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Docket Nos. 50-321
50-366

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

Edwin I. Hatch Nuclear Plant
Effect of Kaowool on the River Intake Structure
Fire Area Safe Shutdown Analysis

Ladies and Gentlemen:

In response to Nuclear Regulatory Commission Unresolved Item (URI) 50-321, 50-366/00-04-01, "Kaowool Fire Protection Barrier at Intake Structure," Southern Nuclear Operating Company (SNC) reevaluated the requirement for the river intake structure Kaowool installation to meet 10 CFR 50, Appendix R requirements relative to safe shutdown. The evaluation included an electrical circuit failure analysis, a review of the combustible loading in the river intake structure and a hydraulic analysis to assure that the requirements of 10 CFR 50, Appendix R are met. In addition, previously approved exemptions for the river intake structure were reviewed.

Based upon evaluation results, SNC confirmed the Kaowool barrier material installed in the Plant Hatch river intake structure is adequate to provide divisional separation per Branch Technical Position APCSB 9.5-1, Appendix A requirements and reduce combustible loading in support of previous exemptions for 10 CFR 50.48, Appendix R. No credit is taken for Kaowool as a fire barrier wrap material used to protect post-fire safe shutdown circuits per the requirements of 10 CFR 50, Appendix R. However, Kaowool is used to reduce the combustible loading of the river intake structure in support of 10 CFR 50, Appendix R exemptions. Also, SNC confirmed that the as-installed Kaowool fire-barrier material does not adversely impact previously approved exemptions. In summary, SNC considers the URI concerning the Kaowool installation at Plant Hatch to be sufficiently addressed.

The enclosure provides the report detailing the reevaluation of the effect of Kaowool on the Plant Hatch river intake structure. Included in the report are Plant Hatch's design and licensing bases for the Kaowool installation, detailed discussions of the circuit failure and the combustible loading analyses, a review of current exemptions, and evaluation results.

Should you have any questions in this regard, please contact this office.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

IFL/sp
Enclosure: River Intake Structure Fire Area Shutdown Analysis

A006

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ENCLOSURE

EDWIN I. HATCH NUCLEAR PLANT

RIVER INTAKE STRUCTURE
FIRE AREA SHUTDOWN ANALYSIS

January 2001

EDWIN I. HATCH NUCLEAR PLANT

RIVER INTAKE STRUCTURE FIRE AREA SHUTDOWN ANALYSIS

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EDWIN I. HATCH NUCLEAR PLANT

RIVER INTAKE STRUCTURE FIRE AREA SHUTDOWN ANALYSIS

I. INTRODUCTION

In response to Nuclear Regulatory Commission (NRC) Unresolved Item (URI) 50-321, 50-366/00-04-01, "Kaowool Fire Protection Barrier at Intake Structure," a reevaluation of the Title 10 Code of Federal Regulations (CFR) 50, Appendix R Safe Shutdown Analysis for the Edwin I. Hatch Nuclear Plant river intake structure was performed to determine and/or confirm that the use of the Kaowool fire-barrier material meets the current licensing basis for its use in the river intake structure. To effectively resolve this issue, Southern Nuclear Operating Company (SNC) reviewed the current licensing basis and reanalyzed the safe shutdown circuits, combustible loading, and hydraulic requirements for the river intake structure. In addition, the previously approved exemptions for the river intake structure were reviewed to ensure compliance with applicable provisions of the exemptions is maintained.

Based upon evaluation results, SNC confirmed the following:

1. The Kaowool barrier material was installed in the river intake structure to meet the requirements of 10 CFR 50, Appendix R, Subsection III.G, "Fire protection of safe shutdown capability"; i.e., to reduce combustible loading and provide divisional separation per 10 CFR 50, Appendix A, Branch Technical Position (BTP) APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants."

2. The requirements of 10 CFR 50, Appendix R are met.

3. The as-installed Kaowool barrier material is acceptable for the intended application and does not adversely affect current exemptions.

