RAS M-179

DOCKETED
USNRC

August 12, 2008 (11:00am)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

EXHIBIT A

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of Entergy Nuclear Vermont Yankee LLC
Docket No. 50-271-LR Official Exhibit No. A
OFFERED by: Applicant/Licensee Intervenor
NRC Staff Other
IDENTIFIED on 7/23/08 Witness/Panel Hsu / Rowley
Action Taken: ADMITTED REJECTED WITHDRAWN
Reporter/Clerk MAC

Template Secy-027

DS03

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

NUREG-1829
Vol. 1

Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process

Main Report

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Manuscript Completed: March 2008
Date Published: April 2008

Prepared by
R. Tregoning (NRC), L. Abramson (NRC)
P. Scott (Battelle-Columbus)

A. Csontos, NRC Project Manager

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APPENDIX D

PIPING BASE CASE RESULTS OF BENGT LYDELL

An Application of the Parametric Attribute-Influence Methodology to Determine Loss of Coolant Accident (LOCA) Frequency Distributions

Report No. 2 to the NRC Expert Panel on LOCA Frequency Distributions

Prepared for

U.S. Nuclear Regulatory Commission
Washington (DC)

June 2004

D.3.2.2 FW Piping Service Experience - Figures D.9 and D.10 summarize the service experience with FW piping. With respect to plant designed by General Electric, the Code Class 1 portion of BWR carbon steel feedwater piping has performed well in the field. There are no reported leaks in medium-or large-diameter RCPB piping. Foreign plants have experienced (and in some cases, continue to experience) thermal fatigue damage due to thermal mixing and stratification. In fact, 80% of the degradation of the RCPB portions of FW piping has occurred in foreign plants with a piping system design that differs from that of U.S. BWR plants.

The U.S. service experience includes a few instances of non-through wall cracking of FW nozzle-to-safe-end (bimetallic) welds. The root cause of the cracking is attributed to weld defects from original construction. As documented in Information Notice 92-35 [D.19], Susquehanna Unit 1 has experienced flow-accelerated corrosion damage about 250 mm (10 inches) from a weld connecting NPS12 piping to a 20-inch by 12-inch reducing tee. There have been no reported flaws in any U.S. plant beyond T = 15 years of operation.

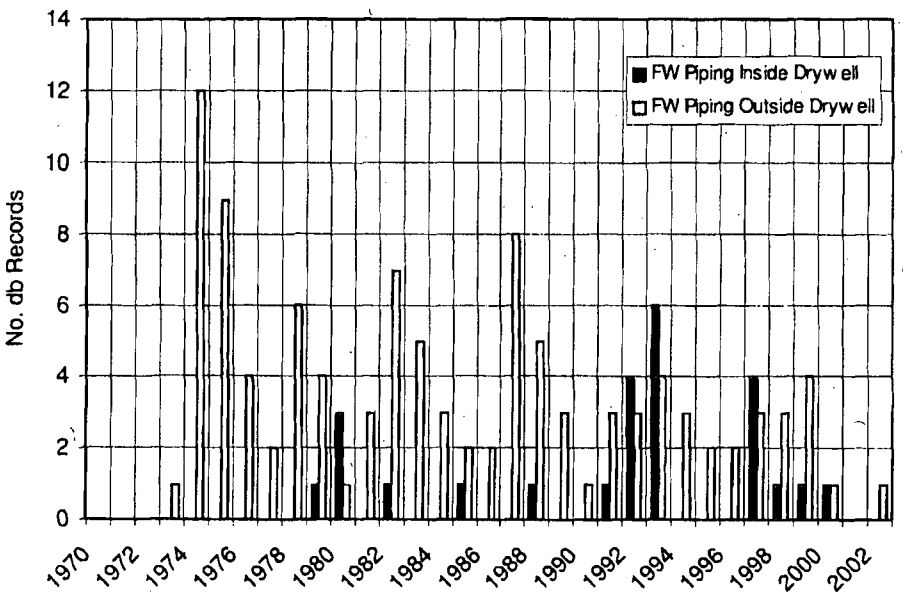

Figure D.9 Service Experience with FW Piping (i)

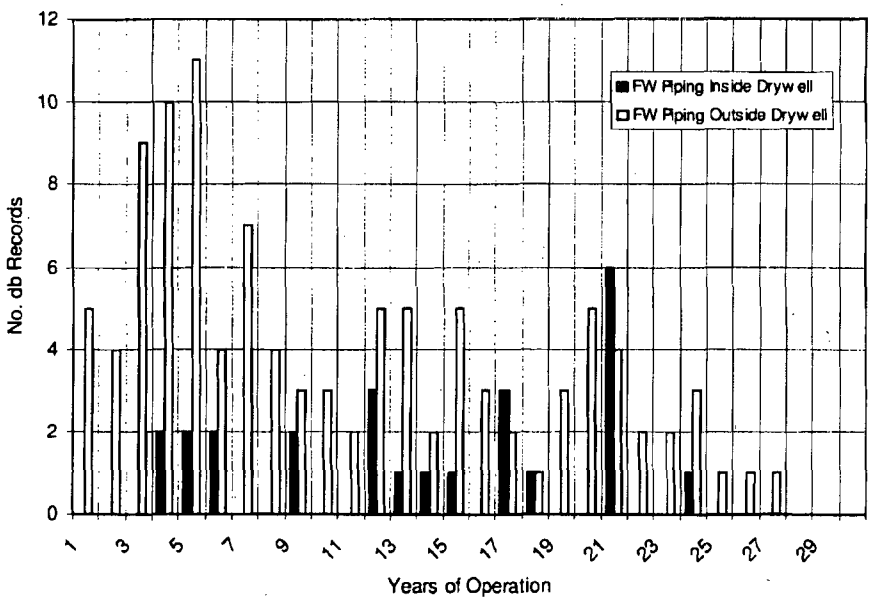

Figure D.10 Service Experience with FW Piping (ii)

D.3.3 Review of PWR-Specific Piping Service Experience

Limited to the PWR Base Case systems, this section summarizes the service experience with Code Class 1 piping. The results of this review are input to the pipe failure rate estimation.

D.3.3.1 RC & HPI/NMU Piping Service Experience - There have only been a limited number of events involving through-wall cracks in the large-diameter RC piping and the Class 1 portion of SI/CV piping. Evidence of axial primary water stress corrosion cracking (PWSCC) in the bimetallic safe-end to RPV nozzle welds of the RC-HL piping has been reported at Ringhals [D.20] and V.C. Summer [D.21].

During an eight-year period, the now decommissioned Trojan nuclear power plant experienced pressurizer surge line movement, which was attributed to thermal stratification [D.22]. In response, the NRC issued Bulletin 88-11 in December of 1988 [D.23] requesting that licensees perform visual inspections of the pressurizer surge line at the first available cold shutdown. Purpose of the inspections was to determine presence of any "gross discernible distress or structural damage in the entire pressurizer surge line, including piping, pipe supports, pipe whip restraints, and anchor bolts."

The current version (June 2004) of the PIPExp database includes four records associated with degradation of pressurizer surge lines:

- Record # 19849; during the Three Mile Island-1 2003 Refueling Outage (18-Oct-2003 to 3-Dec-2003), a UT examination found an axial flaw about 13 mm (0.5-inch) deep in the surge line nozzle-to-safe end interface in dissimilar metal weld No. SR0010BM. This weld connects a 10-inch Schedule 140, carbon steel nozzle to stainless steel safe end.
- Record # 19736; in November 2002 during UT examination of RC piping in the Belgian plant Tihange-2 (a 900 MWe series plant designed by Framatome), code rejectable indications were