U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Construction Inspection

IE Inspection Report No. 050-346/76-08

Licensee: Toledo Edison Company
Edison Plaza
300 Madison Avenue
Toledo, Ohio 43652

Davis-Besse Nuclear Power Station
Unit 1
Oak Harbor, Ohio

License No. CPPR-80
Category: B

Type of Licensee: B&W PWR 871 MWe

Type of Inspection: Routine, Announced

Dates of Inspection: January 5-6; February 11, 12, 27; March 19-21; and May 12-13, 1976

Principal Inspector: D. W. Hayes — June 7, 1976 (Date)

Accompanying Inspector: J. C. LeDoux (March 19-21, 1976, only) — June 7, 1976 (Date)

Other Accompanying Personnel: None

Reviewed By: D. M. Hunnicutt, Chief
Reactor Construction and
Engineering Support Branch — 6-7-76 (Date)

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SUMMARY OF FINDINGS

Inspection Summary

Inspection on May 12 and 13; March 19 and 21; February 11, 12 and 27; and January 5 and 6, 1976 (76-08). Reviewed procedures, records, inspection and audit reports; observed work in progress and completed work relating to: (1) surface preparation and application of the primer coat for interior sections of the containment vessel, (2) repair of the coating application on the containment vessel upper dome area, and (3) testing and evaluation of protective coatings previously applied on interior containment vessel surfaces.

Enforcement Items

No items of noncompliance were identified during the inspection.

Licensee Action on Previously Identified Enforcement Items

Not applicable to this inspection.

Other Significant Items

A. Systems and Components

Not applicable.

B. Facility Items (Plans and Procedures)

As a result of allegations, an inspection was conducted on July 17 and 18, 1974, to review quality assurance, quality control procedures and records concerning protective coatings on the containment vessel (IE Inspection Report No. 050-346/74-05). As a result of this inspection, several deficiencies, including lack of an adequate QA program, were identified relative to the containment vessel coating activities. Subsequent to the inspection of July 17 and 18, 1974, the licensee, in addition to correcting the specific deficiencies, undertook two programs; (1) to establish an adequate and approved QA program to assure future containment vessel coating work is accomplished in accordance with requirements, and (2) to develop and conduct a comprehensive testing and evaluation program to verify coatings previously applied to the containment vessel meet requirements. This inspection report documents the status of these programs and results to date of the IE review of records, observation of work in progress and testing activities in connection with the programs.

C. Managerial Items

None.

D. Noncompliance Items Identified and Corrected by Licensee

Not applicable.

E. Deviations

None identified.

F. Status of Previously Reported Unresolved Items

None reviewed.

Management Interview

A. An interview was held with licensee management personnel following completion of each segment of the inspection. Personnel attending the interview following the current inspection segment were as follows:

Toledo Edison Company (TECO)

L. E. Roe, Vice President, Facilities Development
J. P. Lenardson, Quality Assurance Manager
C. T. Daft, Field Quality Assurance Engineer

B. Matters discussed and comments, on the part of management personnel, were as follows:

1. The inspector reviewed the results of the inspection of containment vessel protective coating activities including repair of the upper dome area and testing and evaluation of coatings previously applied to the steel containment vessel. The inspector added that no adverse items were identified relative to implementation of the QA program requirements or the quality of the coatings.

2. Concerning testing and evaluation of coatings previously applied to concrete surfaces within the containment vessel the licensee stated that because of the difficulty in cutting through the coating due to rough surfaces and less uniformity of thickness, the "Knife" and "Cross-Hatch Adhesion" tests did not appear to be meaningful and that these tests had been discontinued. The licensee added that the "Elcometer Adhesion" tests had been completed but had not been fully evaluated. In response to questioning the licensee added that preliminary review of Elcometer adhesion test results for the concrete coated surfaces indicated that these tests easily met the minimum 200 pound pull specified in ANSI N5.12 Section 6.4.

3. In regard to containment vessel coatings the inspector stated the following items remained:

Review of the adherence test and evaluation results for previously coated concrete surfaces within containment.

Review of coating repairs of sample sites, areas damaged during construction and areas identified during the test program as not meeting acceptance criteria.

Review of infrared spectrographic analysis of selected samples from the containment vessel coatings to verify that coating material used was as specified.

Review of design basis accident testing results for composite coating systems used at Davis-Besse Unit 1. (The test coupons are same as before but with thicker top coatings to match deviations from specified thicknesses identified during the test program).

Review of qualification records of the consultant engineer testing personnel.

