



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-8064

Craig G. Anderson, Vice President,
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Arkansas Nuclear One
Entergy Operations, Inc.
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Russellville, Arkansas 72801-0967

SUBJECT: RESPONSE TO BACKFIT CLAIM REGARDING NRC INSPECTION
REPORT 50-313/01-06; 50-368/01-06

Dear Mr. Anderson:

This letter is written in response to your letter of September 28, 2001, in which you claimed that our position that manual actions cannot be used to comply with 10 CFR Part 50, Appendix R, Section III.G.2. was a backfit. At issue is your use of manual actions for achieving and maintaining hot shutdown conditions in the event of a fire in the Unit 1 emergency diesel generator corridor and north switchgear room. In your letter of September 28, 2001, you asserted that the NRC has accepted such manual actions in the past, and stated that our position with respect to disallowing the use of manual actions for complying with Section III.G.2. of Appendix R should be considered a backfit that is generic to all plants. EHS

On October 26, 2001, and again on _____, we convened a backfit panel in accordance with NRC Management Directive 8.4, "NRC Program for Management of Plant-Specific Backfitting of Nuclear Power Plants," to review your backfit claim as stated in your letter of September 28, 2001. After careful consideration of your appeal, we have determined that (1) the NRC did not impose a regulatory staff position that is new or different from a previously applicable staff position relative to the requirements of 10 CFR Part 50, Appendix R, Section III.G.2; (2) the NRC did not approve the use of manual actions for complying with 10 CFR Part 50, Appendix R, Section III.G.2 in the Unit 1 diesel generator corridor and north switchgear room; and (3) your methodology for using manual actions (in the event of a fire in the Unit 1 diesel generator corridor and north switchgear room), in lieu of ensuring that one train of redundant equipment needed for achieving and maintaining hot shutdown conditions was free of fire damage, does not comply with the requirements of 10 CFR Part 50, Appendix R, Section III.G.2. The bases for these conclusions are described in Enclosures 1, 2, and 3. Enclosure 4 lists the licensing basis documents we reviewed in reaching these conclusions.

This document was prepared in accordance with the Freedom of Information Act, exemption 5
FOIA-2003-358

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this matter, please contact me at (817) 860-8225 or Mr. A. T. Howell at (817) 860-8180.

Sincerely,

/RA/

Ellis W. Merschoff
Regional Administrator

Enclosures: As stated

Dockets: 50-313; 50-368
Licenses: DPR-51; NPF-6

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M. R. Johnson, NRR

BGramm (RAG)

TAlexion (TWA)

NRR Event Tracking System (IPAS)

copy NRR

DOCUMENT: R:\ano\2001\an0106backfit-rln.wpd

RIV:DRS/PSB	C:EMB	D:DRS	C:DRP/D	D:DRP	D:DNMS
RLNease/lmb	CSMarschall	ATHowell III	LJSmith	KEBrockman	DDChamberlain

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RC	ACES:ES	D:ACES/	OGC	OGC	DRA
KDSmith	GMVasquez	GFSanborn	GSMizuno	DCDambly	TPGwynn
RA					
EVMerschhoff					

*previously concurred

ENCLOSURE 1

BACKFIT ANALYSIS

In a letter dated September 28, 2001, Entergy Operations, Inc., claimed that Region IV's position that manual actions cannot be used to comply with 10 CFR Part 50, Appendix R, Section III.G.2. was a backfit, generic to all plants.

Backfitting is defined in 10 CFR 50.109 "as the modification of or addition to systems, structures, components, or design of a facility; or the design approval or manufacturing license for a facility; or the procedures or organization required to design, construct or operate a facility; any of which may result from a new or amended provision in the Commission rules or the imposition of a regulatory staff position interpreting the Commission rules that is either new or different from a previously applicable staff position..."

FIRE PROTECTION REGULATIONS

In 1981, the NRC issued 10 CFR 50.48, "Fire protection," and Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979." Arkansas Nuclear One (ANO) Unit 1 was licensed in 1974, and Unit 2 was licensed in 1978; therefore, for both units, the licensee was required to meet the provisions of 10 CFR Part 50, Appendix R, Sections III.G, III.J, and III.O.

10 CFR 50.48, Fire protection.

- (b) *"Appendix R to this part establishes fire protection features required to satisfy Criterion 3 of Appendix A to this part with respect to certain generic issues for nuclear power plants licensed to operate before January 1, 1979.*
- (2) *With respect to all other fire protection features covered by Appendix R, all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O."*

10 CFR Part 50, Appendix R, Paragraph III.G, Fire protection of safe shutdown capability.

- 12.
- 2. *"Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:*
 - a. *One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and*
 - b. *Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within*

72 hours.

2?

3. *Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:*
 - a. *Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;*
 - b. *Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or*
 - c. *Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; . . .*
3. *Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room or zone under consideration, shall be provided:*
 - a. *Where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of paragraph G.2 of this section; or*
 - b. *Where redundant trains of systems required for hot shutdown located in the same fire area may be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.*

In addition, fire detection and a fixed fire suppression system shall be installed in the area, room, or zone under consideration."

