



HELPING BUILD ARKAS. AS

ARKANSAS POWER & LIGHT COMPANY

9TH & LOUISIANA STREETS • LITTLE ROCK, ARKANSAS 72203 • (501) 372-4311

April 15, 1974

Mr. D. F. Knuth
Director of Regulatory Operations
Office of Regulation
United States Atomic Energy Commission
Washington, D. C. 20545

Subject: Arkansas Power & Light Company
Arkansas Nuclear One-Unit 1
Docket No. 50-313
Makeup Pump Orifice Leak

Dear Mr. Knuth:

On March 4, 1974, we notified Mr. M. S. Kidd, Reactor Inspector, Region II, of a possible significant deficiency discovered during Hot Functional Testing regarding a leak in a flow orifice of the makeup pump recirculation line. An interim report was also submitted to Mr. N. C. Moseley, Director, Region II, on April 3, 1974.

Attached please find our final report on this subject.

Very truly yours,

J. D. Phillips
Senior Vice President

JDP:cc

Attachment

cc: Mr. Norman C. Moseley, Director
Directorate of Regulatory Operations
Region II
United States Atomic Energy Commission
230 Peachtree Street, N. W. - Suite 818
Atlanta, Georgia 30303

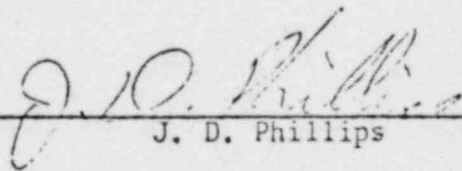
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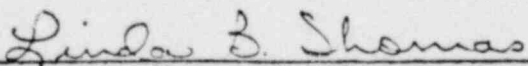
STATE OF ARKANSAS)
) SS
COUNTY OF PULASKI)

J. D. Phillips, being duly sworn, states that he is a Senior Vice President of Arkansas Power & Light Company; that he is authorized on the part of said Company to sign and file with the Atomic Energy Commission this Supplementary Information; that he has read all of the statements contained in such Information, and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.



J. D. Phillips

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 15th day of April, 1974.



Notary Public

My Commission Expires:

March 1, 1978

REPORT ON THE
MAKEUP PUMP RECIRCULATION ORIFICE LEAK

This report is being made in accordance with 10 CFR 50.55 (e) on significant deficiencies and relates to the generic investigation made as a result of the erosion of the "B" makeup and purification recirculation orifice on Arkansas Power & Light's ANO-Unit 1.

Identification of Incident

A pinhole leak in the "B" makeup pump recirculation flow orifice at ANO-1 was first noticed at a location approximately 1 inch below the upper weld where the orifice makes its downstream connection to the 2-inch recirculation line. Examination of the orifice after its removal from the line revealed nearly complete erosion of the last element at the discharge end of the orifice. Because the flow discharge from this last element was near the pipe wall, a portion of the pipe wall had also been eroded to the point of generating the pinhole leak observed. This penetration occurred only in the "B" line because of its extended operating time compared to the "A" and "C" lines. The reactor coolant letdown flow orifice is of the same manufacture and was also investigated for possible failures.

Analysis of Causes

B&W has identified that the leakage resulted from erosion of the orifice wall near the last stage of the orifice. The erosion was caused by high exit flow velocity at the last stage. The last stage exit is located eccentrically in the cylindrical orifice shell and near the wall of the orifice.

Safety Evaluation

The recirculation flow orifice is a pressure reducing device between the pump discharge and the makeup tank. The recirculation line is provided to prevent "dead ending" the pump during the low-flow makeup injection required by the core during normal operation. For emergency high-pressure injection, the recirculation line is closed by an automatic valve downstream of the orifice thereby directing the full makeup pump flow into the core. Communication of the "A" and "C" recirculation lines with the "B" line leak would have been prevented by a stop-check valve.

The loss of integrity in the "B" recirculation line could, therefore, have resulted in the loss of some core injection flow during normal operation and a significant loss of flow during emergency injection. In both modes, however, the remaining "A" and "C" injection lines were each available to deliver their design flow to the core. Only one of the three injection lines operating at design flow is required to provide core protection in the event of a LOCA. However, in the event of a single failure of a diesel generator (thus leaving only one HPI pump with an affected orifice) the design HPI flow could not be maintained.

Corrective Action

The makeup pump recirculation orifice design has been modified to reduce the exit velocity at the last stage from a maximum of 183 fps to 110 fps, and to locate the last stage exit concentrically in the orifice shell. B&W is procuring and will replace the existing orifices with those of the modified design. The reactor coolant letdown flow orifice was examined by a UT inspection and showed no erosion. The exit velocity from this orifice was approximately 125 fps in the original design and thus will not be replaced.