The following sections present the river intake structure installed Kaowool configuration, as well as the design and licensing bases for Kaowool. Detailed discussions of the circuit failure, hydraulic, and combustible loading analyses are provided. Also included are the review of current exemptions and conclusions based upon analysis results.

It should be noted that unless stated otherwise, the term "safe shutdown" used in this report applies to both hot and cold shutdown functions.

II. RIVER INTAKE STRUCTURE CONFIGURATION

The Edwin I. Hatch Nuclear Plant river intake structure is a remotely located, reinforced concrete, enclosed structure with sufficient spatial separation to preclude exterior exposure hazards. The river intake structure contains the residual heat removal service water (RHRSW) pumps, the plant service water (PSW) pumps, a standby service water pump, cabling, valves, ventilation fans, and motor control centers (MCCs) for both units. Each divisional pump and motor assembly, and MCC is isolated from the adjacent division to prevent possible damage resulting from water spray, debris, or missiles. Concrete curbs contain and control spilled oil from the RHRSW pump motor bearing housings in case of a rupture.

The river intake structure pump area covers 3984 ft^2 of floor area. Combustible materials consist of lubrication oils and grease contained within the pumps, electrical cable contained in conduit or in cable trays, and a small amount of plastic and paper items. Fire protection features consist of an area-wide fire-detection system, automatic wet-pipe water-spray systems for each pump, manual hose stations, and portable fire extinguishers.

Based upon previous exemption requests, stringent administrative controls for work activities performed in the river intake structure are proceduralized. A continuous fire watch is required for activities involving the introduction of transient combustible loads. Administrative procedures ensure fire-related incidents are precluded during routine and special maintenance activities.

The river intake structure contains ~ 300 linear feet of cable trays wrapped with the Kaowool fire-barrier material. The cable trays are 12-in. and 18-in.-wide National Electrical Manufacturers Association (NEMA) Class II aluminum, ladder-type cable trays. The Kaowool fire-barrier installation consists of four 1/2- in.-thick Kaowool blankets wrapped around the cable trays. The blankets are secured to the cable trays with stainless-steel banding placed a maximum of 14-in. on centers and within 4-in. of each end-joint.

Cable trays are installed 12 to 14 ft above the floor to avoid interference with major equipment, such as MCCs and pump motors. The trays contain only a few low-voltage cables.

III. DESIGN AND LICENSING BASIS FOR KAOWOOL

A. Background

1. Appendix A to BTP APCSB 9.5-1

Following a fire at the Browns Ferry Nuclear Station in March 1975, the NRC initiated an evaluation of the need for improving fire protection programs at all licensed nuclear power plants. As part of this initiative, the NRC published the report, "Recommendations Related to Browns Ferry Fire," NUREG-0050, in February 1976. This report recommended that improvements in the areas of fire prevention and fire control be made in most existing facilities and consideration be given to design features that will increase the ability of nuclear facilities to withstand fire without the loss of important safety functions. To implement the report's guidelines and recommendations, the NRC initiated a program for reevaluation of fire protection programs at all licensed nuclear power stations and a comprehensive review of all new license applications. The subject guidelines are contained in the following documents:

- "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," NUREG-75/087, Section 9.5.1, "Fire Protection," May 1976.
- "Guidelines for Fire Protection for Nuclear Power Plants," (Appendix A to BTP APCSB 9.5-1), August 23, 1976.
- "Supplementary Guidance on Information Needed for Fire Protection Program Evaluation," September 30, 1976.
- "Sample Technical Specifications."
- "Nuclear Plant Fire Protection Functional Responsibilities Administrative Controls, and Quality Assurance," June 14, 1977.

All licensees were requested to:

a. Compare their fire protection programs with the new guidelines.

b. Analyze the consequences of a postulated fire in each plant area.