STATEMENTS OF CONSIDERATION for 10CFR50.48 and 10 CFR PART 50, APPENDIX R

1. As shown below, in the statements of consideration for 10 CFR 50.48 and 10 CFR Part 50, Appendix R (FR 76606, Vol. 45 No. 225, November 19, 1980), the Commission explained that there were three ways to ensure that one means of achieving safe

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shutdown is available (Appendix R.III.G.2), and that if none of these three methods is feasible, then alternative or dedicated safe shutdown capability is required (Appendix R. III.G.3).

"G. Protection of Safe Shutdown Capability Technical Basis. The objective for the protection of safe shutdown capability is to ensure that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire in the plant. Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified rather than the design basis fire. Three different means for protecting the safe shutdown capability outside of containment are acceptable. The first means is separation of redundant safe shutdown trains and associated circuits by means of 3-hour fire rated barriers. The second means is a combination of separation of redundant safe shutdown trains and associated circuits by a 1-hour fire rated barrier and automatic fire suppression and detection capability for both redundant trains. The third means, which may be used only when redundant trains and associated circuits are separated by 20 feet or more of clear space, requires automatic fire suppression and detection systems in the area. An alternative or dedicated safe shutdown capability independent of the fire area is required if fire protection for safe shutdown capability cannot be provided as outlined above . . ."

GENERIC NRC GUIDANCE

Generic Letter (GL) 81-12 As shown below, in the first paragraph of GL 81-12 and again in Enclosure 2 to GL 81-12, the NRC explained that cables for or associated with redundant safe shutdown systems must be protected from the effects of fire by the methods described in Section III.G.2 of Appendix R to 10 CFR Part 50 (Appendix R), or provided with alternative or dedicated shutdown capability as described in Section III.G.3 of Appendix R.

"Paragraph 50.48(b) of 10 CFR Part 50, which became effective on February 17, 1981, requires all nuclear plants licensed to operate prior to January 1, 1979 to meet the requirements of Section III.G, III.J and III.O of Appendix R to 10 CFR Part 50 regardless of any previous approvals by the Nuclear Regulatory Commission (NRC) for alternative design features for those items. This would require each licensee to reassess all those areas of the plant " . . . where cables or equipment, including associated non-safety circuits, that could prevent operation or cause maloperation due to hot shorts, open circuits or shorts to ground or (sic) redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment . . ." to determine whether the requirements of Section III.G.2 of Appendix R are satisfied. If not, the licensee must provide alternative shutdown

capability in conformance with Section III.G.3 or request an exemption if there is some justifiable basis. . . *Quoted from Section III.G.2 of Appendix R to 10 CFR Part 50 . . ."

"Section III.G of Appendix R to 10 CFR Part 50 required cabling for or associated with redundant safe shutdown systems necessary to achieve and maintain hot shutdown conditions be separated by fire barriers having a three-hour rating or equivalent protection (see Section III.G.2 of Appendix R) . . . Safety related and non-safety related cables that are associated with the equipment and cables of the alternative, or dedicated method of shutdown are those that have a separation from the fire area less than that required by Section III.G.2 of Appendix R to 10 CFR 50 . . ."

Clarification of GL 81-12: The NRC further clarified the requirements of Appendix R, Section III.G in a memorandum from Darrell G. Eisenhut, Director, Division of Licensing, NRR, to Roger J. Mattson, Director, Division of system Integration, NRR, dated March 22, 1982, which was sent to all licensees.

"Using the requirements of Sections III.G and III.L of Appendix R, the capability to achieve hot shutdown must exist given a fire in any area of the plant in conjunction with a loss of offsite power for 72 hours. Section III.G of Appendix R provides four methods for ensuring that the hot shutdown capability is protected from fires. The first three options as defined in Section III.G.2 provides methods for protection from fires of equipment needed for hot shutdown:

1. Redundant systems including cables, equipment, and associated circuits may be separated by a three-hour fire rated barrier; or,
2. Redundant systems including cables, equipment and associated circuits may be separated by a horizontal distance of more than 20 feet with no intervening combustibles. In addition, fire detection and an automatic fire suppression system are required; or
3. Redundant systems including cables, equipment and associated circuits may be enclosed by a one-hour fire rated barrier. In addition, fire detectors and an automatic fire suppression system are required.

The last option as defined by Section III.G.3 provides an alternative shutdown capability to the redundant trains damaged by a fire.

4. Alternative shutdown must be independent of the cables, equipment and associated circuits of the redundant systems damaged by the fire."

Information Notice (IN) 84-09: [REDACTED]

Section III,

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"Protection of Equipment Necessary To Achieve Hot Shutdown," of IN 84-09 states,

"Appendix R, Section III.G.1, requires that fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that one train of systems necessary to achieve and maintain a hot shutdown condition from either the control room or emergency control station(s) is free of fire damage.

