



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
GENERIC LETTER 83-28, ITEM 4.4
IMPROVEMENTS IN MAINTENANCE AND TEST PROCEDURES FOR B&W PLANTS
OCONEE UNITS 1, 2, AND 3
DUKE POWER COMPANY
DOCKETS NOS. 50-269, 50-270 AND 50-287

I. INTRODUCTION

On February 25, 1983, at the Salem Nuclear Power Plant (SNPP) Unit 1, both of the scram circuit breakers failed to open on an automatic reactor trip signal from the reactor protection system. This incident occurred during plant startup and the operator tripped the reactor manually about thirty 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 undervoltage trip attachment. On February 22, 1983, during startup of SNPP, Unit 1, an automatic trip signal occurred as a result of steam generator low-low level. 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 staff started to investigate and report on the generic implications of these occurrences. The results of the staff's inquiry into these incidents are reported in NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant." As a result of this investigation, the NRC requested, by Generic Letter (GL) 83-28 dated July 8, 1983 (Reference 1), 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.

Item 4.4 of GL 83-28 required licensees and applicants with Babcock & Wilcox (B&W) reactors to confirm that safety-related maintenance and test procedures are applied to the diverse reactor trip feature provided by interrupting power to the control rods through the silicon controlled rectifiers (SCRs). The test procedure is required to verify that the SCRs have degraded, thereby removing power from the control rods.

Item 4.4 also required that the appropriate surveillance and test sections of the plant Technical Specifications be revised to include testing of the SCRs used to interrupt power to the control rods. Guidance on appropriate Technical Specifications in response to Item 4.4 was provided by GL 85-10, "Technical Specifications For Generic Letter 83-28, Items 4.3 and 4.4," dated May 23, 1985 (Reference 2). The required Technical Specifications were the subject of a previous staff safety evaluation and were issued as Amendments 148, 148 and 145 to Facility Operating Licenses DPR-38, DPR-47, and DPR-55 for Oconee Nuclear Station, Units 1, 2, and 3 respectively, by letter dated August 20, 1986 (Reference 3).

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II. EVALUATION

By letters dated November 4, 1983 (Reference 4), August 9, 1985 (Reference 5), and December 2, 1985 (Reference 6), Duke Power Company, the licensee for Oconee Nuclear Station, Units 1, 2 and 3, responded to Item 4.4 of GL 83-28. The staff and its consultant, EG&G Idaho, Inc. (EG&G), have reviewed the licensee's responses. As a result of its review, EG&G issued the attached Technical Evaluation Report (TER) (EGG-NTA-7910). The staff has reviewed this TER and concurs with its findings. The TER is a part of this Safety Evaluation.

In its submittals, the licensee confirmed that functional surveillance testing and maintenance of the SCRs are performed under the control of procedures that comply with all requirements of safety-related procedures. The licensee also stated that the test procedures verify that the tested SCRs have degated and opened the power supply to the control rods.

III. CONCLUSION

Based on its review, the staff concludes that the SCRs are maintained and tested using safety-related procedures, and that the testing confirms the opening of the power supply to the control rods. Moreover, on the basis of its previous review (Reference 3), the staff concludes that Technical Specifications changes have been made to include the SCRs in the appropriate maintenance and test sections of the plant Technical Specifications. These actions meet the requirements of Item 4.4 of GL 83-28 and are, therefore, acceptable.

IV. IMPLEMENTATION

In its November 4, 1983 letter (Reference 4), the licensee stated that the required procedures would be completed by December 31, 1983. During a November 10, 1986 telephone conversation, the licensee confirmed that these procedures have been implemented. The required Technical Specifications amendment was issued August 20, 1986 (Reference 3).

Dated: November 19, 1986

Principal Contributor: D. Lasher

REFERENCES

1. D. G. Eisenhut, NRC letter to all Licensees of Operating Reactors, Applicants for Operating License, and Holders of Construction Permits, "Required Actions Based on Generic Implications of Salem ATWS Events (Generic Letter 83-28)", July 8, 1983.
2. H. L. Thompson, Jr., NRC Letter to all Babcock & Wilcox Pressurized Water Reactor Licensees and Applicants, "Technical Specifications For Generic Letter 83-28, Items 4.3 and 4.4 (Generic Letter 85-10)," May 23, 1985.
3. H. N. Pastis, NRC Letter to H. B. Tucker, Duke Power Company, August 20, 1986.
4. Duke Power Company letter, H. B. Tucker to H. R. Denton, NRC, "Oconee Nuclear Station," November 4, 1983.
5. Duke Power Company letter, H. B. Tucker to H. R. Denton, NRC, "Oconee Nuclear Station," August 9, 1985.
6. Duke Power Company letter, H. B. Tucker to H. R. Denton, NRC, "Oconee Nuclear Station," December 2, 1985.