2. 10 CFR 50, Appendix R

On February 19, 1981, the new fire protection regulation published in 10 CFR 50, Paragraph 50.48, "Fire protection," and 10 CFR 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," became effective. Appendix R establishes the fire protection features required to satisfy General Design

Criterion 3, "Fire protection," of 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants."

The underlying purpose of Appendix R, Subsection III.G is to ensure at least one means of achieving and maintaining safe shutdown will remain available during and after any postulated fire within a plant area. Subsection III.G specifies three options for limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown remains free of fire damage. Two of the options rely upon fire-rated barriers, and one option relies upon separation with no intervening combustible loads.

For the river intake structure, Plant Hatch relies upon separation with no intervening combustible loads. The Kaowool fire-barrier material is used to encapsulate non-Appendix R circuits to reduce combustible loading in support of exemptions to the requirements of Appendix R, Subsection III.G.2.b. Kaowool is not used in the river intake structure to protect redundant safe shutdown circuits; therefore, the requirements of Appendix R, Subsection III.G.2.c are not applicable.

B. Licensing Basis for Plant Hatch Kaowool Installation

1. Appendix A to BTP APCSB 9.5-1

Plant Hatch uses Kaowool fire-barrier material in the river intake structure to meet divisional separation requirements.

By letter dated February 15,1978, SNC submitted Amendment 3 to the "Evaluation of the Hatch Fire Protection Program" (in response to BTP APCSB 9.5-1).

On October 4,1978, the NRC issued the Hatch Nuclear Plant Fire Protection Safety Evaluation Report (SER), which documented the NRC's evaluation of the Plant Hatch Fire Protection Program Re-evaluation Report, dated October 27,1976. In the SER, the NRC concluded the protection to be provided for the river intake structure meets the positions of Appendix A to BTP APCSB 9.5-1 and is, therefore, acceptable. SNC committed, in part, to:

a. Install Kaowool as a fire-retardant barrier around the overhead cable trays and conduits for ~ 10 ft in either side of divisional crossings. The remaining open-floor areas will be appropriately marked to exclude transient combustibles.

b. Protect against a potential fire involving oil contained in the pump motors, provide a curb around each residual heat removal service water (RHRSW) pump to contain oil spills.

c. Provide an automatic wet-pipe sprinkler system with directional nozzles to protect each pump motor.

2. 10 CFR 50, Appendix R

Plant Hatch uses Kaowool fire-barrier material in the river intake structure to reduce combustible loading in support of the exemptions discussed below to meet the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.b. Kaowool is not used in the river intake structure to protect redundant safe-shutdown circuits; therefore, the requirements of Appendix R, Subsection III.G.2.c are not applicable.

By letter dated July 1, 1982, with subsequent letters dated April 28, May 27, November 16, November 30, and December 20, 1983, SNC submitted a request for exemption from the technical requirements of Appendix R, Subsection III.G.2 to the extent it requires the installation of an automatic, area-wide fire-suppression system for the river intake structure.

By letter dated April 18, 1984, the NRC issued an SER based upon SNC's July 1, 1982 request. The SER provided the following input:

> *The fire loading in this location, which includes anticipated transient combustibles, is low. If the combustibles were totally consumed, they would produce a fire which corresponds to a fire severity on the ASTM time-temperature curve of less than 50 minutes; but this fire would be unlikely to occur because of the existing level of fire protection. It is our judgment that a fire in this area would not be significant and would not breach the protection provided by physical fire barriers until the fire self-extinguished or was suppressed by the plant fire brigade. We, therefore, have reasonable assurance that one safe shutdown pathway will be free of fire damage.*

By letter dated May 16,1986, SNC submitted to the NRC a request for exemption from the technical requirements of Subsection III.G.2.b of Appendix R to the extent it requires 20-ft separation between redundant divisions with no intervening combustibles.

