

TECHNICAL EVALUATION REPORT  
CONFORMANCE TO  
ITEM 4.5. OF GENERIC LETTER 83-28  
DUANE ARNOLD  
ENRICO FERMI-2  
HOPE CREEK  
LASALLE COUNTY-1/-2  
LIMERICK-1/-2  
MILLSTONE-1  
MONTICELLO  
NINE MILE POINT-1/-2  
OYSTER CREEK

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B&R 20-19-19-11-3

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## SUMMARY

This EG&G Idaho, Inc. report provides a review of the submittals for some of the General Electric (GE)-supplied nuclear plants for conformance to Generic Letter 83-28, Item 4.5.2. This item deals with the on-line functional testing of Reactor Trip System components. Where special circumstances and proper justification exist, alternatives to on-line testing can be permitted. The report includes the following plants, all GE, and is in partial fulfillment of the following TAC Nos.:

<u>Plant</u>	<u>Docket Number</u>	<u>TAC Number</u>
Duane Arnold	50-331	53979
Enrico Fermi-2 (OL)	50-341	N/A
Hope Creek	50-354	61478
LaSalle County-1	50-373	53994
LaSalle County-2	50-374	53995
Limerick-1	50-352	56263
Limerick-2 (OL)	50-353	N/A
Millstone-1	50-245	53999
Monticello	50-263	54001
Nine Mile Point-1	50-220	54002
Nine Mile Point-2 (OL)	50-410	N/A
Oyster Creek	50-219	54008

B&R 20-19-19-11-3  
FIN Nos. D6001 and D6002

## PREFACE

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 Engineering and System Technology, by EG&G Idaho, Inc., Regulatory and Technical Assistance Unit.

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CONFORMANCE TO  
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HOPE CREEK  
LASALLE COUNTY-1/-2  
LIMERICK-1/-2  
MILLSTONE-1  
MONTICELLO  
NINE MILE POINT-1/-2  
OYSTER CREEK

1. INTRODUCTION

On July 8, 1983, Generic Letter 83-28<sup>1</sup> was issued by D. G. Eisenhut, Director of the Division of Licensing, Office of 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."<sup>2</sup>

This report documents the EG&G Idaho, Inc., review of the submittals of some of the GE plants including Duane Arnold, Enrico Fermi-2, Hope Creek, LaSalle-1/-2, Limerick-1/-2, Millstone-1, Monticello, Nine Mile Point-1/-2, and Oyster Creek for conformance to Item 4.5.2 of Generic Letter 83-28. The submittals from the licensees utilized in these evaluations are referenced in Section 15 of this report.

## 2. REVIEW REQUIREMENTS

Item 4.5.2 (Reactor Trip System Reliability - System Functional Testing - On-Line Testing) requires licensees and applicants with plants not currently designed to permit on-line testing to justify not making modifications to permit such testing. Alternatives to on-line testing will be considered where special circumstances exist and where the objective of high reliability can be met in another way. Item 4.5.2 may be interdependent with Item 4.5.3 when there is a need to justify not performing on-line testing because of the peculiarities of a particular design.

All portions of the Reactor Trip System (RTS) that do not have on-line testing capability will be reviewed under the guidelines for this item. Maintenance and testing of the Reactor Trip Breakers (RTBs) are also excluded from this review, as they are evaluated under Item 4.2. This review of the licensee/applicant submittals will:

1. Confirm that the licensee/applicant has identified those portions of the Reactor Trip System that are not on-line testable. If the entire Reactor Trip System is verified to be on-line testable, no further review is required.
2. Evaluate modifications proposed by licensees/applicants to permit on-line testing against the existing criteria for the design of the protection systems for the plant being modified.
3. Evaluate proposed alternatives to on-line testing of the Reactor Trip System for acceptability based on the following:
  - a. The licensee/applicant submittal substantiates the impracticality of the modifications necessary to permit on-line testing, and

