Enclosure

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
Upton, Long Island, New York 11973

June 13, 1984

Mr. Richard L. Bangart
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Bangart:

In accordance with our previous discussion, attached is BNL's draft report on allegations which you can review for format and technical content. I would appreciate your comments prior to our performing additional allegations work.

It is understood that this report will not be issued in final form, but will form the basis for a future report when all the coatings allegation work is completed.

Very truly yours,

John H. Taylor, Group Leader
Plant Systems & Equipment Analysis Group

JHT/sm
Enc.
cc: R. Hall

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Department of Nuclear Energy

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DRAFT

Revision VIII
June 8, 1984

U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

STATUS REPORT ON PROTECTIVE COATINGS ALLEGATIONS

PREPARED BY BROOKHAVEN NATIONAL LABORATORY

LICENSEE: Texas Utilities Generating Company
2001 Bryan Tower
Dallas, Texas 75201

FACILITY: Comanche Peak, Units 1&2
Glen Rose, Texas

TECHNICAL SPECIALISTS:

_____ _____
Vincent Lettieri (date)

_____ _____
S. John Oechsle* (date)

APPROVED:

_____ _____
John H. Taylor (date)

* Stephen G. Pinney and Associates

DRAFT

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I. INTRODUCTION

A. General Discussion of Allegation Disposition

This report provides the status of BNL's investigation of sixty allegations that were made by 10 individuals in regard to the coatings program at the Comanche Peak Steam Generating Station.

It was not in BNL's scope of work to assess the validity of allegations that require investigative interviews, which is the purview of the NRC. These allegations are indicated by an asterisk in the report and are numbers 16, 18, 32, 50, 53, 54, 56, 59, and 60. However, the technical adequacy of the applied coatings in question might be assessed by a properly conducted and adequately designed backfit program (Note 1) and/or an audit of training records (Note 2). These are identified as Note 1 and Note 2, respectively, and are indicated when appropriate following the subject allegations.

It was not possible to investigate every allegation in detail in the time available (approximately 30 allegations received a detailed investigation). However, it was possible to resolve some allegations without specific site investigations, in that the subject addressed practices that were acceptable and common throughout the industry. For those allegations that were not examined at all, recommended courses of action are provided that will be helpful in resolving the allegation. These allegations are Numbers 48, and 51, and are identified by a (+) in the report.

The allegations were dispositioned as follows:

Disposition Category	No. of Allegations in this Category	Explanation of Disposition
Substantiated	19	The allegation as stated is valid.
Not Substantiated	9	The allegation as stated was found to be not valid.
Unresolved	21	The allegation requires further information prior to disposition.
Not in Scope	9	The allegation requires investigative interviews, which is the purview of the NRC.
Not investigated	2	There was insufficient time to investigate these allegations to date.

The reader should be cautioned against using the above table indiscriminantly for the following reasons:

1. The number of allegations in the substantiated or not substantiated category is not an indication of safety significance of lack thereof. For example, an allegation might address a minor issue and be substantiated, yet safety is not impacted.

2. Many allegations in the unresolved category were investigated by BNL, yet remain unresolved due to one of two dominant reasons: a) A response is due from the licensee, such as the results of DBA testing, or b) A trend or disposition was becoming evident, but additional review is required before final disposition.

B. Indicated Areas of Concern

The majority of the allegations address one or more of the seven areas listed below:

Backfit Test Program - In the "Remarks" section for some of the allegations, it is suggested that an adequate backfit program would resolve the issue raised in the allegation. Information required to assess the adequacy of the licensee's backfit program was requested in BNL's April 25, 1984 report to the NRC.

DBA Testing - Some of the coatings were not "Design Basis Accident" qualified as per ANSI Standard 101.2 and FSAR Commitments. The licensee has committed to have this testing performed and results available by June 11, 1984.

QA Management Pressure - A number of the allegations imply or directly state that there was QA management pressure to perform work incorrectly. This was the subject of a separate NRC Office of Investigation inspection, which should be referred to for further detail in this area.

Procedural Deficiencies - The allegations identified numerous procedural deficiencies which were, for the most part, substantiated. These are identified in this report and in BNL's April 25, 1984 report.

Training - The question of training and licensee's capability to properly test was identified in many of the allegations. This information was also requested in the April 25, 1984 report in regard to the Backfit Program.

Non-Conformance Reporting - Some allegations state that engineering "Design Change Authorizations (DCA)" were used where Nonconformance Reports (NCR) should have been issued. Other violations of the engineering and non-conformance reporting system were identified. This area requires further review prior to resolution. Also, a review of a sampling of DCA's should be performed as a generic issue raised in response to a number of allegations.

Exemption Log - Many areas where coatings could not be applied per specification were identified and scheduled to be entered on an exemption log. Although this . an accepted industry practice, the placement of discrepant coating conditions on the exemption log was used to disposition DCA, NCR and subsequently certain allegations. It is, therefore, important that the licensee's exemption log program be examined.

C. Report Outline

The format of the report is as follows:

Section I - Discussion of how allegations were dispositioned, summary of major areas of concern, report outline.

Section II - Background discussion of importance of coatings and specific problems at Comanche Peak.

Section III - Detailed analysis of all 60 allegations

Section IV - Allegation summary by disposition category.

Attachment A identifies the allegations by originator. To maintain confidentiality, letter designations are used.

II. BACKGROUND

There are two major reasons for applying protective coatings inside the reactor containment building. The first reason is to protect exposed carbon steel surfaces from corrosion. The second reason is to provide for easier decontamination, which also reduces the level of occupational radiation exposure.

If coatings are not properly applied and subsequently fail, they may have an adverse safety impact by clogging pump strainers, spray nozzles, and fan filters which can degrade safety equipment operation. For additional information, see Manual of Coatings Work for Light-Water Nuclear Power Plant Primary Containment and Other Safety-Related Facilities, American Society for Testing and Materials, First Edition, 1979, Chapter 1, Section 1.6, Relationship of Coatings Work to the Enginered Safety Systems, and ANSI N101.2-1972, Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities, Section 4.1.

This is more than a theoretical concern since a number of protective coatings failures have occurred at nuclear power stations. For example:

- Beaver Valley (1975) - During construction, the coatings failed on the containment dome.
- Brunswick 2 (1980) - During operation, coatings failure occurred below the torus water line.
- Dresden 2 (1971) - During operation, Torus coatings failure occurred.
- Peach Bottom 2 (1971, 1973) - During preoperational testing, torus coatings failure occurred.

Starting in 1983, numerous individuals have made allegations concerning the adequacy of the applied protective coatings at Comanche Peak. See Section III of this report.

Brookhaven National Laboratory (BNL) was contracted to provide technical assistance in performing on-site inspections of the protective coatings program at Comanche Peak. The work, as stated in the contract, is to "Provide technical assistance in performing an inspection of the protective coatings program at the specified NTOL nuclear power plant. This inspection will include the examination of site procedures and verification of the adequacy of these procedures against standards and FSAR commitments, the adequacy of applied coatings, the adequacy of rework, and the procedures governing rework, the adequacy of verification testing, and the adequacy of completed quality records. Also included in the scope of this task will be the followup on specific technical questions contained in sworn testimony from persons making allegations of the adequacy of the protective coatings program."

The responsibility for reviewing the statistical adequacy of the licensee's Backfit Program, (i.e., sampling techniques, acceptance criteria, etc.) has been assigned to the NRC Auxiliary Systems Branch. With the concurrence of NRC Region IV, a meeting was held between ASB and BNL on April 2, 1984. The outcome of this meeting was that additional statistical information is required. This information has been incorporated into Section III of BNL's Letter Report of April 25, 1984.

COMANCHE PEAK ALLEGATION STATUS REPORT

NOTE: The allegations as listed below are as provided to the NRC by BNL in letters to Region IV dated January 16, 1984, January 24, 1984, February 16, 1984 and March 15, 1984.

