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SUBJECT: Responds to NRC 910306 ltr forwarding notice of violation & proposed imposition of civil penalties in amount of \$150,000 per Special Team Insp Repts 50-315/90-18 & 50-316/90-18 re design control per App R to 10CFR50.

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AEP:NRG:1125K

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
INSPECTION REPORT NOS. 50-315/90018; 50-316/90018;
RESPONSE TO VIOLATIONS

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Attn: A. B. Davis

March 26, 1991

Dear Mr. Davis:

This letter is in response to your letter dated March 6, 1991, which forwarded the Notice of Violation and proposed imposition of a civil penalty that resulted from two special team inspections of our implementation of the applicable requirements of Appendix R to 10 CFR Part 50. These inspections were conducted during the periods April 12 through June 10, 1982, and September 10 through November 6, 1990. In the March 6 letter, you also requested that, in addition to responding to the violations identified in Enclosure 1, we broadly address design control. Attachment 1 to this letter contains a discussion of our efforts to improve Cook Nuclear Plant design control. Attachment 2 to this letter contains our response to the one Severity Level III violation and the five Severity Level IV violations identified in the Notice of Violation attached to your letter.

We do not contest the Severity Level III violation and, on March 25, 1991, initiated payment of the \$150,000 civil penalty by electronic transfer.

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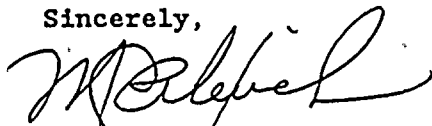
Mr. A. B. Davis

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AEP:NRC:1125K

This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,



M. P. Alexich
Vice President

ldp

Attachments

cc: D. H. Williams, Jr.
A. A. Blind
J. R. Padgett
G. Charnoff
NRC Resident Inspector - Bridgman
NFEM Section Chief

Attachment 1 to AEP:NRC:1125K

Current AEPSC Initiatives in Design Control

As discussed in our October 23, 1990 letter, AEP:NRC:1138, which summarized our October 4, 1990 meeting regarding NRC Inspection Report 50-315/90201; 50-316/90201 (essential service water SSFI), AEP has expended significant resources to improve design control. In late 1988 the electrical and mechanical engineering divisions were consolidated into a single Nuclear Engineering Department. Subsequently, in late 1989, a reorganization was undertaken within the Design Department that resulted in the formation of the Nuclear Design Group. A key facet of both of these reorganizations was the development of new procedures to incorporate significantly enhanced design control requirements.

In order to assess the overall effectiveness of implementation of our design control procedures, a historical review of design outputs has been initiated of design outputs. This review began in the fourth quarter of 1990 and involves both the Nuclear Engineering and Nuclear Design organizations. Due to the number of design outputs to be included in the review, this effort is scheduled for completion by the end of 1991. Based on previous findings identified in the ESW SSFI and other internal audits, we do not expect to identify any safety significant discrepancies. Discrepancies identified through the current effort will be resolved in a time frame commensurate with the relative potential safety impact. We will, of course, follow any Technical Specification limitations as well. In the event that the resolution of an identified discrepancy should include modification of existing systems or components, these modifications will also be completed in a time frame commensurate with the potential safety significance of the discrepant condition.

In addition to these initiatives, both the Nuclear Engineering Department and the Nuclear Design Group have formed Quality Review Teams to provide ongoing review of safety-related design output documents. The teams were formed in the fall of 1990 and have been tasked with the responsibility to review safety-related design control activities and output documents. These teams place particular emphasis on design verification and the compliance of output documents with technical and procedural requirements. The Quality Review Teams will examine our design processes to identify strengths, weaknesses, and areas for improvement, and will recommend improvements in training, procedures, and practices to improve our effectiveness and efficiency.

Training was provided to both Nuclear Engineering Department and Nuclear Design Group employees on design verification in August 1990. Specific deficiencies noted during the ESW SSFI were used as training examples. The training material covered the following subject areas:

- o NRC SSFI findings (general)
- o Design control generic requirements
- o Design process input and output
- o Design verification
- o Specific examples of the NRC SSFI findings

In addition, both the Nuclear Engineering Department and the Nuclear Design Group technical and professional staff are attending training on their organization's various implementing procedures to assist in improving the quality of work.

