Staffing and Logistics Insights to Steer New Ethane Cracker to Top-Quartile Performance

Solomon Q1 Day 1 Level 3 program identifies ways to enhance future performance at the facility, including staffing recommendations.

**CHALLENGE**

An operator wanted to determine how a new ethane cracker would perform at the start of operations.

**SOLUTION**

Solomon used its Q1 Day 1 Level 3 program to identify performance gaps and assess the facility’s key metrics and planned staffing levels.

**RESULTS**

Solomon identified further improvements that could be made in plant yields, non-maintenance personnel staffing, and maintenance costs.

**Assessing operations before startup**

A major operator contacted Solomon to assess the initial performance of a large ethane cracker under construction in the US. Solomon utilized its Q1 Day 1 Level 3 program to identify performance gaps and assess the facility’s key metrics and planned staffing levels for up to 5 years of operation, or after the first turnaround is completed. The Q1 Day 1 program examines the key competitive performance areas indicated in Figure 1 to develop strategies that would allow the facility to achieve top-quartile performance.

![Figure 1. Competitive Performance Areas](image)

CASE STUDY
Identifying improvements

Because the plant was not yet operational at the time of the study, Solomon based the study on plant design information instead of operational data. The *pro forma* data was then analyzed in comparison with a custom peer group that Solomon created from the 2017 *Worldwide Olefin Plant Performance Analysis (Olefins Study)* database representing high performing ethane-only plants (HPP).

Using similar size and complexity to compare the olefin cracker with the average of the HPP group, Solomon identified a 3–5% margin gap between the projected plant operations versus the HPP peer group (illustrated in Figure 2), which was quite good for a new plant. Solomon estimated the facility would perform well in terms of reliability, utilization, operating expenses, production costs and energy efficiency within the North American operating region.

Solomon did find opportunities for improvement in plant yields, non-maintenance personnel, and routine and turnaround maintenance costs. Solomon identified the pyrolysis furnace technology the client selected and the configuration of the olefin unit recovery area as the primary contributors to the yield gap.

Other issues identified included the significantly low estimate the client made for maintenance costs associated with a new North American plant and the need for more maintenance staff at the facility to ensure high performance was sustained.

Developing organizational design recommendations

Solomon worked with the client to finalize a more realistic maintenance cost estimate and created recommendations to optimize operations, technical and maintenance processes, as well as reduce the maintenance effort demand. Solomon also assessed the staffing levels as compared to the HPP and evaluated the proposed organizational design for overall effectiveness.

To meet the performance expectations of this new facility, Solomon advised the client to redirect maintenance employees’ focus on establishing reliability programs and efficiently executing maintenance activities. For example, Solomon provided guidance for improving the maintenance work flow process with the objective of streamlining the maintenance work and avoiding duplication of effort by multiple groups.

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and individual contributors. This action should result in a more efficient process leading to optimum work loads of both company and contractor personnel assigned to the maintenance effort. In addition, Solomon provided recommendations for improving the turnaround planning and execution processes, which will result in optimized staffing during periods of increased workload.

The new facility included considerations for highly automated operations. With this type of operation in mind, Solomon recommended that the client clarify roles, responsibilities, and accountabilities to fully utilize the capabilities of the operations and technical staff.

Optimization of the operational work processes in conjunction with the technology will result in more effective use of operators and technical resources without adding resources.

To improve overall competency and skills of the workforce, Solomon suggested that the client consider adding key positions to focus on operator training, to expand technology expertise, and to improve logistics functions.

Solomon’s experience shows businesses that have consistently achieved top performance in terms of reliability, energy efficiency, yield optimization, and overall profitability are not necessarily the businesses with the fewest personnel. In fact, the best performers within the industry typically have more personnel resources. At the same time, the skills and capabilities of their workforces, in conjunction with the efficiency and effectiveness of their work processes, enable them to consistently achieve an increased level of performance compared to their competition. As such, Solomon evaluated the proposed organization to identify the most significant productivity improvement opportunities.

Enabling first-quartile performance

Facility designers typically are focused on project budget and schedule, not future operations, and some designs are based on overly optimistic assumptions that don’t account for what is actually achievable. The client was pleased with the feedback they received on staffing and logistics for the facility through year five and beyond, after the facility’s first turnaround. Solomon’s study gave the client the insight it needed to optimize operations and achieve first-quartile performance.