Final examination of the coated surfaces within containment following completion of the vessel pressure proof test.

REPORT DETAILS

Personnel Contacted

The following personnel, in addition to those listed in the Management Interview section were contacted during the inspection.

Toledo Edison Company (TECO)

R. E. Blanchong, Construction Superintendent
G. W. Eichenauer, Field Quality Assurance Representative
E. M. Wilcox, Field Quality Assurance Specialist

Bechtel Corporation (Bechtel)

H. E. Bumgarner, QC Engineer (Welding)
L. E. Sturgis, Coatings and Plastics Engineer (Gaithersburg)

Bagwell Coatings, Inc. (Bagwell)

C. M. Monroe, Jr., Project Manager
C. Baker, Project Manager (Effective March 9, 1976)
H. McGee, Project Superintendent
M. L. Perron, Quality Control Engineer
R. E. Reifsnyder, Quality Control Engineer
K. Landreneau, Quality Control Engineer

Kenneth Tator Associates

K. B. Tator, Owner
K. A. Trimber, Inspector

Inspection Results

1. Background

As a result of allegations received concerning the quality assurance program for interior protective coating of the steel containment vessel, the Region III Office of Inspection and Enforcement conducted in inspection at the Davis-Besse Unit 1 Construction site on July 17 and 18, 1974. As a result of this inspection ten (10) items of noncompliance with applicable quality assurance requirements were identified. Following the inspection, on July 22, 1974, the Toledo Edison Company (TECO) issued a stop work order for all safety related coating work which remained in effect until December 16, 1975.

On September 25, 1974, TECO replied to the noncompliances identified during the July inspection and a followup inspection was conducted on October 23-25, 1974, (IE Inspection Report No. 050-346/74-07). During this inspection it was determined that adequate corrective action had been completed on six of the ten items. The remaining items were resolved during inspections conducted on April 21-23, 1975 and August 18-20, 1975. (IE Inspection Reports No. 050-346/75-07 and No. 050-346/75-16).

2. Containment Vessel Coating History

The steel containment vessel sections were shop fabricated and erected in the field. The sections were cleaned and prime coated in the shop and it was initially intended to reclean and apply spot primer coat on the field weld areas after erection then apply the finish coat. Upon completion of field erection of the vessel, evaluations of test coating applications indicated that an adequate surface preparation could not be obtained to assure a satisfactory coating system due to extensive touch-up work required at weld areas and shop primed surfaces. For example, surface preparation problems existed in areas that had scaffolding attachments or scratches due to field erection and where extensive crayon marking had been applied on the shop primer from field erection marking and radiograph index marking. This general condition was present over most of the vertical sides of the erected containment vessel but was not as extensive in the upper dome area.

TECO decided that to ensure a high quality coating system it would be necessary to remove all shop applied prime coat material on the vessel by grit blasting to "white metal" then re-prime and finish coat. This was done except for the upper dome section which was completed utilizing the original specified method of cleaning and preparation of field weld areas, spot priming and finish coat application.

The internal coating of the containment vessel was done in accordance with Bechtel Specification No. 7749-A-24. The specifications require:

a. One coat of Dimetcote 6 (a solvent base inorganic Zinc rich primer) and two, 3 mil coats of Amercoat 66 (a polymid cured epoxy) to be applied from elevation 565 feet to the crane rail at elevation 725 feet. (A surface area of about 64,490 square feet). This coating system is manufactured by the Corrosion Division of the Ameron Corporation.

b. One coat of Carbo Zinc 11 (a solvent base inorganic zinc rich primer) and one coat, 4 to 4.5 mils, of Phenoline 305 finish (a modified phenolic) for the vessel area above the crane rail. (A surface area of about 37,968 square feet). This coating system was manufactured by the Carboline Company.

Concrete covers the steel containment vessel below elevation 565 feet and is used for equipment enclosures, and support structures, shielding, etc. Total surface area of exposed concrete within containment is about 89,313 square feet. Some of this concrete (generally easily accessible areas) is surfaced with Nukem 110AA then top coated with Amercoat 66. The balance of the concrete, with the exception of a few areas that remain to be coated, were cleaned and top coated with Amercoat 66. The steel reactor cavity liner was grit blasted to "white metal", then coated with three coats of Amercoat 90.

About 90 percent of the coating work inside the containment vessel took place from May 17, 1973 through November 14, 1973. The construction opening, which was sealed at a later date, and the interior area where the steel for the construction opening was stored were vacuum blasted to "white metal" and primed from January 23, 1976 through February 5, 1976. To date these areas have not been top coated.

