# pework Inspection, nalysis and Outage upport

## **Case study**

The high pressure, high temperature pipework at EDF civil nuclear sites is routinely inspected to check for indications of degradation. As part of EASL's partnership with EDF Energy we provide experienced engineers to work both at our office and their sites to provide structural integrity assessments to underwrite the pipework's continued fitness for purpose.

### Fitness for purpose

One degradation mechanism is flow accelerated corrosion (FAC). Sudden failures of piping due to FAC is a major concern with the possibility of causing plant shutdown and posing a significant risk to the staff. Across the UK at all eight of EDF's civil nuclear sites, EASL is contracted to assess the ultrasonic thickness testing (UTT) of components deemed susceptible to FAC.

Working as contractors to the station owners, an EASL engineer or team is present on-site for the duration of the inspection programme and is responsible for the interpretation, analysis and classification of assessment results.

EASL interpret the results of the UTT to assess for indications of FAC or other forms of degradation, using this information to determine the components as acceptable for future service or determining the most appropriate, safe and cost effective course of action if further work is required to achieve this.

For pipework deemed to have FAC, the EASL engineer calculates the minimum acceptable thickness of the pipework and a material loss rate for comparison with the UTT results to determine how long the component will continue to be fit for purpose.

EASL produces an assessment report sentencing the component, recommending a re-inspection schedule and determining the best course of action when the component is no longer fit for purpose, such as repair or replacement. The report is presented to a multidisciplined assessment panel for peer review.



### The support

As the EASL team is involved in all stages of the process from interpreting the raw data to sentencing the pipework we have developed excellent working relationships with client staff and contractors at all stages of the process from hands-on inspection staff to office-based technical specialists in metallurgy.

Alongside this, EASL provide background support where specialist advice is required to assess the consequences of unexpected inspection findings across all inspection types including high integrity safety critical inspections. EASL provides additional office-based support in areas such as design code assessment, fracture mechanics, pipework modelling and the use of finite element (FE) analysis to better understand material performance.

For example, where unexpected cracks or indications have been identified or weld thicknesses have been found to be below minimum thickness criteria, cases can be referred on an individual basis for immediate attention. We are able to provide a wide range of structural integrity engineering assessment experience from simple design code assessments to more complex creep-fatigue crack growth analyses using FE derived stresses. This office-based support enables our on-site engineers to provide the most cost effective advice to the client at all times ensuring compliance with client quality procedures and engineering standards, to the ensure continuing safe operation of the plant.



#### **KEY STAGES IN THE ASSESSMENT PROCESS:**

- Analysis of the ultrasonic thickness testing results by the on-site EASL engineers;
- If required, referral to EASL for more in-depth analysis of unexpected findings;
- Determination of the component's fitness-for-purpose; and
- Recommended schedule for re-inspection, repair or replacement.

Whether it's on-site or office-based support, EASL provides a wealth of experience from our highly trained team of experts. With years of experience working both on site and off site assessing structural integrity, we can provide a reliable, clear and costeffective service to our clients. We have a solutions-based approach, taking into account real world factors to ensure that a realistic and specific service is delivered.



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