The Nuclear Design Group has issued a new procedure to maintain Appendix R compliance, which details how design changes are to be reviewed for potential Appendix R impact. When the design change does impact Appendix R the procedure delineates the responsibilities of the Appendix R engineer, the design change lead engineer and the lead designer to ensure that continued Appendix R compliance is achieved. We believe that the implementation of this procedure will significantly improve design control on Appendix R related modifications.



Attachment 2 to AEP:NRG:1125K

Response to NRC-Identified Violations



NRC VIOLATION I

"10 CFR 50.48(b) requires that all nuclear power plants licensed to operate prior to January 1, 1979 satisfy the applicable requirements of Appendix R to 10 CFR Part 50 including, specifically, the requirements of Sections III.G, III.J and III.O.

10 CFR Part 50, Appendix R, Section III.G.2, requires, in part, that, 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, means of ensuring that one of the redundant trains is free of fire damage shall be provided.

10 CFR Part 50, Appendix R, Section III.G.2, requires, in part, that the means to be employed shall be (a) separation of cables and equipment and non-safety circuits of redundant trains by a fire barrier having a 3-hour rating, or (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 combustibles or fire hazards and fire detectors and an automatic fire suppression system installed, or (c) enclosure of the cables and equipment and non-safety circuits of one redundant train in a fire barrier having a one-hour rating with fire detectors and an automatic fire suppression system installed.

10 CFR 50, Appendix R, Section III.G.3, requires, in part, that independent alternative or dedicated shutdown capability shall be provided where the fire protection features for structures, systems, or components whose functions are required for hot shutdown do not satisfy Section III.G.2.

Contrary to the above, for Unit 1 of the D.C. Cook facility, licensed to operate prior to January 1, 1979, the licensee failed to ensure that one of the redundant trains of components and cabling located within the same fire area outside of primary containment whose function was required to achieve and maintain hot shutdown conditions were adequately separated or protected. Specifically, as of August 24, 1990, the power supply cabling in Fire Areas 48 and 49 for both control room indication and local shutdown indication (redundant trains of indication necessary to achieve and maintain hot shutdown of Unit 1) were not adequately separated or protected in that the cabling was not separated by a fire barrier having a 3-hour rating, a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards or a one-hour fire barrier



and no independent alternative/dedicated shutdown indication was provided."

RESPONSE TO VIOLATION I

As previously stated, we do not contest this Severity Level III violation and have initiated payment of the \$150,000 civil penalty by electronic transfer on March 25, 1991.

As part of the readiness review for the Appendix R audit, a review was performed to verify the accuracy of cable routings that had been installed as part of modifications intended to achieve compliance with 10 CFR 50 Appendix R. As part of this review, it was discovered on July 20, 1990, that cable 1-29685G, which had been installed to provide power from Unit 1 local shutdown indication (LSI) panel 1-LSI-6 to panel 1-LSI-6X, had been routed through some of the same fire areas as the cable that provides the normal source of power from MCC 1-ABD-B to all the Unit 1 LSI panels. The consequence of this routing error was that a fire postulated in Fire Area 40 (Zone 41), Fire Area 48 (Zone 55) or Fire Area 49 (Zone 56) had the potential to cause the failure of both the normal and alternate source of power to the Unit 1 LSI panels. This, in turn, would have rendered the LSI panels unavailable for safe shutdown process monitoring.

Further investigation revealed that the control room instrument indications required for safe shutdown would not have been affected by a fire in fire area 40 and therefore would have been available for safe shutdown process monitoring in the event of a fire in this area.

In the case of a fire in Fire Areas 48 and 49, it was found that both control room and LSI panel indications may have been lost. Although suppression and detection systems are installed in these areas and could protect these cables from fire damage, the physical separation between LSI and control room indication circuits, as required by Section III.G.2 of Appendix R, was not provided.