- b. High Reactor Trip System availability (comparable to that which would be possible with on-line testing) is achieved in another way. Any such proposed alternative must be described in detail sufficient to permit an independent evaluation of the basis and analysis provided in lieu of performing on-line testing. Methods that may be used to demonstrate that the objective of high reliability has been met may include the following:
- i. Demonstration by systematic analysis that testing at shutdown intervals provides essentially equivalent reliability to that obtained by on-line testing at shorter intervals.
  - ii. Demonstration that reliability equivalent to that obtained by on-line testing is accomplished by additional redundant and diverse components or by other features.
  - iii. Development of a maintenance program based on early replacement of critical components that compensates for the lack of on-line testing. Such a program would require analytical justification supported by test data.
  - iv. Development of a test program that compensates for the lack of on-line testing, e. g., one which uses trend analysis and identification of safety margins for critical parameters of safety-related components. Such a program would require analytical justification supported by test data.
4. Verify the capability to perform independent on-line testing of the reactor trip system breaker undervoltage and shunt trip attachments on CE plants. Information from licensees and applicants with CE plants will be reviewed to verify that they require independent on-line testing of the reactor trip breaker undervoltage and shunt trip attachments.

### 3. GROUP REVIEW RESULTS

The relevant submittals from each of the GE reactor plants were reviewed to determine compliance with Item 4.5.2. First, the submittals from each plant were reviewed to establish that Item 4.5.2 was specifically addressed. Second, the submittals were evaluated to determine the extent to which each of the GE plants complies with the staff guidelines for Item 4.5.2.

#### 4. REVIEW RESULTS FOR DUANE ARNOLD

##### 4.1 Evaluation

The Iowa Electric Light and Power Company, the licensee for Duane Arnold, provided their responses to Item 4.5.2 of the generic letter on February 29, 1984 and April 30, 1985. In those responses, the licensee states that the Reactor Protection System (RPS) design complies with all applicable regulatory requirements for the reactor trip system, and includes a summary description of the on-line functional testing that is performed on the RPS and the testing intervals used.

The licensee's response states that Arnold does not perform on-line testing of the backup scram valves because testing during operation would cause a plant scram; and the valves will be independently tested during each refueling outage.

##### 4.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the licensee's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

## 5. REVIEW RESULTS FOR ENRICO FERMI-2

### 5.1 Evaluation

Detroit Edison, the applicant for Fermi-2, provided their response to Item 4.5.2 of the generic letter on April 30, 1985. In that response, the applicant affirms that Fermi-2 is designed to permit on-line testing of the Reactor Trip System.

The applicant's response states that Fermi-2 does not perform on-line testing of the backup scram logic and valves because testing during operation would cause a plant scram; and the backup scram logic and valves are independently tested during each refueling outage.

### 5.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the applicant's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram logic and valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

## 6. REVIEW RESULTS FOR HOPE CREEK

### 6.1 Evaluation

The Public Service Electric and Gas Company, the licensee for Hope Creek, responded to Item 4.5.2 of the generic letter on March 30, 1984. In that response, the licensee confirms that Hope Creek will perform periodic on-line testing of the Reactor Trip System.

The licensee's response states that Hope Creek does not perform on-line testing of the backup scram valves because testing during operation would cause a plant scram; and the valves are independently tested during each refueling outage.

### 6.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the licensee's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

## 7. REVIEW RESULTS FOR LASALLE COUNTY-1/-2

### 7.1 Evaluation

Commonwealth Edison, the licensee for LaSalle-1/-2, responded to Item 4.5.2 of the generic letter on November 5, 1983 and June 1, 1984. In those responses, the licensee confirms that on-line functional testing of the Reactor Trip System is allowed during normal plant operation.

