UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 10, 1993

MEMORANDUM FOR: Ashok C. Thadani, Associate Director
for Inspection and Technical Assessment

FROM: Martin J. Virgilio, Acting Director
Division of Systems Safety and Analysis

SUBJECT: REVIEW OF THE FIRE PROTECTION REASSESSMENT REPORT (EQ-TAP ACTION ITEM 3.b) (TAC M85643)

As discussed in the staff's Environmental Qualification Task Action Plan (EQ-TAP) of June 16, 1993, we are performing a programmatic review of EQ for electrical equipment. Our efforts in this regard are specifically defined under Action Item 3 of the EQ-TAP, which includes the following elements:

3.a Review License Renewal Background Information

3.b Review Fire Protection Reassessment Report

3.c Elicit Opinions from Others (Regions, EQ Experts)

3.d Review Existing EQ Program Requirements

3.e Review NRC Audit/Inspection Practices

3.f Review Licensee Implementation Practices

3.g Finalize Review Results

Our objective in completing items 3.a through 3.f (above) is to identify potential EQ issues and concerns that may deserve further staff consideration. It is important to recognize that this part of our programmatic review is not intended to resolve or to otherwise address any of the EQ issues that are identified. After items 3.a through 3.f of the EQ-TAP have been completed, all of the EQ issues will be consolidated and specifically addressed in the staff's final report under item 3.g, "Finalize Review Results," which will include recommendations as appropriate. Our final report is scheduled to be completed by August 30, 1994.

We have now completed the review associated with item 3.b of the EQ-TAP, "Review Fire Protection Reassessment Report," and our evaluation is enclosed for your information. The potential issues that were identified during our review will be assembled and addressed in our final report along with any

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other potential issues that are identified as we complete the remaining items of the IO-TAP programmatic review (i.e., items 3.c through 3.f). Please contact me if you should have any questions regarding the enclosed evaluation.

Original Signed By

Martin J. Virgilio, Acting Director
Division of Systems Safety and Analysis

Enclosure:
Review of the Fire
Protection Reassessment
Report (IO-TAP Action Item 3.b)

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other potential issues that are identified as we complete the remaining items of the EQ-TAP programmatic review (i.e., items 3.c through 3.f). Please contact me if you should have any questions regarding the enclosed evaluation.

Martin J. Virgilio, Acting Director
Division of Systems Safety and Analysis

Enclosure:
Review of the Fire
Protection Reassessment
Report (EQ TAP Action Item 3.b)

Enclosure

REVIEW OF THE FIRE PROTECTION REASSESSMENT REPORT (TAC NO. M85648)

1.0 INTRODUCTION

As discussed in the Environmental Qualification Task Action Plan (EQ-TAP) of June 16, 1993, the staff is performing a reassessment of the NRC environmental qualification (EQ) requirements for electrical equipment. Action Item 3 of the EQ-TAP lists those actions that pertain to the programmatic review of EQ, which include:

3.a Review License Renewal Background Information

3.b Review Fire Protection Reassessment Report

3.c Elicit Opinions from Others (Regions, EQ Experts)

3.d Review Existing EQ Program Requirements

3.e Review NRC Audit/Inspection Practices

3.f Review Licensee Implementation Practices

3.g Finalize Review Results

This particular evaluation is intended to address EQ-TAP Action Item 3.b, "Review Fire Protection Reassessment Report." Since the EQ Rule and the Fire Protection Rule share striking similarities in the way they were developed and implemented, it is likely that many of the potential issues and concerns that were identified during the staff's reassessment of fire protection are also applicable to EQ. Therefore, the specific objective of this review is to identify potential EQ issues and concerns by reviewing the findings of the Fire Protection Reassessment Report. Ultimately, all of the issues and concerns that are identified during the EQ programmatic review will be consolidated and discussed in the final report (EQ-TAP Action Item 3.g). Therefore, this evaluation does not include specific recommendations for further staff actions.

2.0 BACKGROUND INFORMATION

In response to issues that were raised in a report by the Office of the Inspector General dated August 12, 1992, the staff completed a programmatic review of NRC requirements in the area of fire protection. The staff's assessment dated February 27, 1993, identified a number of weaknesses and made specific recommendations for programmatic improvements. In view of the weaknesses that were identified relative to the NRC fire protection program, the staff concluded that other programs such as EQ should also be reviewed. EQ was specifically targeted because the development of EQ requirements was very similar to the development of fire protection requirements, and both of these areas were very subjective and controversial in nature.

3.0 REVIEW OF THE FIRE PROTECTION REASSESSMENT REPORT

The staff reviewed the Fire Protection Reassessment Report (FPRR) to identify issues that may be applicable to EQ. In general, since the two issues are so similar, each issue that was identified during the the fire protection reassessment study was also assumed to be applicable to EQ. Only those issues that were specifically oriented to fire and could not be applied to EQ (such as adequacy of manual fire fighting effectiveness) were eliminated. Table 3.1 is a complete listing of the issues that were identified during the fire protection reassessment study, and Table 3.2 indicates how these issues were viewed in terms of EQ. In particular, those issues that are "lined out" in Table 3.2 are specific to fire protection only and could not be restated in terms of EQ.

