

# Future proof

SASREF seeks high performance from refinery fire suppression system



Given an oil refinery's tight operating windows and the flammability of the various products, it can be a potentially hazardous environment. Understandably, fire safety systems are high on refinery managers' priority lists to ensure the wellbeing of staff and a healthy local environment, and to maintain the efficient running of the plant. And having a good fire safety system is essential for retaining a licence to operate.

Saudi Aramco Shell Refinery Company (SASREF) has been operating the oil refinery in Al Jubail for the last 20 years. It is a large refinery with a production capacity of 305 000 barrels per day, and has an extensive fire safety system that is regularly maintained. However, SASREF was aware that the refinery's fire suppression system needed some updating.

"We wanted to verify the adequacy of the system and the operability of system components such as isolation valves and deluge nozzles. It is not unusual to face operational-related difficulties on such system components," says Abdullah Al Badran, plant superintendent at SASREF.

"We knew that some of the system components were due for replacement, but we needed to identify the extent of the remedial work."

SASREF also wanted a detailed picture of the various elements of the firefighting water system to make sure that it was operating as efficiently as possible. The company wanted to assess whether the levels of equipment and the processes were appropriate to the refinery's requirements and that unnecessary expenditure would not be incurred. It also needed to establish whether the firefighting water system's capacity would be adequate to cope with possible refinery expansion without modification or extension.

The company commissioned Shell Global Solutions to examine the firefighting water system and make recommendations. A multidisciplinary team from the organisation reviewed the system and its components on-site, and assessed the current configuration and the design capacities. The team also made a comparison against the latest design and engineering\* requirements and industry

best practices, and assessed the impact of future expansion projects.

As a result, SASREF has established in considerable detail the condition of each component. The review has shown that the firefighting water main is in good hydraulic condition and that the refinery and causeway tank farm water systems are capable of delivering the original design capacity. Items that needed addressing included the performance of the diesel firefighting water pumps; the pressure controller set point and operation; and the control valve integrity and performance.

As part of the exercise, Shell Global Solutions used its simulation software to prepare a calibrated model of the complete firewater system and evaluate new operating scenarios. The model will enable SASREF's staff to analyse any proposed changes to the firefighting water system, for example, the impact of refinery expansion.

"The study has told us not only what needs to be done but also what can be left alone," says Al Badran. "For example, we discovered that our main header is in good condition and can last another 10 years. This will provide a significant saving for us, because replacing the main header would be very costly."

Al Badran continues, "We now have a really clear picture of the integrity of the fire suppression system and how much longer the various components will last. The exercise resulted in several recommendations, which we are in the process of implementing. It has also given us a better understanding of how to monitor the system in the future."

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