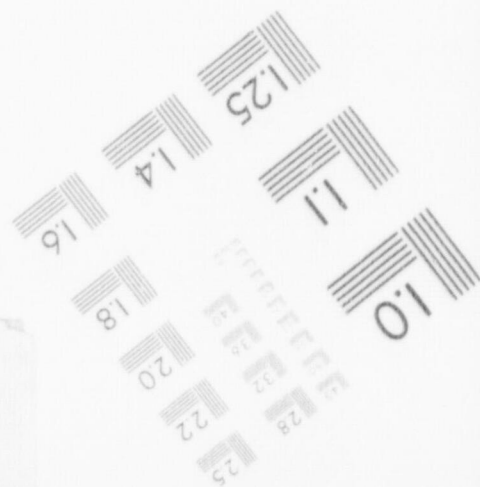
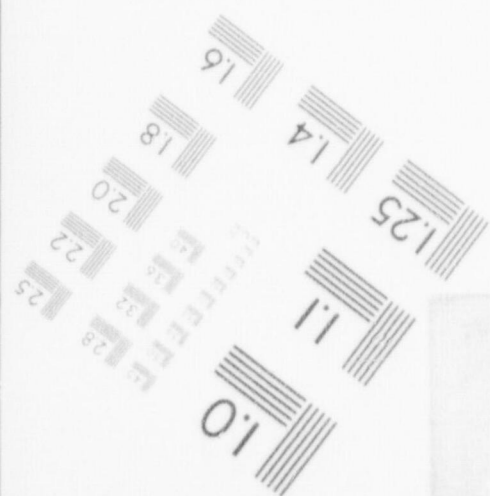
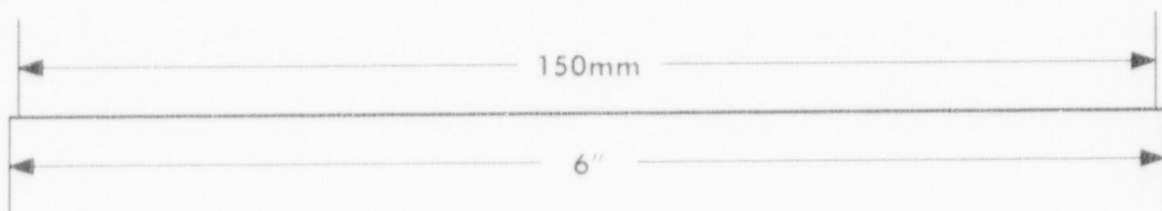
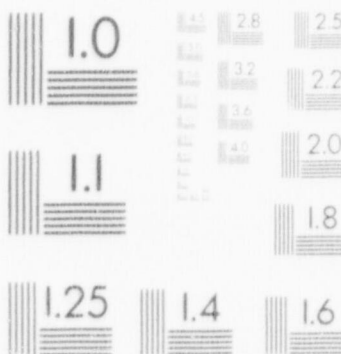
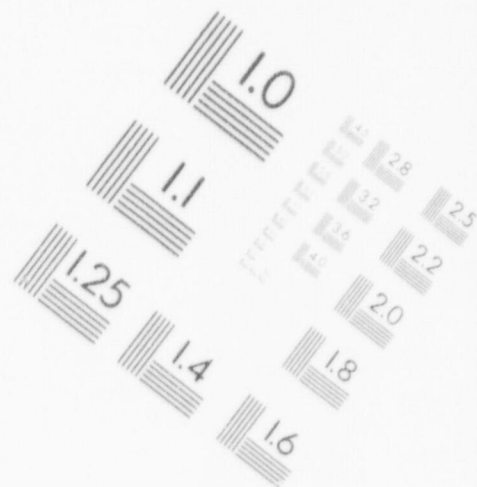
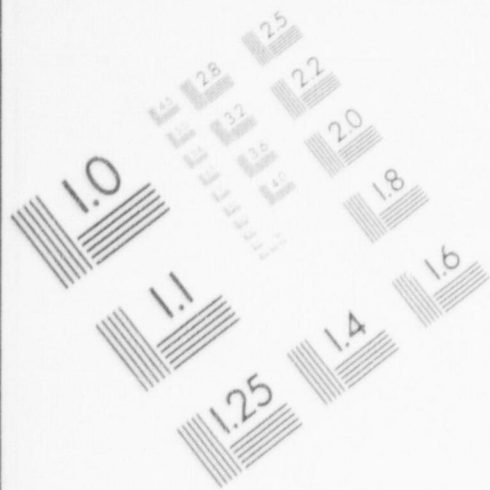
The licensee's response states that LaSalle-1/-2 does not perform on-line testing of the reactor mode switch or the backup scram logic and solenoid valves because testing during operation would cause a plant scram; and the backup scram logic and solenoid valves are independently tested during each refueling outage.