III. ALLEGATIONS

NUMBER: 1

Paragraph 4.3.1.2 of Procedure Number CCP-40 states "Imperial coatings may be applied in the following sequential order: #11S/1201/11S/1201 or 11S/-1201/11/1201," The second paragraph of an Imperial letter dated May 8, 1978, VBR-7697 to Mr. Kelly Williams, second paragraph, states: "Although the resultant systems #11S/1201/11S/1201 or #11S/1201/11/1201 have not been qualification tested, there is no reason to believe that they are not viable systems," Thus, these two systems have not been DBA qualified.

(Note: The purpose and scope for testing coatings at simulated DBA conditions per ANSI N101.2 is as follows:

Following a design basis accident (DBA) in nuclear power plants, conditions in the reactor containment facility will be characterized by steam-air atmospheres at elevated temperature, pressure, and ionizing radiation. Water sprays, with or without chemical additives, may be used in the containment facility to suppress the incident, to scavenge fission products, and to return the facility to near-ambient conditions. It is important that the coating systems not deteriorate under these conditions, as the fragments of the coatings may interfere with the operation of the spray or core cooling systems. A test method is used to determine the suitability of coatings at elevated temperature and pressure. This standard test provides a procedure for evaluating the performance of protective coating systems at anticipated conditions which includes irradiation testing, methods of examining and evaluating the test. Testing for protective containment facilities is used to show the integrated radiation dose anticipated during the DBA for the specific application.)

Finding: Substantiated

Contrary to FSAR Section 6.1B.2, ANSI N101.2, Section 4, the above identified coatings systems have not been DBA or irradiation qualified.

Licensee's Response:

Subsequent to the allegation investigation, the licensee has committed to perform DBA and irradiation testing. This testing will be for the qualification for concrete coating systems 11S/1201/11S/1201 and 11S/1201/11/1201 manufactured by Southern Imperial Coatings Corporation, Inc. This testing will be per ANSI N101.2 at both the high and low values for coating thickness of each range. The test results are expected to be available on June 11, 1984.

Remarks

The test results are necessary to resolve this allegation.

This allegation is considered open.

NUMBER: 2

Specific sequencing of coatings for systems is not required. For example, Nonconformance Report (NCR) No. C83-01752 dated 6/23/83, Disposition section, first paragraph, states: "Table A2 in Appendix A of AS 31 specifies acceptable coating sytems, i.e., primer and final coat product identification and vendors." It then goes on to say that full sequencing is not identified. "This table does not identify full system sequencing or application parameters." Does a system's sequencing change for a repair? Why? Has the repair sequence been DBA qualified?

Finding: Substantiated

Contrary to CPSES Protective Coatings Specification 2323-AS-31, Revision 1, March 15, 1978, Table A-2 and 10 CFR 50, Appendix B, Criterion III, Design control specific sequencing of coatings has not been established.

Licensee's Response:

Per Imperial letter VBR-7697 dated May 8, 1978, the licensee will obtain from Imperial the test results referenced in this letter. The test results were expected to be available April 24, 1984.

Subsequent to this allegation investigation, the licensee has committed to perform DBA and irradiation testing where such data do not currently exist for all systems used in Service Level I areas. In those cases where the licensee feels extrapolation of existing test data is possible, it will provide for review that data that demonstrates that the coatings systems are DBA and irradiation qualified. The test results and other data are expected to be available June 11, 1984.

Remarks:

The new test results and existing test data are necessary to resolve this allegation. It was not discussed with the licensee, but the Protective Coatings Specification should be changed to incorporate all the coatings systems as applied in the field at CPSES.

This allegation is considered open.

NUMBER: 3

Design Change Authorization (DCA), No, 17, 142, Rev, 2, allows Carboline 305 to be applied over another manufacturer's epoxy coating. Has this system been DBA qualified?

Finding: Substantiated

Contrary to FSAR Section 6.1B,2 ANSI N101,2, Section 4, the above identified coatings system has not been DBA or Irradiation qualified.

Licensee's Response:

The equipment identified in the DCA has had its coatings incorporated into the Protective Coatings Exemption Log. The Protective Coatings Exemption Log includes the following items:

1. Coatings which did not meet QC requirements as documented by DCAs.

2. Coatings which did not meet QC requirements for primer documented by PCRs (Backfit inspection reports)

3. Coatings applied to equipment installed inside containment which do not meet the specification requirements.

Please note the following concerning the above:

- Regarding Item 1: In most cases, the DCA established the area of unsatisfactory coating; in other cases, a conservative estimate was made.

- Regarding Item 2: Liner-plate PCRs were not included. The field should confirm if any of the noted areas have been repaired to a satisfactory condition. Final PC inspection reports should be used to close out the violating PCRs.

- Regarding Item 3: Westinghouse equipment is not included. Estimates of mil thickness are conservatively based on the generic type of paint used.

This log is used by field personnel for recording coating deviations.

Remarks:

The equipment coatings identified by the DCA have been incorporated into CPSES Coatings Exemption Log. Therefore, this allegation as written has been resolved.

A general review is needed as to how items are placed on the CPSES Protective Coatings Exemption Log. Procedure CP-EP-16.4, Rev. 0, dated 10/31/83 does not appear to have sufficient mechanisms to ensure that all defective and non-qualified coatings are placed in the Coatings Exemption Log. Also, further review is required into the status of Westinghouse supplied equipment coatings. It does not appear that the Westinghouse equipment coatings have been incorporated into the Coatings Exemption Log, and they may not be DBA and irradiation qualified. The method by which items are placed on the CPSES Coatings Exemption Log and the status of coatings applied to Westinghouse supplied equipment should be examined in greater detail.

NUMBER: 4

DCA, No. 12, 374, Rev. 1, allows inorganic zinc primer (Carboline CZ-11) to be top coated by Imperial 1201. Has this system been DBA qualified?

Finding: Substantiated

Licensee's Response:

The licensee provided BNL with parts of Imperial Technical Report, Number 553-81, titled "Test Program to Evaluate DBA Performance of Overlap Coating Systems (Carboline/Imperial) for Beaver Valley Unit 2, dated December 24, 1981. The Licensee has committed to put the Richmond Inserts in the Coatings Exemption Log by April 15, 1984. [Richmond Inserts are concrete anchors that allow the installation of approximately one inch bolts at a later date.]

Remarks:

This system has not been DBA qualified when applied over Richmond Inserts because the above referenced DCA states "Due to the size and configuration of these Richmond Inserts, coating activities shall be performed in accordance with 2323-AS-30 coating specification." Coating Specification 2323-AS-30 is for Non-Service Level I coatings work and therefore the coatings on the Richmond Inserts in Service Level I area are no longer qualified for use in these areas. The licensee's options include placing these coatings on the Protective Coatings Exemption Log, requalifying the coatings systems, or redoing the coatings work. The DCA was approved in November 1982. This allegation will be resolved when the Richmond Inserts are placed in the Protective Coatings Exemption Log.

NUMBER: 5

Procedure No. CCP-30A, Rev. 2, page 2 of 13, paragraph 1.3.1 allows the application of Carboline 305 over the primer Dimetcote 6 by Ameron. Has this system been DBA qualified?

Finding: Not Substantiated

Licensee's Response:

Irradiation data do not exist directly for the coating system of Carboline 305 over the primer Dimetcote 6 by Ameron. The licensee believes that acceptable irradiation data for Dimetcote 6 and Phenoline 305 could be established by presenting data on Dimetcote 6/Amercoat 90 and Carbo Zinc 11/Phenoline 305. The rationale for establishing acceptable irradiation tolerance is based on the fact that both Dimetcote 6 and Carbon Zinc 11 are inorganic zinc primers and that both Amercoat 90 and Phenoline 305 are modified phenolic epoxies. Since these systems meet the irradiation qualifications, it can be concluded that a system consisting of Dimetcote 6 and Phenoline 305 will also meet irradiation qualification.