By letter dated January 2, 1987, the NRC granted the above exemption to Appendix R, Subsection III.G.2.b, as stated below:

> *...the licensee's request for an exemption from the requirements of Subsection III.G.2.b to the extent that a 20-foot separation distance is required between redundant cables, is granted for the Intake Structure outside of the automatic suppression areas. As a condition for granting of this exemption, however, the licensee will be required to maintain a continuous fire watch during repair and*

maintenance activities whenever combustible materials are stored in or are moved through the non-sprinkled area.

It should be noted that SNC's May 16, 1986, exemption request provided the following information:

All other cables are routed in conduit or other metal enclosures. Outside of the suppression areas, unwrapped Unit 2 redundant conduit is separated by a minimum of 8 feet.

The analysis results confirm the conduit referenced above does not contain redundant safe shutdown circuits.

Summary

1. Kaowool fire-barrier material is used to support exemptions to 10 CFR 50, Appendix R, Subsection III.G.2.b by reducing the combustible loading of the river intake structure.

2. Kaowool fire-barrier material is not used to protect redundant safe shutdown circuits; therefore, the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.c are not applicable.

IV. Analyses

A. Circuit Failure

A circuit failure analysis for the equipment and cables located in the Plant Hatch river intake structure was performed to determine whether the requirements of 10 CFR 50, Appendix R are met without taking credit for the Kaowool fire-barrier material as a 1-hour-rated fire barrier. A circuit failure analysis is typically used as input to the Fire Hazards Analysis to show that the necessary control circuitry and power circuitry are adequately maintained for the applicable safe shutdown equipment.

The circuit failure analysis confirmed that the reactor core isolation cooling (RCIC) system is used as the credited path for hot shutdown and the low pressure coolant injection (LPCI) mode of RHR is used for cold shutdown. Also, the analysis determined that no required circuits for hot shutdown are contained within the river intake structure, and no credited circuits for cold shutdown are contained within the cable trays wrapped with the Kaowool fire-barrier material.

1. Evaluation of Cables in Cable Trays

The circuit failure analysis assumed all cables routed in trays are lost due to fire; thus, credit is not taken for the cables or their function. The effects on the operability of safe shutdown equipment due to cable damage were analyzed. The analysis demonstrated the ability of Plant Hatch to achieve safe shutdown as required by 10 CFR 50, Appendix R. Any actions necessary for the safe shutdown equipment to perform its safe shutdown function are included in the appropriate plant procedures, with sufficient time available. A summary of the safe shutdown cables located in cable trays follows.

The river intake structure contains two sets of divisional cable trays:

a. Division I Cable Trays

Approximately 100 ft of Division I cable trays contain a total of 7 cables that affect safe shutdown equipment. Of the 7 cables:

- Two affect de-energized PSW return line isolation valve 1P41-F312, which is required to remain closed to prevent diversion of PSW flow to the river.

  Power to the valve is removed during normal operation; fire damage to the cables cannot cause the valve to open.

- One affects PSW turbine building isolation valve 1P41-F310A, which is required to close to prevent diversion of PSW flow away from the required safe shutdown equipment to the turbine building.

Loss of this circuit will not prevent the valve from being closed from the MCR.

- One affects PSW strainer A isolation valve 1P41-F313A, which is required to remain closed to prevent diversion of PSW flow to the river.

  Loss of this circuit can cause the valve to open. However, hydraulic analysis shows that diversion of water through the open valve will not affect the ability to achieve safe shutdown.

- One affects PSW traveling water screen isolation valve 1W32-F002A, which is required to close to prevent diversion of Division 1 PSW flow to the river.

  Loss of this circuit can cause the valve to open; however, hydraulic analysis shows that diversion of water through the open valve will not affect the ability to achieve safe shutdown.

- One affects river intake structure ventilation fan 1X41-C009A.

  The loss of this circuit will prevent the fan from automatically operating; however, the circuit loss is justified by performing a proceduralized manual action that is not required until ~ 4 hours into the event.

- One affects river intake structure ventilation fan 1X41-C009C.