Table 3.1

POTENTIAL ISSUES

1. Identification and resolution of "risk-significant" fire scenarios
2. Adequacy of the FIVE methodology
3. Acceptability of a single exposure fire causing damage to both trains of safety-related equipment
4. Adequacy of manual fire fighting effectiveness
5. Capability of fire brigade to extinguish a "worst-case" fire
6. Capability to man the fire brigade and shutdown the plant from outside the control room simultaneously
7. Acceptability of the fire brigade responding to a fire outside the plant or protected area
8. Adequacy of local control capability for ventilation systems/dampers
9. Adequacy of fire brigade notification and response procedures
10. Reliability of fire barrier elements
11. Adequacy of fire barrier/fire seal negative pressure qualification methodology
12. Acceptability of fire seal systems containing air passages
13. Acceptability of penetration seal fire tests that were not conducted by a nationally recognized testing laboratory
14. Adequacy of the security determination for GI-149 re: fire barriers
15. Adequacy of protection from control systems interactions
16. Acceptability of the thermal damage threshold currently assigned to electrical cables in light of the Sandia test results

Table 3.1

POTENTIAL ISSUES
(cont.)

17. Effect of fire barriers and cable coatings on ampacity
18. Adequacy of equipment protection from fire suppression system actuations
19. Vulnerabilities due to broken or leaking flammable gas lines
20. Vulnerabilities due to seismic/fire interactions
21. Effects of fire and smoke on plant equipment
22. Adequacy of sprinkler installations
23. Acceptability of using foam and deluge nozzles in high fire hazard areas
24. Acceptability of not requiring shutdown systems to satisfy seismic, single failure, or other criteria
25. Acceptability of not postulating plant accidents, natural phenomena, and non-fire related failures concurrent with fire events
26. Adequacy of fire safe shutdown capability and procedures
27. Acceptability of AOTs for safe shutdown/Appendix R equipment
28. Acceptability of surveillance test requirements for alternate shutdown panels
29. Adequacy of pre-1979 Technical Specifications for active fire barriers
30. Adequacy of Technical Specifications in addressing upgraded fire barriers
31. Acceptability of operability requirements for safe shutdown/Appendix R equipment during shutdown and outage conditions
32. Acceptability of safe shutdown equipment on the shutdown unit not being available to support the operating unit at multi-unit sites
33. Adequacy of in-place detector testing
34. Adequacy of fire damper testing
35. Adequacy of licensee QA programs for fire protection
36. Adequacy of NRC fire protection review and inspection programs
37. Adequacy of training/qualification of NRC inspectors and reviewers
38. Adequacy and consistency of previously issued exemptions

Table 3.1

POTENTIAL ISSUES
(cont.)

39. Adequacy of the exemption process
40. Differentiate safety-significance between issues
41. Adequacy of Fire Hazards Analyses and fire analyses (i.e., 50.59 reviews) performed by licensees
42. Adequacy of NRC reporting requirements for fire events
43. Acceptability of using fire watches in lieu of other features
44. Acceptability of using engineering evaluations and techniques as an alternative to deterministic requirements
45. Define "margin of safety" requirements for fire protection
46. Adequacy of GL 89-13 in addressing fire pump operability concerns
47. Acceptability of fire risk assessment uncertainty
48. Acceptability of cabinet fire spread mechanisms
49. Reconsider the need for further research

Table 3.2

ISSUE DISPOSITION

1. Identification and resolution of "risk-significant" ~~fire~~ EQ scenarios
2. ~~Adequacy of the FIVE methodology~~
3. ~~Acceptability of a single exposure fire causing damage to both trains of safety related equipment~~
4. ~~Adequacy of manual fire fighting effectiveness~~
5. ~~Capability of fire brigade to extinguish a "worst case" fire~~
6. ~~Capability to man the fire brigade and shutdown the plant from outside the control room simultaneously~~
7. ~~Acceptability of the fire brigade responding to a fire outside the plant or protected area~~
8. ~~Adequacy of local control capability for ventilation systems/dampers~~
9. ~~Adequacy of fire brigade notification and response procedures~~
10. Reliability of ~~fire~~ EQ barrier elements
11. ~~Adequacy of fire barrier/fire seal negative pressure qualification methodology~~
12. ~~Acceptability of fire seal systems containing air passages~~
13. Acceptability of ~~penetration seal fire~~ EQ tests that were not conducted by a Nationally recognized testing laboratory
14. ~~Adequacy of the priority determination for GI 149 re: fire barriers~~
15. Adequacy of protection from control systems interactions
16. ~~Acceptability of the thermal damage threshold currently assigned to electrical cables in light of the Sandia test results~~
17. Effect of fire barriers and cable coatings on ~~ampacity~~ EQ
18. Adequacy of equipment protection from fire suppression system actuations
19. Vulnerabilities due to broken or leaking flammable gas lines
20. Vulnerabilities due to seismic/~~fire~~EQ interactions
21. Effects of fire and smoke on plant equipment
22. ~~Adequacy of sprinkler installations~~

Table 3.2

ISSUE DISPOSITION
(cont.)

