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May 6, 1988

10 CFR 50.62

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Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
TAC #59105
AMSAC Submittal Supplement

References: 1. Letter from D. C. Hintz to US NRC dated March 31, 1988
2. Letter from M. B. Fairtile to D. C. Hintz dated September 22, 1986

Reference 1 transmitted plant specific AMSAC design details for the system to be installed at the Kewaunee Nuclear Power Plant (KNPP). After receiving reference 1, the NRC requested a conference call with Wisconsin Public Service Corporation (WPSC) to discuss its contents. This call took place on Tuesday, April 19, 1988. During the course of this discussion the NRC requested an AMSAC submittal supplement consisting of the following: 1) a logic diagram which shows the Class 1E/non-1E interface (including isolation devices), computer points, test points, the block switch, and annunciator signals; 2) information with regard to the qualification of the AMSAC actuation/isolation relay in accordance with Appendix A of Reference 2 and with regard to relay diversification; and 3) a more detailed end-to-end AMSAC test description, including any overlap, that would verify operability of the entire system. These items are addressed in attachments 1, 2, and 3, respectively. Should you have any further questions with regard to the KNPP AMSAC design, please contact my staff.

Sincerely,

D. C. Hintz
Vice President - Nuclear Power

PEM/jms
Attach.
cc - Mr. Robert Nelson, US NRC
US NRC, Region III

A001
1/1

Attachment 1

To

Letter from D. C. Hintz (WPSC)

To

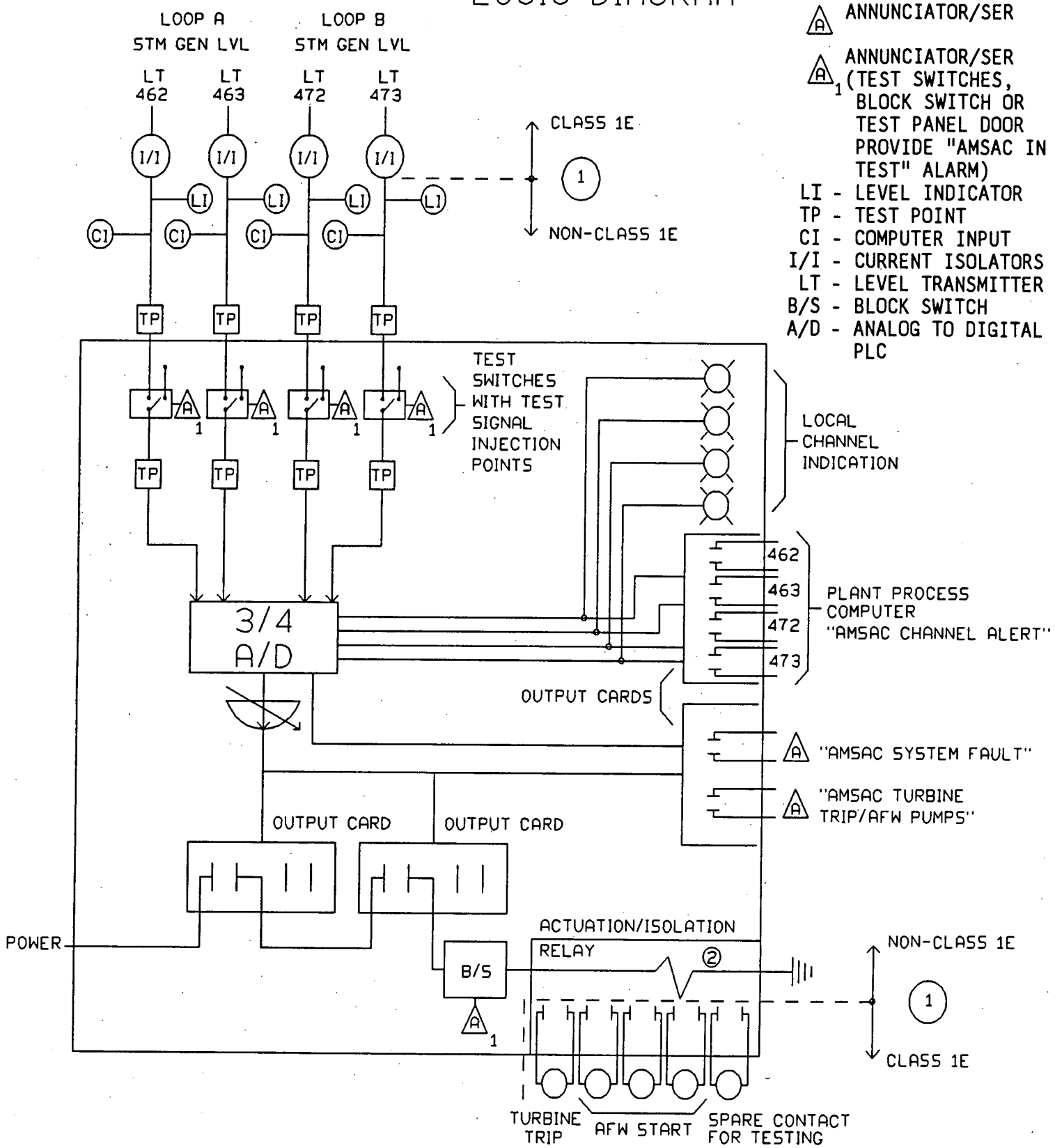
Document Control Desk (NRC)