  The loss of this circuit will prevent the fan from automatically operating; however, the circuit loss is justified by performing a proceduralized manual action that is not required until ~ 4 hours into the event.

b. Division II Cable Trays

Approximately 200 ft of Division II cable trays contain 2 cables that affect safe shutdown equipment. Of the two cables:

- One affects PSW strainer B backwash flow valve 1P41-F313B, which is required to remain closed to prevent diversion of PSW flow back to the river.

  Loss of this circuit can cause the valve to open; however, hydraulic analysis shows that diversion of water through the

open valve will not affect the ability to achieve safe shutdown.

- One affects river intake structure ventilation fan 1X41-C009B.

  Loss of this circuit will prevent the fan from automatically operating; however, the circuit loss is justified by performing a proceduralized manual action that is not required until ~ 4 hours into the event.

Loss of the above-referenced motor-operated valve (MOV) cables will not adversely affect the ability to achieve safe shutdown, since hydraulic analysis shows that diversion of water through the open valves will not affect the ability to achieve safe shutdown. Proceduralized manual actions to ensure the operability of river intake structure ventilation will ensure adequate area cooling within ~ 4 hours of the event.

2. Evaluation of Cables in Conduit

Safe shutdown noncable-tray cables within the river intake structure are routed in conduit, including all 4-kV and 600-VAC power cables. These cables are embedded in concrete and/or separated by distance with no intervening combustibles per approved exemptions to 10 CFR 50, Appendix R, Subsection III.G.2. A summary of the safe shutdown cables located in conduit follows:

a. Pumps

The river intake structure contains four RHRSW and four PSW pumps per unit. Power cables for the RHRSW and the PSW pumps are routed in conduit embedded in concrete from the diesel building. No control cables for the RHRSW and PSW pumps are located in the river intake structure. Only one RHRSW pump and one PSW pump are required for any unit safe shutdown path.

b. MCCs

The river intake structure contains two 600-VAC MCCs per unit:

- The two Unit 1 MCCs supply power for two ventilation fans.
- One of the Unit 2 MCCs supplies power to the third ventilation fan.

Only 1 MCC is required for any safe shutdown path.

Power cables for the MCCs are routed in conduit embedded in concrete within the river intake structure. No control cables for the MCCs are located in the river intake structure.

c. Ventilation Fans

The river intake structure contains three ventilation fans. Operation of ventilation fan is required to provide area cooling for the river intake structure. All control cables for the fans are routed in cable trays as stated previously .

Power cables for ventilation fans are routed from the 600/208-V MCCs in conduit in the river intake structure. These cables are separated by distance with no intervening combustibles per approved exemptions to 10 CFR 50, Appendix R, Subsection III.G.2.

d. Miscellaneous Cables

In addition to the cables discussed above, the river intake structure contains additional safe shutdown cables routed entirely in conduit. These cables are separated by distance with no intervening combustibles per approved exemptions to 10 CFR 50, Appendix R, Subsection III.G.2. However, an analysis performed on these circuits determined fire-induced damage to the cables will not prevent either unit from achieving safe shutdown. Any actions necessary for the loss of function is included in the appropriate plant procedures with sufficient time available.

Summary

1. The cable trays in the river intake structure are divisional and do not contain redundant Appendix R circuits required for safe shutdown.

2. The loss of the cables contained within the cable trays wrapped with the Kaowool fire-barrier material will not affect the safe shutdown of the plant.

3. Approved exemptions to 10 CFR 50, Appendix R, Subsection III.G.2 (separation by distance with no intervening combustibles) for noncable-tray cables and equipment are unaffected, and the requirements of Appendix R are met.

B. Hydraulic

The hydraulic analysis reviewed the potential impact on safe shutdown equipment should the three PSW valves identified in the circuit failure analysis open inadvertently. The hydraulic analysis assumed the worst-case situation; i.e., all three PSW valves were assumed to fail open, thereby diverting cooling

water back to the river. The analysis reviewed the required flow rates for the safe shutdown equipment against the supply flow rates.