Sections III.G.2 and III.G.3 specify four alternatives that may be implemented outside of primary containment to assure that one redundant train of equipment, cabling and associated circuits necessary to achieve and maintain hot shutdown remains free of fire damage. The alternatives are:

- 1. Separation of redundant trains of equipment, cabling, and associated circuits by a three-hour fire barrier.*
- 2. Enclosure of redundant trains of equipment, cabling, and associated circuits by a one-hour fire barrier with fire detection and automatic fire suppression systems installed in the area.*
- 3. Separation of redundant trains of equipment, cabling, and associated circuits by a horizontal distance of 20 feet with no intervening combustibles and with fire detection and automatic fire suppression systems installed in the area.*
- 4. Installation of alternative or dedicated shutdown capability independent of the equipment, cabling, and associated circuits under consideration, and installation of fire detection and fixed fire suppression systems in the area containing this alternative or dedicated shutdown capability."*

NUREG 0800, STANDARD REVIEW PLAN 9.5.1, "FIRE PROTECTION PROGRAM"

In 1981, the NRC issued Revision 3 of NUREG 0800, Standard Review Plan Section 9.5.1, "Fire Protection Program" as guidance to NRC staff in performing fire protection program reviews. NUREG 0800 included Revision 2 to Branch Technical Position CMEB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," which provided guidance acceptable for implementing 10 CFR 50.48 and Appendix R. Section C.5.b, "Safe Shutdown Capability," of Branch Technical Position CMEB 9.5-1 states,

- "(1) Fire protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:*
 - (a) One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control stations(s) is free of fire damage; and*

- (b) *Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control stations(s) can be repaired within 72 hours.*
- (2) *To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free of fire damage should be provided:*
 - (a) *Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming part of or supporting such fire barriers should be protected to provide fire resistance equivalent to that required of the barrier;*
 - (b) *Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area; or*
 - (c) *Enclosure of cable and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area.*
- (3) *If the guidelines of Positions C5.b.1 and C5.b.2 cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided."*

ANO EXEMPTIONS AND SAFETY EVALUATION REPORTS

In the following safety evaluation reports (SERs) and exemptions, the NRC restated the requirements of Appendix R, Section III.G, and clarified how to ensure that one train of equipment and cables necessary for achieving and maintaining hot shutdown conditions was free of fire damage. These documents explain that there are three methods specified in Section III.G.2 of Appendix R of ensuring one train free of fire damage, and that if these methods cannot be met, then an alternative fire protection configuration must be provided in accordance with Section III.G.3 of Appendix R.

Exemption and SER Dated March 22, 1983: Section II of the Exemption states,

"Section III.G of Appendix R requires fire protection for equipment important to safe shutdown. Such fire protection is achieved by various combinations of fire barriers, fire suppression systems, fire detectors, and separation of safety trains (III.G.2) or alternative safe shutdown equipment free of the fire area (III.G.3). The objective of this protection is to assure that one train of equipment needed for hot shutdown would be undamaged by fire, and that systems needed for

cold shutdown could be repaired within 72 hours."

Section 1.0 of the SER issued with the Exemption states,

"Section III.G.2 requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;*
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or*
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.*

If these conditions are not met, Section III.G.3 requires alternative shutdown capability independent of the fire area of concern. It also requires a fixed suppression system installed in the fire area of concern if it contains a large concentration of cables or other combustibles.

These alternative requirements are not deemed to be equivalent for all configurations; however, they provide equivalent protection for those configurations in which they are accepted.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified in the rule rather than the design basis fire. Plant specific features may require protection different than the measures specified in Section III.G. In such a case, the licensee must demonstrate, by means of a detailed fire hazards analysis, that existing protection or existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Fire protection configurations must either meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazards analysis."

Exemption and SER Dated October 26, 1988: The Exemption states,

"Section III.G of Appendix R requires fire protection for equipment important to post-fire shutdown. Such fire protection is achieved by various combinations of fire barriers, fire suppression systems, fire detectors, and separation of safety trains (III.G.2) or alternate post-fire shutdown equipment free of the fire area (III.G.3). The objective of this protection is to assure that one train of equipment needed for hot shutdown would be undamaged by fire, and that systems needed for cold shutdown could be repaired within 72 hours (III.G.1)."

Section 1.0 of the SER issued with the Exemption states,

"Section III.G.2 requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;*
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or*
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.*

If these conditions are not met, Section III.G.3 requires an alternative shutdown capability independent of the fire area of concern. It also requires a fixed fire suppression system be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are accepted.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified in the rule rather than a design basis fire. Plant specific features may require protection different than the measures specified in Section III.G. In such a case, the licensee must demonstrate, by fire hazards analysis, that existing protection or existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown

are free of fire damage. Fire protection configurations must either meet the specific requirements of Section III.G or another fire protection configuration must be justified by a fire hazards analysis."

BACKFIT ANALYSIS CONCLUSION

In reviewing the above documents, the panel found that the regulations, statements of consideration, generic correspondence, as well as ANO-specific safety evaluation reports are in agreement concerning the use of manual actions for achieving and maintaining hot shutdown conditions as required in Section III.G of Appendix R to 10 CFR Part 50. As these documents show, the NRC did not consider manual actions to be acceptable for complying with 10 CFR Part 50, Appendix R, Section III.G.2; however, if the requirements of Section III.G.2 could not be met, manual actions were permitted under Section III.G.3. The panel concluded that the position to disallow the use of manual actions for meeting 10 CFR Part 50, Appendix R, Section III.G.2 is not an imposition of a regulatory staff position interpreting the Commission rules that are either new or different from a previously applicable staff position. Therefore, this position is not a backfit generic to all plants, nor is it a backfit specific to ANO.

