



Effects of the Implications of R5/R6 UQ199 Material Property Changes on DNB Main Steam LDS and Safe-Life Values

Case study

EASL received a request to examine the implications of reduced material properties which resulted in advice from R5/R6 for DNB main steam LDS values and safe-lives. When carrying out the investigation, EASL had to consider the implications on MSWL branch assessments, which use plant specific tensile data, by introducing additional sensitivity studies.

Safety case

During the Dungeness dual reactor outage in 2018, defects in the main steam (MS) pipework on reactor 21 (R21) and reactor 22 (R22) were observed. Return to service safety-cases needed to be made for both the reactors. These safety-cases required safe-life assessments to be conducted. EASL carried out the assessments for various components within the MS pipework.

As part of the safe-life assessments and in accordance with the structural integrity assessments guidelines, EASL calculated limiting defect sizes (LDS) for all normal operating and frequent fault conditions.

Assessments

EASL used several different assessments including: through-wall defects in main stream worming line branches, semi elliptical defects in the MS butt welds not adjacent to a bend, through-wall defects in the MS butt welds not adjacent to a bend, semi-elliptical defects in the MS butt

welds adjacent to a bend and finally, through-wall defects in the MS butt welds adjacent to a bend.

Outcome

For the assessments of butt welds not adjacent to a bend and butt welds adjacent to a bend, EASL discovered that the reported bounding LDS values and safe-lives were generally unaffected.

The LDS was reduced for semi-elliptical circumferential defect in a butt weld not adjacent to a bend, even in the sensitivity case considering an aspect ratio of 10. However, the 12 year safe-life was maintained.

The LDS was slightly reduced for a through-wall axial defect in a butt weld adjacent to a bend and for the thickness sensitivity case. The safe-life remained at less than 3 years.

If you would like to discuss how EASL can help your business please get in touch.