

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9008270034    DOC. DATE: 90/08/17    NOTARIZED: NO    DOCKET #  
FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv    05000387  
50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylv    05000388  
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RECIP. NAME    RECIPIENT AFFILIATION  
BUTLER, W.R.    Project Directorate I-2

SUBJECT: Submits proposed action plan to resolve jet impingement questions, per 861017 ltr.

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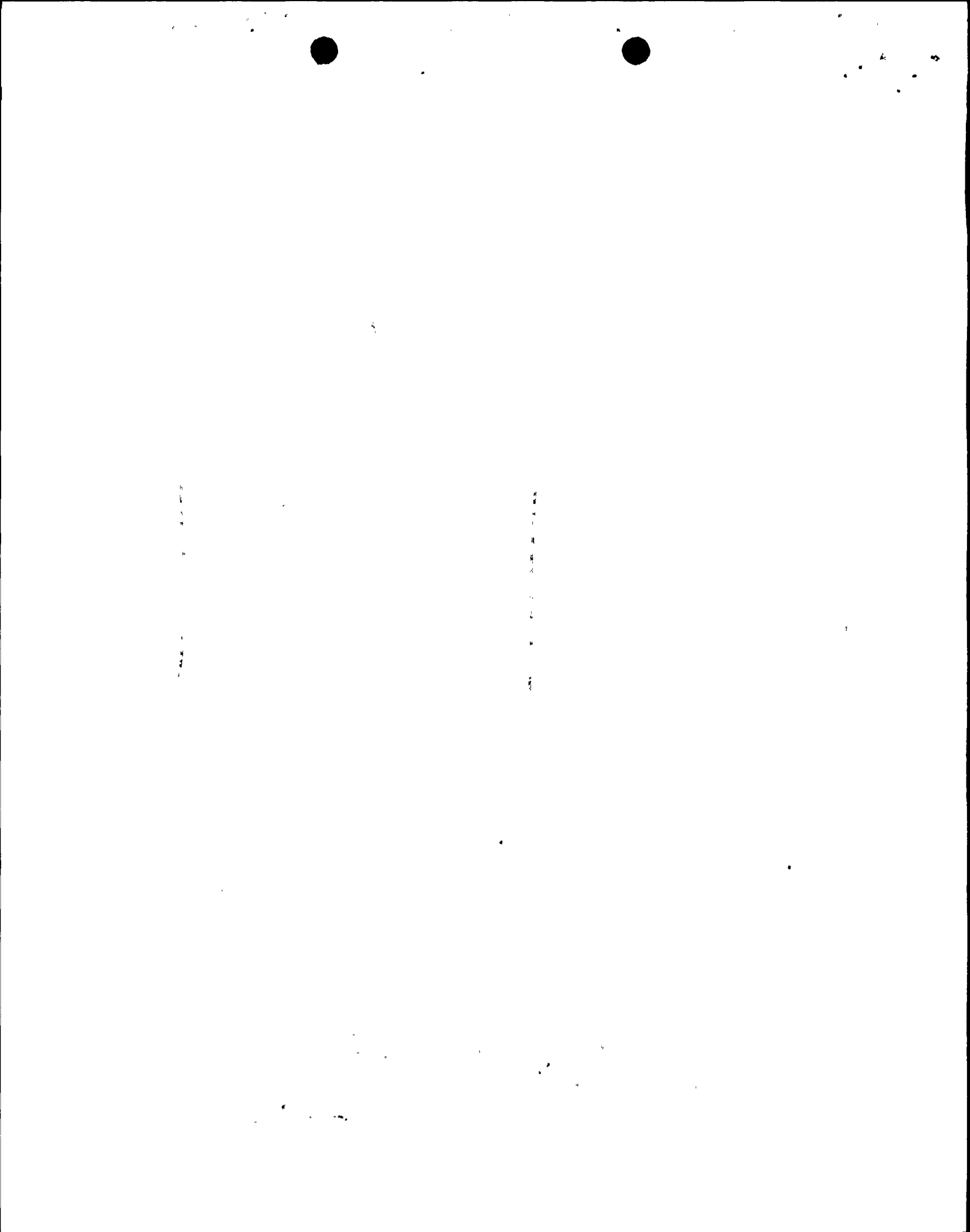
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**AUG 17 1990**

Harold W. Keiser  
Senior Vice President-Nuclear  
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Director of Nuclear Reactor Regulation  
Attention: Dr. W.R. Butler, Project Director  
Project Directorate I-2  
Division of Reactor Projects  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION  
ACTION PLAN TO RESOLVE  
JET IMPINGEMENT QUESTIONS  
PLA-3421                      FILES R26/R41-2

Docket Nos. 50-387  
and 50-388

Reference: PLA-2744, "Postulated Pipe Ruptures", H.W. Keiser to  
E. Adensam, October 17, 1986.