The licensee provided Test Report No. SR-105, entitled "Nuclear Data Summary Package Carbo Zinc 11/Phenoline 305 Finish and Ameron Test Report Nos. LSR 2206, LSR 2408A-1 and 2499."

The licensee stated that additional information is required on DBA data for Dimetcote 6 at 1.5 mils. Ameron established data for Dimetcote 6/Amercoat 90 at a thickness range of 2.1 mils for Dimetcote 6 and 4.5 to 10.4 for Amercoat 90. The licensee provided Laboratory Service Request No. 2507A-1 which includes data for Dimetcote 6 at 1.7 mils.

Remarks:

The licensee has provided sufficient data regarding the irradiation qualification of similar coating systems to justify the qualification of the above referenced system.

The Carboline Test report No. 01684 dated August 11, 1978, Test Report No. SR-105 entitled "Nuclear Data Summary Package, Carbo Zinc 11/Phenoline 305 Finish" is acceptable for Amercoat D-6 inorganic zinc top coated with Carboline 305 epoxy top coat.

This allegation is considered resolved.

NUMBER: 6

Procedure No. CCP-40, Rev. 5, page 5 of 13, paragraph 4.1.1.3 states: "Repair of embedded foreign objects such as nails, rebar chairs, bolts, wood, or plastic shall be repaired per the following guideline before application of NUTECH 11S surfacer." Have these systems been DBA qualified?

Finding: Substantiated

Contrary to FSAR Section 6.1B.2, ANSI N101.2, Section 4, the above identified coating systems have not been DBA or Irradiation qualified.

Licensee's Response:

The licensee has provided numerous letters regarding this allegation. Subsequent to this allegation investigation, the licensee has committed to perform DBA and Irradiation testing for embedded metal; the test results should be available June 11, 1984.

Remarks:

The test results are a necessary part of the resolution of this allegation. The licensee must address the DBA and Irradiation qualification of embedded foreign objects such as wood and plastic (e.g., rebar chairs) which it has not done to date.

This allegation is considered open.

NUMBER: 7

NCR No. C83-01986 discusses the cracking and flaking of concrete coatings systems (NUTECH 11, 11S, 1201). The disposition section of this NCR states "cracking of coatings is due to excessive stresses in the coating during drying and curing." The allegation is that repairing these cracks will not remedy the condition which caused the cracks.

Finding: Not Substantiated:

Licensee's Response:

These areas have been repaired per applicable CPSES Coatings Procedures. In the event that protrusions were not removed prior to coating application, there had been a procedure breakdown. With protrusions in place, the coatings would crack due to normal shrinkage of the coating as it dries, with the absence of a solid substrate, such as concrete.

Remarks:

BNL has walked through Reactor Containment Building #1 inspecting for these and other types of coatings failures. BNL could not locate any additional areas that currently needed repair of the coatings as referenced in this allegation.

All chemically converted organic coatings develop internal stress, due to shrinkage, in the process of cure which may cause cracking and peeling. This condition is not uncommon in many concrete applications. Independent tests by BNL at CPSES indicate that the adhesion to concrete is within specified limits. The repair methods are adequate and significant failure is not indicated or anticipated.

This allegation is considered resolved.

NUMBER: 8

Paragraph 4.1.3 of Procedure Number CCP-30, Rev, 11, states: "... shadows or tight residue of primer which may remain in the profile of the previously prepared substrate is acceptable." The allegation questions the integrity of an inorganic zinc primer which has been applied over a steel substrate with metallic zinc residue in the profile of the steel. The concern is that there will be coating adhesion problems, and that the zinc is isolated from the carbon steel substrate; thus the necessary galvanic action will fail to occur.

Finding: Not Substantiated

Licensee's Response:

The licensee referenced and provided BNL with a copy of Carboline Test Report, Testing Project Number 01931, titled "LOCA Testing of Carbo Zinc 11/Phenoline 305 Finish Repairability." It is the licensee's position that this report demonstrates that the allegation does not have safety significance.

Remarks:

BNL concurs with the licensee's response. Surface preparation for coating repair done in accordance with SSPC-SP 2 and SSPC-SP 3 is common in various nuclear facilities. Inorganic zinc residue remaining may be topcoated with inorganic zinc or an appropriate organic material. On the other hand, organic residue remaining must be coated only with the appropriate organic material. The licensee's current work procedures define these methods.

This allegation is considered resolved.

NUMBER: 9

"It is alleged that three coats of inorganic zinc primer have been applied at Comanche Peak to obtain the required dry film thickness. Paragraph 3.2.4 of Instruction Number Q1-QP-11.4.5, Rev. 27, states: 'Only two (2) overcoats shall be applied.' It is alleged that this system would lack chemical attraction or intercoat adhesion with itself. Is this three coat primer system qualified, for example, for environmental (irradiation) conditions and DBA conditions, under ANSI N101.2-1972? This is another example of the coatings systems not being qualified."

Finding: Substantiated

Licensee's Response:

Irradiation qualification data for multicoats of inorganic zinc primer is required. The licensee provided Carboline Testing Project 02182 and Ameron Report TRC-089-03.

Remarks:

Although the licensee's response did not completely and directly address this allegation, application of multiple coats of inorganic zinc coatings is common industry practice. The requirement for thinning additional coats is being met on site. Furthermore, the adhesion and compatability of a third coat is no different than the adhesion and compatability between the first and second coat. Excessive thickness could create a problem, but in this case, the third coat is applied to bring the system within the specified thickness. DBA results would not be expected to differ at a given thickness when the material is properly applied in one, two, or three coats. DBA test data exist for one- and two-coat systems. BNL has determined through discussion with industry sources that this application will not be detrimental to coatings performance.

This allegation is considered resolved.

NUMBER: 10

Paragraph 3.2.2.3 of Instruction Number QI-QP-11.4-5, Rev. 27, page 8 of 27, states: "Surfaces that have been power tooled with '3M Clean-N-Strip,' 80 grit or coarser 'flapper wheels,' sanding discs, 'roto peans,' or equivalent provide acceptable surface profile." It has been alleged that:

a. The coating system applied to surfaces prepared using the above specified power tool methods are not qualified, for example, for environmental (irradiation) conditions and DBA conditions under ANSI N101.2-1972.

b. The above mentioned methods provide a smoothing or polishing action, rather than a penetrating action as obtained with sandblasting or with a needle gun.

c. The profile that is obtained using the above-mentioned methods occurs in a sparse pattern and not a densely packed pattern.

Finding: Substantiated

Contrary to FSAR Section 6.1B.2, ANSI N101.2, Section 4, the above identified coatings systems with these surface preparations have not been DBA or Irradiation qualified.

Licensee's Response:

Additional DBA and irradiation qualification data is required for Dimetcote 6/Phenoline 305 applied to a surface prepared in accordance with SSPC-SP3 Power Tool Cleaning.

The licensee provided the following test reports: Carboline Testing Project No. 02217 (Carbo Zinc 11, LOCA Testing over SSPC-SP3), Ameron Report Nos. LSR 2206, 2207, 2408A-1 and Ameron Test Report No. LSR1862.

The licensee believes that Dimetcote 6 over SSPC-SP3 would be acceptable since Dimetcote 6 and Carbo Zinc 11 are both inorganic zinc primers. Since Amercoat 90 is generally similar to Phenoline 305 (both are modified phenolic epoxies), Dimetcote 6/Amercoat 90 applied to SSPS-SP3 would provide equivalent test results when compared to Dimetcote 6/Phenoline 305.

Remarks:

A BNL review of the procedures indicated that DBA tests were on samples prepared with 60 grit flapper wheels. The referenced procedures were in error in specifying a finer grit (80) and have been subsequently corrected. The coating systems on properly prepared surfaces have been DBA qualified. The amplitude and frequency of surface profile using SSPC-SP2 and SSPC-SP3 will be generally lower in amplitude and less frequent than with sandblasting. The licensee's procedures on approved tools were incorrect in the case of the 80 grit flapper wheel and loose enough to allow unqualified tools such as wire brushes. Therefore, the coating systems with this surface preparation are not DBA and Irradiation qualified. The licensee's options to resolve this allegation include DBA and Irradiation qualifying the coatings systems as applied, or removing and reapplying the coatings.