### 7.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the licensee's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram logic and solenoid valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

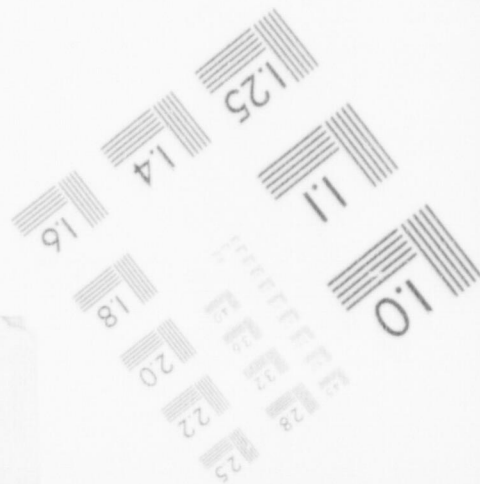
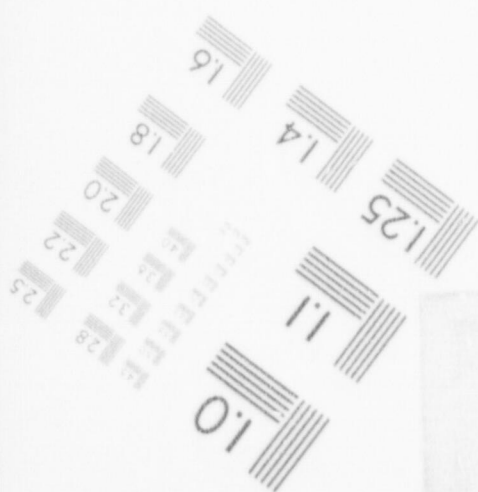
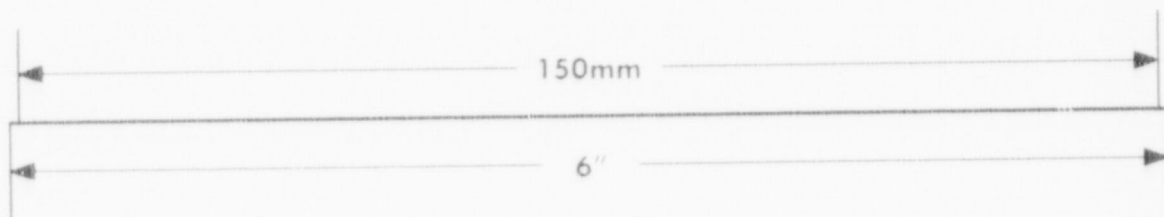
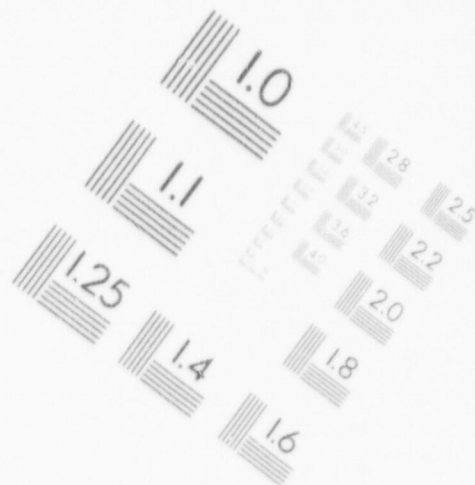
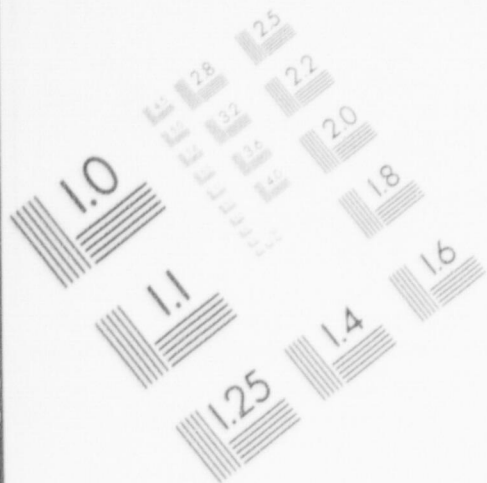
