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10 CFR 2.201

Iowa Electric Light and Power Company

January 26, 1990
NG-90-0106

Mr. James Lieberman, Director
Office of Enforcement
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Reply to Notice of Violation and Proposed Imposition of
Civil Penalty (EA 89-215)
File: A-102, A-64

Dear Mr. Lieberman:

A letter from Mr. A. Bert Davis, U.S. NRC Region III Regional Administrator, to Mr. Lee Liu, President and Chief Executive Officer, Iowa Electric Light and Power Company, dated December 27, 1989, transmitted a Notice of Violation and Proposed Imposition of Civil Penalty. The letter and NRC regulations require Iowa Electric Light and Power Company (IELP) to reply within thirty days. This letter and the attachments constitute the required reply.

Pursuant to the requirements of 10 CFR 2.201(a), Attachment 1 to this letter, "Reply to a Notice of Violation," provides our (1) admission of the violations, (2) the reasons for the violations, (3) the corrective steps that have been taken and the results achieved, (4) corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved.

We recognize that deficiencies in our Environmental Qualification corrective action program did exist. The NRC staff's assessment of the causes of these deficiencies is consistent with our own. Our Project Quality Plan (PQP) was designed to eliminate these causes and the results of our most-recent efforts provided us with a high level of confidence that all EQ deficiencies were identified and corrected before the DAEC was returned to operation on October 22, 1989. This information was discussed in our letters to Mr. Davis, dated October 20, 1989 and November 29, 1989, and during our enforcement conference on November 8, 1989. We do not believe that it is in the best interest of the owners of the DAEC to pursue this matter further. We, therefore, will not submit a response pursuant to 10 CFR 2.205 protesting the Civil Penalty. We enclose our check in the amount of \$50,000, payable to the Treasurer of the United States.

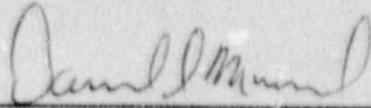
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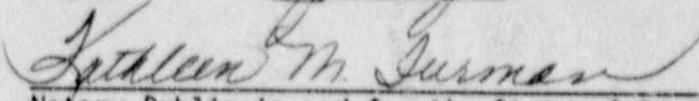
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This response, consisting of this letter and attachments, is true and accurate to the best of my knowledge and belief.

IOWA ELECTRIC LIGHT AND POWER COMPANY

By 
DANIEL L. MINECK
Manager, Nuclear Division

Subscribed and sworn to before me on this
26th day of January, 1990.


Notary Public in and for the State of Iowa

DLM/NKP/pjv+

Attachments: (1) Reply to a Notice of Violation
(2) Check No. 245533

cc: N. Peterson
L. Liu
L. Root
R. McGaughy
J. R. Hall (NRC-NRR)
A. Bert Davis (Region III)
NRC Resident Office
Commitment Control No. 890466

REPLY TO A NOTICE OF VIOLATION

By letter dated December 27, 1989, the NRC transmitted a "Notice of Violation and Proposed Imposition of Civil Penalty." It identified the following Violations and proposed a Civil Penalty of \$50,000.00.

I. Violation A

A. NRC Description of Violation

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality, including nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The corrective action taken shall be documented and reported to appropriate levels of management.

Contrary to the above, the licensee failed to assure that conditions adverse to quality, including nonconformances, were promptly identified and corrected after an April 13-29, 1987, NRC inspection identified significant environmental qualification (EQ) deficiencies with AMP butt splices that resulted in the imposition of a \$50,000 civil penalty (EA 87-83) on October 21, 1988. Specifically, during a September 19, 1989, inspection, the licensee identified and repaired 2 AMP splices located in the Drywell, as well as three AMP butt splices and nine Thomas and Betts splices located in a radiation-only environment, which were not taped in accordance with EQ requirements.

B. Iowa Electric Response

1. Admission of the Violation

Iowa Electric Light and Power Company (IELP) admits that the equipment identified in the Notice did not meet the requirements for environmental qualification and that the company had failed to identify and correct all conditions adverse to quality following discovery of EQ deficiencies in 1986.