This allegation is considered open.

NUMBER: 11

It is alleged that DCA No. 18, 489, Rev. 1, allows a primer thickness of 0.5 mils. If this is so, is a coating system having a primer coat of 0.5 mil thickness qualified, for example, for environmental (irradiation) conditions and DBA conditions, under ANSI 101.2-1972?

Finding: Substantiated

Contrary to FSAR Section 6.1B.2 ANSI N101.2, Section 4, the above identifed coatings systems have not been DBA or Irradiation qualified.

Licensee's Response:

The DCA reference above has been voided and the areas it addressed had been placed on the Protective Coatings Exemption Log, items 8 through 15.

Remarks:

With the voiding of this DCA and the placing of these areas that it addressed on the Protective Coatings Exemption Log, this allegation is considered resolved.

NUMBER: 12

If maximum limits are used, paragraph 4.3.1.2 of Procedure Number CCP-40, Rev. 5., allows a 102 mil thick coating system for 11S/1201/11S/1201. Is this system thickness qualified, for example, for environmental (irradiation) conditions and DBA conditions, under ANSI 101.2-1972?

Finding: Substantiated

Contrary to FSAR Section 6.1B.2 ANSI N101.2, Section 4, the above identifed coatings systems have not been DBA or Irradiation qualified.

Licensee's Response:

Subsequent to the allegation investigation, the licensee has committed to perform DBA and Irradiation testing. This testing wil be for the qualification for concrete coating systems 11S/1201/11S/1201 and 11S/1201/11/1201 manufactured by Southern Imperial Coatings Corporation, Inc. This testing will be per ANSI N101.2 at both the high and low values for coating thickness of each range. The test results are expected to be available on June 11, 1984.

Remarks:

The test results are necessary to resolve this allegation.

This allegation is considered open.

NUMBER: 13

It is alleged that the coatings applied to areas such as the reactor core cavity will not maintain their integrity due to neutron and gamma exposure. It is further alleged that water and flaked-off paint will flow out of the reactor core cavity in the case of a LOCA. Are the coating systems applied to these areas qualified under ANSI 101.2-1972, especially for environmental and DBA conditions? Which areas are qualified and which areas are not? If coatings in the cavity will come off with irradiation, will this cause a problem post-LOCA?

Finding: Unresolved

Licensee's Response:

The licensee has provided Gibbs & Hill, Inc. Telex's GTT-9572 and GTT-10210 and Gibbs & Hill, Inc. letter GTN #68601.

Remarks:

Insufficient information has been provided to date to demonstrate that the protective coatings in the reactor core cavity will not present problems in the case of a LOCA. What is required is documentation that demonstrates that the coatings either will not fail or if the coatings do fail, they cannot inhibit the safe shutdown of the plant.

NUMBER: 14

"a. It has been alleged that after an NCR is written, anyone can sign off on it.

b. It has been alleged that NCRs cannot be written, and that IRs must be written with "unsats." It is alleged that NCRs must be dispositioned by an engineer, while IRs can be dispositioned by anyone. What prevents items identified on an IR fronm becoming lost, the problem not being resolved, or generic items not being identified?"

Finding: Substantiated

Licensee's Response

The licensee presented his procedure manuals to address this allegation.

Remarks

BNL has performed a partial review of this allegation and concluded that while some of the alleged conditions existed, no significant problem resulted. Some additional inspection work is still required and some areas needing improvement were identified in the BNL report of February 24, 1984, see Attachment B. The additional onsite inspection followup needed for this allegation includes:

a. Verify that unresolved items 5.3.2, 5.3.3, and 5.3.4 of the February 24, 1984 report have been adequately addressed.

b. Verify that the licensee has a working tracking system to ensure that all unsatisfactory IR's or travelers written are eventually re-inspected satisfactorily.

Briefly, the licensee has a workable program for identifying and correcting deficiencies. Areas needing improvement were identified as unresolved items in the referenced inspection report. These deficiencies should be corrected as the potential existed for unsatisfactory conditions or nonconformances not to receive the proper attention.

NUMBER: 15

It is alleged that Paragraph 4.4.3.0 of Procedure Number CCP-30, Rev. 11, allows CZ-11 or Carboline 191 to be applied over existing Phenoline 305 topcoat and left intact, without sanding back to a "mottled" (an area showing both top coat and primer coat) transition.

It is also alleged that this paragraph allows Phenoline 305 to be applied over Reactic 1201 and vice versa.

Are these coating systems qualified, for example, for environmental and DBA conditions, under ANSI 1012.2-1972?

Finding: Substantiated.

Contrary to FSAR Section 6.1B.2, ANSI N101.2, Section 4, the above identified coatings systems have not been DBA or Irradiation qualified.

Licensee's Response:

The licensee has committed to provide DBA and Irradiation test results per ANSI N101.2 for the coating systems that interface each other. In some cases, the licensee may choose not to DBA and Irradiation test, but to provide documentation that demonstrates that the coating system does not need to be tested. The test results are expected to be available on June 11, 1984.

Remarks:

The BNL review of CCP-30 Rev. 11 indicates confusing and in some cases incorrect statements. In paragraph 4.1.3, a statement should be included that states when an inorganic zinc is applied to a repair area, the interfacing area will be sanded back to expose the organic portion of the feathered edge. The organic finish coat may then be applied. Organic zinc should never be applied over an organic film. Paragraph 4.4.3.0 of CCP-30, Revision 11, compounds the problem in the last sentence by stating "within the interface area, overlapping of any materials or systems is acceptable,"

The Request for Information or Clarification (RFIC), dated October 20, 1983, is answered incorrectly. The response could allow inorganic zinc over the organic coating approximately 1 inch wide on the entire outside dimension of the patch. There would be no adhesion between the zinc and the organic coating in this area.

Application of various epoxys in combination is generally acceptable, provided that the overlapping surfaces are sanded and solvent wiped. The epoxy formulations are noted for their excellent adhesive qualities. In minor areas such as around imbeds, the slight overlap should not present a problem.

The test results are necessary to resolve Part "a" of this allegation. In addition, the justification for not testing will have to be reviewed.

NUMBER: 16*

As a result of numerous allegations regarding improper pressure being applied to QC inspectors, NRC Office of Investigations has written violations in this area and proposed two civil penalties. Are there any coating material deficiencies in the plant resulting from the improper pressure applied to QC inspectors? (e.g., pressure not to write unsat reports or NCRs, threats to lose job, use of verbal instructions to QC inspectors vs. written insructions, lack of support from QC management in technical disputes with construction, confusing instructions which do not suppport unsats, such as QI-QP-11, 4-5, Rev. 27, page 5 of 27, Note 4 and page 19 of 27, paragraph 3.7.5.b). This is considered outside the scope of the BNL review.

* See Section I.A, Note 1, of this report

NUMBER: 17

It is alleged that the "air acceptability test" results are invalid because cigarette butts are placed into the cheater valve of the spray gun prior to the test and removed after the test. Further, it is alleged that construction and QC management was aware of this practice.

Finding: Substantiated

Contrary to the Steel Structures Painting Manual (SSPM), Volume 1, Good Painting Practice, Chapter Five, Section VI.C., page 129, the licensee has not been following good painting practices. The SSPM states "Traps and seperators for removing oil and water from the compressed air source should be effective enough so that the air being used does not deposit visible oil or water when it is allowed to impinge for 15 seconds on a clear metal surface."

Licensee's Response:

The licensee stated that they were aware that cigarette filters were placed in cheater valves. The licensee does not believe this to be a problem for two reasons:

1. It is an effective if unconventional method to remove oil from the air line. At the same time, cigarette filters were being used, the air compressors were old and passing oil.

