

# Hot stuff

German refineries enhance safety with a fired-equipment review

The German government is implementing a new policy on the integrity management of fired equipment with the aim of maintaining the country's high refinery safety standards. The Elbe Mineralölwerke Hamburg-Harburg refinery (Harburg refinery), the Heide refinery and the Rheinland refinery, Cologne, which are all operated by Shell Deutschland Oil GmbH, have a wide variety of fired equipment with different types of safeguarding systems.

The refineries wanted to ensure that their fired equipment continued to operate safely, reliably and in compliance with the government's new policy. Shell Deutschland Oil felt that an in-depth review of the integrity management of fired equipment would outline the refineries' strengths and identify areas for improvement. These potential enhancements could then be implemented to help the refineries to maintain their high integrity-management standards.

## Harburg

In 2004, Harburg refinery staff worked with a Shell Global Solutions multidisciplinary team to perform a focused asset integrity review (FAIR<sup>‡</sup>) of the refinery's fired equipment, known as FAIR<sup>+FE</sup>. Such a review has two following steps: implement and sustain. Harburg refinery is now in the final stages of implementation and moving into the sustain phase.

During the review, the team assessed and challenged the status of the refinery's fired equipment and its integrity-management systems. The team members applied their specialist maintenance, engineering\* and operational experience to evaluate issues in areas that included combustion, operations, process technology, inspection, materials and corrosion, process control and safeguarding.

The FAIR<sup>+FE</sup> team interviewed key refinery staff and contractors, assessed plant records and viewed the equipment. The results were then scored and weighted, and used to systematically evaluate the fired equipment against current best-practice technical and operational standards for long-term integrity. For example, the presence of effective safeguarding systems and flame detectors was given a high weighting, and the existence and appropriate management of integrity operating windows was considered crucial.

Volker Bonitz, Harburg refinery inspection manager, Shell Deutschland Oil GmbH, says, "The team's greatest challenge was defining the scope of the furnaces to be reviewed and making the resources available. The Shell Global Solutions team was highly organised; this made site visits effective and very thorough. The team asked over 300 questions to find out about our general management practices and the details of our operations. But they did not just ask questions: they also wanted to see the equipment being operated."

The key recommendations from the review included upgrading the management of integrity operating windows and revising start-up procedures and burner maintenance protocols. Many of the maintenance recommendations for items such as burners, heater observation windows and mechanical minimum stops for stack dampers would be easy to implement, but, when combined, would help to deliver considerable benefits.

Risk-based inspection methods, similar to those that Harburg refinery was already applying in other areas, were recommended. The review also indicated that some fired equipment would benefit from thermographic and metallographic examinations and consequent material replacement.

The refinery's management were given a concise overview of the status of the fired equipment and the areas for improvement and recommendations for risk-prioritised actions to help realise those improvements.

Bonitz continues, "We have implemented the highest-priority recommendations and have had the first of our three annual reviews. Quantifying the benefits of this kind of study is difficult, but I feel that it is important for an organisation like ours to get an external perspective and that we have benefited from Shell Global Solutions' views and experience."

The FAIR<sup>+FE</sup> review found that Harburg refinery's fired equipment was generally in good condition and had suitable management systems. In addition, the



## “WE WANTED TO IMPROVE THE INTEGRITY AND AVAILABILITY OF OUR FIRED EQUIPMENT, WHICH IS WHY WE BROUGHT IN THE SHELL GLOBAL SOLUTIONS TEAM”

operators and process engineers were well trained in combustion and fired equipment, and consequently checking procedures and testing frequencies were satisfactory.

Some of the review’s recommendations for improving integrity management confirmed the refinery staff’s opinions of which actions were required. For example, the review helped to justify investment in a \$26-million crude oil furnace to replace the existing furnace, which would not have met the forthcoming environmental laws or the refinery’s long-term integrity goals.

### Rheinland

At the Rheinland refinery, a business improvement review in 2004 identified the reliability of fired equipment as an area that could be improved. One refinery team member had participated in a

FAIR<sup>+FE</sup> programme in another refinery and had seen how its recommendations could help to improve fired-equipment reliability. Rheinland refinery initiated a FAIR<sup>+FE</sup> programme early in 2005.

Jan Vonk, Rheinland refinery operational availability coordinator, Shell Deutschland Oil GmbH, is the focal point for the implementation of the FAIR<sup>+FE</sup>. He says, “We wanted to improve the integrity and availability of our fired equipment, which is why we brought in the Shell Global Solutions team. We had quite a number of follow-up meetings. These discussions took time but they were a very important step that enabled us to take ownership of the implementation process; without the buy-in of our team, the FAIR<sup>+FE</sup> report might just have disappeared.

“The FAIR<sup>+FE</sup> process is logical and transparent, so everyone understood why the recommendations were being made. It has given us a flying start in improving the reliability of our fired equipment, and I am confident that we will now develop our own actions and strategies.”

---

• Contact: Dick Wesdorp  
Email: [dick.wesdorp@shell.com](mailto:dick.wesdorp@shell.com)

<sup>†</sup>FAIR (focused asset integrity review) is a Shell Group trademark.