3. Purpose of Inspection

The purpose of this inspection was to: (1) verify that the remaining containment vessel coating work was accomplished in accordance with requirements including provisions of the approved QA/QC program as amended, (2) review the results of the testing and evaluation program initiated by the licensee to establish that the coatings previously applied to the containment vessel interior surfaces meet requirements, and (3) review repair of areas damaged by construction activities, as a result of the testing program and areas identified where coating adhesion did not meet acceptance criteria of the testing program. These objectives were accomplished as outlined and discussed below.

a. Remaining Vessel Coating Work

(1) QA/QC Program

Reviewed provisions and implementing procedures for the preparation, application and inspection of interior coatings for the containment vessel and the control of materials, equipment and personnel involved.

(2) Materials

Reviewed coating material purchase orders, receiving reports, dispersment records and certification records. Observed coating storage areas and the quarantine zone for nonconforming materials.

(3) Application and Inspection Personnel

Reviewed test and qualification records for coating applicators, quality control engineers and quality control technicians.

(4) Equipment

Reviewed certification and calibration records for measuring and test equipment. Examined coating application equipment in the field for proper condition including air supply for capacity and provisions to prevent oil and moisture contamination.

(5) Inspections

Reviewed QC Inspection records for surface preparations and application of inorganic zinc primer. Inspection requirements included examinations and documentation of surface cleanliness, air quality, abrasive specified and used, environmental conditions and measuring instruments used, anchor profile pattern, residue removal and general cleanliness, coating material used including quantity and batch numbers, and final inspection of completed work for defects and proper film thickness.

(6) Completed Work

Observed completed prime coat on the sealed construction opening and adjacent area where the steel section for the construction opening was stored. Examined for overall quality of application and presence of "holidays" runs, sags, etc.

Note: The top finish coat for the sealed construction openings and adjacent area had not been applied as of May 13, 1976.

(7) Reviewed reports of audits conducted by TECO and Bechtel of activities of the coating contractor. Also reviewed reports of internal audits conducted by Bagwell including audits of their coating suppliers.

Findings:

Based on review of the quality assurance program and implementing procedures; observation of work in progress, and completed work; examination of records, including audit reports and discussions with licensee and contractor personnel it is concluded that safety related coating applications and related activities conducted subsequent to lifting of the stop work order were accomplished in accordance with quality and specification requirements.

b. Testing and Evaluation Program

(1) General

It had previously been established through an independent testing laboratory (Oak Ridge National Laboratory) that the coating systems used on the steel containment vessel, properly applied, were satisfactory for the required service conditions and would remain intact under design basis accident conditions. However, since it could not be established that an adequate quality assurance program for the application and inspection of containment vessel coatings had been implemented by the coatings contractor (Bagwell) prior to July, 1974, it was not possible to fully confirm that the previous coatings were applied in accordance with the specification and manufacturer's recommendations. To establish that the previously applied coatings met requirements, the Toledo Edison Company hired a consultant engineering firm specializing in paints and protective coating to conduct a testing program. The firm hired was Kenneth Tator Associated (KTA) a recognized authority in testing and evaluating coating systems.

The approach of the testing and evaluation program was to compare the field applied coating with that applied to a test patch of the same material.

(2) Test Methods

The tests available for field use to determine adhesion on already applied coating films are few and none are considered standard tests by ASTM or other standard organizations due principally to insufficient reproducability between operators or testing agencies. Of the test methods available, the following three adhesion tests were selected by TECo and KTA as the most reproducible and best for field evaluation. All tests were conducted in accordance with detailed

written procedures, using appropriate QA Documentations and qualified testing personnel.

Elcometer Adhesion Test - This is a tensile adhesion test in which a small (½ square inch) "dolly" is cemented to the surface of the coating. After curing of the adhesive, the perimeter of the dolly is scribed to the substrate and the "dolly" pulled off. The force at which the "dolly" delaminates is recorded, as well as the nature of the delamination. This adhesion test is specified by ANSI N5.12 - 1974 "Protective Coatings" (Paints) for the Nuclear Industry." Paragraph 6.4 requires a minimum adhesion by this method of 200 pounds.

Knife Adhesion Test - This test consists simply of using a knife to cut through the coating down to the substrate and attempting to delaminate the coating with the knife blade. A comparative evaluation is made on the degree of difficulty of coating removal and in conjunction of the size of the coating chips thus removed. This subjective comparison is then quantified on a 10 (best) to 0 scale.