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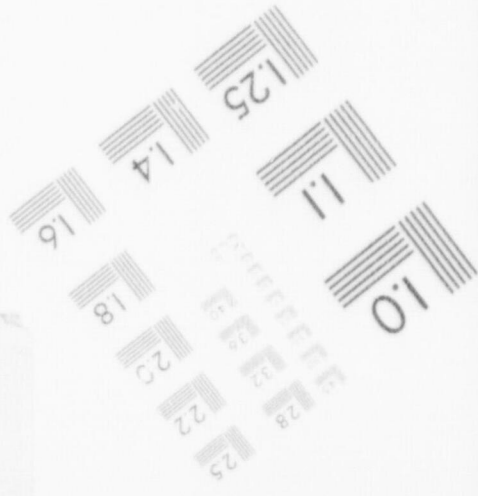
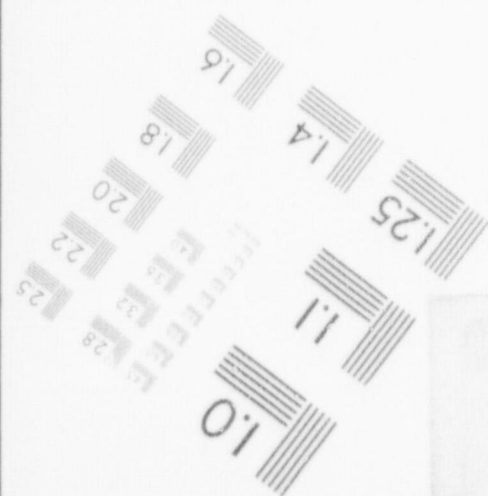
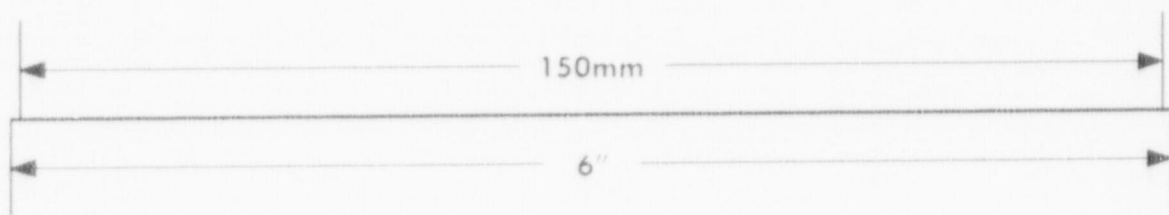
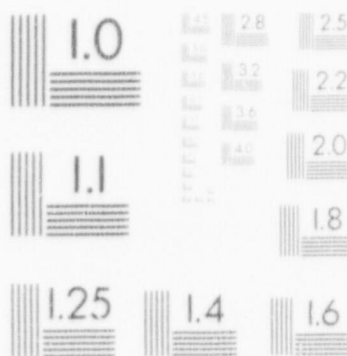
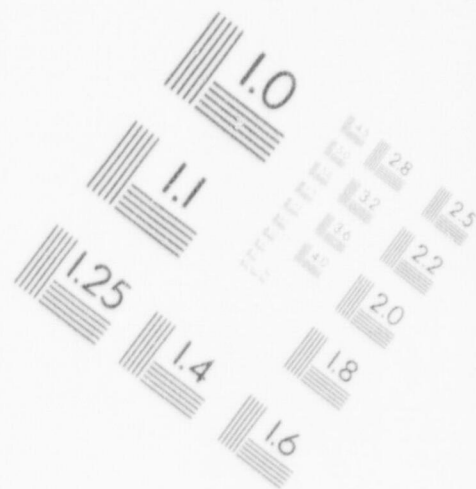
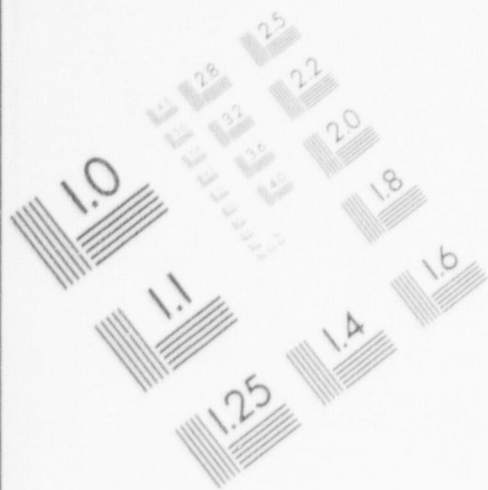
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IMAGE EVALUATION  
TEST TARGET (MT-3)