A similar cable routing error involving the Unit 2 LSI panels was discovered on September 6, 1990. This condition was reported to the NRC on September 21, 1990 in Unit 1 LER 90-10 along with the Unit 1 error. The Unit 2 error is addressed in our response to Violation II.B.

(1) Corrective Action Taken and Results Achieved

A plant temporary modification was immediately initiated to install a one ampere fuse in 1-LSI-6 to isolate the LSI panel electrical distribution system from fire-induced faults on cable 1-29685G. The fuse prevents a fault on

this cable from leading to a complete loss of LSI panel indication. While this action alone resolves the separation problem, a minor modification has been initiated to reroute the cable and restore the panels to the configuration originally intended.

(2) Corrective Action Taken to Avoid Further Violations

The root cause of this violation was that insufficient controls were in place to ensure that new cables were routed in compliance with Appendix R requirements. We believe that the initiatives described in Attachment 1, especially the Appendix R procedures and the enhanced training programs in both the Nuclear Design Group and the Nuclear Engineering Department, will help preclude similar violations in the future.

(3) Date When Full Compliance Will Be Achieved

Full compliance was achieved with the installation of a one ampere fuse in 1-LSI-6 cable 1-29685G on August 24, 1990.

VIOLATIONS NOT ASSESSED A CIVIL PENALTY.

NRC VIOLATION II.A

"Sections 2.C(4) and 2.C.3(o) of Amendments No. 31 and No. 12 to Plant Operating Licenses No. DPR-58 and DPR-74, respectively, require the administrative controls for fire protection, as described in the licensee's submittal dated October 27, 1977, shall be implemented and maintained. The October 27, 1977 licensee submittal specifies that the Operations Quality Assurance Program will meet the criteria as described in Attachment No. 6 of the NRC document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." Paragraph 8.0 of Attachment No. 6 states, in part, that measures shall be established to ensure that conditions adverse to fire protection, such as deficiencies and defective components, are identified and corrected promptly.

Contrary to the above, the licensee identified conditions adverse to fire protection, i.e., emergency lighting system deficiencies, and failed to promptly correct the deficiencies. Examples of these failures include:

1. Battery deficiencies associated with Emergency Lighting Unit 366 were identified on July 19, 1988, and were not corrected. The deficiencies were identified again on September 20, 1988.
2. Battery deficiencies associated with Emergency Lighting Unit 386 were identified on November 8, 1988, and were not corrected. The deficiencies were identified again on December 23, 1988."

RESPONSE TO VIOLATION II.A

Emergency lighting maintenance is an important aspect of the fire protection program. The maintenance program is critical to ensuring that emergency lighting units can be relied on to assist the operator in performing safe shutdown actions following a fire. While we agree with the finding that we did not promptly correct deficiencies, we are in minor disagreement over the event chronology noted in the violation examples. In the case of Example 1, the job order that initiated a routine emergency lighting inspection under Planned Maintenance Task 9 was dated July 19, 1988. This inspection led to the initial discovery of the deficiency in Emergency Lighting Unit 366. However, this unit, which is one out of a population of over 400 units installed on site, was not actually inspected



until August 24, 1988. The deficiency was corrected on the same job order on September 17, 1988, approximately three weeks after it was initially identified.

Similar to Example 1, the deficiency associated with Emergency Lighting Unit 386 cited in Example 2 was also reported in two consecutive Planned Maintenance Task 9 inspections. The first of these inspections was initiated on October 7, 1988, while the second was initiated on November 29, 1988. The example correctly notes the dates on which the lighting unit was actually inspected and reinspected. According to our records, the deficiency was not corrected until August 5, 1989, approximately nine months after it was initially identified.

(1) Corrective Actions Taken and Results Achieved

The deficiency on Emergency Lighting Unit 366 was corrected on September 17, 1988. The deficiency on emergency lighting Unit 386 was corrected on August 5, 1989.

In May 1990 routine surveillances for Planned Maintenance Task 9 were suspended while corrective actions for previously identified deficiencies were completed. These corrective actions were accomplished by July 1, 1990, thus bringing all known hardware deficiencies into compliance.

