Insight

Improving the margin for success in refining projects

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Following record margins in 2015, a number of refiners are examining strategic investments in capital projects to improve their net cash margin and maintain their position as a ‘cash engine’. At the same time, refiners must focus on sustaining safe and reliable operations, meeting requirements for changing environmental regulations and ensuring maintenance and turnarounds are executed efficiently. Choosing the optimal time to invest in refining capital projects or shut down capacity for turnarounds is a complex decision. Crude oil quality, differentials and crack spreads, driven by seasonal product supply and demand balances and stock levels, impact margins differently depending on where your asset is located and how it is configured. The impact of delays or overruns can quickly start to erode your project economics. So, what is the key to completing successful refining projects and turnarounds?

While many integrated oil and gas players have seen their cash flow performance strengthened by better than average refining margins from their downstream businesses, this is unlikely to last long term. The low feedstock price stimulated record refinery runs last year, leading to refined product stock builds and oversupply, which ultimately led to a weakening of margins for refiners. Many refiners postponed maintenance in 2015 to reap the rewards while they could. Now refiners are playing catch-up with maintenance (additionally some have been hit by unplanned shutdowns caused by running flat out for prolonged periods) and the International Energy Agency anticipates that the seasonal ramp-up in 3Q2016 will be the largest on record.

Regardless of whether a planned shutdown is for a turnaround or tie-in of new capital projects, it is essential to complete the scope of work as quickly and efficiently as possible to maximise availability. During unscheduled shutdowns, the pressure to get back online is even higher. The cost of longer than planned downtime goes much further than the loss of margin of processing the incremental barrels of crude. Other factors include:

- additional construction and management costs
- additional owners project management team man-hours
- more opportunity for late scope additions, contractual disputes and commercial claims
- delayed start-up impact on other refinery unit operations, potentially leading to product quality and blending implications
- crude and products inventory challenges.

Poorly managed turnarounds can lead to delays, unplanned scope growth and contractual disputes with the contractors, incurring additional time and cost to the business.
It is therefore essential to prepare refining projects carefully through thorough understanding of cost and schedule optimization, risk analysis, procurement strategy, contract management, scope definition (and scope control) and efficient project execution.

**Five key factors for project success**

As refiners face increasing pressure to improve assurance on cash flow from their downstream business while maintaining safe and reliable operations, we have identified five key factors that will help drive successful outcomes. Although this article focusses on capital project investment, these principles also apply to turnarounds.

1. **Improve cost and schedule predictability**
2. **Minimise project risk**
3. **Integrated planning**
4. **Aligned competency and capability**
5. **Effective cost management and tracking**

The measure of a project’s success is typically against the cost estimate and duration agreed at investment decision. Overestimating or underestimating can have equally serious consequences for the project. Despite this, there can be significant pressure from management and other stakeholders to adjust the estimate to an “acceptable” value which is unrealistic. Achieving a higher degree of accuracy and predictability of costs for capital projects is a key concern for many refiners. The list below highlights some key tips to follow.

**Some key tips to improve your cost and schedule predictability**

- The **accuracy of the estimate should be verified by someone completely independent to the project team**, to avoid any bias high or low.
- The estimated cost and schedule should be **benchmarked** against similar completed projects. Quantitative benchmarking can be done against external rates; industry norms; and expected allowances, or against your own internal project experience. It is vital to develop meaningful benchmarks that reflect the particular characteristics of your project.
- **Define the scope and project execution plan and stick to it.** Follow best practises for freezing scope well in advance and don’t fall into the trap of “While we are shut down, let’s just do X as well”. *Scope creep will always drive costs up and schedule out.*
- **Check the accuracy of your resource plan.** Consider the mix of skills, the amount of work fronts and the total resource for the job. Check that the schedule and man-hours are achievable and also available.
- **Assure the quantities** of man-hours and materials for planned works and identify any unforeseen costs.
- **Capture and store your project cost and schedule performance** at the end of the turnaround. *This can often be overlooked, however, it is essential for lessons learned to improve predictability for the next event.*

**Improving cost and schedule predictability is key to assuring operational cash flow performance in a marginal environment**

**Minimise project risk by planning for the unexpected**

It is never too early to start identifying and formally managing the uncertainties faced by the project, and this is done through effective application of risk management procedures from the outset. Too often projects divest their risk as early as possible believing that they have transferred liability to the contractor. The best strategy, however, is to keep the liability for risk with the party that is best placed to mitigate the risk. Managing the transfer of risk requires a
sound contract strategy. Experienced risk practitioners should be used to facilitate your risk management strategy and procedures to answer the following key questions.

