



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

Enclosure

SAFETY EVALUATION BY  
THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO OPERATION OF  
ZION NUCLEAR POWER STATION UNIT NOS. 1 AND 2  
COMMONWEALTH EDISON CO.  
DOCKET NOS. 50-295 AND 50-304

I. INTRODUCTION

On February 25, 1983, both of the scram circuit breakers at Unit 1 of the Salem Nuclear Power Plant failed to open upon an automatic reactor trip signal from the reactor protection system. This incident occurred during the plant start-up and the reactor was tripped manually by the operator about 30 seconds after the initiation of the automatic trip signal. The failure of the circuit breakers has been determined to be related to the sticking of the under voltage trip attachment. Prior to this incident, on February 22, 1983, at Unit 1 of the Salem Nuclear Power Plant, an automatic trip signal was generated based on steam generator low-low level during plant start-up. In this case, the reactor was tripped manually by the operator almost coincidentally with the automatic trip. Following these incidents, on February 28, 1983, the NRC Executive Director for Operations (EDO), directed the staff to investigate and report on the generic implications of these occurrences at Unit 1 of the Salem Nuclear Power Plant. The results of the staff's inquiry into the generic implications of the Salem unit incidents are reported in NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant." As a result of this investigation, the Commission (NRC) requested (by Generic Letter 83-28 dated July 8, 1983) all licensees of operating reactors, applicants for an operating license, and holders of construction permits to respond to certain generic concerns. These concerns are categorized into four areas: (1) Post-Trip Review, (2) Equipment Classification and Vendor Interface, (3) Post-Maintenance Testing, and (4) Reactor Trip System Reliability Improvements.

The first action item, Post-Trip Review, consists of Action Item 1.1, "Program Description and Procedure" and Action Item 1.2, "Data and Information Capability." This safety evaluation report (SER) addresses Action Item 1.1 only.

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## II. REVIEW GUIDELINES

The following review guidelines were developed after initial evaluation of various utility responses to Item 1.1 of Generic Letter 83-28, and incorporate the best features of these submittals. As such, these review guidelines in effect represent a "good practices" approach to post-trip review. We have reviewed the licensee's response to Item 1.1 against these guidelines:

- A. The licensee or applicant should have systematic safety assessment procedures established that will ensure that the following restart criteria are met before restart is authorized.
  - ° The post-trip review team has determined the root cause and sequence of events resulting in the plant trip.
  - ° Near term corrective actions have been taken to remedy the cause of the trip.
  - ° The post-trip review team has performed an analysis and determined that the major safety systems responded to the event within specified limits of the primary system parameters.
  - ° The post-trip review has not resulted in the discovery of a potential safety concern (e.g., the root cause of the event occurs with a frequency significantly larger than expected).
  - ° If any of the above restart criteria are not met, then an independent assessment of the event is performed by the Plant Operations Review Committee (PORC), or another designated group with similar authority and experience.

- B. The responsibilities and authorities of the personnel who will perform the review and analysis should be well defined.
  - ° The post-trip review team leader should be a member of plant management at the shift supervisor level or above and should hold or should have held an SRO license on the plant. The team leader should be charged with overall responsibility for directing the post-trip review, including data gathering and data assessment and he/she should have the necessary authority to obtain all personnel and data needed for the post-trip review.
  - ° A second person on the review team should be an STA or should hold a relevant engineering degree with special transient analysis training.
  - ° The team leader and the STA (Engineer) should be responsible to concur on a decision/recommendation to restart the plant. A nonconcurrence from either of these persons should be sufficient to prevent restart until the trip has been reviewed by the PORC or equivalent organization.
- C. The licensee or applicant should indicate that the plant response to the trip event will be evaluated and a determination made as to whether the plant response was within acceptable limits. The evaluation should include:
  - ° A verification of the proper operation of plant systems and equipment by comparison of the pertinent data obtained during the post-trip review to the applicable data provided in the FSAR.

- An analysis of the sequence of events to verify the proper functioning of safety related and other important equipment. Where possible, comparisons with previous similar events should be made.
- D. The licensee or applicant should have procedures to ensure that all physical evidence necessary for an independent assessment is preserved.
- E. Each licensee or applicant should provide in its submittal, copies of the plant procedures which contain the information required in Items A through D. As a minimum, these should include the following:
  - The criteria for determining the acceptability of restart
  - The qualifications, responsibilities and authorities of key personnel involved in the post-trip review process
  - The methods and criteria for determining whether the plant variables and system responses were within the limits as described in the FSAR
  - The criteria for determining the need for an independent review.

### III. EVALUATION AND CONCLUSION

By letters dated November 5, 1983 and June 5, 1985, the licensee of Zion Nuclear Power Station, Units 1 and 2, provided information regarding its Post-Trip Review Program and Procedures. We have evaluated the licensee's program and procedures against the review guidelines developed as described in Section II. A brief description of the licensee's response and the staff's evaluation of the response against each of the review guidelines is provided below:

- A. With regard to the criteria for determining the acceptability of restart, the licensee referred to a Corporate Directive, "Plant Start-up After Trip," which provides guidance for post-trip analysis, determination of root cause and approval for startup. The licensee indicated that prior to the authorization of restart, the Corporate Directive requires: a determination of the root cause of the event; a satisfactory evaluation of equipment performance; and an understanding of the cause of any degraded, abnormal, or unexpected performance of safety-related equipment. Based on our review, we find that the licensee's criteria for determining the acceptability of restart are acceptable.
- B. The licensee indicated that a Shift Supervisor has the responsibility and authority to obtain all necessary personnel and any special assistance considered necessary to ensure a thorough post-trip review. The Station Superintendent has the final authority to authorize plant restart. The personnel performing the review and analysis will be shift management personnel (i.e., Shift Engineer, Shift Foreman and Station Control Room Engineer). These are all SRO licensed shift positions. We find that the qualifications, responsibilities and authorities of the personnel who will authorize the restart and/or perform the post-trip review and analysis have been clearly defined and are acceptable.
- C. The licensee has addressed the methods and criteria for comparing the event information with known or expected plant behavior. Based on our review, we find them acceptable.
- D. With regard to the need of independent assessment of an event, the licensee has indicated that station Technical Specifications require all unscheduled reactor trips to be assessed by the Onsite Review and Investigative Function and again by the Offsite Review and Investigative Function. In addition, the licensee has established procedures to

ensure that all physical evidence necessary for an independent assessment is preserved. We find that these actions taken by the licensee conform with the guidelines as described in the above Sections II.A and D.

- E. The licensee has provided for our review a systematic safety assessment program to assess unscheduled reactor trips. Based on our review, we find that this program is acceptable.

Based on our review, we conclude that the licensee's Post-Trip Review Program and Procedures for Zion Nuclear Power Station, Units 1 and 2, are acceptable.

Principal Contributor:

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