



ARKANSAS POWER & LIGHT COMPANY
FIRST NATIONAL BUILDING/P.O. BOX 551/LITTLE ROCK, ARKANSAS 72203/(501) 371-7901

January 5, 1983

JOHN M. GRIFFIN
Vice President
Nuclear Operations

2CANØ183Ø4

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368 License No. NPF-6
Inadvertant Safety System Actuation
Due To A Potential PPS Design Problem

Gentlemen:

Our letter dated December 28, 1982, (2CAN128219) informed you of the applicability of the December 17, 1982, San Onofre Unit 3 inadvertant actuation of all Engineered Safety Features (ESF) to Arkansas Nuclear One - Unit 2 (ANO-2). That letter also notified you of the interim administrative actions AP&L placed in effect at ANO-2 on December 24, 1982. Generally, these interim actions involved administratively limited access to the Plant Protection System (PPS) cabinets and procedure changes and training to the plant operators of the possibility of such an event as well as instructions as to the proper course of action to mitigate the event.

In that letter we concluded operation of ANO-2 with these interim actions was acceptable and safe. In conversations with NRC (referenced in the December 28, 1982, letter), we noted NRC's concurrence with this conclusion.

On December 30, 1982, we had a lengthy conference call with both NRR and Region IV NRC personnel in which we proposed to implement an electrical modification to prohibit the Recirculation Actuation Signal (RAS) from automatically closing the mini-recirculation valves from the discharge of the High Pressure Safety Injection (HPSI) pumps to the Refueling Water Tank (RWT). In the event of an inadvertant and simultaneous actuation of Safety Injection and Recirculation, this modification would preclude the possibility of HPSI pump damage due to the pumps running at a shut off head condition with the mini-recirculation lines closed. It was noted this modification was similar to one proposed by SONGS-3.

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January 5, 1983

Following that conference call, we received another call from NRR personnel expressing concerns that we might be proposing to make the modification in a shorter time frame than necessary. It was acknowledged that the interim administrative actions were adequate and that additional time for a more thorough evaluation of the proposed modifications might be appropriate.

In still later conversations (the same date) between our Mr. John Griffin and Mr. Jim Gagliardo (Region IV) and a later one between Mr. Griffin and Mr. Gus Lainas (NRR), we requested we be allowed until January 4, 1983, to further evaluate our proposed modification. In addition, Mr. Griffin informed both individuals that we were evaluating a different option (involving piping modifications vice electrical modifications) that appeared to be a more appropriate modification than the electrical modification and that we would use the additional time to more thoroughly evaluate the alternative modification. Mr. Griffin committed to respond to NRC on January 4, 1983, with the results of this evaluation and the feasibility of implementing the alternative.

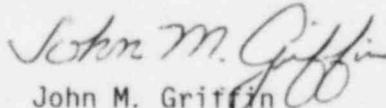
On January 4, 1983, we called both NRR and Region IV with the results of the reviews. NRC was not receptive to the alternative piping modification due to the uncertainty in the implementation schedule. NRC requested we submit, by January 5, 1983, the interim electrical modification (similar to the one proposed by SONGS-3) for review and approval.

We are submitting, for your review and approval, a summary of temporary electrical modifications which will remove the automatic RAS to the HPSI mini-recirculation valves. Attached is a description of the change, a Safety Evaluation, and appropriate Technical Specification changes.

We will be happy to discuss this submittal with you at your convenience.

In accordance with 10CFR170.22, we have determined this Technical Specification change request to be a Class III Amendment as it involves the review of a single safety issue. Therefore, a check in the amount of \$4000.00 is enclosed.

Very Truly Yours,



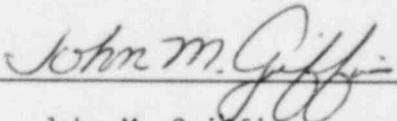
John M. Griffin
Vice President,
Nuclear Operations

JMG/JTE

Attachments

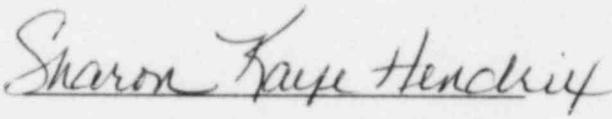
STATE OF ARKANSAS)
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COUNTY OF PULASKI) SS

I, John M. Griffin, being duly sworn, subscribe to and say that I am Vice President, Nuclear Operations for Arkansas Power & Light Company; that I have full authority to execute this oath; that I have read the document numbered 2CANØ183Ø4 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.



John M. Griffin

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 5th day of January, 1983.