Dated

May 6, 1988

LOGIC DIAGRAM

LOGIC DIAGRAM



ANNUNCIATOR/SER

ANNUNCIATOR/SER (TEST SWITCHES, BLOCK SWITCH OR TEST PANEL DOOR PROVIDE "AMSAC IN TEST" ALARM)

LI - LEVEL INDICATOR
TP - TEST POINT
CI - COMPUTER INPUT
I/I - CURRENT ISOLATORS
LT - LEVEL TRANSMITTER
B/S - BLOCK SWITCH
A/D - ANALOG TO DIGITAL PLC

Notes:

(1) THE CLASS 1E/NON-1E INTERFACE ISOLATION DEVICES ARE THE CURRENT ISOLATORS AND THE ACTUATION/ISOLATION RELAY.

(2) THE ACTUATION/ISOLATION RELAY COIL IS POWERED FROM A NON-CLASS 1E SOURCE. THE ACTUATION/ISOLATION RELAY CONTACTS ARE PART OF CLASS 1E ACTUATION CIRCUITS.

Attachment 2

To

Letter from D. C. Hintz (WPSC)

To

Document Control Desk (NRC)

Dated

May 6, 1988

RELAY ISOLATION TESTING

This attachment outlines WPSC's proposed methodology for meeting the intent of Appendix A of reference 2, as it applies to the actuation/isolation relay in the KNPP AMSAC design.

WPSC has under consideration three options for procurement of a qualified relay. These options consist of: 1) purchase of a fully qualified relay from a qualified supplier, 2) qualifying a relay through the use of an independent laboratory, or 3) WPSC performing its own qualification testing on a relay. Regardless of the method of procurement/qualification, the final product will meet the intent of Appendix A of reference 2.

Because a specification has not yet been developed for the relay isolation qualification testing, we cannot provide all of the specific information requested in Appendix A of reference 2 at this time. However, all of the information, as described below, will be available and auditable at WPSC after the KNPP AMSAC system is installed. As a result of the April 19, 1988 teleconference it was understood that the NRC could issue a SER on the AMSAC submittal, based on this type of commitment.

