U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-546/83-02(DE); 50-547/83-02(DE)

Docket Nos. 50-546; 50-547

Licensee: Public Service of Indiana
Post Office Box 190
New Washington, IN 47162

Facility Name: Marble Hill Nuclear Generating Station, Units 1 and 2

Inspection At: Marble Hill Site, Jefferson County, IN

Inspection Conducted: February 1-4, 7-10 and 14-17, 1983

Inspector: J. F. Norton — 4/6/83

Approved By: C. C. Williams, Chief, Plant Systems Section — 4/6/83

Inspection Summary

Inspection on February 1-4, 7-10 and 14-17, 1983 (Reports No. 50-546/83-02(DE); 50-547/83-02(DE))

Areas Inspected: Observed ongoing work activities and reviewed quality records and specifications relative to the application of Service Level I protective coatings; observed ongoing repair of fuel handling building foundation slab; observed ongoing concrete placement and reviewed associated quality records; and attended an informational meeting regarding test program proposals for static testing of embedded plate assemblies in unrepaired and repaired concrete. This inspection involved a total of 110 onsite inspector-hours by one NRC inspector.

Results: No items of noncompliance with NRC requirements were identified during the course of this inspection.

DETAILS

Persons Contacted

Public Service of Indiana (PSI)

C. Beckham, Quality Assurance Manager
*L. Ramsett, Quality Assurance Officer
*W. Petro, Vice President-Nuclear Service
J. Bott, Nuclear Regulation and Affairs Manager
*G. Warner, Civil Construction Engineering Supervisor
*J. Parks, Civil Quality Engineering Manager
R. Mustafa, Senior Project Engineer-Special Projects
C. Togni, Chief Civil Engineer
G. Fisher, Quality Engineer, Civil
D. Downs, Construction Surveillance Specialist

Sargent and Lundy Engineers (S&L)

R. Hooks, Assistant Division Head, Structural Engineering Division
L. Holish, Division Head, Geotechnical Division
A. Weiss, Concrete Technologist

J. L. Manta Incorporated (JLM)

D. Ullrich, Lead QA/QC Inspector
C. Peapples, QA/QC Inspector
R. Valentine, QA/QC Inspector
K. Runge, QA/QC Inspector
R. Todd, QA/QC Inspector
D. Weiss, Superintendent of Blast Shop

Intrusion - Prepakt, Incorporated

E. Hawkins, Superintendent

Newberg Construction Company

M. Renfro, Project Engineering Supervisor
M. Swinford, Quality Assurance Concrete Supervisor
R. Alcorn, Quality Control Inspector
J. Olson, Field Engineer

Other Personnel

J. Harrison, NRC Senior Resident Inspector
R. Lipinski, NRC Structural Engineer
J. King, Grouting/Consultant
C. Paulsen, Wiss Janney Elstner and Associates

*Denotes those attending the exit meeting.

Functional or Program Areas Inspected

Service Level I coatings ongoing work activities and storage facilities were observed in conjunction with review of coating program quality records and specifications. In-process grouting of the fuel handling building foundation slab was monitored. Category I concrete placement activities were observed and quality records reviewed. A meeting detailing a planned testing program for static testing of plate assemblies embedded in concrete was attended.

1. Service Level I Coatings

a. J. L. Manta Incorporated of Chicago is the Marble Hill Nuclear Generating Station coatings contractor responsible for the surface preparation, application, and first line QC inspection of Service Level I protective coatings. The purchase of coating materials, including source surveillance, is the responsibility of the licensee. Receipt, receipt inspection, storage and documentation are the responsibility of JLM.

b. Ongoing work was observed in both containments. The embeds received a white metal dry blast with 3.2 to 4.2 mesh Ottawa sand, in accordance with SSPC-SPF-63 criteria (Steel Structures Painting Council). The embedments were then cleaned by air blowing and brushing. Following inspection by a QC inspector, the areas were primed with 3-6 mils of Carbozinc 11 by a qualified applicator utilizing a Binks No. 18 nozzle and a 5-gallon double regulated agitating pot at 30 psi pot pressure and 15 psi nozzle pressure. The areas then receive a mist coat followed by a top coat of Phenolene 305.

Concrete surfaces were dry blasted, then received Carboline 195 filler to repair minor surface irregularities. A build coat of the same material was then applied. Finally, a top coat of Phenoline 305 was applied.

