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ILLINOIS POWER COMPANY



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

January 28, 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 one (1) interim report (ref. IP letter U-10209, D. P. Hall to J. G. Keppler dated October 24, 1984). Our investigation of this issue is progressing and this letter is submitted as an interim report in accordance with the requirements of 10CFR50.55(e). Attachment A provides the details of our investigation to date.

We trust that this interim 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

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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

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## ATTACHMENT A

Illinois Power Company  
Clinton Power Station

Docket No. 50-461

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

### Interim 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 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 is being performed to determine the extent of this problem, root cause, effect on installed hardware, and significance to the safety of operation of CPS.

### Background

Bristol Steel 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. The vendor inspection records indicate that Carbo Zinc-11 primer was used by Bristol Steel for structural steel inside Containment. For structural steel outside of Containment, Mobil 13-F-20, a phenolic resin, zinc dust, zinc oxide primer was designated for use by Specification K-2947.

The coating applicator, Midway Industrial Contractors, was contracted to apply a finish coat to the shop primed structural steel at Clinton Power Station. 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

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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  $1 \times 10^6$  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 is implementing an investigation plan 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 significant discrepancies were identified as a result of these reviews.

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

Since our last report, the 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.

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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 could be left as-is. The peeling top coat will be removed and any future touch-up will be made utilizing CZ-11 over the unknown primer (ref. NCR 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 Clinton Power Station.

Safety Implication/Significance

Illinois Power's Investigation of this issue is continuing, the Safety implications and significance will be assessed following review and evaluation of the final test reports. It is anticipated that approximately sixty (60) days will be necessary to complete our investigation, determine reportability, and file a final report on the matter.