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ILLINOIS POWER COMPANY

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U-10268
CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

Docket No. 50-461

April 18, 1985

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Potential 10CFR50.55(e) Deficiency 55-84-12: Installation of Concrete Expansion Anchors in Floors with Finishing Slabs

Dear Mr. Keppler:

On June 4, 1984, Illinois Power Company notified Mr. D. Keating, NRC Region III, (Ref: IP Memorandum Y-20647 dated June 4, 1984) of a potentially reportable deficiency concerning the installation of concrete expansion anchors in floors with finishing slabs. This initial notification was followed by three (3) interim reports (Ref: IP letter U-10177, D. P. Hall to J. G. Keppler, dated July 13, 1984; IP letter U-10214, D. P. Hall to J. G. Keppler, dated October 26, 1984; and IP letter U-10246, D. P. Hall to J. G. Keppler, dated February 14, 1985). Illinois Power's investigation into this matter is complete. Our investigation identified, documented and evaluated for adequacy, all concrete expansion anchor installations utilized for equipment and components installed on all nine (9) Category I finishing slabs. Our investigation into this matter has determined that this issue does not represent a reportable deficiency under the provisions of 10CFR50.55(e). This letter is submitted as a final report in accordance with the requirements of 10CFR50.55(e). Attachment A provides the details of our investigation.

We trust that this final report provides you sufficient background information to perform a general assessment of this potentially reportable deficiency and adequately describes our overall approach to resolve this issue.

Sincerely yours,

D. P. Hall
Vice President

RLC/lr (NRC1)
Attachment
cc: NRC Resident Office
Director, Office of I&E, USNRC, Washington, DC 20555
Illinois Department of Nuclear Safety
INPO Records Center

ATTACHMENT A

Illinois Power Company
Clinton Power Station

Docket No. 50-461

Potential 10CFR50.55(e) Deficiency 55-84-12:
Installation of Concrete Expansion
Anchors in Floors with Finishing Slabs

Final Report

Statement of Potentially Reportable Deficiency

Baldwin Associates Resident Engineering (BARE) provided Illinois Power Company (IPC) with a list, identifying 129 supports assumed to be installed on finishing/topping slabs. The concern expressed that the installation of the concrete expansion anchors (CEAs) for these supports would not meet the embedment length as required by the Sargent & Lundy (S&L) Specification.

Background

In February, 1984, BARE provided IPC with an initial listing of 129 supports installed on finishing/topping slabs. This listing identified the support, the length of the installed anchor, the thickness of the finishing/topping slab, and the amount of anchor installed in rough concrete. Several of the CEAs identified had an effective embedment length of zero (0) inches (i.e., if the thickness of the finishing/topping slab was subtracted from the embedment length).

Specification K-2944 requires the effective embedment length of CEAs to be determined from the surface of the rough concrete.

Illinois Power Company requested that S&L evaluate for adequacy the 129 mechanical component supports identified by BARE. S&L stated that none of the CEAs associated with the identified installed mechanical supports met the specification requirement for effective embedment.

Of the 129 supports identified, 58 had been installed. S&L evaluated the installed supports for adequacy with regard to design loads (total design basis accident loads), 14 were initially evaluated as inadequate. Subsequent evaluation of the actual installations of these 14 supports determined that ten (10) were adequate to carry design loads (i.e., installed in rough concrete, already reworked with longer bolts, or were part of another support with no anchors of their own) and four (4) were evaluated as inadequate due to effective CEA embedment.

The effective embedment deficiencies associated with these four (4) supports were documented on Nonconformance Reports (NCRs) and resolved in accordance with approved site procedures. Subsequent NCRs which were initiated resulted in three (3) additional supports that were reworked but were not safety significant.

Investigation Results

Illinois Power prepared and implemented an investigation plan to determine the extent of this problem at Clinton Power Station (CPS). The investigation plan included:

1. A review of construction procedures governing the installation/inspection of CEAs was performed to determine adequacy and compliance.

2. Based on the preliminary as-built drawings that were generated, a complete listing of all potentially affected equipment/components was compiled.

3. A complete set of composite as-built drawings was generated which identifies all equipment/components installed on finishing/topping slabs which utilize CEAs for installation.