(2) Corrective Action Taken to Avoid Further Violations

The procedure that governs the prioritization of job orders, PMI-2290, was revised in May 1990 to raise the priority level of corrective action job orders for Appendix R items. This change in priority will ensure that identified deficiencies are promptly corrected.

(3) Date When Full Compliance Will Be Achieved

We believe that the procedural changes we implemented in May 1990 brought our emergency lighting system maintenance program into compliance with the criteria described in Attachment 6 of the NRC document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." Despite this, as noted above, we will continue to evaluate options for making further program improvements.

NRC VIOLATION II.B

"Section 2.C(4) and 2.c.3(o) of Amendments No. 31 and No. 12 to Plant Operating Licenses No. DPR-58 and No. DPR-74, respectively, require that the administrative controls for fire protection as described in the licensee's submittal dated October 27, 1977 shall be implemented and maintained. The October 27, 1977 licensee submittal specifies that the Operations Quality Assurance Program will meet the criteria described in Attachment No. 6 of the NRC document, "Nuclear Plant Fire Quality Assurance." Paragraph 1.0 of Attachment No. 6 states, in part, that measures shall be established to assure that applicable guidelines are included in design documents. These measures shall include design reviews to verify adequacy of wiring isolation and cable separation criteria.

10 CFR Part 50, Appendix R, Section III.G.2, used as a criteria by the licensee for design of Fire Area 29 requires, in part, that redundant trains of cables be separated by a horizontal distance of more than 20 feet with no intervening combustibles.

Contrary to the above, licensee design review failed to ensure the adequacy of wiring isolation and cable separation for fire protection considerations. Specifically, as of September 6, 1990, the licensee failed to verify that Cable Nos. 1-1936R and 2-12467 in Fire Area 29, which provide the Unit 2 LSI panels alternative and normal power supply, respectively, had been adequately separated. The cables were physically separated but the fire area was not free of intervening combustibles."

RESPONSE TO VIOLATION II.B

As part of a readiness review for the Appendix R audit, a review was performed to verify the accuracy of cable routings that had been installed as part of modifications intended to achieve compliance with 10 CFR Part 50 Appendix R. As part of this review, it was discovered on September 6, 1990, that cable 1-1936R had been routed through one of the same fire areas as 2-12467. Cables 1-1936R and 2-12467 provide the Unit 2 LSI panels with their alternate and normal sources of power, respectively. The consequence of the routing error was that a fire postulated in Fire Area 29 (Zone 24) had the potential to cause the failure of both sources of power to the Unit 2 LSI panels. This, in turn, would have rendered these panels unavailable for safe shutdown process monitoring.

Although Fire Area 29 is protected by suppression and detection systems, the physical separation between these power circuits, as required by Section III.G.2 of Appendix R, was not provided.

Further investigation revealed that the following Unit 2 control room instrument indications would not have been affected by a fire in Fire Area 29 and therefore would have been available for safe shutdown process monitoring in the event of a fire in this area:

2-BLP-112	SG 1 Water Level (normal range)
2-BLP-142	SG 4 Water Level (normal range)
2-MPP-210	SG 1 Pressure
2-MPP-240	SG 4 Pressure
2-N31	Source Range Monitoring Channel 1
2-NLP-151 or 2-NLP-153	Pressurizer Water Level
2-NPS-121	RCS Pressure (wide range)

Although a direct indication of reactor coolant system temperature may not have been available, the available steam generator pressure indication could have been utilized by the operators to obtain an estimate of the cold leg temperature, which in turn would have permitted safe shutdown operations to be performed.

(1) Corrective Action Taken and Results Achieved

A plant modification was initiated to provide a one-hour fire enclosure around the portion of conduit 2-12467 that exists in Fire Zone 24, thereby precluding a loss of both Unit 1 and Unit 2 power to the LSI panels.

(2) Corrective Action to Avoid Further Violations

As discussed in our response to Violation I and in Attachment 1 of this submittal, the measures that we are taking to improve Cook Nuclear Plant design control should preclude recurrence of similar conditions.

(3) Date When Full Compliance Will Be Achieved

Compliance was achieved on September 20, 1990 with the completion of the minor modification to provide a one-hour fire enclosure.