23.	~~Acceptability~~ Effect of using foam and deluge nozzles ~~in high fire hazard areas~~ on EQ
24.	Acceptability of not requiring shutdown systems to satisfy seismic, ~~single failure,~~ or other EQ criteria
25.	~~Acceptability of not postulating plant accidents, natural phenomena, and non-fire related failures concurrent with fire events~~
26.	Adequacy of ~~fire~~ safe shutdown capability ~~and procedures~~ with regard to EQ
27.	~~Acceptability of AOIs for safe shutdown/Appendix R equipment~~
28.	~~Acceptability of surveillance test requirements for alternate shutdown panels~~
29.	~~Adequacy of pre-1979 Technical Specifications for active fire barriers~~
30.	~~Adequacy of Technical Specifications in addressing upgraded fire barriers~~
31.	~~Acceptability of operability requirements for safe shutdown/Appendix R equipment during shutdown and outage conditions~~
32.	~~Acceptability of safe shutdown equipment on the shutdown unit not being available to support the operating unit at multi-unit sites~~
33.	~~Adequacy of in-place detector testing~~
34	~~Adequacy of fire damper testing~~
35.	Adequacy of licensee QA programs for ~~fire protection~~ EQ
36.	Adequacy of NRC ~~fire protection~~ EQ review and inspection programs
37.	Adequacy of training/qualification of NRC inspectors and reviewers
38.	Adequacy and consistency of ~~previously issued exemptions~~ exceptions that were allowed to EQ requirements
39	Adequacy of the exemption process
40.	Differentiate safety-significance between issues
41.	Adequacy of ~~Fire Hazards Analyses and fire~~ EQ analyses (i.e., 50.59 reviews) performed by licensees
42.	Adequacy of NRC reporting requirements for ~~fire events~~ EQ-related problems
43.	~~Acceptability of using fire watches in lieu of other features~~

Table 3.2

ISSUE DISPOSITION
(cont.)

44. Acceptability of using engineering evaluations and techniques as an alternative to deterministic requirements
45. Define "margin of safety" requirements for ~~fire protection~~ EQ
46. ~~Adequacy of GL 89-13 in addressing fire pump operability concerns~~
47. Acceptability of ~~fire risk assessment~~ EQ methodology uncertainty
48. ~~Acceptability of cabinet fire spread mechanisms~~
49. Reconsider the need for further research

4.0 ONCLUSIONS

Because the EQ Rule and the Fire Protection Rule are quite similar in the way they were established and imposed on the industry, it would be reasonable to assume that the issues that were identified during the staff's programmatic review of fire protection may also be applicable to EQ. Therefore, the staff reviewed the issues that were identified during the programmatic reassessment of fire protection and, unless the issue was specific to fire protection only, it was restated in terms of EQ. The potential issues that resulted from this effort are listed in Table 4 and will be addressed in the staff's final report on EQ (EQ-TAP Action Item 3.g).

TABLE 4

POTENTIAL EQ ISSUES

1.	Identification and resolution of "risk-significant" EQ scenarios
2.	Reliability of EQ barrier elements
3.	Acceptability of EQ tests that were not conducted by a Nationally recognized testing laboratory
4.	Adequacy of protection from control systems interactions
5.	Effect of fire barriers and cable coatings on EQ
6.	Adequacy of equipment protection from fire suppression system actuations
7.	Vulnerabilities due to broken or leaking flammable gas lines
8.	Vulnerabilities due to seismic/EQ interactions
9.	Effects of fire and smoke on plant equipment
10.	Effect of using foam and deluge nozzles on EQ
11.	Acceptability of not requiring shutdown systems to satisfy seismic or other EQ criteria
12.	Adequacy of safe shutdown capability with regard to EQ
13.	Adequacy of licensee QA programs for EQ
14.	Adequacy of NRC EQ review and inspection programs
15.	Adequacy of training/qualification of NRC inspectors and reviewers
16.	Adequacy and consistency of exceptions that were allowed to EQ requirements
17.	Adequacy of the exemption process
18.	Differentiate safety-significance between issues

TABLE 4

POTENTIAL EQ ISSUES
(cont.)

19.	Adequacy of EQ analyses (i.e., 50.59 reviews) performed by licensees
20.	Adequacy of NRC reporting requirements for EQ-related problems
21.	Acceptability of using engineering evaluations and techniques as an alternative to deterministic requirements
22	Define "margin of safety" requirements for EQ
23	Acceptability of EQ methodology uncertainty
24	Reconsider the need for further research

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