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February 3, 1983

2CAN028307

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

SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Bypass of EFW Auto Start During
Mode 5 and 6

Gentlemen:

In response to your letter dated December 21, 1982, (2CNA128201) the following is provided.

Item 1: Please provide a detailed description of this bypass, including all protective actions affected and the exact method used to accomplish this bypass. Also, please verify whether or not our understanding of it (as described above) is correct.

Response: Page 6 of ANO-2 Procedure 2304.37 (Attachment 1) and the typical Steam Generator (SG) Plant Protection System (PPS) level transmitter scheme (Attachment 2) show in detail the methods used to bypass the SG level inputs to the PPS during fill and drain procedures. The PPS actions defeated by these bypasses are listed below. The EFW portion of the system is the Engineered Safety Features Actuation System.

a. Reactor trip on low SG water level.

b. Automatic initiation of Emergency Feedwater (EFW) on low SG level.

c. Reactor trip on high SG water level.

Your understanding of the bypasses is essentially correct. Minor differences will be discussed in our responses to your specific questions.

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Item 2: Please verify whether or not this bypass is only used when draining the steam generators for maintenance or filling them for wet layup and that it is not part of the operating procedures such that it would be used each time the plant enters a shutdown mode. Also, indicate the frequencies (as best as can be determined) at which this bypass is used normally (based on past experience) and the most frequent interval of bypass which might be expected.

Response: These bypasses are used during each cold shutdown when it is possible to maintain "cocked rod" protection with shutdown banks "A" of the Control Element Assemblies (CEAS) withdrawn. Cocked rod protection is maintained in Mode 5 except for certain conditions when the Reactor Coolant System (RCS) is less than 200F.

During Mode 5, draining of the SGs may occur for maintenance, filling may occur for wet layup, and fill and drain activities may take place for water chemistry control. Therefore, the most frequent interval of the ESFAS/EFW bypass would be each cold shutdown (Mode 5). During 1982 there were nine entries into Mode 5.

Item 3: The staff is concerned about the false level indications provided in the control room by the eight steam generator narrow range level channels when the bypass is in effect. It is our understanding that there are two non-safety related steam generator level indications (one per steam generator) provided in the control room which would indicate actual level. However, we feel that control room personnel, who typically rely on the safety grade level indications, may not adequately respond to unanticipated conditions which may require actions from the control room. Section 4.20 of IEEE Std. 249-1971 states that "The protection system shall be designed to provide the operator with accurate, complete, and timely information pertinent to its own status and to generating station safety. The design shall minimize the development of conditions which would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications confusing to the operator."

Compliance with IEEE Std. 279 is required for plant protection systems (of which the steam generator narrow range level channels, including control room indicators, are a part) and is the basis for acceptance of protection system designs by the staff. It is realized that conditions requiring actions from the control room to avoid unacceptable consequences are not as likely to occur when the plant is shutdown, however, the potential for incorrect actions based on false level indications caused by the bypass is unacceptable to the staff. Propose corrective measures to prevent these false level indications in the control room or justify the existing design on some other basis.

Response: In addition to the eight safety grade level indications there are six non-safety indications of SG level unaffected by the subject bypasses.

We agree with your statements concerning IEEE 279. It should be recognized that IEEE 279 is intended to apply to systems that are functioning and providing a safety function. In Mode 5 operation, neither the EFW or the ESFAS is required to perform a safety function nor are they required to be

operable. It is allowable, during Mode 5 to completely remove the ESFAS and/or EFW from service without violating IEEE 279 or the Technical Specifications as neither of these systems are required to perform a safety function in Mode 5. Restoration of the SG level indications before entering Mode 4 is no different than restoring the PPS or EFW to an operable status following maintenance or repair.

"Conditions requiring actions from the control room to avoid unacceptable consequences..." is undefined. There are no postulated events during Mode 5 which require the EFW System or ESFAS else these systems would be required to be operable during that Mode.

Therefore, no modifications or corrective measures are proposed to address the SG level bypasses during Mode 5.