2. If the cigarette filters had in fact been removed or were not removed, and the air that entered the paint was in fact contaminated, then this contamination would have been evident in the applied paint.

Remarks:

Air pressure is used for spray painting and no sandblasting is currently being done inside containment. BNL has verified the poor condition of the pressure air system at the time of the allegation, and the use of filters in the cheater valves of the spray guns. The old air system that passed oil has since been replaced and the new air system includes adequate air filter systems. If a water/oil emulsion contaminated the spray system, we would expect to see a fisheye type condition in the coating or possible discoloration. The water portion of the emulsion would tend to accelerate the cure of an organic coating.

BNL anticipates that an adequate Backfit Program and an adequate final walk-down procedure should enable this allegation to be resolved.

This allegation is considered open.

NUMBER: 18*

It is alleged that QC inspectors are not allowed to identify visual defects such as cracking or blistering during backfit inspections, and is outside the scope of this review.

* See Section I.A, Note 1 of this report.

NUMBER: 19

It is alleged that Instructions Number QI-QP-11.4-23 and QI-QP-11.4-24 are very vague regarding the way the backfit inspections are to be conducted.

(Note: These instructions address the reinspection of seal and finish coated steel and concrete substrates for which documentation is missing or discrepant.)

Finding: Unresolved

Licensee's Response:

The licensee stated that the QC Inspectors go through a training program in the use of the Elcometer Adhesion Tester.

Remarks:

A review of these procedures has been performed. The results were that the procedures could be interpreted properly by a well trained QC Inspector. However, a QC Inspector that was not well trained in these procedures could have difficulty properly implementing them.

The resolution of this allegation is dependent on the licensee's response to the BNL report of April 25, 1984, which requested information on many areas of the Backfit Program.

In response to the licensee's comments on training, BNL has been unable to verify the proper training of inspectors on the Backfit procedure and use of the Elcometer Adhesion Tester. No documentation of training was found in the personnel files.

NUMBER: 20

It is alleged that adhesion testing of the protective coatings are not performed properly. The QC inspectors are instructed not to cut around the adhesion test dollies when conducting adhesion tests. The instructions that come with the machine tell you to do so (and Specification AS-31 references these instructions).

Finding: Substantiated

Contrary to manufacturer's instructions for the use of the Elcometer Adhesion Tester, the test dollies were not scored around prior to adhesion testing.

Licensee's Response:

It does not matter whether or not the test dollies are scored around prior to adhesion testing.

Remarks:

Industry test data indicates no measurable difference between cut and uncut dolly pull tests. Site practice has been modified and currently all dollys are scored prior to adhesion testing.

This allegation is considered resolved.

NUMBER: 21

It is alleged that Brown & Root is doing the calibration on these adhesion testers, and they are not using a corrected value curve (which should have been supplied with each unit).

Finding: Substantiated

Contrary to 10 CFR 50, Appendix B, Criterion XII, Control of Measuring and Test Equipment, the licensee has not assured that instruments are properly calibrated.

Licensee's Response:

The licensee issued a letter report to the NRC on February 15, 1984 on this item.

Remarks:

Up until recently (approximately January 1984) the calibration lab was using an improper calibration standard and did not furnish a deviation chart with each instrument sent to the field. Additionally, the QC Inspection Report forms do not include an area for indicating the deviation and recording the corrected value. The licensee's response to BNL's letter report of April 25, 1984 may resolve this allegation.

This allegation is considered open.

NUMBER: 22

In the present Backfit Program, QC inspectors are required to take readings with adhesion testers without receiving formal training.

Finding: Unresolved

Licensee's Response:

The licensee stated that the allegation is not true and that all inspectors must take written exams on this technical detail.

Remarks:

The requirement for formal training is referenced in 10 CFR Part 50, Appendix B, Criterion II, ANSI N512-1974, Protective Coatings (Paints) for the Nuclear Industry, Section 10.3, and ANSI N101.4-1972, Quality Assurance for Protective Coatings Applied to Nuclear Facilities, Section 6.3.

The resolution of this allegation is dependent on the licensee's response to the BNL report of April 25, 1984, which requested information on many areas of the Backfit Program.

In response to the licensee's comments on training, BNL has been unable to verify the proper training of inspectors on the Backfit procedure and use of the Elcometer Adhesion Tester. No documentation of training was found in the personnel files.

NUMBER: 23

It is alleged that the Coatings QC Program at CPSES is inferior to the same programs at other nuclear power plant projects. One reason is that standard inspection practices, used at other sites, are not used at CPSES. For example, a sample adhesion test used by a QC inspector regularly at another site, was not allowed at CPSES by one of the QC lead men. This is the ASTM tape adhesion test.

Finding: Not Substantiated.

Licensee's Response:

This allegation is not true. CPSES has a good QC Program.

Remarks:

Quality Programs and Quality Control procedures vary from site to site depending on the licensee's interpretation of Appendix B requirements and applicable Reg. Guides and Standards. The ASTM Tape Test is not extensively used on other nuclear sites.

An allegation as general as this cannot be resolved without detailing specific attributes of the QC Program that are unacceptable. BNL has identified some weaknesses in the QC Program at CPSES and brought them to the attention of the licensee and the NRC, in this and previous reports. BNL has also observed good aspects of the QA/QC program at CPSES. No overall breakdown was observed during inspection visits by BNL.

This allegation is considered resolved.

NUMBER: 24

It is alleged that Q coatings have been placed over rusty, scaly unprepared metal surfaces inside pipe supports made of tube steel without endcaps. In these cases the protective coating gets on the rusty inside of the tube. This coating material could later crack, scale, come off the pipe, and then travel to the sumps."

Finding: Substantiated

Contrary to FSAR Section 6.1B.2, ANSI N101.2, Section 4, the above identified coatings systems have not been DBA or Irradiation qualified over unprepared metal surfaces. During inspection visits, it was observed that Q coatings had been allowed onto unprepared metal surfaces inside supports made of tube steel without endcaps.

Licensee Response:

Licensee has stated that an engineering study is in progress that may result in placing these coatings on the exemption log.

Remarks:

The amount of coating material referred to in the allegation may not be significant, and the listing of these areas on the exemption log could resolve the allegation.

This allegation is considered open.

NUMBER: 25

It is alleged that a seal coat was accepted prior to the finished coat being applied, when in fact the seal coat should have been rejected. The area in question is just outside the Skimmer Pump Room, in Reactor Containment Building-Unit 1, on the steel liner plate. The stains on the liner plate, in the opinion of the inspector, were not acceptable per procedure and should have

caused the seal coat to be rejected for finish coat application. The QC inspector brought the condition to management's attention and requested their opinion. Management stated that the stains were in fact rust stains and acceptable, while the QC inspector felt it was obvious that the stains were not rust and unacceptable. The QC inspector stated: "The reason I accepted this was because I feared adverse action would be taken against me if I rejected it." The QC Inspector goes on to say that this area has the finish coat on it now and none of the stains are visible.

Finding: Not Substantiated

Licensee's Response:

The licensee stated that the stains were scrubbed with solvent and then top coated per procedure.

Remarks:

Stains on organic coatings that are not removed with water and solvent wiping are acceptable. BNL's review indicates that areas are routinely wiped down prior to top coating. Additionally, it is not within the BNL scope of work to address the "fear of adverse action" on the part of the inspector. The QC pressure issue is being addressed separately by NRC.

This allegation is considered resolved.

NUMBER: 26

It is alleged that Design Change Authorization (DCA) documents are not controlled.

Finding: Substantiated

Licensee's Response:

The licensee stated that DCA's have always been controlled both by computer and logging records. Additionally, as of January 1984, all DCA's carry a stamped control number and are serialized.