NRC VIOLATION II.C

"10 CFR 50.48(b) requires that all nuclear power plants licensed to operate prior to January 1, 1979 satisfy the applicable requirements of Appendix R to 10 CFR Part 50 including, specifically, the requirements of Sections III.G, III.J and III.O.

10 CFR Part 50, Appendix R, Section III.J, requires that emergency lighting units with at least an eight hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes to those locations.

Contrary to the above, from April 14, 1988 through August 30, 1990, for Units 1 and 2 of the D.C. Cook facility, licensed to operate prior to January 1, 1979, adequate emergency lighting was not provided in certain plant areas needed for operation of safe shutdown equipment and in access and egress routes to those locations. For example:

1. The Nuclear Sampling Room, Elevation 587 feet;
2. The Unit 2 Auxiliary Building Piping Penetration Area, Elevation 591 feet, at Local Shutdown Panel 2-LSI-2;
3. The Unit 1 West Non-Essential Service Water Valve Gallery, Elevation 612 feet; and
4. The Unit 2 West Non-Essential Service Water Valve Gallery, Elevation 612 feet."

RESPONSE TO VIOLATION II.C

On April 14, 1988, the Unit 1 and 2 Emergency Remote Shutdown (ERS) Procedures 1-OHP 4023.001.001, Rev. 8, and 2-OHP 4023.001.001, Rev. 5, respectively, became effective. These revisions significantly expanded the level of detail provided in the previous revisions and incorporated the Unit 1 and 2 Alternate Shutdown and Cooldown Procedures (12-OHP 4023.100.001 and 12-OHP 4023.100.002, respectively). The revised ERS procedures were designed to provide an alternate method to achieve safe shutdown for any fire having the potential to adversely affect the plant's normal safe shutdown capability with or without offsite power available.

While this new version of the procedure had been walked down prior to issuance to evaluate implementation and timing, it was not walked down to evaluate the adequacy of emergency lighting. Previous versions of the procedure had been walked down for emergency lighting. However, no definitive acceptance criteria

had been established to evaluate its adequacy. On April 19, 1990 an emergency lighting walkdown was performed with the normal auxiliary building lighting turned off. Under those simulated blackout conditions, previously overlooked lighting deficiencies were made apparent.

The majority of the areas which required emergency lighting did, in fact, have lighting packs installed. However, the lighting provided from these packs was judged in a number of cases to be less than that required to support efficient and timely completion of operator actions in those areas. Inadequate lighting was found to be mainly due to shadows cast by equipment and structures located between the lighting packs and the safe shutdown equipment requiring operator access.

In areas where emergency lighting was found to be lacking altogether, the cause was found to be mainly due to the introduction of new operator actions in areas of the plant that did not require access in previous procedure revisions (eg., nuclear sampling room).

On June 20 and 21, 1990, another walkdown of the auxiliary building was performed. The purpose of this walkdown was to select exact locations for the installation of new battery packs and lighting heads. These locations were selected based on the inadequacies identified in the April 19, 1990 walkdown.

On July 17, 1990, a third emergency lighting walkdown was conducted. In this third walkdown, a light meter was used to obtain lighting measurements for various plant areas and safe shutdown components. The light meter was used to verify the adequacy of lighting available from the emergency lighting packs in areas of the plant where, due to normal plant operating requirements, simulated blackout testing could not be performed. A conservative, objective criteria of 0.4 foot-candles was established as the minimum lighting level that would permit an operator to read plant equipment identification tags without difficulty.

As a result of these three walkdowns, 61 locations were identified as having inadequate emergency lighting.

(1) Corrective Action Taken and Results Achieved

Installation of additional Appendix R emergency lighting was expedited. Except for those lighting packs that were needed in the Unit 1 control room, the installation of the additional lighting packs was completed by August 31, 1990. The Unit 1 control room installations were delayed until Unit 1 entered its refueling outage. These

installations were completed on February 11, 1991.

In addition, the operators were issued lamp-type miner's hats to help facilitate the implementation of the emergency remote shutdown procedure in the event that an Appendix R fire occurred during this installation period. We intend to retain the miner's hats or provide other means of portable lighting for use by the members of the ERS team for extra conservatism during procedure execution. The hats are viewed as an effective back-up to the installed lighting packs.