Summary

1. The inadvertent opening of the three PSW valves will not adversely affect the safe shutdown capability of the plant.

2. A spurious actuation of the PSW valves in different combinations will not change the analysis results.

C. Combustible Loading

A combustible loading analysis for the river intake structure was conducted to determine maximum fire duration and review the results against Kaowool fire-barrier performance in reducing the combustible loading of the area. The analysis examined the maximum damage given the unlikely occurrence of fire. The postulated fire in the river intake structure is of short duration with a very low heat release.

The fire analysis included the total volume of oil in the PSW and RHRSW pump motors for Unit 1 and Unit 2, grease in their stuffing boxes, and some plastic associated with equipment located in the river intake structure. To add a margin of conservatism to the analysis, a fixed amount of combustible liquids for routine maintenance activities was added to the inventory list. The routine maintenance materials were derived from a 5-year review of repetitive maintenance practices. The materials comprising the combustible inventory used in analysis are provided in Table 1.

The analysis established a postulated fire duration of 8 1/2 min for the river intake structure and assumed all combustible loads and all transient material for both Unit 1 and Unit 2, with the exception of cable insulation encapsulated in Kaowool, ignite and burn simultaneously, with no credit taken for a fire-suppression or fire-detection system.

The information on fire endurance tests provided in SECY 99-204, "Kaowool and FP-60 Fire Barriers," dated August 4, 1999, was used as a reference point in evaluating the installation of Kaowool as a fire-barrier material in the river intake structure. Reference Test E.26, Report on Electrical Circuit Protective Materials, is comparable to Plant Hatch in the method construction and the cable loading of the river intake structure with lightly filled, small-diameter cables. The combustible loading analysis compared the time-temperature curve for Reference Test E.26 to the postulated fire duration of the Plant Hatch river intake structure and confirmed all combustibles would be consumed prior to the interior surface temperature of the barrier reaching 250°F above ambient. The 250°F temperature rise of the interior of the barrier was used to define where cable damage is assumed not to occur.

Summary

Based upon the combustible fire loading for the river intake structure and with a potential worst-case fire of 8 1/2 min, the cables encapsulated with the Kaowool fire-barrier material will not contribute to the combustible loading of the river intake structure, and cable damage will not occur prior to the combustible material being consumed.

V. REVIEW OF CURRENT EXEMPTIONS

The review of current exemptions provided below delineates the previous approval of the existing Kaowool fire-barrier installation per 10 CFR 50, Appendix R, Subsection III.G.2, and supports the conclusion that the as-installed Kaowool fire-barrier material does not adversely impact previous exemptions granted by the NRC.

A. By letter dated May 27, 1983, SNC requested an exemption from the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.c, which requires an area-wide, automatic fire-suppression system.

Basis for Exemption Request

The river intake structure is constructed of non-combustible concrete with no appreciable combustible loading within the structure. Limited combustible loads are contained within a Kaowool wrap to reduce combustible loading. The wet-pipe sprinkler heads with low actuation temperatures are used to protect the pumps.

SNC justified the exemption on the basis of low combustible loading in the area as a result of spatial separation, containment of pump oil, automatic suppression over pumps, and the wrapping of cable trays.

Disposition of Exemption Request

By letter dated April 18, 1984, the NRC approved the above requested exemption for the Plant Hatch river intake structure.

B. By letter dated September 4,1984, SNC informed the NRC that a final resolution on the acceptability of using Kaowool as a fire-barrier material in reducing combustible loading at the river intake structure had not been received. Additionally, SNC stated that Kaowool is installed in the river intake structure to reduce the combustible loading as part of 10 CFR 50, Appendix R modifications. In the transmittal, SNC requested the NRC to provide notification of the acceptability of Kaowool as a fire barrier at the Staff's earliest convenience.