Remarks:

While the approval of DCA's pertaining to protective coatings is controlled, their distribution and incorporation into various documents is not adequately controlled. Based on a review of Design Change Authorizations written in the coatings area, it is apparent that there is no formal mechanism to ensure that users of controlled copies of the coatings specification have received and are aware of all applicable DCA's. Additionally, there is no requirement for specification revision after DCA's have been issued against it, either based on time or number of DCA's.

This allegation is considered open, pending resolution of the above concerns.

NUMBER: 27

It is also alleged that DCA's at CPSES are originated and approved totally by engineering. QA/QC has no input in the review and disposition of DCA's.

Finding: Substantiated

Licensee's Response:

The licensee stated that DCA's are the responsibility of Engineering. There is a Design Engineering Review group that overviews DCA's. There is no formal Quality Engineering review. QC and QA's roles come into the picture when the quality procedures are affected.

Remarks:

Unless some quality aspect (such as accept/reject criteria, regulatory requirement, etc.) of the specification, procedure or instruction is changed, there is no requirement for a review and/or approval by QA/QC.

The procedure by which the DCA originates and is finally dispositioned could be reviewed to assure that quality aspects are, in fact, not being changed without QA/QC input. Normally, the licensee's own QA department (through internal audits) would have already confirmed this fact.

This allegation as written is considered to be resolved.

NUMBER: 28

It is alleged that DCA's are used frequently and conveniently to address issues for which a Nonconformance Report (NCR) should be written. The alleger estimated that 40% of the DCA's are for NCR conditions.

Finding: Unresolved

Licensee's Response:

DCA's are not knowingly issued in place of the issuance of an NCR.

Remarks:

The majority of DCA's reviewed to date addressed inaccessible areas or conditions that can be addressed as best effort or use as is and do not require an NCR.

It appears from BNL's limited review of DCA's that certain DCA's were written without engineering justification to eliminate nonconforming conditions. An example is DCA 13,429 Rev. 2 that allows weld splatter to remain.

Further review of DCA's is required to resolve this allegation, as follows:

1. Review of licensee's procedures for issuance of DCA's and requirements for review of safety significance.

2. Analysis of scope and content of issued DCA's.

NUMBER: 29

It is further alleged that DCA's are written to overcome a problem area which will take considerable time for repairs. In other words, the DCA's are used to facilitate the completion of a job even though this means that accepted procedures will not be followed.

Finding: Not Substantiated

Licensee's Response:

The licensee stated that DCA's must satisfy the Engineering Design Review. Also, an engineer could, for various reasons such as cost effectiveness, design, and completion schedule, determine that a DCA should be issued. DCA's are an accepted procedure.

Remarks:

It is acceptable industry practice to modify specification requirements if they cannot be satisfied for one reason or another. Generally, factors of safety are built into requirements and can be modified without effecting basic design criteria or safety.

This allegation is considered resolved.

NUMBER: 30

It is alleged that on numerous occasions, DCA's have been issued to downgrade the surface preparation from an SP-10 to an SP-6 standard preparation. It is further alleged that DCA's are also written to downgrade Specification AS-31 requirements in containment to AS-30, which is the non-safety specification. The downgrading of an SP-10 to an SP-6 surface preparation is an example of DCA's being written to downgrade from an AS-31 to an AS-30 requirement.

Finding: Substantiated

Licensee's Response:

The licensee stated that this allegation alludes to inaccessible areas where it is impossible to clean to Specification AS-31 standards.

Remarks:

A limited review of the DCA file indicates that virtually all questions in this allegation are for inaccessible areas, A best effort, use as is and downgrading of specification requirements for inaccessible areas are accepted industry practice, provided that basic design criteria are met and safety is not impaired.

Those areas not meeting Specification 2323-AS-31 can be properly dispositioned by placing them on the Protective Coatings Exemption Log. If they are not properly placed on the exemption log, this will be observed in the followup to Allegation No. 3.

This allegation is considered resolved.

NUMBER: 31

It is further alleged that QC management interpreted an SP-6 on a DCA to mean "do the best you can". For example, when difficult access areas were involved, QC management allegedly stated to the QC inspectors, "if you cannot get to an area, do not worry about it."

Finding: Unresolved

Licensee's Response: The licensee had no knowledge of this occuring.

Remarks:

A limited review of the DCA file indicates that virtually all questions in this allegation are for inaccessible areas. A best effort, use as is, and downgrading of specification requirements for inaccessible areas are accepted industry practice, provided that basic design criteria are met and performance is not impaired.

The resolution of this allegation will require further review to ensure that those areas not meeting Specification 2323-AS-31 are properly dispositioned. Placing these areas on the Protective Coatings Exemption Log is one method of properly dispositioning these areas.

NUMBER: 32*

It is alleged that after a reading list was signed by QC inspectors, the document that they read was removed and replaced by a different document, yet the reading list coversheet remained the same. This is outside the scope of this review.

NUMBER: 33

It is alleged that many problems at CPSES with coatings are due to a QC Coatings Lead Inspector's (Individual K) lack of experience in QC. An example of this was when he identified the rust on an A-frame structural component inside containment in the core area as being D-6 Amercoat Dimetcote residue.

Finding: Unresolved

Licensee's Response:

The licensee had no knowledge of this occurring.

Remarks:

BNL was not able to verify the allegation. BNL believes an audit of training and qualification records, especially for Individual K, is required. It should also be pointed out that BNL identified a deficiency in the number of Level 2 and 3 inspectors in the April 25, 1984 report to the NRC.

NUMBER: 34

It is alleged that the requirements of ANSI/ASME N45.2.2-1978 were not met for material storage.

Finding: Unresolved

Licensee's Response:

The licensee stated that QC is in charge of receiving and issuing coatings materials. They are meeting the requirements of ANSI N45.2.2.

Remarks:

BNL's partial review has confirmed that on one occasion, the temperature control for the storage facility was lost. This condition was for a short term and emergency measures were instituted to protect the coating inventory. Further review needs to be completed in regard to this allegation. The individuals making this allegation may need to be contacted for additional information. An audit of procedures, records, and interviews with field personnel for compliance with ANSI N45.22 is required to resolve this allegation.

NUMBER: 35

It is alleged that Comanche Peak has problems in the area of workmanship, quality of work, painter qualification, and indoctrination. It is also alleged that documentation requirements were not being met, for example documentation of painter qualifications and in-process work.

Finding: Unresolved

Licensee's Response:

The licensee stated that they do have records of painter qualifications. QC interfaces with the paint foreman on each painting job through the use of a monthly printout that shows what each painter is qualified to perform in regard to procedures, type of coating material, and application technique. Construction puts all painters through a training qualification program.

Remarks:

BNL's partial review has verified that qualification records were maintained and furnished to the foreman and inspectors. The personnel records of 4 painters and 4 QC inspectors were reviewed. These documents demonstrated that the personnel had been trained and in fact were qualified. BNL spot-checked that qualified painters were properly applying the specified materials during the on-site visit.

NUMBER: 36

It is alleged that the traceability of coatings materials was not always maintained.

Finding: Unresolved

Licensee's Response:

The licensee stated that QC monitors the receipt and distribution of all coatings materials. QC also logs all of the applicable data for traceability.

Remarks:

BNL has verified that currently a coating material log exists and is operational.

NUMBER: 37

This allegation has been rewritten to separate the technical aspects from the non-technical aspects:

Part a - It is alleged that for the Backfit Program, areas that were stated to have satisfactory primer documentation ended up having 10 mils of primer on them, which exceeded the allowed maximum.

Part b - It is also alleged that none of the maps showing areas of adequate primer documentation were correct for the Backfit Program.

Part c - Additionally, it is alleged that the documentation for the Backfit Program was forged and falsified.

Part d - Furthermore, it is alleged that a QC inspector for the night shift wrote up acceptable inspection reports for the dome area without ever performing the inspections.

Finding: Unresolved (Part a)

Licensee's Response:

The licensee stated that the backfit program was properly performed and that test results demonstrated that the primer system was indeed within CPSES specification. In regard to the second part of this allegation, the licensee had no knowledge.