4. The equipment/components identified by the listing generated in item 2, were entered into the computer in a "search" for all documentation (i.e., NCR, Field Change Request (FCR), etc.) that may have addressed these components. The documents identified by the "search" were reviewed to identify those documents which address the problem of CEA embedment.

5. All components with CEAs that violated the effective embedment criteria and did not have prior approval documentation, were documented on NCRs and resolved in accordance with approved site procedures.

6. At the 825' elevation of the Control Building a waterproof membrane lies between the rough concrete and the topping slab. For this design, the CEAs were not to be installed through the waterproof membrane. NCR 24947 and NCR 24948 document over 73 installations which have penetrated into or through the membrane. Baldwin Associates Quality Control (BAQC) generated NCRs to document each identified installation violation. These NCRs were resolved in accordance with approved site procedures.

Corrective Action

The corrective actions taken on this issue include:

1. To aid site personnel in locating finishing slabs, a stencilling program was implemented. The placement of the stencilling was such that individuals involved with installation/inspection of CEAs could easily recognize areas where effective embedment would require additional consideration due to the thickness of the finishing slabs.

2. Baldwin Associates issued Memo MA-31-84, dated June 6, 1984, emphasizing to supervisory personnel the requirement to install CEAs into the structural slab in order to achieve full embedment per S&L Specification K-2944, Form CPS-1-CEA.

3. Several procedures and checklists were revised to ensure proper installation and verification of the embedment depth:

   a) QAI-710.11, Rev. 2: Concrete Expansion Anchor Checklist, was issued on August 3, 1984, and step V specifically states the term "rough concrete (with no finishing slab)" and adds the formula for concrete embedment with finishing slabs.

   b) BQAI-190-1, Rev. 4: Concrete Expansion Anchors Field Verification, was issued on August 3, 1984, and Exhibit 2, Concrete Expansion Anchor Field Verification Checklist, requires the minimum effective embedment of expansion anchors be based on the amount of anchor length embedded in rough concrete.

   c) BAP-2.16: Concrete Expansion Anchor Work, This was revised to note the existence of finishing/topping slabs, precautions for accomplishing work, and guidelines for checking anchor embedments.

4. Sargent & Lundy provided a listing, identifying the Category I finishing/topping slabs at CPS.

5. A review was performed to identify all documents relating to installations utilizing CEAs on Category I finishing/topping slabs. These documents were utilized in conjunction with the drawings to establish adequate anchor bolt installation.

6. Forty-three (43) composite as-built drawings of the nine (9) Category I finishing/topping slabs, involving safety related equipment, were generated from the individual discipline oriented preliminary drawings. The as-built drawings identify installations which have utilized CEAs and are located on Category I finishing slabs. The 43 as-built floor drawings were finalized and BAQC verified. The BAQC review involved the verification of all CEAs and their dimensional location on the finishing slab.

7. A complete list of installations on the nine finishing slabs was compiled and all pertinent documentation was obtained.

8. Installations that were documented as not having been accepted to the present embedment criteria for CEAs were noted on a finalized set of composite as-built drawings. Baldwin Associates Quality Control initiated NCRs to document each of the remaining embedment violations as identified on the finalized set of as-built drawings.

9. NCRs initiated as a result of this investigation were dispositioned/reviewed by S&L to determine adequacy of the installations to meet design requirements. Those installations requiring rework/repair were evaluated by S&L for significance to the safety of operations of CPS. It is anticipated that all corrective action associated with this issue will be completed by April 30, 1985.

Root Cause

The root cause for the various violations has been attributed to:

1) Misinterpretation of the term "finish Concrete".

2) Inadequate utilization, by site personnel, of available information regarding the location of finishing/topping slabs.

Safety Implications/Significance

Illinois Power's investigation of this potentially reportable deficiency is complete. Sargent & Lundy has reviewed and evaluated the identified deficiencies associated with this investigation and have stated that none of the deficiencies represent a condition adverse to the safety of operations of CPS. Illinois Power has reviewed and evaluated the findings associated with this investigation and has concluded that the issue does not represent a reportable condition under the provisions of 10CFR50.55(e).