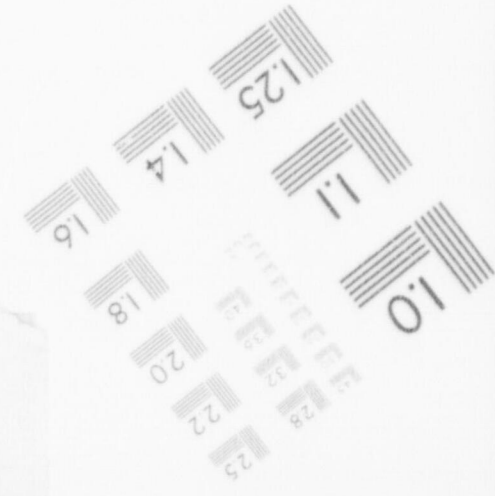
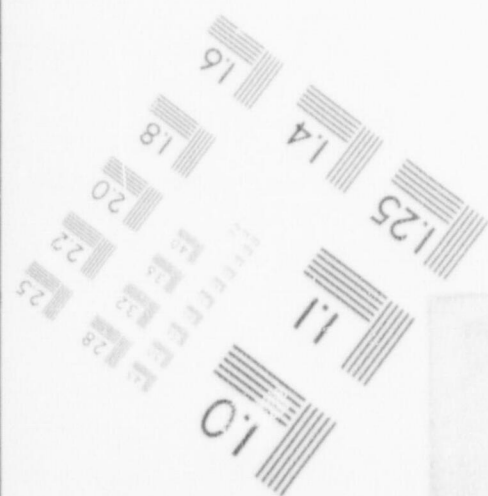
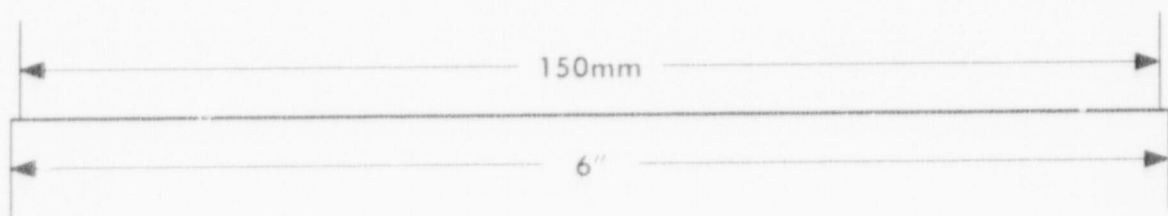
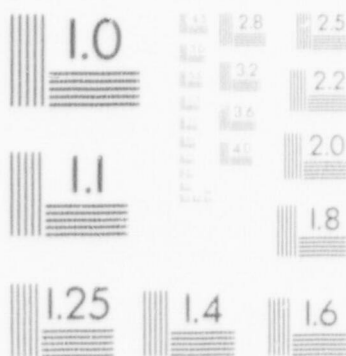
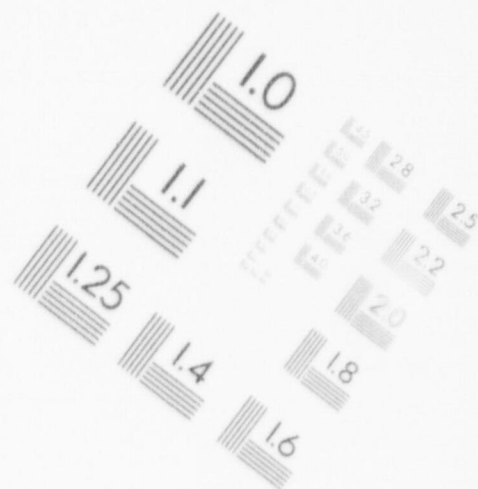
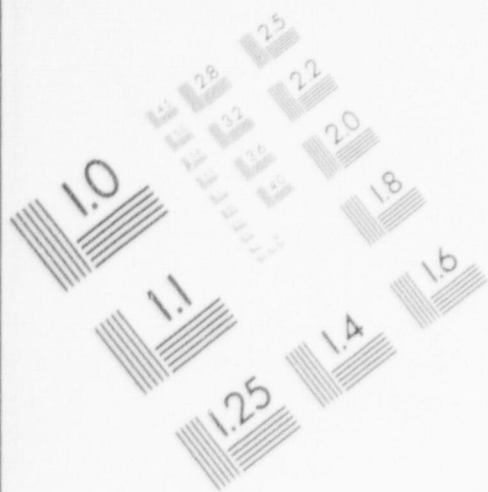
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IMAGE EVALUATION  
TEST TARGET (MT-3)