Item 4: It is our understanding that there is no indication of bypass provided in the control room when the bypass of the steam generator low level trip/EFWS initiation signal is in effect. Administrative controls (i.e., startup procedure) are relied upon to insure the bypass is removed. Section 4.13 of IEEE Std. 279 (Indication of Bypasses) requires that when the protective action of some part of the protection system has been bypassed or deliberately rendered inoperative for any purpose, this fact shall be continuously indicated in the control room. The staff's position is that if conditions a, b, and c of Regulatory Guide 1.47 (Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems) are met, then an automatic indication of bypass of EFWS automatic start capability should be provided in the control room to supplement existing administrative procedures. This is particularly important since steam generator low level is the automatic initiation signal (steam generator is used as a permissive) for the ANO-2 EFWS. Either provide continuous indication (automatically activated) on loss of EFWS automatic start capability when this bypass is in effect, or justify the existing design. This justification should include a discussion of how the existing design complies with the guidance given in Regulatory Guide 1.47 and a detailed description of the two steps provided in the startup procedure to assure the bypass is removed. State whether or not the step which requires verification that RPS jumpers/bypasses have been removed specifically lists this steam generator low level bypass such that it would be checked each time during startup regardless if it were in effect. Compliance with Section 4.13 of IEEE Std. 279 is required by Section II.E.1.2.1 of NUREG-0737.

Response: Regulatory Guide 1.47 Section C provides an acceptable method of meeting the requirements of IEEE 279 as your correctly note. Section C of the Regulatory Guide addresses "... systems that must be operable... to perform their safety function." During Mode 5 or 6 (when the bypass is applied) the ESFAS and EFW systems have no safety function to perform and are not required to be operable.

Section C.3 gives three criterion which, if met, require indication of the bypasses. Criterion C.3.c states "Is expected to occur when the affected system is normally required to be operable." Again, this bypass is used when the plant is in Modes 5 or 6 and the ESFAS and EFWS are not required to be operable. Clearly, then, the bypass indication of Section C.3 is not

applicable to the SG level bypass in Modes 5 and 6. Therefore, these bypasses will not violate the requirements of IEEE 279 or NUREG-0737 Section II.E.1.2.1 or the guidance of Regulatory Guide 1.47.

Page 1 of ANO-2 procedure 2102.01 (Attachment 3) shows the two sign-off steps required to assure removal of the bypasses. It shows, as well, that the SG level bypasses are specifically addressed.

Item 5: The staff is concerned about the method used to effect the bypass described above. Lifting leads and modifying existing protection system circuitry increases the potential that the system will not be returned to its normal operating condition prior to startup. We have received LERs in the past where lifted leads have been connected to the wrong terminals. In one case this prevented the automatic start of the AFWS at a Westinghouse plant following the bypass of the automatic start signals for maintenance purposes. This went undetected for several months of operation and caused the AFWS to fail to respond to a steam generator low-low level signal. The use of keylock switches to effect such a bypass, with corresponding control room indication, is more preferable to the staff. The potential for not returning the existing system to normal is of particular concern since leads are lifted in each of the eight safety related narrow range channels. The method used (i.e., lifting leads and modifying leads and modifying existing protection system circuitry) to bypass the steam generator low level reactor trip/EFWS initiation signals is not acceptable. Therefore, propose an alternate means of accomplishing this bypass function.

Response: Two separate procedures and at least three separate procedure sign-offs are required to assure the SG level bypasses are removed.

The EFW system is not required to be operable until Mode 3 and does not perform a safety function until that Mode. However, the Control Room operators use the EFW system during plant startup (Mode 4) for SG inventory.

We do not understand how or why the SG level bypasses are considered to be any different than maintenance. It is clearly acceptable to remove the entire EFWS and ESFAS (or portions thereof) from service during Mode 5. Removal from service could be for myriad reasons including physical removal of the entire system. The concern, therefore, reduces to one of assurance the system is restored to an operable status before Modes of operation in which it is required to perform a safety function. In the case of the SG level bypasses, steps are taken beyond those for maintenance restoration to assure the bypasses are removed.

We conclude that the bypasses do not violate any regulation, standard or guidance. The actions taken to assure restoration of the systems to an

operable status are redundant and b yond those considered necessary following maintenance. Thus, we believe use of the SG level bypasses is acceptable and we propose no modifications.