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TECHNICAL EVALUATION REPORT
CONFORMANCE TO GENERIC LETTER 83-28
ITEM 4.4
ARKANSAS NUCLEAR ONE, UNIT 1
CRYSTAL RIVER UNIT 3
DAVIS-BESSE UNIT 1
OCONEE UNITS 1, 2 AND 3
RANCHO SECO
THREE MILE ISLAND UNIT 1
WNP 1

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ABSTRACT

This EG&G Idaho, Inc. report provides a review of the submittals for Babcock & Wilcox (B&W) nuclear plants for conformance to Generic Letter 83-28, Item 4.4. The group includes the following plants:

<u>Plant</u>	<u>Docket Number</u>	<u>TAC Number</u>
Arkansas Nuclear One, Unit 1	50-313	53952
Crystal River Unit 3	50-302	53953
Davis-Besse Unit 1	50-346	53954
Oconee Unit 1	50-269	53955
Oconee Unit 2	50-270	53956
Oconee Unit 3	50-287	53957
Rancho Seco	50-312	53958
Three Mile Island Unit 1	50-289	53959
WNP 1	50-460	N/A

FOREWORD

This report is provided as part of the program for evaluating licensee/applicant conformance to Generic Letter 83-28, "Required Actions based on Generic Implications of Salem ATWS Events." This work is conducted for the U. S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of PWR Licensing-A, by EG&G Idaho, Inc.

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CONFORMANCE TO GENERIC LETTER 83-28

ITEM 4.4

ARKANSAS NUCLEAR ONE, UNIT 1

CRYSTAL RIVER UNIT 3

DAVIS-BESSE UNIT 1

OCONEE UNITS 1, 2 AND 3

RANCHO SECO

THREE MILE ISLAND UNIT 1

WNP 1

1. INTRODUCTION

On July 8, 1983, Generic Letter 83-28¹ was issued by D. G. Eisenhut, Director of the Division of Licensing, Nuclear Reactor Regulation, to all licensees of operating reactors, applicants for operating licenses, and holders of construction permits. This letter included required actions based on generic implications of the Salem ATWS events. These requirements have been published in Volume 2 of NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant."²

This report documents the EG&G Idaho, Inc. review of the submittals from Arkansas Nuclear One, Unit 1, Crystal River Unit 3, Davis-Besse Unit 1, Oconee Units 1, 2 and 3, Rancho Seco, Three Mile Island Unit 1 and WNP 1 for conformance to Item 4.4 of Generic Letter 83-28. The submittals from the licensees utilized in these evaluations are referenced in Section 12 of this report.

2. REVIEW REQUIREMENTS

Item 4.4 (Reactor Trip System Reliability - Improvements in Maintenance and Test Procedures for B&W Plants) requires licensees and applicants with B&W reactors to apply safety-related maintenance and test procedures to the diverse reactor trip feature provided by interrupting power to control rods through the silicon controlled rectifiers (SCRs). The Item does not require any hardware changes nor additional environmental or seismic qualification of these components, but it does require inclusion of safety related maintenance and test procedures for the SCRs in the appropriate surveillance and test sections of the Technical Specifications.

Responses from the included B&W plants were evaluated against a minimum description of how safety related maintenance and test procedures can be applied to the SCRs in the Control Rod Drive Control System. Each response should:

1. Confirm that the required action has been implemented.
2. Include a brief description of the safety related procedures used to conduct periodic surveillance, testing and maintenance of the SCR diverse reactor trip feature, that includes degating the SCRs and verifies that they have opened the power supply circuit to the control rod drive holding coils.
3. Confirm that Technical Specification changes which include requirements for safety related surveillance and tests of the SCRs to be performed at intervals commensurate with existing test intervals for other safety related portions of the reactor trip system are submitted to the NRC, or verify that these requirements are included in the existing plant Technical Specifications.

3. GROUP REVIEW RESULTS

The relevant submittals from each of the B&W reactor plants were reviewed to determine compliance with Item 4.4. First, the submittals from each plant were reviewed to establish that Item 4.4 was specifically addressed. Second, the submittals were evaluated to determine the extent to which each of the B&W plants complies with the staff guidelines for Item 4.4.