1

IMAGE EVALUATION  
TEST TARGET (MT-3)



## 8. REVIEW RESULTS FOR LIMERICK-1/-2

### 8.1 Evaluation

Philadelphia Electric Company, the licensee for Limerick-1 and applicant for Limerick-2, responded to Item 4.5.2 of the generic letter on May 8, 1984. In that response, the licensee/applicant confirms that the Limerick Reactor Protection System design permits on-line testing of the RPS.

The licensee's/applicant's response states that Limerick does not perform on-line testing of the backup scram valves because testing during operation would cause a plant scram; and the valves are independently tested during each refueling outage.

### 8.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the licensee's/applicant's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

## 9. REVIEW RESULTS FOR MILLSTONE-1

### 9.1 Evaluation

Northeast Utilities, the licensee for Millstone-1, responded to Item 4.5.2 of the generic letter on November 8, 1983. In that response, the licensee states that the Millstone-1 Reactor Trip System, with the exception of the backup scram valves, is designed to allow on-line testing, and that such tests are performed at the frequencies defined in the Technical Specifications. The normal backup scram valves and the ATWS backup scram valves are tested during refueling outages. These components cannot be tested during operation because they are the final control elements in the RTS and on-line testing of these valves would cause a scram.

### 9.2 Conclusion

The licensee has confirmed that the RTS components are tested on-line with the exception of the backup scram valves and the ATWS scram valves. The licensee is justified in not testing these components on-line and has committed to functionally test these components on a refueling basis. Based on these responses, we find the licensee's submittals regarding Item 4.5.2 of Generic Letter 83-28 acceptable.

## 10. REVIEW RESULTS FOR MONTICELLO

### 10.1 Evaluation

Northern States Power Company, the licensee for Monticello, responded to Item 4.5.2 of the generic letter on November 14, 1983. In that response, the licensee affirms that on-line functional testing of the reactor trip system is being performed at Monticello, with the exception of the backup scram valves.

The licensee states that functional testing of the backup scram valves is performed as part of the plant prestart testing, which is performed prior to restart from each refueling outage.

### 10.2 Conclusions

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the licensee's/applicant's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram valves, meets the requirements of Item 4.5.2 of Generic Letter 33-28 and is, we believe, acceptable.

## 11. REVIEW RESULTS FOR NINE MILE POINT-1

### 11.1 Evaluation

The Niagara Mohawk Power Corporation, the licensee for Nine Mile Point-1, responded to the generic letter on November 8, 1983, July 31, 1984, and December 31, 1984. The licensee's responses confirm that on-line functional testing of the Nine Mile Point 1 reactor trip system is performed on a regular basis.

The licensee's response states that Nine Mile Point-1 does not perform on-line testing of the backup scram valves because testing during operation would cause a plant scram. In Reference 16, the licensee commits to testing those valves on a refueling basis.

### 11.2 Conclusion

The licensee has confirmed that the RTS components are tested on-line with the exception of the backup scram valves. The licensee is justified in not testing these components on-line and has committed to functionally test these components on a refueling basis. Based on these responses, we found the licensee's submittals regarding Item 4.5.2 of Generic Letter 83-28 acceptable.

## 12. REVIEW RESULTS FOR NINE MILE POINT-2

### 12.1 Evaluation

The Niagara Mohawk Power Corporation, the applicant for Nine Mile Point-2, responded to the generic letter on April 10, 1984, December 20, 1985, and April 15, 1986. The applicant's responses affirms that Nine Mile Point-2 is designed to permit on-line functional testing of the Reactor Protection System, with the exception of the backup scram valves.