Cross-Hatch Adhesion Testing - An Erichsen Cross-Hatch Cutter is used to cut four parallel scribes through the coating into the substrate. Another cut, perpendicular to the first forms nine squares, with each side approximately 5 mm. "Masking tape" is then rubbed onto the cross-hatched area then pulled quickly off. The percentage of coating delaminated from each square is estimated and evaluated from 10 (perfect) to 0 (complete delimination).

(3) Reference Test Patches

To determine the optimum or "ideal" adhesion of the coating systems used on the containment vessel two reference test patches, each approximately 24 square feet in area, were prepared on the surface of the steel containment vessel at the 603 foot elevation; one for the Carboline system and one for Ameron.

The surfaces were vacuum blasted to SSPC-SP-5* "white metal" with all work accomplished under inspection of the consulting engineer (KTA) in strict accordance with the specification and manufacturer's literature, using recommended equipment and thickness.

*Steel Structure Painting Council, Procedure SP-5.

Twenty-three sets of tests (one test set consists of: The Elecometer Adhesion Tester, a Knife grading, and a cross-hatch cut) were conducted on the Carboline test patch. The average tensile pressure of which either the adhesive disbonded or portions of the coating were delaminated was 457 psi, with a range of 185 psi to 665 psi. The subjective knife gradings averaged 6.5 ranging from 6 to 7. The cross-hatch gradings ranged from a low of 7.7 to a high of 9.9 with an average of 9.0.

Twenty-two test sets were conducted on the Ameron test patch with an average tensile pressure of 488 psi, ranging from 246 psi to 825 psi. The knife ratings ranged from 7 to 8 with an average of 7.9. The cross-hatch ranged from 9.4 to 10 with an average of 9.9.

(4) Selection of the Test Locations

The sampling plan was developed by Toledo Edison with every sample site located and numbered by Toledo Edison for KTA evaluation. Originally there were to be 300 sample locations in the Carboline System (above the polar crane) and an additional 300 sample locations in the Ameron system (below the polar crane). The sample configuration in the Carboline system was a "w" shaped pattern around the entire circumference of the vessel, at elevations 807' (55 samples), 799' (25 samples), 787' (81 samples), the polar crane rail at 725', and elevations above the polar crane rail accessible only when standing on the upper portion of the polar crane (144 samples). The samples varied from approximately 3 feet to 11 feet apart. The sampling configuration of the Ameron system was random from the 603' elevation to the 725' elevation providing a fairly uniform coverage of the shell (299 samples). The sample locations on the 565' (37 samples) and 585' (34 samples) elevations were also random due to the complexity of equipment locations and congestion of the areas.

During testing, Toledo Edison determined that the sample number could be reduced from 300 to 100 per system. Random number tables were used to select the Carboline sample sites already tested that would be included in the reduced sample size. This technique was also used to determine which of the remaining Carboline and Ameron sample locations, not yet tested, but already located and numbered on the containment vessel wall, should be evaluated.

From February 25 through February 27, 1976, in addition to the determining adhesion of the test patches, a few of the sample site locations were chosen randomly throughout the Carboline system to obtain a preliminary over view of the adhesion at the various levels. At this time it was discovered that some of the sample locations chosen at scattered locations in the 80 foot diameter "cap" area at the top of the containment vessel appeared to have substantially lesser adhesion than the Carboline test patch or other randomly selected sampling sites at lower elevations. Subsequently, the licensee decided to discontinue any additional sampling of the cap because of the poor test results, and to blast and recoat this area. (See Section 3c of this report below) The 100 sample locations in Carboline System did not include any locations in the cap area.

(5) Acceptance Criteria

(a) Each System as a Whole

The formula $A.L = \bar{X} - Z\sigma/\sqrt{N}$ was used to determine acceptance criteria for each system as a whole.

A.L. = The Action Limit above which the paint is acceptable and below which it is rejected.

$\bar{X}$ = The lowest mean value acceptable to Toledo Edison = 400 psi.

Z = Factor relative to 99.9% confidence level of not accepting the paint when it should be rejected. In this case, Z = 3.0 (from Probability Tables)

σ = The standard deviation of the test patch.

N = The number of samples tested.

The acceptance criteria for each paint system was determined by TECO using the Elecometer Adhesion Test Values only as the Knife and Cross-Hatch tests were very subjective and did not provide useful statistical data.