ENCLOSURE 2

APPENDIX R, SECTION III.G.2 LICENSING BASIS ANALYSIS

In a letter dated September 28, 2001, Entergy Operations, Inc. (Entergy), claimed that Region IV's position that manual actions cannot be used to comply with Section III.G.2 of 10 CFR Part 50, Appendix R (Appendix R) was a backfit. In addition to the backfit claim, Entergy asserted that during the review of their fire protection program in the 1980's, the NRC was aware that manual actions were sometimes credited for complying with Section III.G. of Appendix R at ANO, and that the NRC's failure to categorically deny the use of all manual actions for complying with Section III.G.2 implied tacit approval. Because of this tacit approval, the licensee stated that the use of manual actions became part of the licensing basis.

NRC EXEMPTIONS AND SAFETY EVALUATION REPORTS

ANO-1 was licensed prior to January 1, 1979; therefore, was required to meet 10 CFR Part 50, Appendix R, Section III.G.

Safety Evaluation Report (SER) dated May 13, 1983: This SER contained the NRC's review of the licensee's methodology for alternative safe shutdown in accordance with Appendix R, Sections III.G. 3 and III.G.L.

[REDACTED]

SER, "Introduction," reads

"By submittals dated July 1 and July 29, 1982, the licensee described the means by which safe shutdown can be achieved in the event of fire and proposed modifications to the Arkansas Nuclear One Units 1 and 2 to meet the requirements of Appendix R to 10 CFR 50, Items III.G.3 and III.L."

SER, Section C. "Remaining Plant Areas"

Alternative shutdown

"All other areas of the plant not required to have alternate safe shutdown will comply with the requirements of Section III.G.2 of Appendix R, unless an exemption request has been approved by the staff."

Exemption and (SER) dated March 22, 1983: In this SER, the NRC clearly described the requirements of Appendix R, Section III.G.2, and added that if those requirements could not be met, then the licensee was required to meet the provisions of Appendix R, Section III.G.3.

SER, Section 1.0 reads,

"Section III.G.2 requires that one train of cables and equipment necessary to

[REDACTED]

[REDACTED]

capability independent of the fire area of concern. It also requires a fixed fire suppression system be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are accepted."

LICENSEE SUBMITTALS

Licensee letter dated July 1, 1982: Arkansas Power & Light submitted the results of their Appendix R compliance review by letter dated July 1, 1982. This review evaluated fire areas in ANO Units 1 and 2 for compliance to 10 CFR 50.48 and Appendix R, incorporating recommendations, clarifications, and evaluation criteria of Generic Letter 81-12 (see Enclosure 1 for relevant excerpts from GL 81-12). In the general description of their Appendix R analysis methodology, the licensee stated that they: first, credit manual actions; second, provide protection for the remaining vulnerable safe shutdown equipment using the separation criteria of Section III.G of Appendix R; and third, provide alternative methods of mitigating the effects of fire damage to any remaining equipment whose damage from fire could adversely affect safe shutdown. [REDACTED] later statement that this methodology would divert "primary reliance from administrative controls to preclude fires or damage due to fires." The reliance on manual actions to operate equipment that is damaged by a fire does not preclude damage. In addition, the licensee failed to specify that manual actions were credited for complying with Section III.G.2 of Appendix R in Fire Zones 98J and 99M. [REDACTED]

Section I, "Introduction," of this submittal, the licensee stated,

- " 6. *In certain cases, credit for manual operation of equipment was taken if controls (and power for valves) could possibl[y] be damaged by a fire. Such credit was taken only if:*
 - a. *the component to be operated is not located in the affected fire zone, although the cable may be damaged by fire;*
 - b. *sufficient time is available to perform the required manual actions; and*
 - c. *personnel are available, beyond the fire brigade and minimum operations shift crew limitations, to perform the manual actions.*
7. *For redundancies that were still identified as potential safe shutdown concerns following the above review, specific physical separation, barriers, intervening combustibles, and suppression systems were evaluated to determine compliance with Section III.G of Appendix R."*
8. *For those redundancies remaining as a potential safe shutdown concern following 7 above, alternative means for accomplishing the necessary function was reviewed.*

ETS

[REDACTED]

ETS

"The evaluations described above were performed in accordance with the criteria of appendix R, including: consideration of cable insulation as combustible; taking no credit for cable coatings to act as a thermal or radiant barrier to protect cables; and diverting primary reliance from administrative controls to preclude fires or damage due to fires."

Licensee letter dated October 5, 1982: In a meeting held on August 31, 1982, and in the meeting summary dated September 3, 1982, the NRC requested additional information including a description of the manual actions in fire zones that the licensee had indicated were in full compliance with Appendix R. In the letter of October 5, 1982, the licensee listed the following fire zones as being in full compliance with Appendix R, but requiring some sort of manual or non-routine operation: 149E, 67U, 68P, 128E, 170Z, 38Y, 79U, 112I, 46Y, 47Y, 2084DD, 2111T, 2097X, and 2155A. Fire Zones 98J and 99M were not listed.

Licensee letter dated August 15, 1984: In this submittal, the licensee forwarded their re-evaluation of their compliance with Appendix R using additional guidance provided in Generic Letter 83-33, and Information Notice (IN) 84-09. As shown below, the licensee stated that credit for manual action may be taken; however did not specify whether these manual actions were for meeting Section III.G.2 or [REDACTED]

[REDACTED] However, in IN 84-09, the use of manual actions is not provided as an acceptable method for complying with Appendix R, Section III.G.2.