(2) Corrective Action to Avoid Further Violations

This violation can be attributed to three root causes. First, lighting walkdowns performed prior to the April 19, 1990 walkdown were not designed to rigorously verify the illumination levels available at individual safe shutdown component locations. Future lighting walkdowns will provide assurance that all such components will be illuminated to a minimum of 0.4 foot-candles. Second, there was no specific requirement established which called for ERS procedure revisions to be evaluated with respect to emergency lighting needs. To address this issue as well as other Appendix R related issues, the position of a plant Appendix R administrator has been created. It will be this individual's responsibility to oversee the routine implementation of Appendix R at the plant, including the walkdown of all emergency remote shutdown procedure revisions for emergency lighting adequacy.

Finally, the responsibility for Appendix R lighting acceptability had been fragmented. Cook Nuclear Plant and corporate personnel were responsible for only portions of emergency lighting adequacy. Consequently, design modifications were not reviewed for their impact on emergency lighting. To address this, as well as other Appendix R related issues, a Nuclear Engineering Department Appendix R engineer position has been created. This engineer will work closely with the plant Appendix R administrator to ensure that emergency lighting is not adversely impacted by design changes or other factors.

(3) Date When Full Compliance Will Be Achieved

The installation of the additional lighting packs was completed by August 31, 1990, except for those needed in the Unit 1 Control Room. In order to install the lights in the Control Room it was necessary for the unit to be in an outage. The installation of these lights was completed on February 11, 1991.

NRC VIOLATION II.D

"10 CFR 50.48(b) requires that all nuclear power plants licensed to operate prior to January 1, 1979 satisfy the applicable requirements of Appendix R to 10 CFR Part 50 including, specifically, the requirements of Sections III.G, III.J, and III.O.

10 CFR Part 50, Appendix R, Section III.G, requires, in part, that, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to 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, means of ensuring that one of the redundant trains is free of fire damage shall be provided.

10 CFR Part 50, Appendix R, Section III.L.7, requires, in part, that the safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety circuits in the fire area so that shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment.

Contrary to the above, as of September 14, 1990, for Unit 1 of the D.C. Cook facility, licensed to operate prior to January 1, 1979, the safe shutdown equipment for each fire area was not known to be isolated from associated non-safety circuits in the fire area, such that shorts to ground in the associated circuits would not prevent operation of the safe shutdown equipment. Specifically, the licensee's circuit coordination study had not included an evaluation of the potentially adverse affect of high impedance faults, a type of short to ground, on the safe shutdown equipment from all associated non-safety circuits located within any fire area."

RESPONSE TO VIOLATION II.D

Generic Letter 86-10 postulates the simultaneous occurrence of sustained faults with sufficiently high impedance to limit the current in each circuit below the tripping level of the individual circuit protective device. The total fault current, however, is assumed to be above the tripping level of the protective device of the source. This would result in losing coordination and deenergizing the total load connected to this source.

As a result of Generic Letter 86-10, AEPSC prepared a position paper on multiple high impedance faults, which was approved by AEPSC management on June 17, 1988. The paper concluded that fire-induced high impedance faults of a stable, sustained nature on multiple cables were not credible.

On November 1 and 2, 1989, a meeting was held at Cook Nuclear Plant with NRR and Region III staff to discuss fire protection issues. During this meeting we were requested to submit our position on multiple high impedance faults. On February 21, 1990, we submitted AEP:NRC:0692BT, "NRC Request for Additional Information, and Post-Fire Safe Shutdown Methodology." Page 13 of Attachment 1 to AEP:NRC:0692BT, discussed our position that the occurrence of multiple high impedance faults is not a credible event. Our position paper was included as Attachment 2.

On April 26, 1990, the NRC provided us with a safety evaluation of our February 21, 1990 submittal. Issue 2.23.1 of the safety evaluation pertained to multiple high impedance faults. The safety evaluation acknowledges that we presented our justification for the position that multiple high impedance faults are not considered credible. The safety evaluation further states that the NRC will scrutinize our position during the upcoming fire protection audit and that the position is left "open."

