An Approach for Determining the Limiting Set of Components to Monitor Environmentally Assisted Fatigue

NEI License Renewal

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- NUREG-1801 element 1: Sample set includes:
  - NUREG/CR-6260 location as a minimum
  - Additional plant specific limiting locations in RCPB
- RCPB components chosen to assess reactor water environment fatigue effects (wetted surfaces excluding steam)
- Focus on thermal effects that experience strain rates with high impacts on environmental correction factor
- NEI approach is one method to determine the limiting location

NEI approach applies to all RCPB components in a reactor water environment and is based on the following:

- Identification of all design CUFs in applicable design reports/stress reports for each piping system and major component in the RCPB
- Older plants not designed to ASME Section III or B31.7
  - Identify NUREG/CR-6260 locations
  - For each of the NUREG/CR-6260 systems identify the component with the highest temperature and stress range
  - Perform an NB-3200 or NB-3600 analysis for the component

NEI Approach (continued)

- Determine the maximum environmental fatigue correction factor (F_{en})
  - Use formulas in NUREG/CR-6909, NUREG/CR-6583 or NUREG/CR-5704
  - Average or maximum temperature applicable to location
  - Dissolved oxygen concentration
  - Strain rate that would maximize F_{en}
- Calculate the maximum fatigue usage factor corrected for environmental effects (CUF_{en}) for each different material
- As applicable, recalculate CUF_{en} using a strain rate dependent F_{en}

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NEI Approach (continued)

- Augment the NUREG/CR-6260 locations with the limiting locations identified by the above
- Incorporate the results into the Fatigue Monitoring Program. If CUF_{en} greater than 1.0
  - If CUF_{en} greater than 1.0 , perform a detailed CUF_{en} using a plant specific reduced number of cycles
  - If CUF_{en} still greater than 1.0 perform a NB-3200 or NB-3600 analysis using plant specific reduced number of cycles and if necessary actual transient severity.