The applicant's response states that Nine Mile Point-2 will perform functional testing of the backup scram valves during refueling outages.

### 12.2 Conclusion

In as much as the Reactor Protection System includes those components necessary to trip the reactor, we find that the applicant's stated position on Item 4.5.2 of the generic letter, including their justification for not performing periodic on-line testing of the backup scram valves, meets the requirements of Item 4.5.2 of Generic Letter 83-28 and is, we believe, acceptable.

### 13. REVIEW RESULTS FOR OYSTER CREEK

#### 13.1 Evaluation

GPU Nuclear Corporation, the licensee for Oyster Creek, responded to the generic letter on November 14, 1983. The licensee's response confirms that, with the exception of the scram pilot valves and backup scram valves, on-line functional testing is currently being performed on the Oyster Creek Reactor Trip System.

The licensee's response states that Oyster Creek will provide justification for the adequacy of current functional tests of the scram pilot valves and backup scram valves.

#### 13.2 Conclusion

We find that the licensee's stated position on Item 4.5.2 of the generic letter is unacceptable, as the licensee has not provided justification for not performing periodic on-line testing of the scram pilot valves or the backup scram valves, and has not confirmed that the backup scram valves are tested on at least a refueling outage basis.

#### 14. GROUP CONCLUSION

We conclude that the licensee/applicant responses for the listed GE plants for Item 4.5.2 of Generic Letter 83-28 are acceptable, with the exceptions of the justification and confirmation needed from Oyster Creek.

## 15. REFERENCES

1. Letter, NRC (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-1009, Volume 1, April 1983; Volume 2, July 1983.
3. Letter, Iowa Electric Light and Power Company (R. W. McGaughy) to NRC (Harold R. Denton), February 29, 1984.
4. Letter, Iowa Electric Light and Power Company (R. W. McGaughy) to NRC (Harold R. Denton), April 30, 1985.
5. Letter, Detroit Edison (W. H. Jens) to NRC, "Detroit Edison Response to Generic Letter 83-28," November 3, 1983.
6. Letter, Public Service Electric and Gas Company (R. L. Mittl) to NRC, "Response to Generic Letter 83-28," March 30, 1984.
7. Letter, Commonwealth Edison Company (P. L. Barnes) to NRC (Harold R. Denton), November 5, 1983.
8. Letter, Commonwealth Edison Company (P. L. Barnes) to NRC (Harold R. Denton), June 1, 1984.
9. Letter, Philadelphia Electric Company (V. S. Boyer) to NRC (D. G. Eisenhut), "Additional Response to Generic Letter 83-28," May 8, 1984.
10. Letter, Northeast Utilities (W. G. Council) to NRC (D. G. Eisenhut), "Response to Generic Letter 83-28, Generic Implications of Salem ATWS Events," November 8, 1983.
11. Letter, Northeast Utilities (W.G. Council) to NRC (D.G. Eisenhut), "Response to Generic Letter 83-28, Generic Implications of Salem ATWS Events," March 16, 1984, B11053.
12. Letter, Northern States Power Company (D. Musolf) to NRC, "Generic Implications of Salem ATWS Events (Generic Letter 83-28)," November 14, 1983.
13. Letter, Niagara Mohawk Power Corporation (T. E. Lempges) to NRC, November 8, 1983.
14. Letter, Niagara Mohawk Power Corporation (G. K. Rhode) to NRC, April 10, 1984.

15. Letter, Niagara Mohawk Power Corporation (T. E. Lempges) to NRC, July 31, 1984.
16. Letter, Niagara Mohawk Power Corporation (C.V. Mangan) to NRC (D. B. Vassallo), December 31, 1984.
17. Letter, Niagara Mohawk Power Corporation (T. E. Lempges) to NRC (E. G. Adensam), December 20, 1985.
18. Letter, Niagara Mohawk Power Corporation (T. E. Lempges) to NRC, July 31, 1984.
19. Letter, GPU Nuclear Corporation (P. B. Fiedler) to NRC, "Oyster Creek Generating Station," November 14, 1983.