Dear Dr. Butler:

Via the referenced letter, PP&L transmitted a request for an exemption to 10CFR50 Appendix A, General Design Criterion 4. The request was made due to the discovery of jet impingement scenarios that potentially threatened certain containment isolation valves, including the Main Steam Isolation Valves (MSIVs). The exemption request was based on leak-before-break (LBB) analyses of the weld locations in question.

The NRC staff has raised several questions regarding the scope and base assumptions of the analyses as presented in the reference. Based on these concerns, PP&L has chosen to offer an action plan to resolve the issue without relying on the LBB approach. A justification for operation until the action plan is completed is also provided.

JET IMPINGEMENT ACTION PLAN

The following actions are proposed to resolve the jet impingement issues documented in the referenced letter.

1. Review target areas for jet loads from the Recirculation System nozzle breaks and other nozzles where configurations of piping and bioshield doors are similar.

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THESE ARE THE RESULTS OF THE TESTS

CONDUCTED ON THE 11TH OF MARCH

11/3/55

- A. Perform walkdowns as necessary during the upcoming Unit 1 fifth and Unit 2 fourth refueling and inspection outages to identify potential safety-related targets.
2. Qualify the MSIVs to the Recirculation System jet impingement loads and temperatures (includes the MSIVs and associated components).
  - A. Finalize jet impingement analyses for the most limiting N1 and N2 nozzle break locations. These analyses will provide jet pressure and temperature envelopes as a function of distance from the break locations and will form a basis for MSIV load definition.
  - B. Determine by analysis an enveloping jet impingement load to which the MSIVs can be qualified. Qualify the MSIVs by comparison of qualification load to calculated load.
3. Analyze the effect of jet impingement on other equipment.
  - A. Using the jet impingement pressure and temperature envelopes for the worst case Recirculation System nozzle breaks, evaluate the effects of jet impingement on other equipment within the jet zone of influence.
  - B. Analyze equipment targets for jet loads from nozzle breaks where configurations of piping and bioshield doors are similar to the Recirculation System.
  - C. Where safety-related equipment analyzed for jet loads cannot be qualified, design and install hardware to mitigate jet loadings.

PP&L must finish negotiations with our contractor for this work prior to providing a schedule to you. We will keep you informed as information becomes available.

#### OPERABILITY DETERMINATION

In addition to the LBB analyses that were the basis for our previous request, the following items form PP&L's current basis for not declaring the components impacted by the postulated jet impingement scenarios inoperable:



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1. At the suggestion of the NRC staff, PP&L has pursued defining a more realistic jet model with GE. Based on their results, we believe that the jet pressures which could impact the MSIVs (the closest safety-related component to the postulated break location) are less than half of what they were originally thought to be. This information provides reasonable assurance that the MSIVs can be qualified; i.e., they are structurally capable of withstanding the postulated loads.
2. Weld inspections have and continue to be performed to verify weld integrity. Radiograph and dye penetrant inspections of welds were performed during the construction phase of Susquehanna. Ultrasonic inspection of welds was performed for the Preservice Inspection Program. Ultrasonic inspection of welds continues to be performed under the Inservice Inspection Program. One hundred percent of the Recirculation System nozzle welds are inspected every two refueling and inspection outages.
3. Induction Heat Stress Improvement (IHSI) has been performed on both units on welds where breaks are assumed to occur. This treatment lessens the susceptibility of the material to intergranular stress corrosion cracking (IGSCC) and significantly reduces the probability of failure. PP&L's water chemistry control program also reduces the probability of failure. In addition, safe ends at the N2 nozzles have been replaced with corrosion resistant material and the piping has been clad with corrosion resistant material.
4. The probability of occurrence of Recirculation System nozzle breaks is small. For recirculation line breaks which impact the inboard MSIVs, the outboard MSIVs would still be expected to close and provide containment isolation. The probability of a double-ended guillotine break at the N1A nozzle, in addition to the failure of the impacted inboard A and D MSIVs and a corresponding outboard MSIV random failure is exceedingly small. Even if this event occurred, there is a reasonable expectation that the main steam piping would maintain its integrity in the Turbine Building and serve as an effective containment device. Other potential jet impingement effects on the Reactor Water Cleanup and Reactor Building Chilled Water systems would be contained within the Secondary Containment where the leakage would be processed by the Standby Gas Treatment System.
5. Susquehanna has a Technical Specification Limiting Condition for Operation of 5 gpm unidentified leakage. Existing leak detection systems will be used to identify leakage.

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Any questions on the above information should be directed to Mr. R. Sgarro at (215) 770-7916.

Very truly yours,



H. W. Keiser

cc: NRC Document Control Desk (original)  
NRC Region I  
Mr. G. S. Barber, NRC Sr. Resident Inspector  
Mr. M. C. Thadani, NRC Project Manager

11-11-68

UNIT 11 012