The Region III inspector observed the QC inspector recording ambient temperature and humidity conditions with Sling Psycrometer No. 3512; 3513. Also, a KTA Positector Surface Profile Comparator was used to establish surface profiles of the embeds. Current calibration was verified on the test equipment. The work was being accomplished on the secondary shield wall of Unit 2 in quadrant 8, elevation 412 at about 60° azimuth. In Unit 1, concrete surfaces were being prepared for coating in the instrumentation tunnel.

c. Blast Shop

Ongoing production work was observed in the blast shop on February 3, 1983. Beams and columns, scheduled for installation in safety-related plant areas, were surface prepared and coated. Treatment of structural members 2235C4, 2624B1, 2050B1, 2073B3 and 2054B5 was observed. The steel members first received a white metal blast cleaning in accordance with SSPC-SP5-63 criteria. After the blast cleaning was completed, the members were cleaned by air blowing and

brushing. Inspection for nicks and steel slivering, and contamination (oil, grease or other deleterious substances) was then accomplished. Slivers and undesirable deformities were identified, then removed with a surface grinder. Surface profiles were then checked with a KTA Surface Profile Comparator to assure that a 1 to 3 mil blast surface profile was obtained. After final inspection and release by a QA/QC inspector, the members were moved into the coating bays. The measuring, mixing and thinning of the primer, Carboline Carbozinc 11 and Carboline thinner, and also the top coat material, Phenoline 305 Components A and B (an epoxy) and thinner were observed. The coating was accomplished by pre-qualified applicators using Binks 66BP air taps, Binks fluid nozzles and 2-gallon Binks agitating pots. After coating, visual QA/QC inspection was performed, then the material was transported to a curing area. Dry film thickness measurements were observed being taken on other cured steel members in the curing area. A Mikrotest gauge was being employed, and readings of approximately ten mils were being obtained. The desired total thickness was 6-14 mils.

d. Material Storage

Material storage areas were inspected. An 8 ft. by 35 ft. trailer had been recently moved in for additional storage capability. A continuous recording Honeywell Model 623X9-HT-00-7M-L thermometer monitored the temperatures. The trailer had insulated walls and was equipped with electric heaters at each end. A 5 ft. by 8 ft. QA/QC hold area was provided at one end. The primary storage area was in a large metal warehouse and was provided with adequate heating, lighting and temperature monitoring equipment. The storage areas complied with JLM/QP-10 Revision 3 (Housekeeping Procedures) and with JLM/QP-10, Revision 6 (Warehousing Procedure). The areas were also in compliance with Environmental Condition Level (B) as outlined in ANSI N45.2.2 for material protection of Service Level I coatings.

e. Quality Records

The inspector reviewed quality records JLM/QR-06, Report No. 02A (Surface Preparation Record-Steel) and JLM/QR-07, Report No. 15A (Applicator's Coating Record) for work performed on February 2, 1983. JLM/QR-09 (Field Surface Preparation and Coating Record) for work performed February 3, 1983, also was reviewed. The records contain appropriate evaluations for all aspects of the coating process as contained in governing procedures and specifications. The records were orderly and complete.

Calibration records for the following measuring and test equipment were reviewed.

(1) Thermometers: (Surface Temperature) S/N 26214; 23539; 20448; 26205; 26208; 26203; 26215; Taylor Fluid/Glass S/N 3718; 3719; 3720; 3721; Taylor S/N 04; 05; 06; 1330P; 3513; 3512; K1110; United Electric S/N 3705; 3706; 3708; and Taylor Bi-Therm Dial S/N K1108.

(2) Sling Psychrometers: Taylor S/N 10050; Bacharach S/N K1132; K1504; K2610; and K2607.

The records indicated each instrument was properly calibrated within the frequency limits specified in JLM/QP-03, Revision 6 (Control of Measuring and Test Equipment Procedure).

Product Identity and Quality Assurance Certification Records, Receiving and Storage Records, and Warehousing Records were reviewed for materials shipped on Invoice No. 94935. This shipment included 935-gallons of Carboline Carbozinc 11 (Batch Nos. A-3A0076M and B-2L3063M), 400-gallons of Phenoline Thinner (Batch 3A3932M) and 400-gallons of Carboline thinner 33 (Batch Nos. 3A0091M and 3A0152M). The shipment was received February 2, 1983. The records were in accordance with procedures and specifications.

No items of noncompliance or deviations were identified.

2. Concrete Repair

Repair work on the foundation slab of the fuel handling building was observed. Pressure grouting of internal void and honeycomb areas was in progress. The foundation slab concrete deficiencies and repair procedures were documented in Newberg Nonconformance Report (NCR) No. 4584.