Section III.B "Initial Conditions and Assumptions," of this reanalysis reads,

"The reanalysis of ANO-1 and 2 was performed under the initial conditions defined by Appendix R to 10CFR50. Those conditions are consistent with those utilized in AP&L's original Appendix R compliance submittal dated July 1, 1982 (OCAN078202), and subsequent correspondence dated November 11, 1982 (OCAN118210). ... Where adequate time is available, and the valve is not physically located in the vicinity of the postulated fire, credit is taken for manual operation of manually operable valves."

Section III.D, "Activities Required for Achieving Hot Shutdown" of this reanalysis reads,

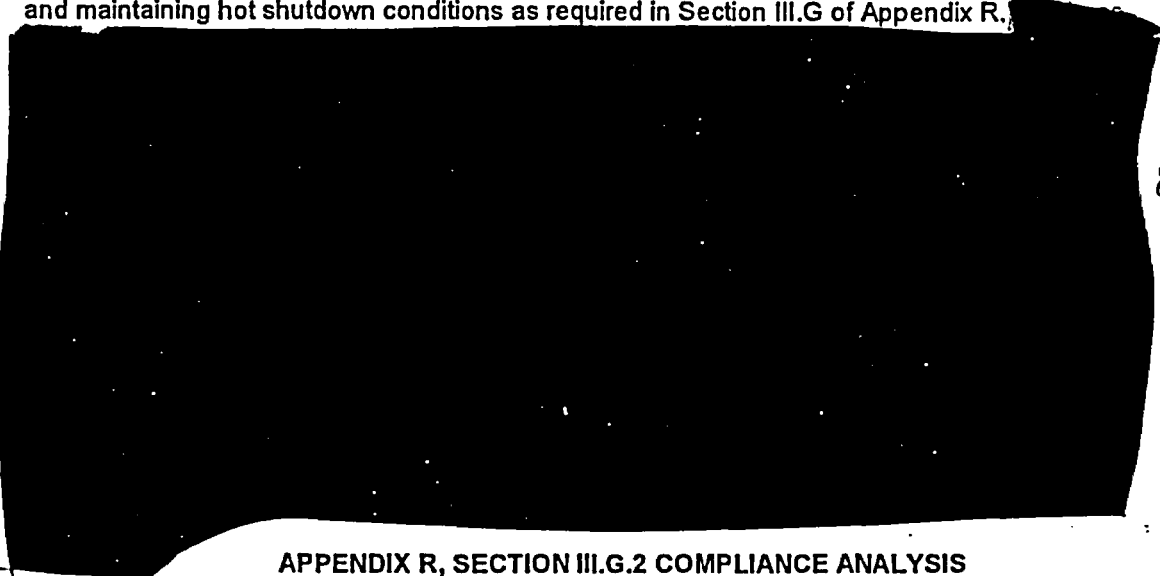
"The activities required for achieving hot shutdown are those credited in our previous Appendix R submittals referenced earlier in this report."

Section III.F, "Separation Criteria," of this reanalysis reads,

"... The method of operability of any component in a given system is to determine whether it is sufficiently protected or separated from the postulated fire. The separation criteria to be used are specified in Appendix R to 10CFR50, Section III.G and in clarification of that regulation presented in Generic Letter 83-33 and IE Information Notice 84-09."

APPENDIX R, SECTION III.G.2 LICENSING BASIS ANALYSIS CONCLUSION

In reviewing the above documents, the panel found that the regulations and the ANO-specific safety evaluation reports are in agreement concerning the use of manual actions for achieving—and maintaining hot shutdown conditions as required in Section III.G of Appendix R.



APPENDIX R, SECTION III.G.2 COMPLIANCE ANALYSIS for FIRE ZONES 98J AND 99M

In a letter dated September 28, 2001, Entergy Operations, Inc. (Entergy), claimed that Region IV's position that manual actions cannot be used to comply with Section III.G.2 of 10 CFR Part 50, Appendix R (Appendix R) was a backfit. In addition to the backfit claim, Entergy asserted that during the review of their fire protection program, the NRC was aware that manual actions were sometimes credited for complying with Section III.G. of Appendix R at ANO, and that the NRC's failure to challenge the use of all manual actions implied tacit approval. The issue of whether manual actions were part of the ANO licensing basis is addressed in Enclosure 2. Entergy further asserted that the unprotected circuits in Fire Zones 98J and 99M interface with systems and equipment necessary for achieving and maintaining hot shutdown conditions, but are not part of the safe shutdown systems. Therefore, because these cables are not "necessary," for achieving and maintaining hot shutdown conditions, in Fire Zones 98J and 99M, Entergy is in compliance with Appendix R, Section III.G.2.

FINDING

During an NRC triennial fire protection inspection conducted on June 11 - 15, 2001, at Arkansas Nuclear One, Unit 1, the following violation of NRC requirements was identified. Note that ANO-1 was licensed prior to January 1, 1979; therefore was required to meet 10 CFR Part 50, Appendix R, Section III.G.