2. Reason for the Violation

This violation was caused by deficiencies in the methodology used during inspections conducted in 1986 and 1987, which were intended to identify all improperly-insulated splices subject to environmental qualification requirements. In December 1986, the power plant was shutdown specifically to correct a problem concerning improperly insulated electrical splices with almost no advance warning of the concern. At that time, the failure modes of the electrical splices were not known and consequently, the decision regarding the method of repairing the splices was delayed. These events led us to separate the splice inspection program from the splice repair program. Many of the effected electrical enclosures which contained splices did not have unique identification numbers. Thus, the inspectors did not have a convenient way to document the location of all such splices which could be used later in the process to prepare adequate

maintenance instructions for personnel assigned to repair the splices. This led to some enclosures not being relocated during the repair program. Since inspection documentation was not sufficiently detailed, subsequent reviews of that documentation did not reveal that electrical splices had not been adequately repaired.

3. The Corrective Steps That Have Been Taken and The Results Achieved

The fourteen improperly-insulated splices were repaired in accordance with the Duane Arnold Energy Center (DAEC) EQ Program.

A comprehensive plan to re-inspect all EQ related equipment was developed. The re-inspection plan was intended to identify and correct any splices in the DAEC EQ program which did not meet requirements. This effort utilized a Project Quality Plan (PQP), which imposed administrative measures that defined the functional responsibilities of the project team members, provided detailed instructions for performing the work and objective acceptance criteria for the inspections, and established detailed requirements for documenting results of the inspections such that objective reviews of the results were possible. Inspection teams were formed to perform the inspections. Each team consisted of two electricians, two engineers, and a quality control inspector. Any discrepancies between the results of this inspection and previous inspections, or deficiencies in the configuration of EQ equipment discovered by a team that could not be resolved in the field were logged and tracked to resolution. Finally, the inspection results were independently reviewed by quality control and environmental qualification engineers to verify that inspection results were properly documented and follow-up actions were completed. This re-inspection program found no additional improperly-insulated splices.

4. Corrective Steps That Will Be Taken to Avoid Further Violations

To preclude recurrence of violations of this type, we have begun to incorporate information gained from the re-inspection into our existing design document system. This information will provide positive identification and location of electrical splices in the DAEC EQ program and facilitate future maintenance activities. For reasons described in our response to Violation B, this action will be completed within ninety days after completion of the next refueling outage, currently scheduled to begin on June 28, 1990. Other corrective actions described in response to Violation B are also applicable here.

5. Date When Full Compliance Will Be Achieved

IELP was in full compliance as of October 22, 1989, the date the DAEC was returned to operation following the Fall 1989 Maintenance Outage.

II. Violation B

A. NRC Description of the Violation

10 CFR 50.49(f) requires, in part, that each item of electric equipment important to safety be qualified by testing identical or similar equipment under environmental conditions identical or similar to those

equipment under environmental conditions identical or similar to those postulated for an accident, with analysis to show that qualification based on similarity is acceptable.

Contrary to the above, during the period November 30, 1985, through September 29, 1989, electric equipment important to safety was not qualified in that discrepancies existed between the tested configuration and the installed plant configuration without documented analyses to show that qualification based on similarity was acceptable, as demonstrated by the following examples:

1. Twenty-four instrumentation lead wires from temperature elements used to sense Drywell temperature and four instrumentation lead wires from a one dual element thermocouple associated with the steam leak detection system were spliced with unqualified Raychem heat shrink tubing.
2. Sixty-one electrical enclosures containing splices and terminal blocks for electrical circuits important to safety, located in LOCA/HELB environments, were installed in a configuration (without weepholes) other than the tested configuration.
3. Terminal blocks requiring qualification located below top entry conduits were installed in two terminal boxes located inside the Drywell without analyses to support the configuration.
4. Twenty-four pressure switches (PS-4400A, B, and C through PS-4407A, B, and C) mounted on the discharge piping of the Safety Relief Valves (SRVs) and the Spring Safety Valves (SSVs) were in an unqualified configuration in that they were installed without seals to preclude moisture intrusion into the switch internals.
5. Two Victoreen radiation monitors (RE-9184 A and B) located in the Drywell were in an unqualified configuration in that they were installed without seals to prevent moisture intrusion.

B. Iowa Electric Response

1. Admission of the Violation

IELP admits that the equipment identified in the five examples listed in the Notice above did not meet the requirements for environmental qualification.