Very truly yours,

Donald A Ruter

for John R. Marshall
Manager, Licensing

JRM:JTE:sc

Attachments

Attachment 1

NOTE

If plant computer is not operational, note in the affected steps that measurements are made for contact status. Defer steps that require a check for computer printout until the plant computer becomes available.

6.2 If in a shutdown condition, ensure CPC OP Modules A, B, C, and D Trip Bypass keyswitches are ON; otherwise, write N/A in initial block. [ ]

6.3 If steam generators are in a shutdown condition, ensure the following; otherwise write N/A in initial block: (appropriate bypasses must be used as each channel is resistored). [ ]

2C15-1 Lift OTA4-67 and OTA4-70 (transmitter inputs). Install 1.3K resistors across input terminals OTA4-67 to 68 and OTA4-70 to 71.

2C15-2 Lift OTB4-67 and OTB4-70 (transmitter inputs). Install 1.3K resistors across input terminals OTB4-67 to 68 and OTB4-70 to 71.

2C15-3 Lift OTC4-67 and OTC4-70 (transmitter inputs). Install 1.3K resistors across input terminals OTC4-67 to 68 and OTC4-70 to 71.

2C15-4 Lift OTD4-67 and OTD4-70 (transmitter inputs). Install 1.3K resistors across input terminals OTD4-67 to 68 and OTD4-70 to 71.

