

IN TOTAL

PROCESS CONTROL

The TOTAL Raffinerie Mitteldeutschland GmbH oil refinery in Spergau close to Leuna in Germany is one of Europe's largest and most modern. The plant is dependent on plate heat exchangers in excellent trim for demanding heat transfer duties.

Safety first; they take it literally at the Spergau refinery. First there is plant safety and stringent control before they let you in. Then there is personal safety: you have to wear safety shoes, a colour-coded overall, safety goggles, a safety helmet and an emergency breathing hood.

The refinery is situated between Leipzig and Halle, not far from the eastern flank of the Harz Mountains. This is the chemical triangle, a region in southern Sachsen-Anhalt where the chemical industry has been the major economic factor since before the Second World War. There are some 9,000 people working in chemical industries in this region.

The Spergau refinery produces exclusively sulphur-free fuels, five million metric tons of it a year to be precise. The list of products includes road fuels and flight fuels, heating oils, liquid gas, gas oil, bitumen and methanol. The refinery is one of Europe's largest producers of these important basic substances, and its products are delivered to the German market as well as to other EU markets. The petrol and diesel produced here fulfil the enhanced quality demands defined for Germany as per January 1st, 2003.

A temperature-sensitive process Crude oil contains 84% carbon and 14% hydrogen. The rest consists of sulphur and other unwanted substances. The refining process begins by heating crude oil at the base of a large column (there are 80 such columns and 700 kilometres of pipes) and capturing the various gases coming off the heated mass. These gases condense at various levels; substances with low boiling points condense higher up in the column. The distillation procedure yields intermediary substances from which the finished products are made.

The finished products are cleaned and stripped of unwanted elements (nitrogen, oxygen and sulphur), dissolved metals, inorganic salts, and water. Then they are pumped into storage tanks for later distribution.

The sulphur taken out is of exceptional purity, some 99.5%, whereas natural sulphur exhibits 70% to 80%. This by-product

Total's refinery in Spergau produces five million tons of fuels a year – all sulphur-free.

can be used as a lubricant, and in the chemical and pharmaceutical industries.

The refining process is temperature-sensitive, and heat exchangers help to maintain narrowly-defined temperatures. The Spergau refinery has a number of plate heat exchangers from Alfa Laval for different demanding applications including regenerative cooling. This technology, which greatly reduces energy loss, uses a pressure drop to cool a liquid or a gas, which is then re-circulated to cool additional liquid or gas as it approaches the pressure drop.

"This plant was built in 1997 and the decision to install plate heat exchangers from Alfa Laval was taken at TOTAL's group headquarters in Paris, when the plant was designed," says Udo Wehsener, in charge of operational maintenance. "The decision was a result of thorough technical considerations".

Service and maintenance – a safety issue Udo Wehsener is regarded as a plate heat exchanger guru among his colleagues. Hardly anyone in the plant dares to do anything with a plate heat exchanger without contacting him first. "The main advantages of the Alfa Laval plate heat exchangers are their simplicity and flexibility. These qualities enable full command of the functions and permit easy alteration or expansion," he says.

"We are strongly involved in environmental issues. The French parent invested an amount equal to 2.5 billion EUR in the construc-





tion of the plant, with 10% going into plant safety and environment protection measures". Safety for Udo Wehsener is to be in full control of operations and this is where efficient and well-planned service and maintenance play an important role.

"Of the total of 600 people working here, the maintenance department alone has around 60 employees, and in this area of every day maintenance, there are six of us."

In addition to comprehensive in-house maintenance resources, the refinery also needs strong support from suppliers like Alfa Laval to maintain the meticulous process control they are looking for. Service people from Alfa Laval in Germany pay regular visits to the site and today Udo Wehsener is being visited by Paul Bies, a service engineer from the company. The two maintain their professional distance, which is common practice in this country, but sometimes they sound like old friends.

This tone of familiarity comes from a long and fruitful working relationship. They have managed to solve problems together and



"We need strong maintenance support from our suppliers," says Udo Wehsener, to the right with Alfa Laval's service engineer Paul Bies.



that has created mutual trust. "The operation of the plate heat exchangers were not smooth sailing for us all the time. There were unforeseen problems at first," Udo Wehsener concludes. "But then I got in direct contact with Paul Bies and he had me spend a week at Alfa Laval for supplemental training, where I acquired valuable knowledge. It paid off."

►► www.alfalaval.com/here/refinery/total