UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION II - SUITE 818
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January 29, 1971

Duke Power Company
Attn: Mr. A. C. Thies, Vice President
Production and Operation
Power Building
422 South Church Street
Charlotte, North Carolina 28201

Gentlemen:

This letter relates to the discussion Messrs. C. E. Murphy, C. M. Upright, and D. C. Kirkpatrick of this office held with Messrs. R. L. Dick, J. C. Rogers, J. R. Wells, and other members of your staff at the conclusion of the inspection conducted on December 1 through 4, 1970, regarding the construction activities authorized by AEC Construction Permit No. CPPR-33.

As noted during the discussion, certain items were identified which apparently were not in conformance with statements in the Final Safety Analysis Report and with Appendix B to 10 CFR 50, "Quality Assurance Program for Nuclear Power Plants," as identified below, or which may otherwise raise questions concerning the adequacy of the construction. These items are as follows:

1. The Final Safety Analysis Report, Figure 1-5, specifies the location of the station batteries.

   Figure 1-5 indicates that the station power batteries (PB) and the station instrumentation and control batteries (ICB) are to be located in the turbine building on the mezzanine floor between the structural steel columns.

   Contrary to this requirement, the ICB's have been located in the ventilation equipment room, and the PB's have been located out on the turbine building mezzanine floor rather than between the columns as specified. This obvious discrepancy raises questions regarding the overall accuracy of the FSAR.

2. The Final Safety Analysis Report, Sections 4.4.2 and 18.5.1, specifies the cleaning requirements and procedures for the reactor coolant piping and equipment.

9

required." Other references in Section 7 and Section 8 also state the requirements for routing in cable trays to achieve separation and isolation of redundant circuits.

The primary method which has been used to achieve physical protection from damage is the metallically armored and protected cable systems. With these systems, either the cables are armored or they are installed in metal conduits. Armoring added to cables in various forms provides additional mechanical physical protection in much the same manner as does flexible conduit. Essentially, each cable with its armor has its own "built-in" conduit.

The types of armors employed are as follows:

[1] Power cables have galvanized steel interlocked armors.

[2] Some control cables have galvanized steel interlocked armors while others have a helically applied corrugated bronze armor.

[3] Instrument cables have galvanized steel interlocked armors, served steel wire armor and braided armors, depending on the size, type and flexibility requirements.

Without the armors, the cables would be suitable for cable tray installations as has been installed in existing nuclear power plants. However, with the armors, the cables use cable trays and other adequate means for support; i.e., cables strapped to beams, etc. The cables are suitable for running outside of the cable trays since each cable has its own physical protection built in.

In addition, the cables would be fire retardant without the armors since they are of fire retardant construction containing self-extinguishing materials over the insulation and in the overall sheaths.

c] The cable installation requirements are as follows:

[1] Power cables are generally supported by cable trays with a few exceptions. Drops from the cable trays to equipment are unsupported unless the drops would have been excessive in which case additional supports are installed. Runs external to the cable trays are supported by other adequate methods.

[2] External to the cable spreading room and electrical equipment room control and instrumentation cables are either supported by cable trays, conduit or other means except for drops to equipment in close proximity to the trays.

[3] Inside the cable spreading room and the electrical equipment room, control, instrumentation and small power cables are for the most part continuously supported in the cable tray system. Except for drops into equipment located adjacent to or beneath the tray, cables are without exception inside the general envelope of the cable tray system. Several very heavy interlocked armored power cables were run outside of the trays and supported by other means.

Vertical changes in cable elevations have generally been made by passing through intermediate elevation trays or by use of a sheet metal wire trough mounted on the outside of the tray. Some few vertical changes or drops were made without the aid of a vertical wire trough; however, the cable is armored and the distances involved are short. Exposed cables in these areas are inherently short due to the relatively low headroom and close spacing of equipment.

We feel that the physical protection provided safety related cables in these areas is adequate and conforms to the intent of the statements regarding physical protection of cables in the FSAR. Many cable supports and tray bracing members are not installed until the cable installations are essentially complete so as not to interfere with the installing of cable.

2] Color Coding of Safety Related Cables

a] We agree that Section 8.2.2 requires that power and control cables be color coded to identify their use and/or channel association. Also, the colors specified for safety-related cables are gray, yellow, blue and orange with black reserved for non-safety related cables. Also, we described to DRL the use of these colors in coding safety related cables and indicated a means of implementing the color coding system was to use completely colored outer jackets. We did not limit or intend to limit the color coding method to only completely colored outer jackets and we did not specifically define the method in the FSAR. There was a very good reason for this, since we were still investigating other methods at the time.

The methods selected to implement the cable color coding systems were:

[1] All power and control cables, which could be identified as safety related cables in sufficient time to obtain delivery compatible with the construction schedule, were manufactured with continuously colored jackets. Power and control cables identified later as safety related and which quantities were not manufactured with colored jackets would be color coded in the field by methods under investigation.

[2] All instrumentation cable was ordered to be manufactured black with the color codes to be applied in the field to safety related cables.

[3] Two methods of field color coding were selected as being adequate and optional, depending on the size and type of cable. One method uses colored vinyl adhesive tapes applied in bands on cables at intervals not to exceed four feet. The other method requires that the cables be continuously colored with a special quick drying cable coloring ink. In general, large power cables are field color coded with the tapes and small control and instrument cables are continuously colored.

With reference to the black cables that were color coded after installation, some were designed before the details of IEEE 308 were available and then the color coding was backfitted to conform to the definitions of that code. In some other cases, the color coding was initially omitted but corrected as a result of additional checking included in Duke's quality assurance design review. This quality assurance review is now being completed prior to release of design documents for cable installation.

The steps which have been taken or will be taken in reference to the non-compliance items are as follow:

1] Physical protection provided safety-related cables.
No action proposed since the cable protection system is adequate.

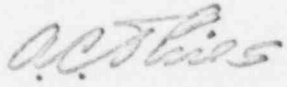
2] Color Coding of Safety Related Cables

a] No action proposed on color coding methods described since we feel the methods are adequate.

b] The additional rechecking of all safety-related circuits for correctness and accuracy has been included in Duke's quality assurance review.

I hope that this adequately answers your concerns and if you need further information, please advise.

Yours very truly,



act/ck

Copy: Mr. W. S. Lee
Mr. E. D. Powell
Mr. C. E. Watkins