WPSC's commitment to implement the intent of Appendix A of reference 2, item by item, as it applies to the actuation/isolation relay in the KNPP AMSAC design is as follows:

a) A description of the specific testing performed to demonstrate that the relay is acceptable for its application will be available. This description will include elementary diagrams when necessary to indicate the test configuration and how the maximum credible faults were applied to the devices.

b) Data will be available which demonstrate that the maximum credible faults, to which the relay coil could be exposed, were applied during the test. A description of how the maximum faults were determined will also be included.

c) Data will be available which demonstrate that the maximum credible fault was applied to the relay coil (non-Class 1E side) and that other faults were considered (i.e., open and short circuits).

d) The pass/fail acceptance criteria for the relay will be defined.

e) The relay will comply with the seismic qualifications which were the bases for plant licensing. Environmental qualification requirements (10 CFR 50.49) do not apply to the relay, as it will be located in a mild environment.

f) The final AMSAC actuation in the KNPP design utilizes relay logic. Inherent in relay logic is the fact that an actuating signal will either be on or off (i.e., no intermediate state). This is due to the mechanical coupling between the relay coil and relay contacts. Any electrical interference signal that may be generated by the AMSAC would be insignificant with respect to the actuating signal, would not affect relay contacts, and therefore would have no deleterious effects on the Class 1E actuating circuits. In addition, the relay to be used in the KNPP AMSAC system will be qualified in accordance with this attachment and will be located in a non-safety related metal cabinet.

g) The relay coil is powered from a non-Class 1E power source (BRB-115 which is a balance-of-plant non-interruptible 120 VAC inverter and is independent of the existing reactor protection system). The relay contacts, when closed, will be completing a Class 1E safety-related actuation circuit.

With regard to diversification, the AMSAC actuation/isolation relay will be of a different manufacturer than that of the relays currently used in the Reactor Protection System.

Attachment 3

To

Letter from D. C. Hintz (WPSC)

To

Document Control Desk (NRC)

Dated

May 6, 1988

AMSAC TESTING

This attachment describes the AMSAC end-to-end testing, including test overlap, that will be implemented at the KNPP to verify operability of the whole system.

Currently, there are four surveillance procedures which will verify operability of portions of the AMSAC. Two additional procedures will be written to test the new equipment installed for AMSAC and to provide additional overlap in the AMSAC testing. A detailed description of each of these procedures follows. The descriptions include frequency, scope, typical loop instruments included, and overlap. A simplified two-wire diagram and an AMSAC Test Matrix for a typical AMSAC instrument loop have also been included to aid in your review process and further demonstrate testing overlap.

1. Surveillance Procedure SP 87-125: Shift Instrument Channel Checks-Operating

   Frequency: Once per shift (NOTE: This procedure is not performed when the plant is in Cold Shutdown or Refueling Shutdown mode.)

   Scope: All six Steam Generator Level Indicators (LI-461 thru LI-463 and LI-471 thru LI-473) are checked once per shift to ensure that the maximum channel deviation is within acceptable limits. Four of these indicators (LI-462, LI-463, LI-472, and LI-473) are part of the AMSAC instrument loops. This procedure will verify instrument loop continuity and functionality from the steam generator level transmitter through the analog (input) side of the programmable logic controller (PLC) for all four of the AMSAC channels.

Typical AMSAC Loop Instruments Included:

Level Transmitter (LT-473), Test Switch (TS/L473), Power Supply (LQ-473), Test Point (TP/LQ-473), Isolation Current Repeater (LM-473B), Test Point (TP/LM-473B), Computer Input (CT-473B), Level Indicator (LI-473), AMSAC Test Switch, AMSAC Test Point, and the analog (input) side of the PLC.

Overlap: With SP 05A-027, SP 05A-028A, SP 05A-028B, AMSAC Test at Power as described in item 5, AMSAC Actuation Test as described in item 6.

2. Surveillance Procedure SP 05A-027: Steam Generator Level Instrument Channel Test

Frequency: Monthly

Scope: This procedure, as it pertains to AMSAC instruments, verifies loop continuity from the test switch (TS/L-473) through the input side of the isolation current repeater (LM-473B) for all four of the AMSAC loops.