The slab was approximately 94 feet by 120 feet in plan view. Thickness is 6 foot except for a trapezoidal section deepened to 8 feet total thickness paralleling the 94 foot dimension to support a load bearing wall. The bottom of the trapezoidal section was about 26 feet. The repair work was embraced in the Special Process Procedure-5 (SPP-5) program for concrete repair being accomplished at Marble Hill.

NCR 4584 was dated September 9, 1982. Unsound concrete was discovered along a cold joint in SPP-5 area 5-812 CP-1. Investigative coring through the area failed to render conclusive information to quantify the problem area. The NCR requested additional coring as necessary to effectively determine the deficiencies. A coring/boring plan was formulated by design engineers Sargent and Lundy (S&L). The plan specified 3 inch diameter holes where possible to penetrate the cold joint from the top of the slab and be extensive enough to assure total delineation and mapping of the deficient areas. Selected cores were to penetrate 12 inches into the underlying limestone. Appropriate changes were made in the investigation plan as information was acquired and evaluated. Approximately 250 holes were eventually drilled, generally on 6 foot centers. The major problem area was evidenced just under the reinforcing bar grid mass near the lower face of the concrete slab.

A Water Injection Test (WIT) was engineered to determine void communication between holes. The test consisted of pressure injecting dyed water into a pattern of holes and monitoring inter-communication holes. Selected injection point holes were selected, and an injection packer was inserted to a point just above the lower slab face grid of

reinforcing bars so that water injection occurred below that level. Injection was then started and the near periphery holes were monitored. When the dyed water was detected in a hole, the hole was plugged just above the level of the bottom mat of steel to prevent water from rising in the hole, and to force the injected water to communicate to other surrounding holes. The injection/monitoring process was continued until a perimeter was established beyond which water did not communicate. Then, another injection point was selected in the area of peripheral holes where colored water was not detected, and the process continued. S&L engineers were involved in surveillance of the WIT and provided in-process direction during the testing. Maximum communication distances of approximately 50 feet were recorded.

An engineering consultant experienced in pressure grouting was retained - Mr. John King from Cleveland Ohio. A grouting program was designed and described in Redisposition No. 6 of NCR 4584, dated January 9, 1983. Intrusion-Prepakt, Incorporated of Cleveland Ohio contracted to perform the grouting. Actual grouting was started the second week of February. Maximum grouting pressures were 40 psi for "take" (communicating) holes and 90 psi for "no take" holes. Grout Materials used were Inpakt Standard (no sand-neat grout) and Inpakt Pre-Mix (Blended with sand). Masterflow-713 Non-Shrink Grout was specified to repair the top slab surface. A 20 to 30 second efflux through a standard flow cone (CRD-C-611-80, Method of Test for Flow of Grout Mixtures) developed by the US Army Corps of Engineers was used to control grout consistency. Compressive strength tests were specified to be performed at 7, 28 and 91 days on specimens taken during the grouting operations, a minimum of one sample from each 50 bags of materials. The grouting operation continued until February 18, 1983.

Verification boring/coring was planned for the near future. Additional grouting may be required, contingent on the findings. Approximately 900 bags of grout had been injected. This translated to a volume of about 516 cf or 21.33 cy.

No items of noncompliance or deviations were identified.

3. Concrete Placement

On February 1, 1983, concrete placement AW 451-28 was visited. The placement location was Q line wall, 28 to 30 line, elevation 451 to 477. The Region III inspector verified that construction joints were properly prepared, reinforcing steel was placed in accordance with applicable design drawings, reinforcing steel and embedments were free from excessive rust, mill scale, concrete or other contaminants and that form work was properly cleaned and prepared. The Preplacement Inspection Checklist, and Concrete Release Sheet were verified to be properly completed to indicate acceptance of the pour area prior to placement.

No items of noncompliance or deviations were identified.

4. Static Testing of Embedded Plate Assemblies

Engineers from Wiss, Janney, Elstner Associates Incorporated, Northbrook, IL, were onsite February 16, 1983, to discuss a proposed program for static testing of embedded plate assemblies in unrepaired and repaired concrete. The Region III inspector attended the meeting. The licensee was currently evaluating the proposed test program. The proposed testing would include a partial repair and full repair series as well as the unrepaired series. All series would be test loaded to failure with both transverse and longitudinal loading lug bracket orientation. The test embeds would be instrumented with displacement transducers and also with strain gages to determine transverse and longitudinal strain. Plate testing was anticipated to be accomplished about April of this year, after finalization of testing program details are accomplished.

No items of noncompliance or deviations were identified.

5. Exit Interview

The inspector met with licensee representatives (denoted under persons contacted) on February 17, 1983, at the conclusion of the inspection. The inspector summarized the findings, as reported herein, which were acknowledged by the licensee.