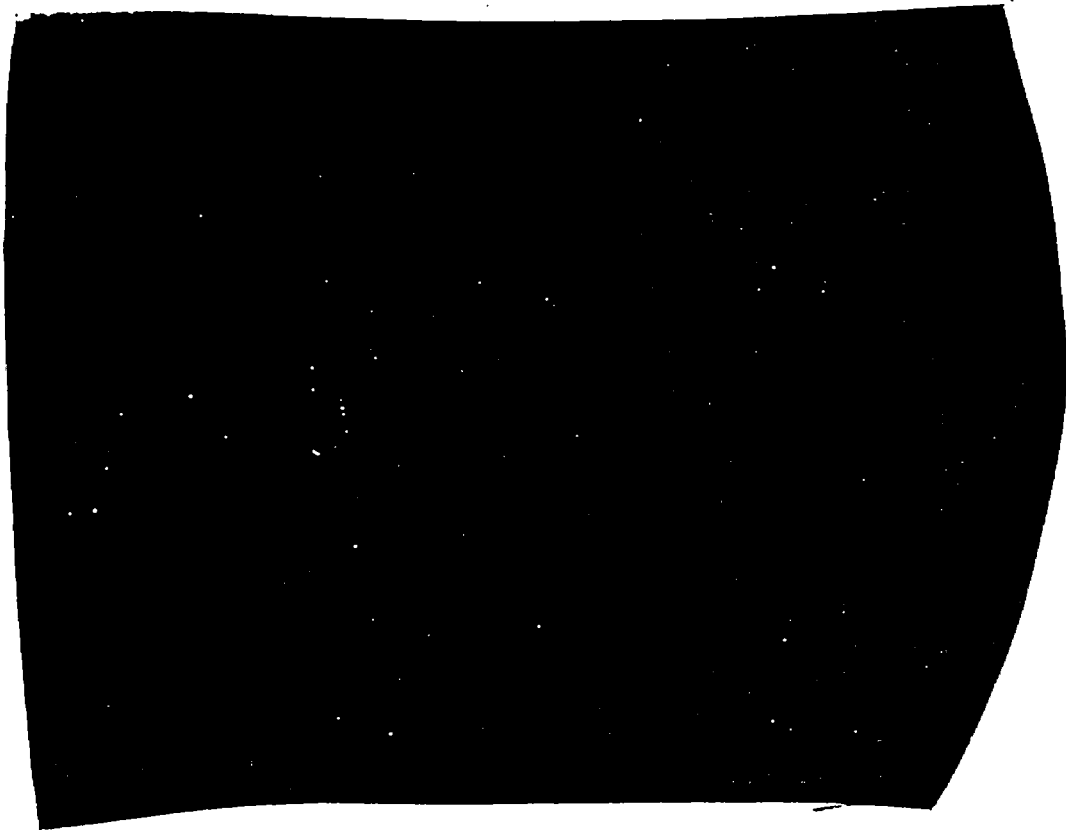
10 CFR 50.48, Section (b) states, "Appendix R to this part establishes fire protection features required to satisfy Criterion 3 of Appendix A to this part with respect to certain generic issues for nuclear power plants licensed to operate before January 1, 1979. ... With respect to all other fire protection features covered by Appendix R, all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O."

10 CFR Part 50, Appendix R, Paragraph III.G. states,

1. "Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:
 - a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and
 - b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.
2. Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:
 - a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
 - b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
 - c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; ...
3. Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room or zone under consideration, shall be provided:

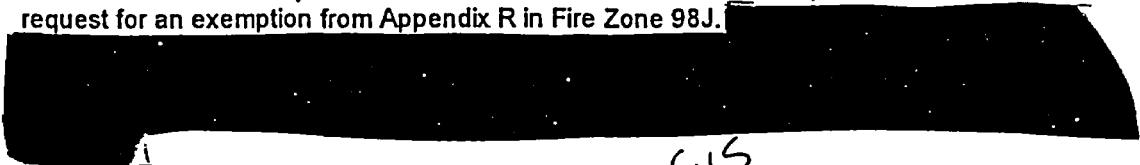
- a. Where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of paragraph G.2 of this section; ..."

Contrary to the above, in two fire zones in Unit 1, the licensee failed to ensure that cables of redundant trains of systems necessary to achieve and maintain hot shutdown conditions were free of fire damage by one of the means specified in 10 CFR Part 50, Appendix R, Paragraph III.G.2.



NRC DOCUMENTS

Exemption and Safety Evaluation Report (SER) dated March 22, 1983: The following excerpts from the SER are in response to additional information the licensee provided concerning their request for an exemption from Appendix R in Fire Zone 98J.



Section IV of the Exemption reads,

"The licensee has indicated that enclosure of the corridor A-train conduits in a one-hour rated fire barrier and separation of the DC equipment room from the corridor by three-hour rated fire barriers will be provided. With these modifications, the area will comply with Section III.G of Appendix R, and no exemption is needed."

Section 8.0 of the SER reads,

". . . The corridor contains primarily B-train cables, however there is one A-train conduit in the corridor. . . . By letter dated November 11, 1982, the licensee proposed to enclose the single A-train conduit in the corridor in a one-hour rated barrier."

"The level of protection provided for the corridor area and D.C. equipment room meets Section III.G; therefore, and exemption is not needed."

SER dated May 13, 1983: This SER contained the NRC's review of the licensee's methodology for alternative safe shutdown in accordance with Appendix R, Sections III.G. 3 and III.G.L. As the following excerpts of the SER show, all other fire areas not identified as alternative shutdown areas were understood by the NRC to meet the requirements of III.G.2 of Appendix R, unless the licensee was granted exemptions. Fire Areas 98L and 99M were not identified as alternative shutdown areas.

