



ARKANSAS POWER & LIGHT COMPANY

September 6, 1988

@CAN@988@7

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Units 1 & 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
NRC Bulletin No. 88-04: Potential
Safety Related Pump Loss

Gentlemen:

Your letter of May 5, 1988 (@CNA@588@4) requested a response to NRC Bulletin No. 88-04: Potential Safety Related Pump Loss. In our letter of July 5, 1988 (@CAN@788@3), Arkansas Power and Light Company (AP&L) committed to provide a response by September 6, 1988. Attached is our response to questions #1 and #2. Question #3 required AP&L to evaluate the adequacy of the minimum flow bypass lines on our safety-related centrifical pumps. This evaluation is currently underway and requires contacting the pump manufacturers and requesting data from them in regard to the minimum flow for pump protection. This information is expected to be received within the next few months. Evaluation of the data received, possible calculations, and additional testing, if required, extends our expected response date for this item to February, 1989.

Very truly yours,

Dan R. Howard
Manager, Licensing

DRH:MCS:de

Attachments

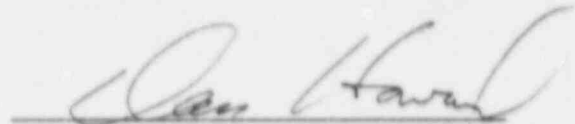
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COUNTY OF PULASKI)

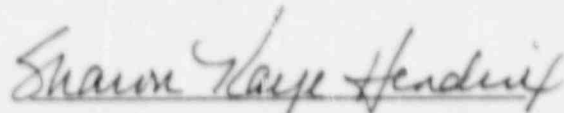
SS

I, Dan R. Howard, being duly sworn, subscribe to and say that I am Manager, Licensing for Arkansas Power & Light Company; that I have full authority to execute this oath; that I have read the document numbered #CAN#988#7 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.



Dan R. Howard

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 6th day of September, 1988.



Notary Public

My Commission Expires:

9-19-89

QUESTION NO. 1

Promptly determine whether or not its facility has any safety-related system with a pump and piping system configuration that does not preclude pump-to-pump interaction during miniflow operation and could therefore result in dead-heading of one or more of the pumps.

RESPONSE

ANO-1

The bulletin concern was reviewed for applicability to the safety-related centrifugal pumps in ANO-1. These pumps are:

<u>Pump No.</u>	<u>Pump Name</u>
P-7 A & B	Emergency Feedwater
P-34 A & B	Decay Heat Removal/LPSI
P-35 A & B	Reactor Building Spray
P-36 A, B & C	Primary Makeup/HPSI

A review of the piping systems for the above pumps has determined that pump to pump interaction during miniflow operation will not result in dead heading of one or more pumps. A summary of each pump's miniflow recirculation piping system is as follows:

P-7 A & B - Emergency Feedwater (EFW) Pumps

Each EFW pump's miniflow recirculation line originates at the pump discharge automatic recirculation control valve as a 2" line. A flow orifice follows and then the line size is increased to 4". Both miniflow recirculation lines join with the line size maintained at 4". The miniflow then continues to either the condenser or condensate storage tank.

The flow orifice and line size increase prior to the miniflow recirculation lines joining prevents either pump from being dead headed by the other.

P-34 A & B - Decay Heat Removal (DHR) Pumps/LPSI

Each DHR pump has an independent miniflow recirculation line originating on the downstream side of the decay heat coolers. A flow orifice is present prior to the 2" line returning to the pump suction.

The presence of independent miniflow recirculation lines precludes any pump to pump interaction.

P-35 A & B - Reactor Building Spray Pumps

Neither reactor building spray pump has a miniflow recirculation line. Pump protection is handled administratively by low flow alarms which would alert the operator when flow is not detected in the containment spray discharge line.

P-36 A, B & C - Primary Makeup Pumps/HPSI

Each primary makeup pump miniflow recirculation line originates at the pump discharge. A flow orifice is present in each 2" line prior to the lines joining at a common 2" header. The 2" header continues to the seal return coolers and then to the reactor coolant makeup tank which supplies the pump suction.

The flow orifice present in each pump's miniflow recirculation line prior to the lines joining the header prevents the dead heading of one or more pumps by another.

ANO-2

The bulletin concern was reviewed for applicability to the safety-related centrifugal pumps in ANO-2. These pumps are:

<u>Pump No.</u>	<u>Pump Name</u>
2P-7 A & B	Emergency Feedwater Pumps (EFW)
2P-39 A & B	Boric Acid Makeup Pumps (BAM)
2P-35 A & B	Containment Spray Pumps (CS)
2P-60 A & B	Low Pressure Safety Injection (LPSI)
2P-89 A, B & C	High Pressure Safety Injection (HPSI)

A review of the piping systems for the above pumps has determined that pump to pump interaction during miniflow operation will not result in dead heading of one or more pumps. A summary of each pump's miniflow recirculation piping system is as follows:

2P-7 A & B - Emergency Feedwater Pumps

Each EFW pump has a miniflow recirculation line originating as a 2" line at the pump discharge. A flow orifice is installed in each line prior to them joining a 4" header and continuing to the condensate storage tank.

The flow orifice installed prior to the 2" lines joining the 4" header and the increase in line size prevents either pump from being dead headed by the other.

connections are present in the EFW pump discharge piping prior to the miniflow recirculation line which could allow pump to pump interaction. However, the manual valves installed in the cross-connections are administratively controlled and locked closed. These valves are not used for normal operation or used in the ANO-2 Emergency Operating Procedures. Therefore, the miniflow recirculation lines are considered independent and pump to pump interaction which could result in dead heading is prevented.

2P-39 A & B - Boric Acid Makeup Pumps

Each BAM pump has an independent miniflow recirculation line originating at the pump discharge as a 2" line continuing to the boric acid makeup tank.

The presence of independent miniflow recirculation lines precludes any pump to pump interaction.

2P-35 A & B - CS Pumps

2P-60 A & B - LPSI Pumps

2P-89 A, B & C - HPSI Pumps

Each of these pumps miniflow recirculation line originates at the respective pump's discharge and contains a flow orifice. Each 2" line ties into a 4" header downstream of the flow orifices. The 4" header ties into a 6" line which continues to the refueling water tank.

The flow orifice installed prior to the 2" lines joining the 4" header and the line size increase prevents any pumps from being dead headed by other pumps.

QUESTION NO. 2

If the situation described in Item 1 exists, evaluate the system for flow division taking into consideration (a) the actual line and component resistances for the as-built configuration of the identified system; (b) the head versus flow characteristics of the installed pumps, including actual test data for "strong" and "weak" pump flows; (c) the effect of test instrument error and reading error; and (d) the worst case allowances for deviation of pump test parameters as allowed by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI, Paragraph IWP-3100.

RESPONSE

The situation described in Bulletin 88-04 is not a concern at Arkansas Nuclear One, Units 1 and 2; therefore, this question is not applicable.