

# Duquesne Light Company

Beaver Valley Power Station  
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January 29, 1991

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U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334, License No. DPR-66  
Main Feedwater Piping Evaluation

Gentlemen:

This letter forwards an evaluation of main feedwater piping misalignment and steam generator nozzle cracking at Beaver Valley Power Station Unit 1. The report documents findings resulting from inspections conducted during the seventh refueling outage and subsequent monitoring of the "A" steam generator feedwater line after the refueling outage.

The following paragraphs summarize the licensing issues raised by the report, actions taken to date and planned actions.

## Licensing Issues

1. Based on recorded displacement data and subsequent correlative analysis it was determined that two (2) monoball supports (R3 and R4) were potentially providing unanticipated restraint to the loop "A" feedwater piping.

The Engineering evaluation concluded that the postulation of binding monoball supports could cause monoball structural frame components to exceed upset limits (per the design basis ANSI B31.1 - 1967) during an Operational Basis Earthquake. However, the supports do meet the one time loading requirements of ASME III Appendix F.

Application of ASME III Appendix F is considered reasonable for operation until the next refueling outage since it is based on sound engineering principles and material behavior, and has been utilized in the design of several nuclear facilities.

2. Under the assumed conditions of global thermal stratification and locked monoballs, pipe support SH-6 exceeds acceptance criteria for evaluation of local piping stresses due to integral welded attachments. However, the pipe support was found to be acceptable based on the criteria of ASME Boiler and Pressure Vessel Code Case N318-3. This code case is identified in Regulatory Guide 1.84 as acceptable to the NRC staff.

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Licensing Issues (Continued)

The code case provides relief from conservative stress indices and limits provided certain geometric limitations are satisfied.

3. Design basis pipe rupture criteria are exceeded under presumed conditions of global thermal stratification (a condition outside the BVPS-1 design basis). However, it has been determined that the main feedwater piping does meet the pipe rupture criteria contained in NRC Mechanical Engineering Branch Technical Position 3-1.

Actions Taken To Date

Administrative controls have been implemented (for operation until the next refueling outage) to require the plant to be shutdown after any seismic event exceeding 25 percent of the Operational Basis Earthquake. Seismic activity at higher levels could result in loop A feedwater piping supports exceeding their upset allowable limits.

An evaluation of all other monoball piping supports has been initiated to determine if similar concerns exist in other piping systems. So far, three monoball supports have been identified on the main steam lines and are being evaluated. Other systems will be reviewed to identify any additional monoball supports. Further corrective actions will be initiated if additional concerns are identified.

The organization which provided the monoball design has been notified of the potential binding. It was recommended that the potential effects of this issue on other clients be evaluated.

Planned Actions

1. At the next refueling outage, monoball piping supports of concern (R3, and R4) will be repaired, modified or replaced to address deficiencies. This is an expeditious approach since inspection and verification that the monoballs are functioning correctly is a complex process. Testing of the supports cannot be accomplished during plant operation, and removal of the supports would have to occur during an outage.

Monoball support R11 on Loop C will also be repaired, modified or replaced since it is of the same design as R3 and R4, and the piping system it supports is susceptible to the effects of global thermal stratification.

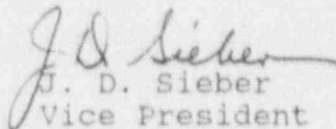
Planned Actions (continued)

These corrective actions will ensure that the main feedwater piping and supports operate within the design basis (ANSI B31.1-1967) criteria even considering the effects of global thermal stratification.

2. Spring hanger pipe support SH-6 was determined to be acceptable based on the criteria of ASME Boiler and Pressure Vessel Code Case N 318-3. It is hereby requested that the NRC approve the use of ASME Code Case N 318-3 to support operation following the next refueling outage. In accordance with Regulatory Guide 1.84, Revision 26, the Updated Final Safety Analysis Report will be revised to identify:
  - (1) the method of lug attachment,
  - (2) the piping system involved, and
  - (3) the location in the system where the case is to be applied.
  
3. Additional instrumentation will be installed (on loops A and C) at the next refueling outage to confirm and better define the global thermal stratification profiles assumed in analyses. Additional information gathered through this instrumentation program will better define the global thermal stratification phenomenon in main feed water piping. This additional information will also aid in determining the generic implications of this phenomenon for the industry.

It is hereby requested that the NRC approve the use of pipe rupture criteria contained in Branch Technical Position MEB 3-1 to support operation following the next refueling outage. The Updated Final Safety Evaluation Report will be revised to identify the piping systems where Branch Technical Position MEB 3-1 is applied.

Sincerely,

  
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Vice President  
Nuclear Group

cc: Mr. J. Beall, Sr. Resident Inspector  
Mr. T. T. Martin, NRC Region I Administrator  
Mr. A. W. DeAgazio, Project Manager  
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