C. By letter dated May 16,1986, SNC submitted clarifications of previously granted exemptions to avoid any future misunderstandings relative to the stipulations of the exemptions. The clarifications identified the area(s) needing clarification, explained the reason(s) for the clarification(s), and restated the exemption(s) in a more specific manner.

In the NRC's above-referenced letter dated April 18, 1984, the exemption from the requirements of 10 CFR 50, Appendix R, Subsection III.G.2 failed to include an exemption from the 20-ft separation requirement for cable in conduit and wrapped cable trays. However, the wording of the exemption, provided below, implies the exemption from the 20-ft separation for redundant cable in conduit and other metal enclosures.

...all cable trays and exposed cable are wrapped with Kaowool, providing a nominal 1-hour...fire barrier and reducing the combustible loading of the area to a negligible level. All other cable is routed in conduit or other metal enclosures. Redundant Unit 2 conduit is separated by a minimum of 8 ft outside the suppression areas, with the exception of one conduit which is wrapped with Kaowool.

It should be noted that the 1-hour barrier referenced in the exemptions is based upon the criteria in use at the time the exemptions were approved. Also, a rated fire barrier is typically associated with safe shutdown circuits required to be protected. Since the Kaowool installed in the river intake structure is not used for this purpose, compliance with applicable regulations is maintained.

Disposition of Clarifications

By letter dated January 2, 1987, the NRC reaffirmed the exemption to the requirement of 10 CFR 50, Appendix R, Subsection III.G.2, which specifies the 20-ft separation for cable in conduit and wrapped cable trays

Summary

The previously granted exemptions remain current based upon the following:

1. Kaowool's use in reducing the combustible loading remains unchanged.

2. Kaowool is not credited with protecting redundant Appendix R circuits.

3. The loss of divisional circuits contained within the wrapped cable trays has no adverse effect upon the safe shutdown capability of the plant.

VI. CONCLUSIONS

Based upon the results of SNC's review of the effect of Kaowool on the Plant Hatch River Intake Structure Fire Area Safe Shutdown Analysis, the following conclusions were established:

A. The electrical cables contained in the cable trays protected by the Kaowool fire-barrier material are divisional circuits and are not redundant circuits required for safe shutdown.

B. The loss of the electrical circuits contained in the cable trays protected by the Kaowool fire-barrier material will not affect the ability to safely shut down the plant.

C. The Kaowool fire-barrier material located in the river intake structure is required to meet the divisional separation requirements of Appendix A to BTP APCSB 9.5-1.

D. The Kaowool fire-barrier material is used to reduce the combustible loading within the river intake structure by assuring the cables contained within the cable trays do not contribute to the combustible loading of the area.

E. The Kaowool fire-barrier material installed in the river intake structure is not used to protect required redundant safe shutdown cables located in cable trays required to be free of fire damage. Therefore, the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.c do not apply to the Kaowool fire-barrier installation for the river intake structure.

TABLE 1

MATERIALS COMPRISING COMBUSTIBLE INVENTORY
FOR
PLANT HATCH RIVER INTAKE STRUCTURE

Equipment / Component	Quantity	Total
PSW motors – 2/division and 4/unit, or a total of 8 motors	13 gal/bearing	Unit 1: 4 x 13 gal = 52 gal Unit 2: 4 x 13 gal = 52 gal Total = 104 gal
RHRSW pump motors – 2/division and 4/ unit, or a total of 8 motors	26 gal/ bearing	Unit 1: 4 x 26 gal = 104 gal Unit 2: 4 x 26 gal = 104 gal Total = 208 gal
Plastics covers, lights, thermostats, switches, batteries, etc.	33 lb for various components	33 lb
Cable Insulation: - Div I = 100 ft Div II = 200 ft	0 lb insulation	Trays remain wrapped, thus, not contributing to combustible loading
Margin for routine maintenance combustible fluids	7.5 gal	7.5 gal