Remarks:

Part a: This allegation and its resolution is related to material expected to be received in regard to the Backfit Program as requested in BNL's April 25, 1984 letter report. Further review will be needed to resolve this allegation in regard to proper primer thickness.

* Parts b, c, and d. are outside the scope of this review: See Section I.A, Note 1, of this report.

NUMBER: 38

It is alleged that high dry film thicknesses (DFT's) of CZ-11 are power ground to an acceptable DFT. It is further alleged that this would burnish or polish the zinc, and possibly result in poor adhesion of the top coat.

Finding: Not substantiated

Licensee's Response:

The licensee does not feel this allegation is valid since there is a "hold point" for inspection of the surface prior to the application of the finish coat.

Remarks:

Reducing the overthickness of inorganic zinc by grinding or sanding is an acceptable industry practice. The organic top coat should exhibit adequate adhesion. For example, two foot wide belly band areas in BWR Torus structures at other power plants, coated with carboline inorganic zinc were prepared with reciprocating sanders and an organic topcoat applied. After 10 years of immersion service, the topcoated areas are still in perfect condition.

This allegation is considered resolved.

NUMBER: 39

It is alleged that old Phenoline 305 (between 1 and 2 years old) is being top coated with new Phenoline 305 with little or no surface preparation (solvent wipe).

Finding: Not substantiated

Licensee's Response:

The licensee stated that Carboline (manufacture of Phenoline 305) recommends solvent wipe after a cure time of more than 30 days.

Remarks:

Solvent wiping of Phenoline 305 prior to finish coat is proper and acceptable. It is common industry practice to solvent wipe the surface of Phenoline 305 prior to topcoating.

This allegation is considered resolved.

NUMBER: 40

Instruction Number QI-QA-11,4-5, paragraph 3.2.2.d, Rev. 27, dated 11/8/83, page 7 of 27 states: "Verify that the blasted or power tooled surface has been brushed or vacuumed to the extent required for final surface inspection." It is alleged this has never been performed on power tool cleaned surfaces. It is further alleged that in lieu of following the procedure, the surfaces are being blown down with compressed air or wiped with a cloth rag. The concern with using compressed air is that the surface becomes contaminated with oil and/or water. The concern with a cloth rag is that the surface becomes contaminated with lint.

Finding: Substantiated

Licensee's Response:

The licensee stated blowdown is part of procedure. It is the QC inspectors responsibility to assure that contamination from oil, water and lint does not occur.

Remarks:

Blowdown, brushing and/or vacuuming are acceptable industry practice for prepared surfaces prior to coating. Cloth rags should not be used.

The possibility of lint remaining on the surface and the fact that the rag will not remove dust or particles from the blast or prepaired profile makes their use unsatisfactory. Air used for blowdown should be free of contamination. Oil/water emulsion in a contaminated air system could deposit on the surface and result in poor to no adhesion of the coating material. Minute amounts of lint could cause spot failure provided the coating was exposed to very high humidity or immersion for extended periods of time.

It is known that at one time the air compressors used for suppling air for the painters had difficulties providing suitable air for painting. It is not known if any of this unsuitable air was used for painting purposes. BNL did observe, during at least one of its inspection visits, the use of cloth rags for wiping surfaces.

BNl believes further review is required to resolve this allegation. The licensee's procedures should be modified to permit the use of blowdown with clean, dry air and to preclude the use of rag wipe downs. An adequately conducted Backfit Program will verify the acceptability of the applied coatings, and be useful in resolving this allegation.

This allegation is considered open.

NUMBER: 41

It is alleged that when wiping a surface immediately prior to repairing that surface, the paint is wiped with a foreign cleaning solution. This foreign cleaning solution is alleged to be a hospital disinfectant containing two (2) percent chlorides. The concern is that this hospital disinfectant is not allowed by procedure and could cause stress corrosion cracking of stainless steel.

Finding: Unresolved

Licensee's Response:

The licensee had no knowledge of this occurring.

Remarks:

BNL verified the availability of "hospital disinfectant" aerosol cans and their use in containment. BNL could not verify that the materials were used for purposes other than freshening the atmosphere. BNL verified that this aerosol did contain chlorides.

If this allegation is substantiated, it could have a safety significance depending on the extent it was used. BNL believes that the determination of whether a foreign cleaning solution containing chlorides was used will require interviews with the personnel that were involved. If it is determined that an improper cleaning solution was used for cleaning, then the major concern is not the effect of chlorides on the protective coatings but on stainless steel.

NUMBER: 42

It is alleged that duct tape has been placed over Richmond Inserts, leaving a hole behind the duct tape. Also, foam rubber was left inside the Richmond Inserts. It is then alleged that 11S and 1201 coatings are applied over the duct tape. The end result is what appears to be a solid wall, but in reality is a wall with holes in it covered with duct tape, 11S and 1201.

Finding: Unresolved

Licensee's Response:

The licensee stated if duct tape was used it was removed and repairs made if needed. In those Richmond Inserts where foam was left at a later date, the foam is removed and repairs made if needed.

Remarks:

It was verified that some inserts were taped prior to painting, others plugged with foam rubber, and others were filled with drypac grout. Procedures should provide for opening the inserts after the application of coating but before curing. This would eliminate the cracking and damage to adjacent coating by opening after the epoxy coating has set.

This allegation requires further review, although preliminary investigation indicates that this allegation is not substantiated.

NUMBER: 43

It is alleged that zinc primer was not sufficiently cured before a top coat was applied. It is also alleged that the procedures were not followed to determine if the zinc primer was properly cured.

Finding: Unresolved

Licensee's Response:

The licensee stated that the data analyzed to date indicate little or no problems with the protective coatings. A final Backfit Report is due at a later date.

Remarks:

BNL was not able to verify the described condition in its limited inspection. BNL's independent testing did not refute this allegation. BNL believes an adequate Backfit Program might be used to resolve this allegation.

NUMBER: 44

It is alleged that the "nickel" test was not performed properly due to instructions received from QC supervisors. It is alleged that QC supervisors instructed QC inspectors to lay the nickel flat on the surface of the coating; then to rub the nickel as lightly as the inspector could, across the coating, to keep just enough pressure on the nickel so that it would not fall out from under the fingers.

Finding: Unresolved

Licensee's Response:

The licensee stated that Carboline has been on site to instruct the painters, foremen, engineers and QC personnel on an acceptable technique for performing the "nickel" test.

Remarks:

This is typical of a number of allegations indicating a lack of training and/or communication between inspectors and management. In BNL's limited review, it appears that documentation is not available in the personnel records to document instructions to QC Inspectors on how to perform the "nickel" test, Therefore, this allegation requires further review. This allegation may be resolved through a review of an adequate Backfit Program, and a review of training records.

NUMBER: 45

It is alleged that repairs of defects have been accomplished with no reinspection of these defects. For example, a repair is made, someone comes along and walks in that repair, you have accepted that area as satisfactory with footprints, contamination, sand, etc., and it is never reinspected. It is further alleged that this repair is not given a final inspection of the type that would have been performed had it been a regular production type job

Licensee's Response:

The licensee stated that QC will have a final "walk-down" prior to signing an area over to the client. In addition, engineering will be performing an independent "walk-down" after QC has performed their walk-down.

Remarks:

This allegation can be resolved with an adequate final walkdown procedure. The present procedure is not adequate to resolve this allegation. The current final coatings walkdown procedure contains no acceptance criteria and does not contain appropriate instructions regarding hiding quality, cracking, delamination, peeling, excessive overspray, excessive roughness, flaking, blistering, or cracking.

This allegation is considered open.

NUMBER: 46

It is alleged that during Tooke gauge tests, it was observed that rust was seen on steel substrate, and grease, grime, filth, and other contaminants on concrete substrate.

Finding: Not Substantiated

Licensee's Response:

The licensee stated that it is technically impossible for this to be observed during Tooke gauge tests. The licensee believes whoever made this allegation has little technical knowledge as to the purpose or function of the Tooke gauge.

