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High Energy Line Break (HELB)

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High Energy Line Break Issue

- HELB Class 1 piping locations in some plants are limited to a cumulative usage factor (CUF) of 0.1
  - Some plants may have difficulty meeting this limit for subsequent license renewal
  - Identified as a possible issue for new plants
- EPRI proposed a risk-informed alternative for establishing postulated break locations (EPRI 1022873, 2011)

Branch Technical Position 3-4

- General Design Criterion 4 (GDC 4)
  - Safety-related components must be designed to accommodate the effects of and to be compatible with the environmental conditions associated with postulated accidents
- SRP 3.6.2
  - Describes methods acceptable to the staff for complying with GDC 4
  - Provides guidance for jet force modeling
  - References Branch Technical Position 3-4 (BTP 3-4)
- Branch Technical Position 3-4
  - Includes criteria for selecting postulated break locations
    - Stress-based criteria
    - CUF criterion

Title	Revision	Date
MEB 3-1	0	September 1975
MEB 3-1	1	July 1981
MEB 3-1	2	June 1987
BTP 3-4	2	March 2007
BTP 3-4	3	July 2016

History of CUF Criterion

- First record - 1972 Giambusso letter (Appendix B of BTP 3-3, ML070800027)
- Early BTP versions only consider CUF criterion when the maximum stress range exceeds a certain value; provision eliminated in later versions
- January 2012 public meeting on fatigue issues (ML120120028)
  - EPRI presented risk-informed approach to postulated break locations (Report 1022873)
  - If environmental effects were accounted for, staff demonstrated willingness to accept 0.4
  - Staff was not aware of a compelling reason to update the criterion at that time
- Economic Simplified Boiling Water Reactor Design Certification
  - Staff permitted a relaxed CUF criterion if environmental effects considered
  - BTP3-4 updated to state CUF limit of 0.4 when environmental effects considered
- Recently, staff has developed a draft technical letter report describing the history of BTP 3-4, with a focus on the CUF criterion

HELB/CUF Issue Timeline at NRC

2010	NRR/NRO User Need Request (UNR) included investigation of CUF criterion
2012	• January 5th Environmentally Assisted Fatigue (EAF) public meeting (meeting summary: ML120120028) • Industry identified no need to address until 2020s • NRC delayed work associated with 2010 UNR until completion of xLPR
2014	NRO escalated HELB issue for new reactors
2015	Second NRR/NRO UNR included investigation of CUF criterion
2018	September 25th EAF public meeting (meeting summary: ML18289A322)

Technical Letter Report

- Discusses current stress and fatigue criteria in BTP 3-4
- Summarizes historical background of BTP 3-4 development
- Describes existing proposed alternatives to the current CUF criterion

Current Status

- Technical Letter Report documenting background and known bases for CUF criteria for existing and new reactors is being finalized for public release
- NRC staff informally reviewing EPRI's risk-informed proposal (EPRI 1022873)
- June 11, 2019 – NRC public meeting to discuss HELB and potential drivers warranting further work

Public Meeting Draft Agenda

- Introductions and meeting objective
- Background
- Overview of EPRI 1022873 report
- Overview of NRC comments on EPRI 1022873 report
- HELB CUF industry impact
  - SLR for BWRs
  - SLR for PWRs
  - Design certification for new reactors
- Discussion of next steps to:
  - identify a regulatory path forward
  - develop the technical basis supporting proposed changes