Typical AMSAC Loop Instruments Included:

Test Switch (TS/L473), Power Supply (LQ-473), Test Point (TP/LQ-473), and Isolation Current Repeater (LM-473B).

Overlap: With SP 87-125, SP 05A-028A, and SP 05A-028B

3. Surveillance Procedure SP 05A-028A: Steam Generator Level Transmitter Calibration

Frequency: Every Refueling Outage

Scope: All six Steam Generator Level Transmitters (LT-461 thru LT-463 and LT-471 thru LT-473) are calibrated every refueling outage. Four of

these transmitters (LT-462, LT-463, LT-472 and LT-473) provide the inputs to the AMSAC. In addition to transmitter calibration, performance of this procedure verifies loop continuity from the level transmitter (LT-473) through the input side of the isolation current repeater (LM-473B) for all four AMSAC channels.

Typical AMSAC Loop Instruments Included:

Level Transmitter (LT-473), Test Switch (TS/L473), Power Supply (LQ-473), Test Point (TP/LQ-473), and Isolation Current Repeater (LM-473B)

Overlap: With SP 87-125, SP 05A-027, SP 05A-028B

4. Surveillance Procedure SP 05A-028B: Steam Generator Level Instrument Calibration

Frequency: Annually

Scope: All six Steam Generator Level Instrument loops are calibrated annually. Four of these loops are used in the AMSAC. Specific typical instruments calibrated during the performance of this procedure include the isolation current repeater (LM-473B), the level indicator (LI-473), and the computer input (CT-473B). Performance of this procedure also verifies loop continuity from the Test Switch (TS/L-473) through the analog (input) side of the PLC for all four AMSAC channels.

Typical AMSAC Loop Instruments Included:

Test Switch (TS/L473), Power Supply (LQ-473), Test Point (TP/LQ-473), Isolation Current Repeater (LM-473B), Test Point (TP/LM-473B),

Computer Input (CT-473B), Level Indicator (LI-473), AMSAC Test Switch, AMSAC Test Point, and the analog (input) side of the PLC.

Overlap: With SP 87-125, SP 05A-027, SP 05A-028A, AMSAC Test at Power as described in item 5, AMSAC Actuation Test as described in item 6.

5. New Procedure: AMSAC Test at Power

Frequency: Quarterly (NOTE: This procedure will not be performed in the quarter that the AMSAC Actuation Test is performed.)

Scope: A procedure will be in place to perform quarterly AMSAC testing at power. This test will consist of blocking the AMSAC output actuating signals, inputting test signals (one channel at a time), and verifying that the individual local channel indication lights come on at the proper setpoint. Blocking the AMSAC output will be accomplished by opening the block switch. This will disable the turbine trip and the auxiliary feedwater pumps' actuation signals. The AMSAC Test Switch will then be turned to the test position and simulated transmitter signals will be inserted into the AMSAC through the AMSAC Test Switch Test Signal Injection Point. When the simulated transmitter signals correspond to the AMSAC actuation set-point, proper operation of the Local Channel Indication light will be verified for the channel in test. Proper operation of the AMSAC IN TEST, AMSAC CHANNEL ALERT and AMSAC SYSTEM FAULT annunciators will also be verified during the performance of each channel test, as well as loop continuity from the AMSAC Test Switch through the

analog (input) side of the PLC.

Typical AMSAC Loop Instruments Included:

AMSAC Test Switch, AMSAC IN TEST Annunciator, AMSAC Test Point, analog (input) side of the PLC, Local Channel Indication, AMSAC CHANNEL ALERT Annunciator, and AMSAC SYSTEM FAULT Annunciator.

Overlap: SP 87-125, SP 05A-028B and the AMSAC Actuation Test as described in the following item 6.

