



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SUPPLEMENTAL SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
ROCHESTER GAS AND ELECTRIC CORPORATION
R. E. GINNA NUCLEAR POWER PLANT
GENERIC LETTER 83-28, ITEM 4.3
REACTOR TRIP BREAKER AUTOMATIC SHUNT TRIP

INTRODUCTION AND SUMMARY

Generic Letter 83-28 was issued by NRC on July 8, 1983, indicating actions to be taken by licensees based on the generic implication of the Salem ATWS events. Item 4.3 of the generic letter requires that modifications be made to improve the reliability of the reactor trip system by implementation of an automatic actuation of the shunt trip attachment on the reactor trip breakers. Subsequent to the review of the licensees' submittals of November 4, 1983, and March 19, 1985, the staff issued a safety evaluation report on May 13, 1985, indicating the acceptable and unacceptable aspects of the design and requested the licensees to submit additional information for staff's approval. By letters dated November 19, 1985, May 15, 1986, and November 20, 1986, the licensees submitted additional information. In addition, the licensees responded to specific staff questions by telecons on May 28, June 19 and June 30, 1986. The staff has reviewed this information, and finds it acceptable. The licensees have not submitted proposed Technical Specification changes in accordance with Generic Letter 85-09 and Item 4.3 T.S. of Generic Letter 83-28; however, these proposed Technical Specifications will be separately evaluated as part of the review for Item 4.3 TS.

EVALUATION

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The licensees have not committed to performing all of the testing requirements which are considered necessary; however, these issues will be considered under Item 4.3 T.S. (Technical Specification changes) and Item 4.5 "RTS Reliability



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(System Functional Testing)." We, therefore, consider this present review as limited to the proposed design modifications.

The licensees submitted revised electrical schematics as requested in the staff's May 13, 1985, SER. Our review of these schematics show that the design:

- (1) permits independent verification of the operability of the shunt and undervoltage trip attachments of the reactor trip breakers during on-line testing;
- (2) provides bypass breaker position status lights on the main control board, including a cell switch interlock to indicate when the bypass breaker is in the operating (racked-in) position; and
- (3) provides interlocks to preclude both bypass breakers (if a second bypass breaker is installed in the future) from being closed at the same time.

The Ginna design for the shunt trip actuation of the reactor trip breakers differs from the generic design provided by the Westinghouse Owners Group in that the Ginna design does not use an auxiliary relay to initiate the shunt trip actuation. Instead, the spare contacts of the existing reactor protection

system logic relays arranged in a matrix are used for automatic actuation of the shunt trip device. Attachment 1 is a simplified schematic diagram to conceptually illustrate the design. The letters in parenthesis used below refer to those on the attachment.

The logic relay contacts (A) and (B) operate simultaneously to trip the RTB. The (A) contacts close to energize the shunt trip attachment TC and the (B) contacts open to deenergize the UV coil. The red light (H) across the UV coil goes off and the green light (G) across the RTB's "a" contact (F) goes on to indicate successful operation of the relay contacts (B) and (A), respectively. This test checks the operation of the relay contacts and does not independently test the UV coil and STA of the RTB. The test can be made with the RTB in the test or racked-in position and in the tripped condition.

Independent testing of the UV trip device and STA of the reactor trip breakers is accomplished using manual test pushbuttons or switches. For the shunt trip test, a test pushbutton (C) in parallel with the spare contacts (A) of the automatic trip logic matrix can be used for manual independent on-line testing of the STA. The UV trip circuitry is not actuated by this test. We find this independent on-line testing capability acceptable.

For the UV trip test, operation of the center plunger on a relay in the zirconium guide tube circuitry can be used to interrupt power flow to the UV coil without actuating the STA as follows. A unique feature of the Ginna station is the zirconium guide tube interlock circuitry. This circuitry is not required for the reactor protection but assures that the control rods are not engaged in the grippers during plant cooldown when different materials may experience different thermal contraction rates. The zirconium guide tube circuitry provides additional relay contacts (D) in series with the protection system logic relay matrix for the UV trip. These contacts can be opened by operating the center plunger of the relay. Opening of these relay contacts tests the operability of the UV trip coil by interrupting the power flow to the UV trip coil without affecting the STA circuitry. We find this on-line testing capability acceptable.

The Ginna cell switch interlocking circuitry associated with the bypass breakers also differs from other designs that we have reviewed. The Ginna design prevents a second bypass breaker from being closed if the other bypass breaker is first racked into the operating position. Other designs would permit the second bypass breaker to be closed, but would immediately trip it if the other

bypass breaker were racked in and closed. The Ginna design is somewhat superior in this regard. However, in the Ginna design, the electric circuitry by itself would not prevent an already closed bypass breaker from being racked in while the other bypass breaker was racked in and closed. Upon questions posed by the staff in this regard, the licensees stated that the bypass breaker is prevented from being racked in while it is closed by a hardware device which would mechanically trip the breaker as it was being racked in. The staff, therefore, finds this design acceptable.