4. REVIEW RESULTS FOR ARKANSAS NUCLEAR ONE, UNIT 1

4.1 Evaluation

Arkansas Power and Light Company (AP&L), the licensee for Arkansas Nuclear One, provided their response to Item 4.4 of the Generic Letter in submittals dated November 5, 1983, and April 24, 1985. In the first response, the licensee states that AP&L supports the B&W Owners Group generic guidelines for SCRs, is evaluating those guidelines and will incorporate those guidelines into procedures "as applicable." That response also states that the safety related Reactor Protection System channel functional test provides for monthly testing of the SCRs with the exception of verification of actual degating. Their response of April 24, 1985, states that testing of the SCRs is conducted using safety related test procedures; verification of degating of the SCRs was added to the procedures and the test procedures now meet the B&W guidelines.

4.2 Conclusion

The licensee's submittals confirm implementation of Item 4.4 of the Generic Letter: testing of the SCRs is conducted using safety related procedures, verification of degating of the SCRs is included in those procedures, and the procedures comply with the B&WOG guidelines for this testing. The staff finds this acceptable.

5. REVIEW RESULTS FOR CRYSTAL RIVER UNIT 3

5.1 Evaluation

Florida Power Corporation (FPC), the licensee for Crystal River Unit 3, provided responses to Item 4.4 of the Generic Letter on November 4, 1983, January 16, 1984, and July 31, 1984. In those responses FPC confirmed implementation of Item 4.4, identified the Crystal River Surveillance and Maintenance procedures and requested an amendment to the Crystal River Technical Specifications to explicitly include SCR operability and SCR degating.

5.2 Conclusion

The licensee submittal confirms implementation of Item 4.4 of the Generic Letter, complete with verification of SCR degating. The staff finds that this is acceptable.

6. REVIEW RESULTS FOR DAVIS-BESSE UNIT 1

6.1 Evaluation

Toledo Edison, the licensee for Davis-Besse Unit 1, responded to Item 4.4 of the Generic Letter on December 9, 1983, and on July 9, 1985. The latter response states that Davis-Besse 1 has installed the capability to test the ability of the SCRs to trip the reactor, and that he does intend to apply safety related maintenance and test procedures to the SCRs.

6.2 Conclusion

The licensee submittal confirms implementation of Item 4.4 of the Generic Letter. We have reviewed information describing the testing of the SCR trip feature that is classified as safety related and that includes verification that the SCRs degate and interrupt power to their holding coils. The staff finds this acceptable.

7. REVIEW RESULTS FOR OCONEE UNITS 1, 2 AND 3

7.1 Evaluation

Duke Power Company, the licensee for Oconee units 1, 2 and 3, responded to Item 4.4 of the Generic Letter on November 4, 1983, and August 9, 1985. In those responses, the licensee concurs with the contents of the B&W Owners Group position. The responses also confirm that surveillance and maintenance of the SCRs will be performed under procedures which comply with all requirements of safety related procedures, and state that the surveillance test will be revised to include adequate documentation of verification that the SCRs have appropriately responded to a RPS signal.

7.2 Conclusion

The licensee's response does confirm that the procedures used for maintenance and testing of the SCR trip feature comply with all the requirements of safety related procedures, that the testing of the SCRs is included in Technical Specifications, and that the testing will verify that the SCRs respond to a trip signal. The staff finds that this is acceptable.

8. REVIEW RESULTS FOR RANCHO SECO

8.1 Evaluation

Sacramento Municipal Utility District (SMUD), the licensee for Rancho Seco, provided a response to Item 4.4 of the Generic Letter on November 4, 1983. That response states that SMUD has satisfactorily tested the SCRs using the test procedure prepared by B&W for the B&W Owners Group, and that the SCR test procedure will be incorporated into the monthly Reactor Protection System instrument test procedure. The response did not include the test procedure prepared by B&W, nor did it include a description of the procedure. We have reviewed the BWOOG proposed test procedure which provides for the verification of degating of the SCRs by noting a decrease in output current of the affected power supply.

8.2 Conclusion

The licensee response does confirm that the B&W Owners Group recommended test procedures will be used for testing the SCRs and will be incorporated in the RPS monthly test procedure. The staff finds that this is acceptable.

9. REVIEW RESULTS FOR THREE MILE ISLAND UNIT 1

9.1 Evaluation

GPU Nuclear Corporation, the licensee for Three Mile Island Unit 1 (TMI-1), responded to Item 4.4 of the Generic Letter on November 8, 1983. That response states that the SCRs are classified as Nuclear Safety Related at TMI-1, and that, while the trip function of the SCRs was not previously verified, the Reactor Protection System test procedure has been revised to include confirmation of the trip function by verifying a reduction in current from the affected power supply. Administrative Technical Specification changes were submitted to provide explicit inclusion of the SCRs on September 30 and October 9, 1985.