Notary Public

My Commission Expires:

9-19-89

SAFETY EVALUATION OF TEMPORARY MODIFICATIONS TO
PRECLUDE HPSI PUMP DAMAGE

EVENT DESCRIPTION

On December 17, 1982, San Onofre Unit 3 (SONGS-3) experienced an inadvertant actuation of all Engineered Safety Features. It was originally believed this event resulted from a connector problem within the Plant Protection System Cabinets (PPS). Later, it was determined that some other initiating event/component was more likely than the connector.

Following the event, AP&L implemented administrative controls to limit access to the PPS cabinets, trained operations personnel on the possibility of a similar SONGS-3 event at Arkansas Nuclear One Unit 2 (ANO-2), and appropriate actions to mitigate the event. Appropriate procedure changes were implemented as well.

Subsequent reviews have not, as yet, specifically indicated the precise initiating event at SONGS-3. However, they have revealed that ANO-2 does have a connector design in the PPS cabinets essentially identical to the SONGS-3 connectors which could initiate a complete ESF actuation if disconnected.

The significance of the complete ESF actuation is the simultaneous occurrence of a Safety Injection Actuation Signal (SIAS) and a Recirculation Actuation Signal (RAS). The RAS is designed to occur sometime (worst case in a minimum of approximately 31 minutes) after a Loss of Coolant Accident (LOCA) at which time the Reactor Coolant System (RCS) would be at a relatively low pressure allowing injection of water from the High Pressure Safety Injection (HPSI) pumps.

The ANO-2 HPSI pumps have a maximum shutoff head of approximately 1425 psi. To accomodate the potential the HPSI pumps may have to run "dead head" against full RCS pressure (no flow through the pumps), mini-recirculation lines are provided to allow a small flow through the pumps for cooling purposes. This flow is normally recirculated to the Refueling Water Tank, the suction source for the HPSI pumps. Upon a RAS, suction for the HPSI pumps is transferred to the Containment sump from the RWT. As this water is potentially contaminated, the mini-recirculation lines from the HPSI pump discharge to the RWT are closed to preclude pumping of contaminated water to the atmosphere vented RWT.

The simultaneous occurrence of the RAS and SIAS creates a situation where the HPSI pumps could be pumping in a "dead head" condition with the mini-recirculation line closed. Operation in this mode for more than a very short time could result in permanent damage to the HPSI pumps.

DESCRIPTION OF MODIFICATION

The intent of the modification is to remove the automatic Recirculation Actuation Signal (RAS) from the HPSI mini-recirculation valves numbers 2CV5126-1, 2CV5127-1, 2CV5128-2, and, 2CV5628-2. Removal of this automatic signal will be accomplished by lifting and insulating certain cables from terminal blocks, and jumpering certain cables on terminal blocks. These modifications will be accomplished entirely in the Auxiliary Relay Cabinets (located in the Control Room) which are separate cabinets from the Plant Protection Cabinets in which the power supplies and connectors are located.

The modifications will not preclude indication of the valve status in the Control Room nor will they disable the capability to remotely operate the valves from the control room. The effect of the completed modification is to preclude the valves from receiving the automatic (RAS) signal only.

These modifications can be safely accomplished due to the spacious layout of the Auxiliary Relay Cabinets. The actual relays are mounted on the front of the cabinets making access directly to the relay from the rear of the cabinet extremely difficult. The terminal strips (where the actual modifications will be made) are mounted vertically on the sides and corners of the cabinet interior. The actual terminal connections are covered with an insulating plate, each plate covering twelve connections. In addition, each individual connection is separated from others by insulating dividers. During the modifications, only one plate will be removed at any time therefore exposing a maximum of twelve terminal connections. Each cable is plainly and permanently labeled with its cable number. The terminal strips are as well marked as to the correct cable termination. We have physically verified the cables and terminations against design drawings during the development of the Work Plan.

The Work Plan under which these modifications will be made requires sequential steps detailing every removal, insulation, and/or jumpering required. Each step is required to be signed by the technician and the supervising engineer assigned to on the spot verification of the changes.

The modifications will be conducted on only one valve at a time and will effect only one channel of systems. The operations personnel will be briefed before each valve is removed from service and will be notified when each valve is returned to service. When all the valves actuated by a single relay are modified, that relay will be exercised for verification that all components actuated by that relay perform their intended function. Following successful completion of the test, the valves actuated by the next specified relay will be modified.