Presently, the issue is moot because Ginna uses only one bypass breaker. However, the staff reviewed the design in case a second breaker is utilized in the future.

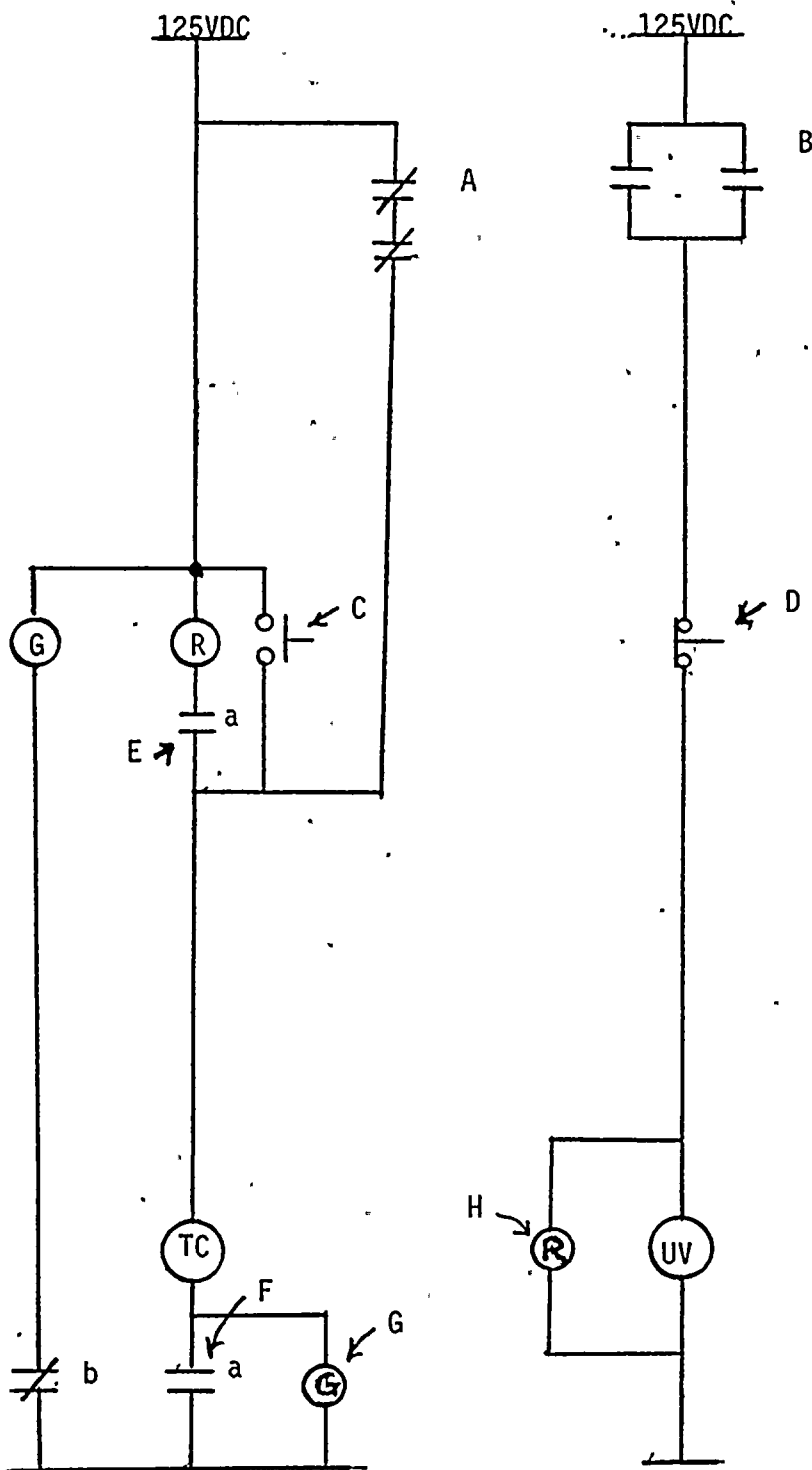
CONCLUSION

All issues under Item 4.3 of Generic Letter 83-28 have now been found acceptable except for submission of proposed Technical Specification changes for staff review. The proposed Technical Specification changes will be considered under a separate safety evaluation.

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Simplified Schematic Diagram
 Illustrating Independent Testing of
 Reactor Trip Breaker UV and STA Devices and
 Logic Relay Contracts



Notes:

A and B are logic relay contacts, C and D are test switches, E and F are "a" contacts on the Reactor Trip Breaker, G and H are test lights.

During normal operation, the Reactor Trip Breaker is closed A and C are open.

For surveillance testing, the Reactor Trip Breaker is bypassed, D is opened to test breaker opening by UV device, C is closed to test breaker opening by STA.

With the Reactor Trip Breaker open and bypassed, contacts C, E and F open and D closed, the logic test opens contacts B and closes contacts A, light H goes out, light G goes on.

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