"Introduction," of the SER reads,

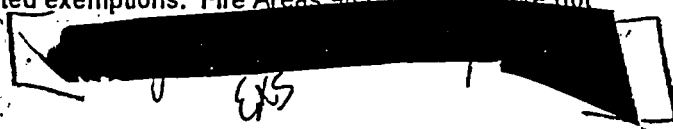
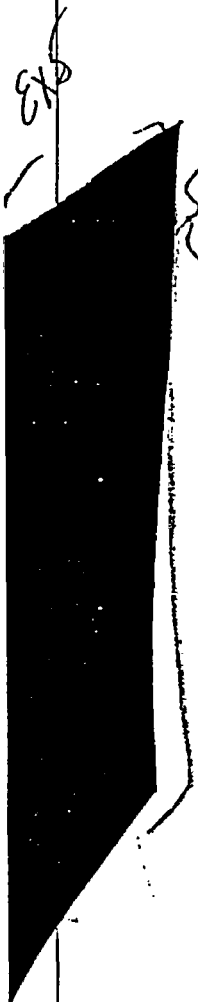
"By submittals dated July 1 and July 29, 1982, the licensee described the means by which safe shutdown can be achieved in the event of fire and proposed modifications to the Arkansas Nuclear One Units 1 and 2 to meet the requirements of Appendix R to 10 CFR 50, Items III.G.3 and III.L."

Section C. "Remaining Plant Areas," of the SER reads,

"All other areas of the plant not required to have alternate safe shutdown will comply with the requirements of Section III.G.2 of Appendix R, unless an exemption request has been approved by the staff."

LICENSEE SUBMITTALS

Licensee letter dated July 1, 1982: As requested by the NRC, Arkansas Power & Light submitted the results of their Appendix R compliance review by letter dated July 1, 1982. In Table 1.0 of Section 1 of this submittal, the licensee indicated that an exemption was needed for Fire Zone 98J, and that modifications were necessary for Fire Zone 99M in order for these fire zones to comply with Appendix R.



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Ex 5

In Section 3 of this submittal, describing modifications in Fire Zones 99M, the licensee stated,

1. For the service water pumps, install breakers outside of zones 100-M and 99-M so the B service water pump may be powered from either the red or the green bus. This pump can therefore be assured of power from the unaffected switchgear room, and be able to isolate from faults in the switchgear room where the fire occurs. ... Outside of zones 99M and 100-N, the new service water pump B circuit breakers will be located in different zones from the pump A and pump C cabling.
2. For the makeup pumps, similar modifications as those described above for the service water pumps will be made to assure that a fire in either switchgear room will not cause loss of all makeup pump capability.

With these modifications this zone will comply with Appendix R."

In Section 4 of this submittal, regarding exemption details for Fire Zone 98J, the licensee stated,

"This zone is predominantly of the "green" or "B" safety division, although certain cables associated with the "red" or "A" division are also located in the corridor portion of the zone. The "A" cables in this zone are routed in conduit and are predominately associated with the "red" D.C. equipment room."

"The "red" division cabling located in the corridor that is required for safe shutdown will be wrapped in a 1-hour fire barrier. The circuits involved are the power supplies to the RS panels [120V ac to vital instrumentation] which are located in the control room. With the suppression system in this area and the addition of the 1-hour fire barrier, the corridor portion of this zone will comply with Appendix R."

Following modifications described above, this zone will substantially comply with Appendix R; however, two exemptions are requested for this zone:

1. *Omission of a complete 3-hour fire barrier separating "red" D.C. equipment room from the corridor; and*
2. *Omission of sprinkler coverage over trays and equipment in the "red" D.C. equipment room."*

Licensee letter dated November 11, 1982: As requested by the NRC, Arkansas Power & Light reviewed other alternatives or modifications which might facilitate approval of certain fire zones for which the exemption requests were being considered for denial.

The licensee submitted the following additional

Ex 5

information regarding Fire Zone 98J,

"Modifications to this zone will be made as stated in our July submittal except for those designed to "separate" the corridor area from the "red" D.C. equipment room. This separation will be accomplished by the addition of a 3-hour rated fire door and fire dampers in the ventilation ducts. . . With this modification, no exemptions are required for zone 98J."

Licensee letter dated August 15, 1984: The licensee re-evaluated the configurations in ANO Units 1 and 2 for compliance with Appendix R using additional guidance provided in Generic Letter 83-33, and Information Notice (IN) 84-09. With this letter, the licensee submitted their "Reanalysis Against 10CFR50 Appendix R, Sections III.G, J, and O," and clarified the proposed modifications and exemption requests. As shown below, the licensee stated that there would be no redundant circuits in Fire Zones 99M after completion of proposed modifications. The licensee did not identify the use of manual actions for complying with Appendix R, Section III.G.2 in Fire Zones 98J and 99M.

Regarding Fire Zone 99M, Section III.I, "Fire Area Analysis," of this reanalysis reads,

". . . Zone 99M, after completion of the 1R6 modifications mentioned below, will contain no redundant circuits. . .

