

A Perfect Fit



KPE takes a modular approach to reduce sulfur emissions, increase safety, and mitigate disruptions

The Kuwait Petroleum Europoort (KPE) refinery in Rotterdam needed to reduce its sulfur emissions to satisfy both Dutch and European emission regulations, but the project came with challenges. Construction on site would require workers to operate in a hazardous environment, while plant operations could potentially be disrupted. The solution? Minimize on-site construction by implementing a modular solution. It was a new strategy for KPE, but guided by Jacobs' expertise, the company took the plunge.

Rise to the Challenge

KPE, a subsidiary of Kuwait Petroleum Corporation and a major producer of lube oils for retail production, first worked with Jacobs on a feasibility study to determine the company's sulfur reduction goal. The team determined they could lower emissions by more than 50 percent by the end of 2010. To achieve this ambitious milestone, the refinery would need to install new waste gas treatment (WGT) facilities and a new sulfur recovery unit (SRU). The technology for the SRU is



“The keys to project success are the product of our culture of caring, plus teamwork, plus fun. The KPE project exemplifies all of those things. Our multi-office project execution and intense focus on safety helped make the project successful.”

Miguel
*Jacobs, Contracts Manager
Leiden, The Netherlands*

SOLVING THE PUZZLE

KPE wanted to reduce sulfur emissions at its refinery in Rotterdam, The Netherlands, by 50 percent but without the disruptions and unsafe conditions of on-site construction. We proposed a modular approach — taking construction offsite to our facility in Charleston, S.C., USA, and shipping the units to the refinery. We not only eliminated safety issues (the project had zero recordable incidents and won the President's HSE Excellence Award), but also saved \$2.4 million in the process.



based on Jacobs' Comprimo® proprietary desulphurization technology, SUPERCLAUS®, and delivered by Jacobs. Previously, waste gases from the refining process were burned off in furnaces, releasing sulfur dioxide into the atmosphere. In the new design, WGT compressors divert these gases to the SRU, which removes the sulfur and produces clean flue gas.

Going Modular

Installing the SRU posed the greatest challenge. Construction in a running refinery would put extra requirements on safety risk mitigation and would cause the craftsmen to work under more difficult circumstances. The skilled labor needed for the job was in short supply, and the fast-track schedule allowed no time for error. Through cooperation and collaboration among KPE, the Jacobs technology group in Leiden, The Netherlands, and the Jacobs team in Charleston, South Carolina, USA, the challenge was resolved: use modular, off-site construction. The majority of construction could be completed by skilled staff in a safe environment in Charleston, and on-site work in Rotterdam would be limited. The modular approach was new to KPE, but recognizing the advantages and counting on Jacobs' expertise, the company committed to the strategy.



Jacobs relied on its Value Enhancing Processes (JVEPs) and its System to Ensure Project Success (JSTEPS) during both design and construction. JVEPs were used to measure client satisfaction, keep the project team in alignment, and incorporate value engineering. JSTEPS kept the project on schedule and on task, and the team recognized the benefits of this disciplined approach.

Putting the Pieces Together

In March 2010, nine SRU modules, each weighing 90 tons, arrived at the Rotterdam harbor and were moved to the KPE plant. In November, the new system went into operation. The entire project was completed without a single recordable safety incident, and the team received the President's HSE Excellence Award for its efforts. Modular construction also resulted in cost savings for KPE, with total savings of \$2.4 million USD. Today, the KPE refinery has among the lowest sulfur emissions in its class, and this initial contract between KPE and Jacobs is well on its way to becoming an ongoing relationship, with Jacobs now providing multiple engineering and maintenance services at the site.