

James W Cook Vice President - Projects, Engineering and Construction

79-12 #8

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May 29, 1981

Mr J G Keppler, Regional Director Office of Inspection and Enforcement US Nuclear Regulatory Commission Region III 799 Roosevelt Road Glen Ellyn, IL 60137

MIDLAND PROJECT -DOCKET NOS 50-329, 50-330 CONTAINMENT INTERNAL STRUCTURES COATING DEFICIENCY FILE: 0.4.9.37 UFI: 73*10*01, 00210(S) SERIAL: 12009



References: CPCo letters to J G Keppler; Same Subject;

Serial Howe-309-79; dated December 13, 1979
 Serial Howe-26-80; dated February 7, 1980
 Serial Howe-75-80; dated April 15, 1980
 Serial 9125; dated June 11, 1980
 Serial 8823; dated September 9, 1980
 Serial 10051; dated October 31, 1980
 Serial 11199; dated February 23, 1981

This letter, as were the referenced letters, is an interim 50.55(e) report on the containment internal structures coating deficiency. Enclosure 1 provides a summary of the actions being taken to correct the deficiencies and preclude their recurrence.

Another report, either interim or final, will be sent on or before August 1, 1981.

James W. Cool

WRB/lr

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Enclosure 1: MCAR-35, Final Report, dated May 15, 1981 "Containment Internal Structures Coating"

CC: Director of Office of Inspection & Enforcement Att Mr Victor Stello, USNRC (15)

Director, Office of Management Information & Program Control, USNRC (1)

RJCook, USNRC Resident Inspector, Midland (1)

2 Serial 12009

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CC: CBechhoefer, ASLB Panel RSDecker, ASLB Panel FPCowan, ASLB Panel AS&L Appeal Panel MMCherry, Esq MSinclair CRStephens, USNRC WDFaton, Esq, USNRC FJKelly, Esq, Attorney General SHFreeman, Esq, Asst Attorney General GTTaylor, Esq, Asst Attorney General WHMarshall GJMerritt, TNK&J 79-12 #8

Enclosure 1 Serial 12009 79-12 #8

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MCAR 35 (ISSUED 11/13/79) CONTAINMENT INTERNAL STRUCTURES COATING FINAL REPORT MAY 15, 1981 CONSUMERS POWER COMPANY MIDLAND PLANT UNITS 1 AND 2

BECHTEL JOB 7200

Bechtel Associates Professional Corporation

SUBJECT: MCAR 35 (Issued 11/13/79) Containment Internal Structures Coating

FINAL REPORT

DATE: May 15, 1981

PROJECT: Consumers Power Company Midland Plant Units 1 and 2 Bechtel Job 7220

I. Introduction

This final report is a summary of the investigations and findings concerning MCAR 35. It includes a description of the corrective actions to be taken to correct deficiencies and prevent the delaminations from reoccurring.

II. Description of Deficiency

Coating System 9 is a decontaminable coating system applied to concrete walls. As applied, System 9 consists of two coats of Ameron's Nu-Klad 117 and two finish coats of Ameron's Amercoat 90. Nu-Klad 117 is an epoxy coating that was used to fill and seal the concrete surface. Amercoat 90 is a modified phenolic epoxy coating which provides a decontaminable finish coat. Delamination has occurred between the two coats of Nu-Klad '17.

III. Investigation

Investigation of the delamination causes included the items listed below:

- a. Selection of the coating system: Coating System 9, as specified, was selected in part because it had successfully passed irradiation and design basis accident (DBA) tests prior to being selected for this project.
- b. Review of Technical Specification 7220-A-15(Q) and the subcontractor's quality assurance program: The review did not reveal any deficiency which would result in misapplication of the coating.
- c. Review of application records: Deviations from the specification and the manufacturer's data sheets were found. The specification stated that Nu-Klad 117 was to be applied as a filler and as a surfacer. The filler was to be used to patch small voids or holes. The surfacer was to be applied as a full coat to seal the concrete.

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The deviations from these requirements are listed below:

- 1) Two full coats of Nu-Klad 117 were applied in most cases.
- Several areas were identified where the time between coats of Nu-Klad 117 exceeded manufacturer's instructions.
- 3) A few areas have more than two coats of Nu-Klad 117.
- A few isolated areas have a full coat of Nu-Klad 117 over Amercoat 90.
- d. Investigation of solvent addition to Nu-Klad 117: Although the specification and the manufacturer's data sheets prohibit the addition of solvent to Nu-Klad 117, solvent was added to the coatings as ascertained by extensive laboratory tests.
- e. Adhesion of the surfacer to the concrete and the finish coats to the surfacer and to each other: Extensive adhesion tests and other investigations did not reveal any significant delaminations. DBA tests of coating samples caused some delamination of finish coats. However, evaluation of test results has shown that the delamination that occured in the DBA test is an isolated, atypical condition unrelated to the subject coating failure.
- f. Pot Life: Coatings applied at or near the end of pot life could have contributed to delamination.
- g. Other possible causes: Variations of product and packaging, application method, surface contamination, and coating thickness were investigated. None of these factors were found to have contributed to the delamination.
- IV. Conclusions Derived from the Investigations
 - Delamination occured at the interface of two full surfacer coats of Nu-Klad 117.
 - b. Delamination occurred at random locations that could not be predicted.
 - c. Causes and possible causes of delamination are listed below:
 - 1) Excessive curing time between coats of Nu-Klad 117
 - 2) Variations in mixing, temperature, and humidity

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- Application of Nu-Klad 117 near the end or after the effective pot life
- 4) Application of two full surfacer coats of Nu-Klad 117
- 5) Addition of solvents
- V. Corrective Actions
 - a. Qualification of the applied System 9 Coatings
 - An adhesion test procedure has been developed. This test is performed by cutting a 1/4-inch wide strip in the coating system and attempting to remove it with a knife. Samples which passed the knife test have been tested at Oak Ridge National Laboratories and have met DBA and irradiation requirements of ANSI N101.2.
 - 2) Where delamination has been found, the coating shall be removed. The remaining coated area will be divided into test grids. Each grid shall be tested at a statistically significant number of locations selected at random. If the allowed number of failed locations within a grid is exceeded, the entire grid is deemed unacceptable. An evaluation will be made and corrective action will be taken for each unacceptable grid. Acceptable grids will be considered loss-of-coolant accident qualified and will be allowed to remain.
 - b. Coating System 9 Repair Procedure Qualifications

To establish and qualify repair procedures, test coating applications were made over surfaces where the coating had been removed. Samples of the test coating were submitted to Oak Ridge National Laboratories for irradiation and DBA testing. Test results showed that tested repair coatings are qualified in accordance with ANSI N101.2.

Procedures for System 9 coating repair will be included in Specification 7220-A-56(Q) and will be based upon procedures established in the test application program. Repairs will be made when the procedures are issued.

VI. Prevention of Recurrence

Specification 7220-A-56(Q) has been issued for the contractor's use when applying decontaminable coatings to concrete. This specification

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> is based on a thorough roview of items addressed in MCAR 35 reports to ensure coating integrity.

Concurrence by:

Submitted by: Worker Muffy Mathu Approved by: Ithe Mithickow

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