After receipt of the April 26, 1990, safety evaluation, the status of the multiple high impedance faults issue was researched. This effort included contacting cognizant individuals at several other power plants and attending NRC exit meetings on the Davis-Besse Appendix R audit. Despite our continued belief that multiple sustained faults are not credible events, it was concluded that such a position would most likely not be accepted by the NRC. Consequently, we initiated a multiple high impedance faults study in May 1990.

(1) Corrective Action Taken and Results Achieved

Our multiple high impedance faults study was completed in October 1990. The study demonstrates that fire-induced multiple high impedance faults would not adversely impact post-fire safe shutdown capability.

(2) Corrective Action Taken to Avoid Further Violation

We believe that this issue has been closed by our successful completion of the fault study.

(3) Date When Full Compliance Will Be Achieved

Full compliance was achieved on October 26, 1990, upon completion of the study.

NRC VIOLATION II.E

"10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into drawings and procedures. These design control measures shall include control of design interfaces and coordination among participating design organizations. The design control measures shall provide for verifying or checking the adequacy of the design.

Contrary to the above, the licensee failed to ensure that adequate design control measures were provided. Specifically, on or about November 13, 1985, for Unit 1 and on or about June 23, 1984, for Unit 2, the licensee failed to verify that the component cooling water (CCW) and essential service water (ESW) low header pressure isolation relay wiring changes had been correctly translated onto Drawings Nos. 1-98405 and 2-98405 (CCW) and Nos. 1-98415 and 2-98415 (ESW) by a design interface organization.

RESPONSE TO VIOLATION II.E

During an internal review, it was discovered that the isolation relay circuitry for the low header pressure auto start switches had not been correctly modified and might not meet the Appendix R separation criteria. Because the circuit was improperly wired, a fuse coordination problem was created between the pressure switch and the remainder of the control circuit, making it possible for a pressure switch wiring short to disable an ESW pump's auto start circuit.

Appendix R of 10 CFR 50 requires that when cables of redundant equipment necessary to achieve and maintain hot shutdown conditions are located in the same area, steps must be taken to ensure that one of the redundant trains is free of fire damage. The installed configuration of the pressure switches did not meet this requirement. All four ESW pressure switches for low header pressure are located in the same fire area. Because of the improper wiring in the pump control circuitry, a short in the pressure switch wiring of a pump had the potential for disabling the auto start feature of that pump. This created a potential that a fire in the area could cause a short in all ESW pressure switch cables and disable the auto start capability. This would not have affected any operating pumps. However, in the event of a loss of offsite power, the pumps could not have been restarted as is stipulated in Appendix R. Restarting the pumps would have required isolating the faulted circuits and reclosing the breaker manually. The ERS procedure includes instructions for accomplishing this action.

As for the CCW pump circuits, further investigation revealed that the physical separation between the circuits was adequate to preclude simultaneous pump failure due to a single fire event. Thus, although the same wiring error existed as that described for the ESW pumps, it was concluded that the error did not violate Appendix R requirements.

(1) Corrective Actions Taken and Results Achieved

The immediate corrective action was to provide fuse coordination for the improperly wired circuits by replacing the pressure switch circuit isolation fuse with one of a lower rating (5 amp). The permanent corrective action was to rewire the circuits to the "as engineered" configuration via a plant modification. Our immediate corrective action, which was completed on June 22, 1990, brought the configuration into compliance with Appendix R.

(2) Corrective Action Taken to Avoid Further Violation

While the engineering documents for the design changes had been properly prepared, the changes were not properly implemented on the design drawings. The aforementioned procedure enhancements and training will help to provide assurances that similar errors do not occur in the future.

(3) Date When Full Compliance Will Be Achieved

Immediate compliance was achieved on June 22, 1990, when the 10 amp isolation fuses were replaced with 5 amp fuses. Permanent compliance was achieved for Unit 2 on September 20, 1990 and Unit 1 on December 20, 1990 upon completion of the rewiring of the circuits.