Paragraph 6.4 of ANSI N45.12 - 1974 "Protective Coatings (Paints) for the Nuclear Industry" requires a minimum adhesion of 200 pounds as determined by the Elcometer Adhesion Test Method. The test conducted

on the test patches resulted in mean value of 457 psi for the Carboline System and 489 psi for the Ameron System. Since the test patches would be considered the ideal in coating adhesion and the field applied coatings should show, all things being equal, similar or lesser adhesion, and that the minimum adhesion of 200 pounds is required by ANSI N45.12 - 1974, TECO selected a value of 400 psi as the lowest acceptable means value. Therefore, in the above formula X = 400 psi. The standard deviation was determined from the data obtained from the test patches. It was found that the standard deviation from the Carboline and Ameron Test Patches was 112 psi and 165 psi respectively. Applying these values to the above formula and the use of 100 samples the Action Limit for Carboline was determined to be 366.4 psi and 350.5 psi for the Ameron. Therefore, the acceptance criteria become:

Carboline:

If the average adherence for 100 samples is greater than or equal to 366.4 psi, accept the paint. If it is less than 366.4 psi, reject the paint.

Ameron:

If the average adherence for 100 samples is greater than or equal to 350.5 psi, accept the paint. If it is less than 350.5 psi, reject the paint.

(b) Acceptance Criteria for Each Test Location

The "acceptable" minimum adhesion limit for each test method at each location was established by lowering the "ideal test patch data" by a specified amount.

If the adhesion of the coating were to fall below the acceptance level for any of the three tests, the coating at that location was considered as having failed and, therefore, would require repair work. The acceptance level established by TECO for each of the adhesion tests is discussed below.

i. Elcometer Adhesion Testing - The minimum requirement for this test is already established in American National Standard N5.12-1974 "Protective Coatings (Paints) for the Nuclear Industry." The minimum adhesive requirement stipulated in Paragraph 6.4 "Adhesion" is 200 pounds. Accordingly, this was used as a minimum adhesive requirement for the Elcometer Adhesion Test.

ii. Knife Adhesion Testing - There were differences between the minimum knife adhesion obtained at the Ameron test patch (minimum 7, average 7.9) the Carboline test patch (minimum 6, average 6.5), and the containment vessel (Ameron 7.41, Carboline 6.89). It was felt by TECO that the minimum ideal adhesion should be the lowest of the test patch values, which is a "6", occurring frequently on the Carboline test patch. On the grading scale, a "6" evaluation is arbitrarily assigned a "good adhesion rating." However, as a result of testing and coating variations and comments from others, including coating company experts who indicated that arbitrary evaluation gradings of "5" and an occasional "4" would result in a satisfactory performance, the acceptance limit was lowered to "5". KTA also agreed that a grading of "5" was entirely satisfactory, reflecting adequate coating adhesion.

iii. Cross-Hatch Adhesion Testing - Again there were differences between the cross-hatch gradings obtained on the Ameron (9.4 minimum, 9.9 average) and Carboline (7.7 minimum, 9.0 average) test patches and the containment vessel (Carboline 9.32 average). (Ameron 9.75 Average).

The acceptance limit was used as arbitrarily selected as 1.1 less than the lowest cluster of readings on the Ameron and Carboline test patches respectively, (the 1.1 value corresponds to complete delamination of one of the nine squares, or equivalent). After disregarding the lowest Carboline cross-hatch rating, the lowest group of ratings was 8.4; which resulted in a Carboline system minimum cross-hatch acceptance value of 7.3. The lowest cluster of Ameron ratings was 9.4 resulting in an acceptance value of 8.3. This again, in the opinion of the consulting engineer, reflects satisfactory adhesion, although it deviates from the test patch ideal.

(6) Test Results

From test data from the 100 sample locations in each coating system KTA determined that the average adherence for the Carboline system was 573 psi compared to the 457 psi average for the test patch and the acceptance limit of 366.4. For the Ameron system the

average adherence was 440 psi compared to the 488 psi for the test patch and the acceptance limit of 350.5 psi.

For the individual test locations, the following results were obtained.

Elcometer Adhesion Test - Of the 200 tests none exhibited coating delamination at a tensile pul less than 200 psi.

Knife Adhesion Test - Of the 200 locations tested, two had a knife adhesion rating of less than "5" within the Ameron System and two within the Carboline System.

Cross-Hatch Adhesion Test - Of the 200 locations tested, three within the Carboline System had a Cross-Hatch adhesion rating less than 7.3 and two within the Ameron System had a rating of less than 8.3.