- Do you know all of the risks the project might face, including unplanned work discovered during the turnaround?
- Do you know what impact the risks will have on the schedule and budget?
- Which risks do you mitigate/accept/transfer/manage? And how do you go about it?

Quantitative risk analysis should be carried out to determine variability in project cost and schedule outcomes, based on identified risks.

**Fail to plan, plan to fail**

In our experience, *planning is the most underestimated activity in project delivery.* All too often planners are reactive, recording rather than planning the application of resources to a delivery strategy. While the contractor will plan and control his work during the turnaround, the owner’s management team ultimately remains responsible for delivering the project on time and budget. *Carrying out an early “cold eyes” workshop to review lessons learned from the last turnaround or capital project is key to testing your plan and any assumptions made.*

The key issue for managing a portfolio of scopes is resolving competing demand for limited resources. It is essential to prioritise and integrate the whole portfolio into one programme that is planned to minimise disruption to processing and to maximise the safe volume of work to be executed. It is reasonable to assume that very few projects that overrun on schedule manage to finish on budget.

**Not all successful projects have had a good planning regime, however invariably all unsuccessful projects have experienced poor planning**

**Improve performance and reduce duplication of effort by aligning owner’s team capability and competency**

Within the owner’s team there are a number of stakeholders with different objectives – from the business, the capital projects team, and the turnaround team. Understanding the strengths and capabilities of each team and the interactions between them is key to avoiding projects going off track. In order to align your teams, think about the key skill sets of the individuals within these teams. Many projects struggle due to a lack of resource with the right experience and competency. This can lead to inconsistent delivery, lack of efficiency and duplication of effort. Rather than having to resource your team with all talents to cover all scenarios, many refiners have been turning to use managed project services from external consultants. This option supplies skilled resources working in an integrated manner as and when necessary (on a call-off basis), leading to lower cost of total resource and reduced owner’s management time.

**Do not underestimate the impact of poorly managed turnarounds on business performance. Align objectives and maintain a ‘one project’ attitude**

*Identify and resolve any barriers that might arise due to tension between the capital project team and the turnaround team.*

*Consider involving the turnaround team in the front end planning and scope definition of any capital project, to ensure both teams are acting with a ‘one project’ attitude.*

**Effective cost management and tracking is essential to ensure good progress against plan**

Turner & Townsend’s experience in reviewing capital project and turnaround performance has shown that where the project or turnaround
significantly overran in both cost and schedule, either failed to capture their scope or neglected to properly record progress and productivity. One of the key areas of failure that we have found is where the project team does not have a firm understanding of its measured quantities and the progress related to these quantities.

During the turnaround, daily tracking and reporting of actual costs and contingency drawdown is therefore essential to ensure good progress against schedule and to provide ongoing predictability of final costs. It can also allow for informed decision making when discovered works are identified which were not part of the original scope of work.

The key to achieving successful cost management during a turnaround is:

- the establishment of real-time reporting
- all cost and schedule progress data derived from one source of information
- well defined reporting format that is hierarchical, allowing management to dig deeper where required
- effective analysis of cost trends and accurate forecasting with the objective of accurately predicting project outcomes.

**Conclusion**

When planning your capital project or turnaround, there are two key questions that any refiner needs to be able to answer:

- is the project going to finish on time?
- is the project going to finish on budget?

If the answer to the first question is no, then almost certainly the answer to the second will be no. Following the five key factors in this article can provide more assurance that your project will meet its cost and schedule targets.