2. Reason for the Violation

- a. Unqualified heat shrink tubing was installed on the twenty-eight instrument lead wires because of a misinterpretation of EQ requirements by personnel in the Design Engineering, Maintenance, and Quality Control departments of the IELP organization which was compounded by poor communication between these departments and field personnel.
- b. The lack of weepholes in electrical enclosures containing splices or terminal blocks in LOCA/HELB areas also occurred because field personnel did not understand EQ requirements. There was procedural guidance for the installation of weepholes but the

requirements were not specified in enough detail to preclude misinterpretation.

- c. No analyses were prepared to support terminal block qualification in enclosures with top-entry conduits due to a lack of knowledge of the installed configurations by EQ engineers. Had these two configurations been known, analyses supporting qualification would have been in place. Evaluations for other similar configurations were prepared and these two omissions are considered isolated errors.
 - d. The deficiencies in the qualification of the Safety/Relief Valve pressure switches were due to errors made by individuals responsible for the review and evaluation of the qualification test reports. These individuals misinterpreted the tested configuration due to the incomplete description contained in the test report and consequently did not identify the potential for moisture intrusion into the switches in the installed configuration. Thus, the installed configuration was believed to be qualified when, in fact, it was not.
 - e. The cause of the deficiencies in the qualification of the Victoreen radiation monitors located in the drywell was a lack of knowledge of the installed configuration of the equipment. Individuals responsible for creating the qualification files failed to verify the adequacy of the installed configuration.
3. The Corrective Steps That Have Been Taken and The Results Achieved
- a. The twenty-eight splices installed with unqualified heat-shrink insulation were repaired with environmentally-qualified Raychem insulation. In addition, the applicable procedure for installing Raychem heat-shrink insulation has been revised to prohibit the use of unqualified insulation in EQ applications.
 - b. Weepholes were installed or analyses were performed for all electrical enclosures associated with EQ equipment (i.e., junction boxes, field-option boxes, and conduit fittings) where the potential existed for moisture accumulation in the enclosures. Procedures governing the installation of splices and terminal blocks have been revised to state more clearly where weepholes are required.
 - c. An inspection, intended to identify all enclosures with top-entry conduits containing terminal blocks in LOCA/HELB areas, was conducted. This inspection identified two such enclosures that had not previously been analyzed. One configuration was evaluated and found to be acceptable. This evaluation has been incorporated into our EQ record files. The other configuration was modified by re-routing the conduits so that they do not enter the enclosure directly above a terminal block.
 - d. A design change was made and the conduits between the junction boxes and the Safety/Relief Valve pressure switches are now sealed in order to prevent moisture intrusion into the pressure switches. Electrical connector sealed assemblies (ECSAs) were installed at the conduit entrances to the pressure switches. These ECSAs are

qualified in accordance with the IELP EQ program and the applicable EQ record files have been revised to reflect the installed equipment configurations.

- e. A design change was made and ECSAs, similar to those installed in the Safety/Relief Valve tailpipe pressure switches, were installed at the entrance to the sealed conduits leading to the radiation detectors. These ECSAs will prevent moisture from entering the radiation detectors and the radiation detectors now conform to the tested configuration. The applicable EQ record files have been revised to reflect the installed equipment configurations.

4. Corrective Steps That Will Be Taken to Avoid Further Violations

We have performed a root cause analysis of the violations described above and have identified two weaknesses in the implementation of the EQ program at the DAEC.

The first cause is characterized as organizational. Administrative control procedures did not clearly define and assign specific, working-level responsibilities for implementing the EQ Program. Interfaces between different departments of the IE organization (particularly Design Engineering and Maintenance) were not well defined. This led to poor communication among persons in these departments. The theory and practice of EQ were perceived to be the responsibility of a limited few within the IELP organization. Others, working in "the field", did not sufficiently understand all EQ requirements and therefore could not have been reasonably expected to properly implement the instructions they received. Moreover, the engineers who developed the instructions did not always have complete knowledge of the as-built configuration of DAEC and their performance was further hampered by the problems with communication between organizational units.

A second and related root cause for the deficiencies also played an important role. That cause was the information concerning the as-built plant configuration which was available. While our design documents are consistent with typical industry practice, we have now concluded that the level of detail is often not sufficient for EQ purposes. Some DAEC design documents which were available to IELP engineers lacked the detail which could assure that in every case qualified component configuration could be readily achieved and maintained in the field. For example, DAEC design documents did not specify equipment orientation or the location of cable splices or enclosure weepholes.

