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Al Kaplan
VICE PRESIDENT
NUCLEAR GROUP

January 26, 1989
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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Allegation - Additional Information

Gentlemen:

Attached is Cleveland Electric Illuminating Company's response to the letter from Mr. Edward G. Greenman, Director, Division of Reactor Projects, Region III dated December 27, 1988. Mr. Greenman's letter requested additional information concerning our response to an allegation (RIII-87-A-0126), letter from Mr. Al Kaplan, Vice President, Nuclear Group, dated October 14, 1988.

If you have any additional questions, please feel free to call.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

AK/sc

Attachment

cc: Document Control Desk
T. Colburn
G. O'Dwyer
USNRC Region III

COPY TO R.C. KNOP

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RIII-87-A-0126

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Supplemental Information
(RIII-87-A-0126)

Each request for information is presented by first paraphrasing the request and then following it with our response.

- a. The basis for the conclusion by CEI's Nuclear Engineering Department (NED) that the electrical Termination discrepancy described in the first nonconformance report (NR) was not a generic problem.

RESPONSE:

As noted on the NR, CEI's NED considered this discrepancy to have no generic implications because there was lack of evidence of this being a widespread concern. This conclusion was made after a review of the work history of control room panels and interviews with personnel that were currently working on them. NED conducted a review of work documentation in construction files for work performed on control room panel lights over several years preceding the initial NR. Additionally, NED performed interviews of supervisors and personnel that were currently working on the panels. In both cases there were no mention of instances in which connections were found without being soldered. Consequently, the discrepancy noted in the first NR was considered sufficiently rare to not warrant generic implications, i.e., an isolated case.

- b. Justify the validity of GE's conclusion considering that failed fuse lampholders were not specifically examined for improper electrical connections and the installation of heat shrink tubing would tend to minimize "clicking" on improperly terminated connections.

RESPONSE:

It should be noted that only one lampholder location was specifically mentioned in the NR. NED and GE did not contest that this one was not soldered. Consequently, there were no other failed lampholders to examine. Additionally, no other lampholder connections were examined as the one discovered was considered an isolated case as noted above. One additional minor clarification should also be made. Two phrases "crimped, but not soldered" and "little fuse lampholders" have been associated with this condition since the original NRs. The former is clarified below. As for the latter phrase, the name of the manufacturer of these lampholders is "Littelfuse". Apparently on the original NRs, this name was misunderstood as being "little fuse." These "Littelfuse lampholders" contain indicating lights for equipment such as valves, fans and pumps.

In order to justify GE's conclusion, the function served by the particular type of heat shrink installed must be explained. To accomplish this, a considerable amount of detail describing the physical configuration of these particular Hollingsworth slip-on terminals is presented below. In general, although the opaque, heat shrink tubing used by General Electric (GE) will give some support to the terminal connections and protect them from moisture, they do not enhance continuity between the male and female terminal connectors.

The Hollingsworth connectors are arranged as follows. The terminals that are attached to the back of a lampholder's base are smooth, straight tabs (the male part of the connector). The Hollingsworth female slip-on terminal (lug) is crimped to the wire conductor and not to the male terminal. The female lug then fits loosely over the male terminal leaving a small gap between the two. Additionally, this terminal connection is not the type that locks in place. Therefore, solder is used to make a solid connection and provide continuity between the female, slip-on lug and the male, straight tab.

The type of heat shrink material used by GE does not have any adhesive on the inside. When in the contracted state it will only press down on the outer surfaces of the female, slip-on lugs, conductors and the base of the lampholders. This type of contact will not eliminate the small gap between the straight tabs and the slip-on lugs as the straight tabs are on the inside of these slip-on lugs. Consequently, any vibration or movement felt by the wires in the control room panels that would be transmitted to the backs of the lampholders will create intermittent continuity resulting in the "intermittent or flickering" lights.

In summary, CEI did not inspect the physical connections as improperly terminated connections would be indicated by a history of lighting problems. There was an enormous amount of work performed in these panels during the years of construction and testing of the Perry Nuclear Power Plant. During this period wire movement was highly likely as there are hundreds of indicating lights on the 20 control room panels cited. With the above information in mind, it is reasonable to conclude that if this one discrepancy was a widespread problem there would be a tremendous number of documented complaints of loose wires, disconnected terminals and intermittent and flickering lights. If this was the case, there would be numerous instances documented of terminals that were not soldered.

- c. Specific justification that would support your conclusion that if the specific discrepancy was present in Unit 1 then it would also be present in Unit 2.

RESPONSE:

CEI felt justified in inspecting the Unit 2 Control Room panel lampholders as being representative of the quality of the Unit 1 panels. The rationale has largely been explained in the initial response. Both panels were constructed by GE at the same location in California during time frames very close to one another.

The time frame between completion of both Units control panels was less than one year and conducted under the same procedures, practices and Quality Control Program. Unit 1 Control Room panel assembly began in the third quarter of 1978. Unit 2 control Room panel assembly began the first quarter of 1979, which was about the same time that factory testing began on the Unit 1 Control Room panels. Therefore, if there was a breakdown in the program that went unknown the quality of each would be similar. For these reasons, CEI judged the status of the lampholder connections in the Unit 2 panels to be representative of those in Unit 1.

It should be noted that CEI maintained their own representative in San Jose during the construction of the panels. Consequently, it is likely that any finding of this magnitude would have been known to CEI's representative.

- d. What would be the impact of performing a direct inspection of a sample of Unit 1 lampholder connections during the first Refueling Outage.

RESPONSE:

The impact of performing a direct inspection of a sample of Unit 1 lampholder connections during the first Refueling Outage would result in about 3 to 5 additional man-days of work. Even though it could take place in parallel with critical path it does add to the work load. Equipment would have to be tagged, heat shrink removed, and connections inspected. Following the inspection, the connections would have to be broken, new heat shrink put on and connections soldered. Then the connections have to be inspected again and the heat shrink secured. This does not include the time for planning the tagouts and scheduling of system outages.

CEI has a very ambitious schedule and scope of work already designated for the Outage and any additional work further challenges the organization. As noted above and in our previous response dated October 14, 1988, there have been more than one investigation including physical inspections of the Unit 2 lampholders. CEI believes that enough information has been processed to confidently conclude that the allegation is unsubstantiated. Therefore, no additional inspections on Unit 1 are being planned.