aspen Technology, Inc.

Celso Flores is a Senior Principal Consultant Engineer working in the Services organization at Aspen Technology. Celso's main area of focus is on implementing petroleum scheduling projects using Aspen Petroleum Scheduler and Aspen Refinery Multi-Blend Optimizer. His career at AspenTech started in 2006 as a consultant implementing petroleum primary distribution solutions. Celso has more than 17 years of experience in the oil and gas industry working in upstream, trading and downstream organizations of multiple industry majors. He has a Bachelor's degree in Information Systems from the University of Texas at El Paso.

With Aspen Petroleum Scheduler, we are able to create tools leveraging APS's application program interfaces (APIs) to better customize APS to meet the customer's specific scheduling needs. We developed a tool, on top of APS, that would automatically readjust crude receipts to discharge into the appropriate tanks and adjust the feeds from these tanks into the crude unit based on inventory containment considerations.

Before APS, adjusting a schedule was very time-consuming, sometimes taking a scheduler up to three hours to complete. With APS, the scheduler was able to reduce this process from three hours to twenty minutes, giving the scheduler more time to analyze and determine the most optimal way to run the refinery. It's important to note that this was a custom tool created for this refiner and is not standard with out-of-the-box Aspen Petroleum Scheduler.



Has the customer experienced any business insights since they started to use the scheduling model?

Yes, with the new scheduling model they are now able to simulate what is moving in their shared line(s) for the entire scheduled horizon. The model now helps the customer easily identify where there will be scheduling conflicts on their line — enabling them to quickly resolve the issues to provide a more stable operating environment.

Also, the reduction in the amount of time they now spend re-adjusting the schedule based on changes to a receipt schedule has allowed them to focus more time on tasks that add more value to operations.

What are the top things you would recommend to a prospective customer before embarking on a scheduling project?

Before a customer embarks on a scheduling project, like Aspen Petroleum Scheduler, they must first think through their short term vs. long term scheduling requirements. For example, do they need to schedule their physical tanks or will scheduling to an aggregate group suffice?

Another key aspect that a customer would need to evaluate is what key business drivers a refinery schedule needs to support. Just because you can schedule a process unit, it doesn't necessarily mean you need to schedule all the details of that unit. A refiner needs to understand key operating constraints they want to simulate within the schedule and plan to model accordingly. When modeling a refinery in Aspen Petroleum Scheduler, you should consider modeling what is important and avoid adding complexity that adds little to no value. Complex/inflexible models may eventually be abandoned by the user community.

Also, as with most software implementation projects, there is always an integration portion. The approach to integrating to an existing system(s) needs to be closely evaluated. A customer needs to carefully consider where the data will come from and if the data is reliable and available at the time the scheduler needs it. Often we see customers attempt to integrate to systems that do not offer data in the frequency a refinery requires. This can become a huge pain point after implementation.



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What is the typical scope of a refinery scheduling project?

Typically, a refinery scheduling project can fall into one of two categories: crude scheduling or entire refinery scheduling. In your typical crude scheduling scope, you would include the receipt of feedstocks into tankage, necessary logistics (such as lines connecting equipment), and consumption of the feedstock in the crude distillation unit(s), as well as the crude assay-based yield predictions off of these crude distillation unit(s).

When scheduling the entire refinery, in addition to the crude scheduling scope, you would need to include the scheduling of process units, tankage and logistics downstream from the crude distillation unit(s). This would include the modeling of unit rundowns (e.g. into tanks or other units), modeling unit yield predictions and final disposition to product shipment tankage or blend component tankage.

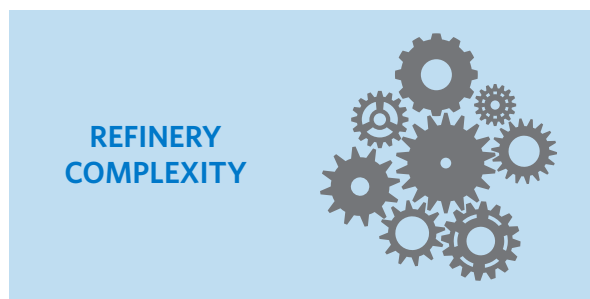
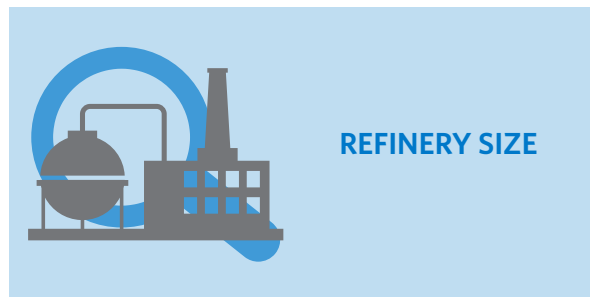
Given the previously discussed scope, project duration depends on the size and complexity of the refinery. Another aspect that affects project duration is the complexity of the integration to and from external systems. Taking that into consideration, a crude scheduling project can take between three to five months to complete — while an entire refinery scheduling model can take anywhere from five to eight months to complete.


That being said, a key dependency in achieving these implementation completion times is to carefully plan cutover from current tools and processes to the new scheduling solution. Planning for these cutovers should occur at project inception and people who will be impacted early in the life of the project should be included.

Why should a prospective customer choose an AspenTech refinery scheduling solution?

Our refinery scheduling solution, Aspen Petroleum Scheduler, provides a platform to project forward and easily visualize those projections. This means that customers are able to project all of the products they are producing with increased visibility into any potential scheduling conflicts/disruptions. APS is also a centralized location where multiple users can see the same information, enabling synergies between the two. Simply put, the refinery scheduling solutions from AspenTech provides customers a competitive advantage related to scheduling their refinery, leading to a more optimal and stable operating environment.

Factors That Affect Scheduling Project Duration





AspenTech is a leading supplier of software that optimizes process manufacturing — for energy, chemicals, engineering and construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE® solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing, and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs, and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit www.aspentech.com.

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