Lifting an incorrect lead in the Auxiliary Relay Cabinets, in itself, would not cause any valve to change state. Removing an incorrect lead and insulating it could preclude a valve from operating. Such would be discovered when the relay test is performed. Jumpering between unintended exposed terminations could cause a component to change

state. Other than the valves being modified, the only components whose terminations will be exposed will be the mini-recirculation valve for a containment spray pump and some thermal overloads for some motor operated valves. These thermal overloads are bypassed in the event of a SIAS and thus their inadvertant bypass would be to a conservative state. Prior to any jumpering operations, the operations personnel will be notified of what valves could potentially be affected by the twelve exposed terminal contacts. The operator will then observe the control board indicators during the modification to observe any inappropriate component movements of the associated components. If an incorrect jumpering should occur and not be discovered by the operators, it would be discovered and corrected as a result of the relay test. Such an occurrence would not create a safety concern or reduce the margin of safety.

SAFETY IMPLICATIONS

An inadvertant simultaneous actuation of RAS and SIAS could result in permanent damage to the HPSI pumps as discussed above. Such an occurrence (all HPSI pumps out of service) is currently addressed by the Technical Specifications requiring shutdown within one hour. Although it is not desirable for such damage to occur to the HPSI pumps, this occurrence would not, in itself, result in endangering the reactor core or the public health and safety. No radioactive releases would occur nor would the unavailability of the HPSI pumps inhibit the ability to safely conduct a normal shutdown as the HPSI pumps do not perform a normal shutdown function.

No regulations or safety limits are violated as a result of a simultaneous actuation of RAS and SIAS.

The above proposed electrical modification will increase the HPSI reliability by precluding "dead heading" as a result of spurious RAS with SIAS. (It should be noted that the Low Pressure Injection Pumps are tripped by a RAS and thus not subject to "dead heading." The Containment Spray pumps are pumping against containment pressure therefore "dead heading" is not a concern for those pumps either.) Manual operator action from the Control Room will be required in lieu of automatic actuation to close the mini-recirculation isolation valves should an actual accident occur.

In the most limiting case for ANO-2 (design basis large break LOCA) recirculation of containment sump water does not occur for approximately 31 minutes. Therefore, as a minimum, approximately 31 minutes are available for the operations personnel to remotely (from the Control Room) close the HPSI recirculation isolation valves should an actual accident requiring RAS occur.

Such isolation is required in the event of an actual accident requiring RAS to preclude recirculation of possible contaminated containment sump water to the atmosphere vented RWT. Closure of the mini-recirculation valves will be procedurally required when HPSI flow is verified to be greater than 100 gpm which will allow significantly in excess of 20

minutes before RAS is required. Operator action within 20 minutes is consistent with past licensing and FSAR safety analysis assumptions as well as guidance provided in NUREG-0460.

It is concluded that more than adequate time is available for the operations personnel to perform the mini-recirculation valve isolation in the event of an actual emergency. Indications in the Control Room and procedural steps (and training) assure the operators have adequate information to make informed and accurate decisions.

CONCERNS:

The design basis of ANO-2 is for all functions necessary to mitigate a design basis accident to be redundant and automatic. Removing the RAS isolation of mini-recirculation to the RWT removes both the redundancy and the automation and replaces it with a single operator action. Failure of an operator to isolate the mini-recirculation valves in the required time (approximately 31 minutes, as a minimum, after initiation of an actual LOCA) could result in substantial offsite doses to the public in a very short time due to contaminated water being pumped from the containment sump to the RWT. Based on simplified calculations using post Design Basis LOCA source terms, the amount of water pumped from the containment sump to the RWT (through the mini-recirculation lines) in approximately 20 minutes could result in exceeding 10CFR100 thyroid dose limits at the Low Population Zone. Conservatively, the operator has approximately 51 minutes following the initiation of a design basis LOCA to terminate mini-recirculation flow to the RWT before 10CFR100 release limits would be exceeded.

It is recognized that reliance on operator actions is appropriate in many other cases and indeed, given the time frames involved, is believed to be appropriate in this case as well. Recognition of the consequences of inappropriate operator action, in this case, will result in sensitivity to the RAS by both management and operations personnel and will be appropriately stressed in initial and requalification operator training.

CONCLUSIONS

It is concluded that this modification can be performed safely with no degradation of the margin of safety afforded the public health and safety. As only one component in only one channel will be effected at any one time, it is concluded that the modification can be safely and efficiently conducted with ANO-2 operating at power. Removing one valve in one train for this modification is essentially no different than removal of a valve or circuit for normal surveillance testing which are routinely required to be conducted with the unit operating at power.

The modification will successfully and adequately alleviate the concern of "dead heading" the HPSI pumps following a simultaneous RAS and SIAS

thus improving equipment reliability. It is concluded the modification will successfully address the problem it is intended to correct.

Due to the Concerns identified above, it is finally concluded that NRC review and approval of this modification is required in accordance with 10CFR50.59 as it potentially results in a reduction in the overall margin of safety as provided to the public and as provided for in the ANO-2 design basis.