9.2 Conclusion

The licensee's response does confirm that the SCR trip feature is safety related and that procedures would be revised to confirm that the SCRs will open the holding coil circuit when degated. Review of the licensee's safety related procedure confirms that his test procedure includes verification of degating of the SCRs. The staff finds this acceptable.

10. REVIEW RESULTS FOR WNP 1

10.1 Evaluation

Washington Public Power Supply System, the applicant for WNP 1, responded to Item 4.4 of the Generic Letter on March 30, 1984. The response states that the applicant intends to apply safety related maintenance and test procedures to the SCRs.

10.2 Conclusion

The applicant submittal confirms implementation of Item 4.4 of the Generic Letter. However, the licensee's submittal does not include a description of the procedures used. It is evident that the concern of Item 4.4 of Generic Letter 83-28 will be resolved on an industry-wide basis prior to completion of the technical specifications for WNP-1 and will be resolved for this plant during the review and approval process of its technical specifications. Therefore, the staff considers this Item to be closed for this evaluation.

11. GROUP CONCLUSION

The staff concludes that the licensee responses for Item 4.4 of Generic Letter 83-28 are acceptable.

12. REFERENCES

1. NRC Letter, D. G. Eisenhut to all licensees of Operating Reactors, Applicants for Operating License, and Holders of Construction Permits, "Required Actions Based on Generic Implications of Salem ATWS Events (Generic Letter 83-28)," July 8, 1983.
2. Generic Implications of ATWS Events at the Salem Nuclear Power Plant NUREG-1000, Volume 1, April 1983; Volume 2, July 1983.
3. Arkansas Power and Light Company letter to NRC, J. Ted Enos to D. G. Eisenhut, Director, Division of Licensing, NRC, "B&W Owners Group Response to Generic Letter 83-28," November 4, 1983.
4. Arkansas Power and Light Company letter to NRC, J. R. Marshall to D. G. Eisenhut, Director, Division of Licensing, NRC, "Arkansas Nuclear One Response to Generic Letter 83-28," November 5, 1983.
5. Arkansas Power and Light Company letter to NRC, J. Ted Enos to Director of Nuclear Reactor Regulation, NRC, "Response to RFI - Items 4.4 and 4.5.3," April 24, 1985.
6. Florida Power Corporation letter to NRC, G. R. Westafer to D. G. Eisenhut, Director, Division of Licensing, NRC, "Crystal River Unit 3 Response to Generic Letter 83-28," November 4, 1983.
7. Florida Power Corporation letter to NRC, G. R. Westafer to D. G. Eisenhut, Director, Division of Licensing, NRC, "Crystal River Unit 3 Technical Specification Change Request No. 111," January 16, 1984.
8. Florida Power Corporation letter to NRC, G. R. Westafer to D. G. Eisenhut, Director, Division of Licensing, NRC, "Crystal River Unit 3 Updated Response to Generic Letter 83-28," July 31, 1984.
9. Toledo Edison letter to NRC, R. P. Crouse to Director of Nuclear Reactor Regulation, NRC, December 9, 1983.
10. Toledo Edison letter to NRC, Joe Williams to Director of Nuclear Reactor Regulation, NRC, July 9, 1985.
11. Duke Power Company letter to NRC, H. B. Tucker to H. R. Denton, Director, Office of Nuclear Reactor Regulation, November 4, 1983.
12. Duke Power Company letter to NRC, H. B. Tucker to H. R. Denton, Director, Office of Nuclear Reactor Regulation, August 9, 1985.
13. Sacramento Municipal Utility District letter to NRC, R. J. Rodriguez to D. G. Eisenhut, Director, Division of Licensing, NRC, "Required Actions Based on Generic Implications of Salem ATWS Events (Generic Letter 83-28)," November 4, 1983.

14. GPU Nuclear Corporation letter to NRC, H. D. Hukill to D. G. Eisenhut, Director, Division of Licensing, NRC, "Required Actions Based on Generic Implications of Salem/ATWS Events," November 8, 1983.
15. Washington Public Power Supply System letter to NRC, G. C. Sorenson to Director of Nuclear Reactor Regulation, "Nuclear Project No. 1, Response to Generic Letter 83-28, Salem ATWS Event," March 30, 1984.