7.0 PROCEDURE

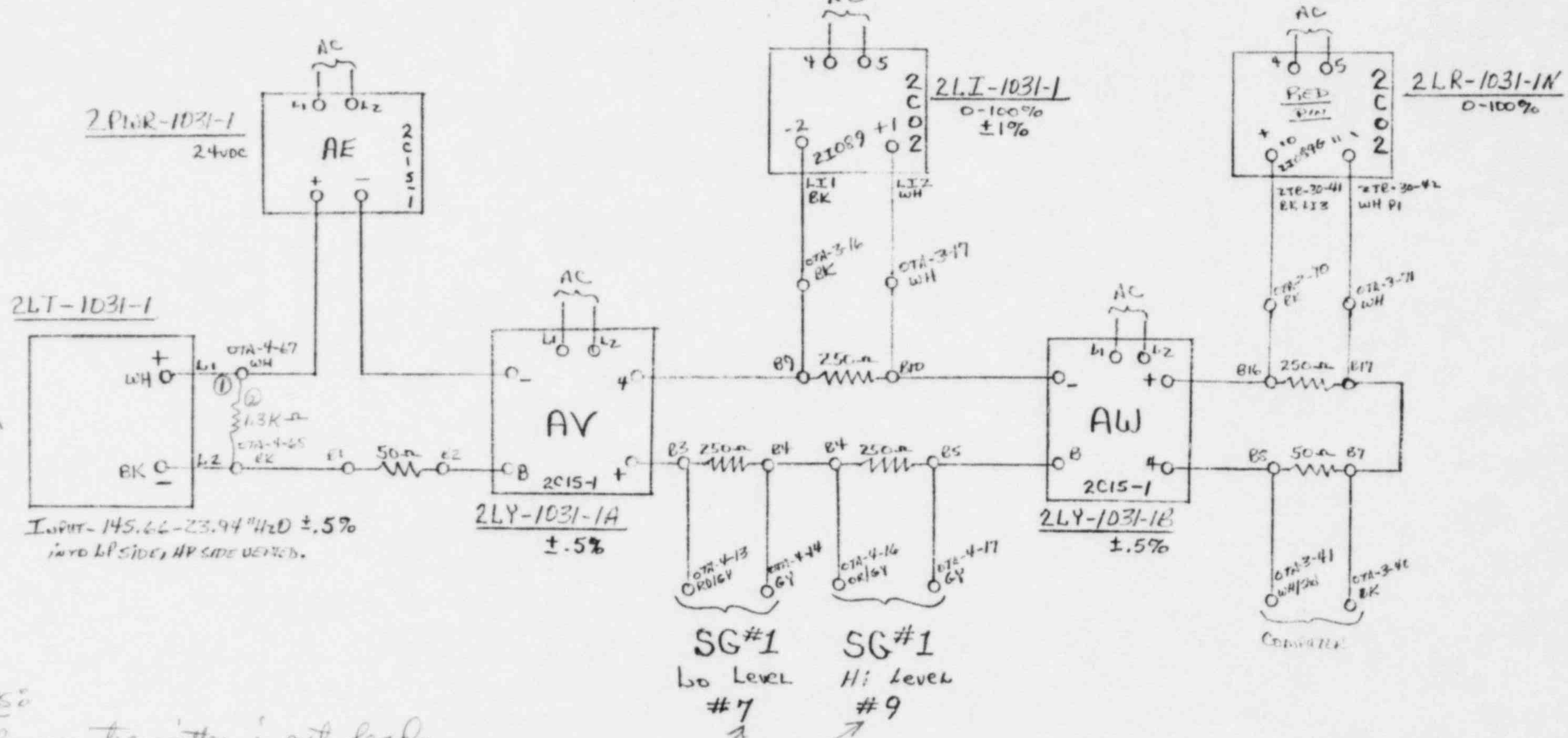
7.1 Power Supply Test

7.1.1 Verify the 14 sets of power supply indicating lights for Channel "A" and "B" are energized. [ ]

7.1.2 Connect DVM positive to cathode of ACR-1101 of PS-1 and negative to the "B" terminal of PS-1 indicator in channel A and record.

Required	Tolerance	Found	Left
12.000VDC	+0.150VDC -0.000VDC		

QUESTION #1 of NRC LETTER 2CNA128201



Attachment 2

Steps:

1. ① Remove transmitter input lead.
2. ② Install 1.3K Ω resistor. Keeps loop reading ~ 70% level.
3. Hang Temp. Mod. Tags on ②.
4. Remove ②.
5. Lay down ①.
6. Sign off removal of Temp. Mod. Tag.

Steam Generator #1 Level

Channel A

Scheme 2I089

E-2725-1

Notes:

1. Remove OT(X) 4-67 for S/G 'A' input.
2. Remove OT(X) 4-70 for S/G 'B' input.
3. All 4 channels done same.
4. Only channel A loops have recorders and instruments on remote shutdown panel-2C80.
5. All loop components - LY's, PWR, and resistors located inside CPC cabinets 2C15-1,2,3 & 4.

Attachment 3

1.0 SCOPE AND INTENT

To provide a checklist that satisfies the requirements (criteria) imposed upon the primary and secondary systems prior to heat up and/or criticality. Section I of this procedure is the Preheatup Checklist and Section II is the Precritical Checklist. This procedure is to be used with OP 2102.02, Plant Startup. This procedure is not required if a "Hot Restart" is made per the conditions of OP 2102.06 (Reactor Trip Recovery) Section 2.0. The group supervisor's signature at the end of each section indicates that all operability and surveillance requirements in his area of responsibility are satisfied. This procedure is written such that the most conservative specifications (usually Modes 1 and 2) are met.

Section I - Preheat Up Checklist

NOTE:
The sign-offs in this section may be performed in any sequence, at the direction of the Shift Supervisor, providing the check list is completed prior to reaching Mode 4 conditions. (Tave >200°F, <300°F with <0.99 K_{eff}.)

		INITIAL
1.	Verify that all operations surveillance is current prior to reaching Mode 4 conditions.	
2.	Perform Supplements I and III of Procedure 1015.01, "Monthly Surveillance of Jumper and Lifted Lead Log" and "Monthly Review of Hold Card/Caution Card Log Books", respectively.	
3.	Verify all resistors that were installed in the PPS for steam generator water levels and/or RWT water level are removed.	
4.	Complete tank check list - Attachment "A". (Except safety injection tank pressurization which is completed in OP 2102.02, Plant Startup).	
5.	Shutdown Margin	
	(a) Shutdown Margin has been calculated and verified adequate per OP 2103.15, Reactivity Balance Calculation.	
6.	Boration Flow Paths	
	(a) Verify that the CVCS Valves are lined up per Attachment "A" of OP 2104.02, CVCS Operations. (The performance of Attachment "A" of OP 2104.02 is not necessary if the system alignment has not been altered during the shutdown.)	