"NECESSARY" FOR SAFE SHUTDOWN

As discussed in Enclosure 2, Section III.G of Appendix R to Part 50 provides three ways of ensuring that cables or equipment (in the same fire area) of redundant trains of systems necessary for achieving and maintaining hot shutdown conditions are free of fire damage. If these conditions cannot be met, then the fire area must meet the alternative or dedicated shutdown requirements of Section III.G.3 of Appendix R. These requirements are explained in NRC generic guidance documents, as well as in safety evaluation reports concerning the ANO Appendix R analysis. During the triennial fire protection inspection at ANO, the inspection team found numerous cables of redundant trains of systems necessary for achieving and maintaining hot shutdown conditions located in the Fire Zones 98J and 99M that were not protected from fire damage in accordance with Section III.G.2 of Appendix R. In addition, the team found that Fire Zones 98J and 99M did not meet the alternative or dedicated shutdown requirements of Section III.G.3 of Appendix R. This finding was documented in NRC Inspection Report 50-313/01-06; 50-368/01-06 as an unresolved issue pending further NRC review and determination of safety significance. On August 30, 2001, the NRC informed Entergy that this finding was a violation of Section III.G.2 of Appendix R to 10 CFR Part 50.

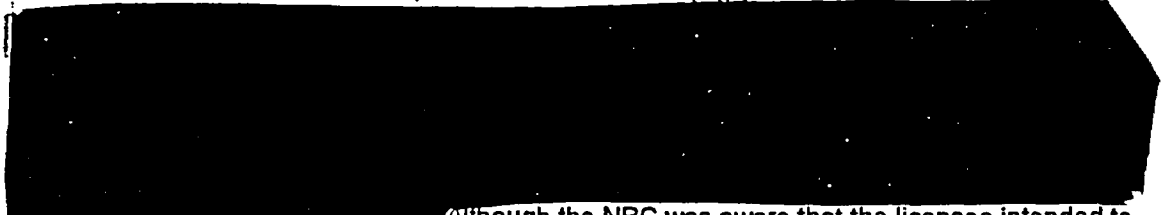
In their letter of September 28, 2001, Entergy asserted that the unprotected circuits in Fire Zones 98J and 99M interface with systems and equipment necessary for achieving and maintaining hot shutdown conditions, but are not part of the safe shutdown systems, therefore are not "necessary," for achieving and maintaining hot shutdown conditions, in Fire Zones 98J and 99M. Entergy concluded that, because these cables in and of themselves are not necessary for achieving and maintaining hot shutdown conditions, then Fire Zones 98J and 99M are in compliance with Appendix R, Section III.G.2, even though manual actions are

required to overcome the effects of fire damage to the cables.




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FIRE ZONES 98J AND 99M COMPLIANCE ANALYSIS CONCLUSION



Although the NRC was aware that the licensee intended to use manual actions for meeting Appendix R, Section III.G for 14 fire zones, neither Fire Zone 98J nor 99M were identified on this list.

Regarding the licensee's claim that the cables contained in Fire Zones 98J and 99M are not "required" for safe shutdown, the panel found that fire damage to certain cables in Fire Zones 98J and 99M could cause maloperation of equipment necessary for achieving and maintaining hot shutdown conditions. Therefore, one train of these cables must be protected from fire damage by one of the methods specified in Appendix R, Section III.G.2, III.G.3, or an exemption must be obtained.

The panel concluded that the NRC staff  did not approve of, the licensee's use of manual actions in the event of fires in Fire Zones 98J and 99M. In addition, the panel concluded that, in Fire Zones 98J and 99M, the licensee does not meet the requirements of Appendix R, Section III.G.2.

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ENCLOSURE 4

LICENSING BASIS DOCUMENTS REVIEWED

DATE	TYPE	DESCRIPTION
July 1, 1982	Letter to NRC	Results of ANO's Appendix R compliance review and exemption requests
July 29, 1982	Letter to NRC	Results of Appendix R compliance review - clarifying information
September 3, 1982	Meeting summary	Summary of meeting with ANO on August 31, 1982 concerning alternate shutdown capability with questions and requests for additional information (RAI) attached
September 3, 1982	Letter to ANO	RAI concerning alternate shutdown capability resulting from NRC review of July 1982 Appendix R compliance submittal
October 5, 1982	Letter to NRC	Response to RAI dated September 8, 1982 resulting from NRC review of July 1982 Appendix R compliance submittal
November 11, 1982	Letter to NRC	Response to RAI of September 3, 1982 and meeting of October 6, 1982, and clarifying information concerning exemption requests.
March 22, 1983	Letter to ANO	Exemptions from Appendix R and safety evaluation report (SER) included in the Exemption by reference
May 13, 1983	Letter to ANO	SER regarding ANO's safe shutdown capability evaluated against Appendix R, III.G.3 and III.L
August 15, 1984	Letter to NRC	Reanalysis of Appendix R Compliance and requests for exemptions from Appendix R, III.G
August 30, 1985	Letter to NRC	Current status of Appendix R modifications and exemption requests
September 3, 1986	Letter to ANO	RAIs on Appendix R exemption requests
October 20, 1986	Letter to NRC	Response to RAI of September 3, 1986. RAI 280.15 and 208/16 responses failed to identify that make-up pump and emergency feedwater pump cables were located in Fire Zones 98J
April 22, 1987	Letter to NRC	Information on exemption for Fire Zone 38Y only
June 24, 1987	Letter to NRC	Information on exemption for Fire Zones 38Y, 34Y and 20Y
September 13, 1987	Inspection Report	Inspection of ANO's implementation of and compliance to the safe shutdown requirements of Appendix R
October 26, 1988	Letter to ANO	Exemptions from Appendix R and SER