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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

1A.120
U-10261

April 1, 1985

Docket No. 50-461

Mr. James G. Keppler
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
Glen Ellyn, Illinois 60137

Subject: Potential 10CFR50.55(e) Deficiency 55-84-20
Structural Steel Coatings

Dear Mr. Keppler:

On September 21, 1984, Illinois Power Company notified Mr. F. Jablonski, NRC Region III (Ref: IP Memorandum Y-20842, dated September 21, 1984) of a potentially reportable deficiency concerning the application of an unknown coating to structural steel within the Primary Containment at the Clinton Power Station (CPS). This initial notification was followed by two (2) interim reports (ref. IP letter U-10209, D. P. Hall to J. G. Keppler dated October 24, 1984; and IP letter U-10243, D. P. Hall to J. G. Keppler dated January 28, 1985). Illinois Power's investigation of this issue is complete. 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 sufficient 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 (NRC2)

Attachment
cc: NRC Resident Office
Director, Office of I&E, US NRC, Washington, DC 20555
Illinois Department of Nuclear Safety
INPO Records Center

IE27

ATTACHMENT A

Illinois Power Company
Clinton Power Station

Docket No. 50-461

Potential 10CFR50.55(e) Deficiency 55-84-20
Structural Steel Coating

Final Report

Statement of Potentially Reportable Deficiency

A condition potentially adverse to quality was identified in the area of structural steel coatings. Vendor coating documentation on file indicates that all structural steel inside containment was coated in accordance with Sargent & Lundy (S&L) Specification K-2947, utilizing Carbo Zinc-11. During the course of investigation into the deficiencies reported on Nonconformance Report (NCR) No. 20271, it was determined that some structural steel located inside Containment was coated with a primer other than Carbo Zinc-11. An investigation and evaluation of this issue was performed to determine the extent of this problem, root cause, effect on installed hardware, and significance to the safety of operations of CPS.

Background

Bristol Steel (a structural steel supplier) has provided shop primed structural steel for use at CPS, both inside and outside of Containment. The project specification for steel inside Containment, requires a primer coat of Carbo Zinc-11 (an inorganic ethyl silicate, zinc-rich coating), manufactured by Carboline Company, St. Louis, Missouri. Bristol Steel's inspection records indicate that they used Carbo Zinc-11 primer for coating the structural steel to be used inside Containment.

Midway Industrial Contractors, a coating applicator, was contracted to apply a finish coat to the shop primed structural steel at CPS. The finishing coat was Carboline 191-HB, a polyamide epoxy also manufactured by Carboline Company. The work began in 1981, with Midway reporting instances of delamination of the epoxy topcoat from the primer coat on August 5, 1981. Carboline visited the job site in September and October, 1981 to conduct testing and remove coating samples. This removal included portions of the primed structural steel for subsequent Design Basis Accident (DBA) testing.

Due to the difficulty with topcoat adhesion, Carboline recommended the use of D3904-111 clear sealer, an inorganic silicate with only 6% solids by volume. The intent of this action was to replace the epoxy topcoat with the sealer in

order to provide a more readily decontaminable surface while eliminating the problem with topcoat adhesion.

In December, 1982, meetings were held with Carboline concerning the problem of topcoat adhesion to the primer coat. The minutes of these meetings indicate that Carboline subjected the test samples of the inorganic zinc primer coating, applied by Bristol Steel, to 1 X 10^9 rads and a DBA 340° F curve. These tests were performed with satisfactory results. The test results also indicated that the sealer when applied over the existing primer coat passed the irradiation/DBA requirements. However, several months after the sealer was applied, the job site reported to Carboline that it appeared that the sealer was cracking and flaking from the surface of the structural steel in very fine particle sizes. In July, 1984 Carboline stated that the sealer on their laboratory test panels was also powdery and flaking from the primer coating. Further examination, by Carboline, indicated that the cracking extended through the sealer and the sealer had curled from the primer, indicating that the sealer had not penetrated into the primer. Carboline also indicated that the physical characteristics of the primer along with microscopic examination (revealed the presence of blue fibers) suggests that the primer applied to the structural steel was not Carbo Zinc 11.

Investigation Results/Corrective Action

Illinois Power prepared and has implemented an investigation to determine the extent of this problem at CPS.

Several documentation reviews have been performed of structural steel purchase order C-14583 and Baldwin Associates' (BA) receipt inspection reports (RIRs) No. S-10984, S-10414, S-8233, S-8569, S-1125, S-10250, and S-10180. No discrepancies were identified as a result of these reviews.

KTA-Tator, Inc, (KTA) was contracted to provide testing services for investigation of this matter.

Our investigation has concentrated on identifying the unknown primer. Identification efforts consisted of comparing the test data obtained by infrared spectroscopic analysis of various samples. Samples of the unknown primer were compared with samples of Carbo Zinc-11 (CZ-11), Mobil Zinc-7, and Dimetcote-6. Although the features of the unknown primer and the CZ-11 were similar, there was a distinct difference at a particular spectrographic band. The spectrographic comparison of other known primers differed considerably from the unknown primer. Our investigation has concluded that the unknown primer is an inorganic zinc compound, but it is not CZ-11. Neither Carboline, nor KTA-Tator could identify the brand of the unknown primer.

Because positive identification of the unknown primer could not be made, a detailed chemical analysis was ordered along with DBA, radiation and decontamination tests. KTA-Tator, Coors/Structure Probe, and Pittsburgh Testing Laboratories provided assistance with the chemical analysis. It was requested that the chemical analysis determine if the unknown primer contained any elements which would be hazardous to the safety or integrity of the Containment. No such elements were identified.

Oak Ridge Laboratory performed the DBA, decontamination, and radiation tests. The test results indicate that the unknown primer met specification requirements.

Based on the test results of the unknown primer, it has been determined that the unknown primer would be acceptable for use in the containment environment and would be able to perform as well as CZ-11. NCR No. 20271 was dispositioned "USE-AS-IS".

The clear sealer (D3904-111) over the suppression pool area was wiped down with a cloth. The purpose of the wipe down was to remove dusting of the clear topcoat. The prime coat was left "as-is" (Ref. NCR No. 20771).

The flaking topcoat (191-HB) at elevation 755 between Azimuth 90° and 180° was removed except for the inaccessable areas which would have involved disturbing steel frames. These areas were left as-is. Any loss of prime coat was restored to proper specification by applying CZ-11 on top of the unknown primer. The flaking top coat was removed because of the undesirability of having flakes of paint, periodically falling to the areas below (Ref. NCR No. 20771).

Root Cause

The findings of this investigation were reviewed to determine the root cause. Based on this review it was determined that Bristol Steel applied an inorganic zinc primer, which does not completely meet the product specifications for CZ-11, to the structural steel supplied to CPS.

Safety Implication/Significance

Illinois Power's investigation of this issue is complete. Extensive testing has proven that the unknown primer met or exceeded the requirements for use in containment. Sargent & Lundy has reviewed and evaluated the NCRs associated with this issue and have stated that the identified deficiencies do not represent a condition adverse to the safety of operations of CPS. On this basis the issue is considered to be not reportable under the provisions of 10CFR50.55(e)