6. New Procedure: AMSAC Actuation Test

Frequency: Every Refueling Outage

Scope: A procedure will be in place to perform an AMSAC actuation test and PLC calibration every refueling outage. This test will be performed with the turbine tripped and the auxiliary feedwater pumps in PULLOUT. An AMSAC demand signal will be simulated by placing 3 of the 4 AMSAC test switches to the test position. A spare contact on the AMSAC Actuation/Isolation Relay will be monitored during this test to verify proper change of state occurs at the specified time delay after insertion of the AMSAC demand signal. In addition, AMSAC Local Channel Indication and AMSAC annunciators will be monitored for proper response. This test will be repeated for all 3 of 4 steam generator level transmitter combinations and also for the 4 of 4 coincidence.

Typical AMSAC Loop Instruments Included:

AMSAC Test Switch, AMSAC IN TEST Annunciator, AMSAC Test Point, PLC, Local Channel Indication, AMSAC CHANNEL ALERT Annunciator,

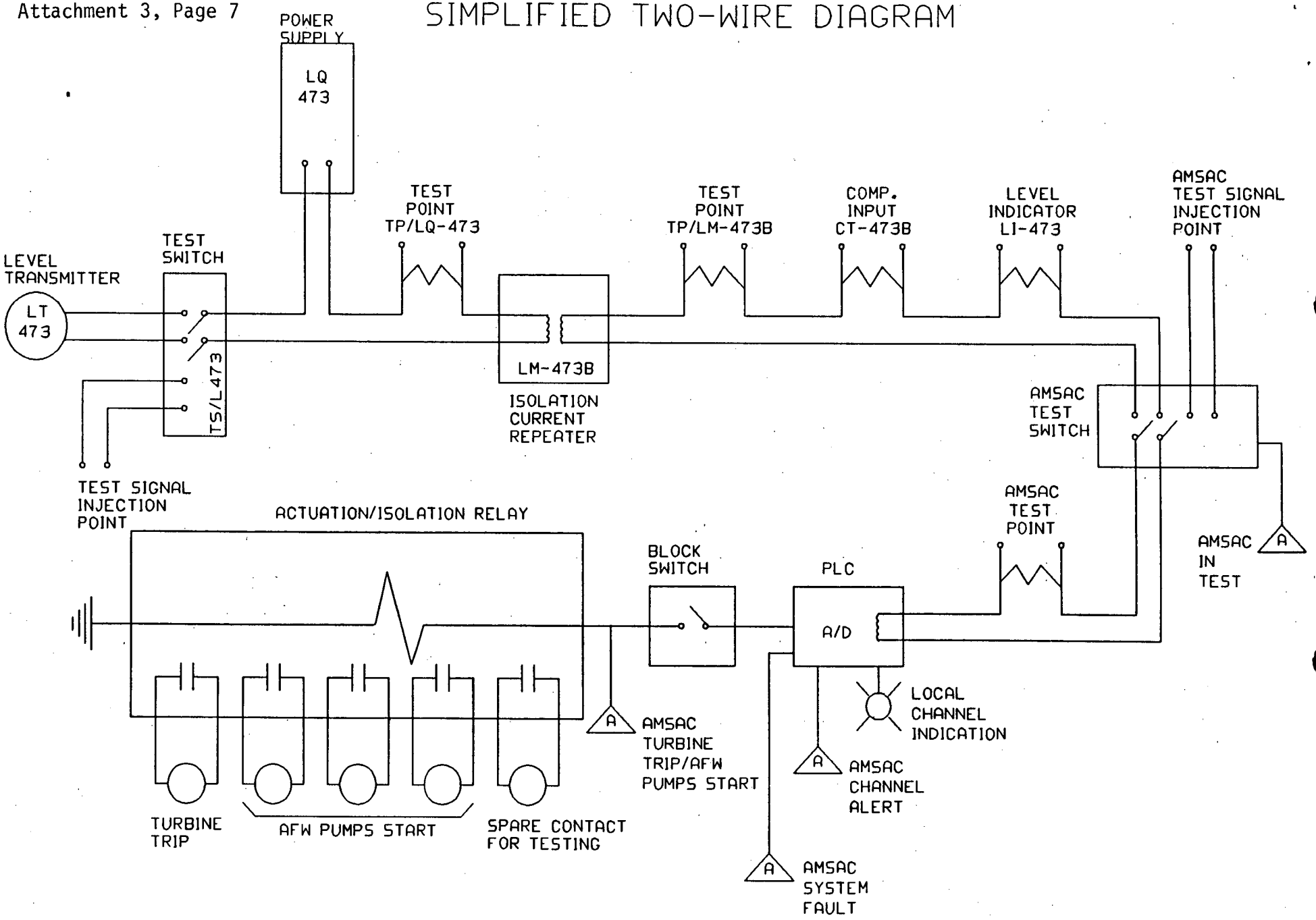
AMSAC Block Switch, AMSAC TURBINE TRIP/AFW PUMPS START Annunciator, Actuation/Isolation Relay.