To eliminate the first root cause described above, i.e., the organization problem, and avoid any further deficiencies in continuing implementation of the EQ Program at DAEC, we have reviewed the organizational structure through which the Program is carried out. This review was conducted as part of an examination of the Design Engineering Department which we have undertaken in response to NRC Inspection Report 88-023. We have defined the elements of the Design Engineering Department, developed mission and task statements for these elements, and identified procedures that need

to be changed to implement the new organization. As part of this reorganization we will define and clearly assign departmental and individual responsibilities for EQ and define the interfaces between Design Engineering Department and the DAEC Plant Staff for implementing the EQ Program. The reorganization of the Design Engineering Department will be completed by February 16, 1990.

However, the necessary changes to the DAEC Administrative Control Procedures to better define the plant staff's responsibilities for the EQ Program are dependent upon a general reorganization of the DAEC plant staff. Technical Specification changes are necessary to implement the plant staff reorganization. The affected plant procedures will be effective within 30 days of issuance of the license amendment approving the requested Technical Specification changes.

The second basic deficiency referred to above is the paucity of information which has been available. That is also being addressed. The recent inspection efforts have developed most of the detailed information previously lacking. This information is being incorporated into our existing design document system. It will be readily accessible to the personnel who need it to maintain qualified configurations for equipment within the EQ Program. Although we have begun incorporating this information into our design documents, we recognize that we may need to gather additional information regarding the as-built equipment configurations to augment the existing information such that it will be more useful. This may require inspections in plant areas which are not accessible during normal operations. Such inspections will be done at the next scheduled refueling outage and incorporation of this information into the design document system will be completed within ninety days after that outage, currently scheduled to begin on June 28, 1990.

We are confident that the corrective actions described above will complete effective integration of the DAEC EQ Program into IELP's organization and facilitate improvements in implementation of EQ requirements in the field.

5. Date When Full Compliance Will Be Achieved

IELP was in full compliance with 10 CFR 50.49 on October 22, 1989, the date the DAEC was returned to operation following the Fall 1989 Maintenance Outage. Permanent revision of the EQ record files associated with the Victoreen radiation monitors, the Pressure Controls, Inc. Safety/Relief Valve tailpipe pressure switches and the Conax ECSAs were completed on January 25, 1990.

III. Violation C

A. NRC Description of the Violation

10 CFR 50.49(f) requires, in part, that each item of electric equipment important to safety be qualified by testing identical or similar equipment under environmental conditions identical or similar to those postulated for an accident, with analysis to show that qualification based on similarity is acceptable.

10 CFR 50.49(j) requires that a record of qualification, including documentation, be maintained in an auditable form for the entire period during which the covered item is installed in the plant.

Contrary to the above, during the period November 30, 1985 through September 29, 1989, the licensee's EQ file did not contain the results of EQ tests and/or analyses that were made to demonstrate qualification of three General Electric (GE) terminal blocks, installed in circuits important to safety, and three Thomas and Betts (T&B) STA-KON splices, installed in a motor operated valve important to safety.

B. Iowa Electric Reply

1. Admission of the Violation

IELP admits that the electrical equipment identified in the Notice did not meet requirements for environmental qualification.

2. Reason For The Violation

The cause of the violations described in the Notice above was the lack of knowledge of the configuration of the installed equipment. Weaknesses in our previous equipment inspection efforts precluded the identification of these deficiencies.

3. The Corrective Steps That Have Been Taken and Results Achieved

The GE terminal blocks found during the Fall 1989 Maintenance Outage were replaced with qualified Amerace terminal blocks or with qualified Raychem insulated splices. The three Thomas & Betts STA-KON splices were repaired using DAEC EQ qualified methods.

4. Corrective Steps That Will Be Taken to Avoid Further Violations

The root causes of this Violation and corrective steps to preclude its recurrence are identical to those described in our response to Violation B above.

5. Date When Full Compliance Will Be Achieved

IELP was in full compliance as of October 22, 1989, the date the DAEC was returned to operation following the Fall 1989 Maintenance Outage.