Knife/Cross-Hatch Adhesion Test - Of the 200 locations tested, two within the Carboline System and two within the Ameron System failed to meet both the knife and cross-hatch adhesion test acceptance criteria.

Findings:

Based on the review of the testing program and documented results, observations of testing activities in progress, and discussions with the consultant engineer and other coating specialists, the inspector concurs with the conclusions of the licensee and his consultant that: (1) the testing program was reasonably representative of the vessel coating; (2) the acceptance criteria was adequately conservative, and (3) the testing results pending satisfactory resolution of the items below indicate that the previously applied coatings on the steel containment vessel were consistent with requirements and would adhere to the underlying steel substrate in the event of a postulated accident condition.

Items remaining to be resolved include:

Satisfactory results of spectrograph analysis that representative samples taken from the applied coating are consistent with the coating formulation specified.

Satisfactory results of design basis accident tests on coating coupons with greater than specified top coat thickness, but consistent with deviations identified during the testing program.

c. Coating Repairs

As discussed previously, TECO decided to repair the coating on the 80 foot diameter cap at the top of the containment vessel by grit blasting to "white metal" and recoating. Because of the size of the repair area, it was decided to seal off the upper dome area and open grit blast rather than vacuum blast. An IE:III inspector was present during the initial phase of this work. See Attachment A to this report for the results of this inspection effort.

In addition to the upper dome section (cap) seven other areas within the Carboline system and six areas within the Ameron system failed to meet one or more of the adhesion test acceptance criteria, and will require repair. The extent or size of each area requiring repair was determined and outlined by the consulting engineer using the knife criteria. The seven areas in the Carboline System total 83 square feet and range in size from 3 square feet to 50 square feet. The six areas in the Ameron System total 109 square feet and range in size from 1 square foot to 48 square feet. These areas, as well as other areas damaged during construction or as a result of the testing program, have not been repaired to date pending development and approval of a repair procedure.

During the current segment of this inspection the completed coating on the repaired dome section was examined for proper "feathering" into the existing coated areas and for absence of defects. In addition, the following documentation relative to the dome repair was reviewed.

(1) Inspection records for surface preparation, prime coat and top coat.

(2) Instrument calibration and equipment inspection records.

(3) Material certification records including the chilled iron grit.

(4) Report of TECO audit performed April 22, 1976, relative to the repair of the containment vessel dome section by the coating contractor (Bagwell).

Finding:

Based on examination of completed work, review of records and discussions with TECO and contractor personnel, it

is concluded that the repair of the containment vessel dome area coating was accomplished in accordance with the quality assurance program and meets specification requirements.

Attachment:
Attachment A

ATTACHMENT A

Prepared by - J. C. LeDoux

Objective: To review preparation of the containment vessel "cap" area for recoating.

Accomplished by:

1. Review of Bagwell procedure BCPØ1 and QC checkoff sheets BC4 and BC4A, "Procedure for surface preparation and application of Inorganic Zinc coatings."

2. Review of personnel qualifications and equipment calibration.

3. Inspection of reactor containment space for protection equipment.

4. Inspection of dome area and work in progress.

5. Review of proposed procedure for acceptance criteria for testing programs of containment area surfaces.

Findings:

1. There were no items of noncompliance.

2. The Bagwell procedure BCPØ1 covers the requirements of TECO specification 7749-A24 with adequate quantitative and qualitative acceptance criteria.

3. The checkoff forms BC4 and BC4A contain adequate control information from the procedures for quality control of work.

4. The vital spaces and equipment within containment were adequately covered. The work area was separated from the lower containment areas by a tent-like tarpaulin which was suspended from the center of the dome and fastened to the lower scaffolding. Collection tubing was arranged to remove the expended grit to the lower levels. Various cable and piping penetrations appeared to be covered. An inspection was made immediately after blasting on March 20, 1976. The upper dome area was very hazy, but the area immediately below the protecting tarpaulin was clear. It appears that no appreciable amount of dust was escaping the controlled area.

5. The personnel qualifications were reviewed and were satisfactory.

6. The following control and QC instruments were checked for calibration and were satisfactory:

   a. Nordson PFT Gage SN2879
   b. Pyscho-Dial - BCI66 -QC
   c. Max-min Thermometer CERTN0716
   d. Pyrometer #8968

7. Following the steel grit blasting, the surface was examined and appeared to be clean with a fine cast iron like appearance. The surface was checked with a Keene-Tator Surface Comparator. Specifications allow eight hours from initial blasting to surface priming. The work force was cognizant of this requirement and had scheduled the work accordingly.