Overlap: SP 87-125, SP 05A-028B, and the AMSAC Test at Power described in previous item 5.

SUMMARY

The previous procedure discussion, along with the supporting Simplified Two-Wire Diagram and AMSAC Test Matrix, demonstrate the extensive overlap testing that will be used in proving end-to-end AMSAC operability at the KNPP.

SIMPLIFIED TWO-WIRE DIAGRAM



Note: THIS IS A SIMPLIFIED TWO-WIRE DIAGRAM WHICH ONLY SHOWS ONE TYPICAL LEVEL TRANSMITTER LOOP GOING INTO THE PLC. THIS HAS BEEN DONE FOR EXPLANATORY PURPOSES. IN ACTUALITY THERE ARE FOUR LEVEL TRANSMITTER LOOPS GOING INTO THE PLC AND A THREE OF FOUR COINCIDENCE IS REQUIRED FOR AMSAC ACTUATION.

AMSAC TEST MATRIX

Instrument (Typical Loop Instrument No.)	Level Trans. (LT-473)	Test Switch (TS/ L-473)	Power Supply LQ-473)	Test Point (TP/ LQ-473)	Isol. Current Repeat. LM-473B	Test Point (TP/LM -473B)	Computer Input (CT-473B)	Level Indicator (LI-473B)	AMSAC Test Switch	Annun. AMSAC in Test	AMSAC Test Point	AMSAC PLC	Local Chan. Ind.	Annun AMSAC Chan. Alert	Annun AMSAC Sys. Fault	AMSAC Block Switch	Annun. AMSAC Turb.Trip AFW Start	Act. Isol. Relay
Procedure: SP 87-125 Freq.: Once Per Shift Loop Continuity:	√	√	√	√	√	√	√	√	√	-	√	√	-	-	-	-	-	-
Procedure: SP 05A-027 Freq.: Monthly Loop Continuity:	-	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-	-	●
Procedure: SP 05A-028A Freq.: Every Refueling Outage Loop Continuity:	√*	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-	-	-
Procedure: SP 05A-028B Freq.: Annually Loop Continuity:	-	√	√	√	√*	√	√*	√*	√	-	√	√	-	-	-	-	-	-
Procedure: AMSAC Test at Power Freq.: Quarterly + Loop Continuity:	-	-	-	-	-	-	-	-	√	√	√	√	√	√	√	-	-	-
Procedure: AMSAC Actuation Test Freq.: Every Refueling Outage Loop Continuity:	-	-	-	-	-	-	-	-	√	√	√	√*	√	√	-	√	√	√ ●

Notes: √ = Instrument included in Loop Continuity check performed in referenced procedure.
- = Instrument not included in Loop Continuity check performed in referenced procedure but is included elsewhere in the matrix.
* = Instrument is also calibrated in the performance of the referenced procedure.
Instrument calibration is not required for those instruments that do not have a *.
+ = This procedure will not be performed in the quarter that the AMSAC Actuation Test is performed.