Remarks:

BNL was not able to verify the described condition in its limited inspection. It is BNL's opinion that it is not reasonable to expect an individual to be able to detect rust on steel substrate and grease, grime, filth and other contaminants during a Tooke test unless they were present in gross amounts. BNL did not detect any such gross conditions during its onsite visits.

This allegation is considered resolved.

NUMBER: 47

It is alleged that for an installation hanger for the steam generators in violation of a written instruction, QC inspectors were instructed to perform approximately 25 Elcometer Adhesion Tests.

Finding: Unresolved:

Licensee's Response:

The licensee stated that the applicable procedures were followed.

Remarks:

BNL believes this allegation requires more specific information from the individual making this allegation. This allegation as currently written and as was stated in the statement received from the individual making the allegation, is not completely clear as to what the concern is.

NUMBER: 48+

It is alleged that coatings have been applied over seismic joints. These joints are filled with foam and were not to be coated.

+ See Section I A. of this report.

NUMBER: 49

It is alleged that overspray into areas that had previously been inspected has been allowed and is commonplace.

Finding: Unresolved

Licensee's Response:

The licensee does not believe the allegation is valid, The licensee feels that the individual making allegations has confused overspray with dry spray.

Remarks:

Dry spray is paint that has dried to a significant extent before it reaches a surface, and then is loosely adherent to that surface. Overspray usually occurs due to an attempt to apply paint too far from the nozzle and it partially dries prior to reaching the surface. Dry spray and over spray are essentially the same thing. They both produce a grainy texture on unintended adjacent surfaces due to the fact tnat the paint has partially dried prior to reaching the surface. Current procedures permit minor amounts of overspray to remain on the surface. This condition will not cause coatings failures but might make decontamination difficult. During plant outages the painted surface is not left smooth but rough and contamination is trapped inside the rough surface. DCA 19622, with its attached Carboline letter dated December 2, 1983 addresses this subject and states that dry spray is acceptable. BNL does not concur with this determination. BNL does not agree that ability to seal zinc primer makes a surface easier to decontaminate. Also, BNL does not agree that the irregularities result simply in a duller finish from an aesthetic viewpoint. It is BNL's position that the irregularities make a surface more difficult to decontaminate. This may increase occupational radiation, contrary to the ALARA principle.

BNL could not determine, in its limited review, whether this practice was commonplace or a significant problem. BNL believes further review is necessary to resolve this allegation.

NUMBER: 50*

It is alleged that coatings have been applied without the benefit of quality control inspection. This is outside the scope of this review.

* See Section I.A., Note 1 of this report.

NUMBER: 51+

It is alleged that Phenoline 305 was thinned to a 50/50 mix with thinner. This 50/50 mix, when dried, became as brittle as glass. The Phenoline 305 became so brittle that it was not possible to obtain a Tooke gauge reading. It lost its impact resistance and abrasion resistance.

+ See Section I.A. of this report.

NUMBER: 52

It is alleged that coatings have been placed over raw concrete that had no surface preparation.

Finding: Unresolved

Licensee's Response:

The licensee had no knowledge of this occurring.

Remarks:

BNL has not been able to verify the described condition in its limited inspection. BNL believes further review is necessary to resolve this allegation, and possibly more specific information may be needed from the individual making the allegation. An adequate backfit program and a random review of concrete surface preparation records and interviews with the personnel involved might be useful in resolving this allegation.

* See Section I.A., Note 1 of this report.

NUMBER: 53*

It is alleged that QC inspectors were not to write Requests for Information or Clarification (RFIC's). This is outside the scope of this review.

NUMBER: 54*

It is alleged that during the Backfit Program, only the first unsatisfactory reading was recorded, even if the following readings were either higher or lower, meaning further out of the acceptable range. It is further alleged that the trend analysis was adversely affected by not including the actual readings. This is outside the scope of this review.

* See Section I.A., Note 2 of this report.

NUMBER: 55

It is alleged that areas identified during the Backfit Program as being outside of the acceptable range for applied coatings were not removed as required.

Finding: Unresolved

Licensee's Response:

The licensee stated that this is being handled by the QA Program.

Remarks:

BNL has not been able to verify the described conditions in its limited inspection. BNL believes further review is necessary to resolve this allegation, and possibly more specific information may be needed from the individual making the allegation. The licensee's response to BNL's April 25, 1984 letter report and/or a review of training records and interviews with the personnel involved may be useful in resolving this allegation.

NUMBER: 56

It is alleged that original documentation related to the Backfit Program was destroyed by QC management. This is outside the scope of this review.

NUMBER: 57

It is alleged that in Unit 2, elevation 860, the room directly off the elevator had an area coated that was covered with filth, weld spatter, tobacco juice, and other unsuitable material prior to protective coatings being applied.

Finding: Unresolved

Licensee's Response:

The licensee had no knowledge of this occuring.

Remarks:

BNL has not been able to verify the described condition in its limited allegation, and possibly more specific information may be needed from the individual making the allegation. An adequate Backfit Program might be useful in resolving this allegation.

NUMBER: 58

QC Inspector procedures such as QI-P-11.4-1 state: "Adequate lighting is defined as the minimum light produced by a (2) cell battery flashlight." It is alleged that the minimum is zero light. It is alleged that QC inspectors were to perform their inspections at arm's length, and if the light was bright, that wasn't the minimum. Rather, it was the maximum and they should obtain a weaker flashlight.

Finding: Unresolved

Licensee's Response:

The licensee believes that the procedures are quite clear in regard to light.

Remarks:

BNL has not been able to verify the described conditions in its limited inspection. BNL believes further review is necessary to resolve this allegation. The procedures involving this allegation and other requirements for the use of flashights at CPSES should be rewritten to meet Industry practices. The requirement for a flashlight to be held only perpendicular to

the inspection surface is not good industry practice. Proper inspection technique would require a light to be positioned parallel to the surface to locate certain types of defects. Additionally, the minimum light required is not specified.

An adequate Backfit Program might be useful in resolving this allegation and determining if past practices affected the quality of applied coatings.

NUMBER: 59*

It is alleged that a QC Inspector accepted substandard coatings on the liner plate, below and above the polar crane rail at azimuth 270° to 0°. This is outside the scope of this review.

* See Section I.A., Note 1 of this report.

NUMBER: 60*

"It is alleged that QC Inspectors were selectively sent to various inspections so that the coatings would pass inspection. For example, production calls for QC Inspection. When the inspector arrives, he is told they are not ready. He returns to the QC office. On the way, he meets a second inspector proceeding to the area he was just told was not ready for inspection. In this way, production selects the QC inspector they want. It is also alleged that QC management would reassign an inspector to a different task if he was going to reject a coating application. It is further alleged that QC management would send two inspectors to inspect an area, yet only one would sign the inspection report. It is alleged that the inspector not signing the report would not perform as thorough an inspection because he did not want to anger QC management, especially since the inspector did not have to sign the report." This is outside the scope of this review.

* See Section I.A., Note 1 of this report.

IV. ALLEGATION SUMMARY BY DISPOSITION CATEGORY

The 60 allegations can be broken down into the following subdivisions:

A. Substantiated and resolved

B. Substantiated and require review of additional information to resolve

C. Not substantiated and resolved

D. Unresolved and require additional information/investigation

The following is a listing of allegations divided among the headings identified above:

A. Substantiated and Resolved

1. Allegation #3
2. Allegation #9
3. Allegation #11
4. Allegation #20
5. Allegation #27
6. Allegation #30

B. Substantiated and Require Review of Additional Information to Resolve

1. Allegation #1 - Information should be available by June 11, 1984.
2. Allegation #2 - Information should be available by June 11, 1984
3. Allegation #4 - Should be able to resolve after April 15, 1984 when licensee enters information onto the Protective Coatings Exemption Log.
4. Allegation #6 - Information should be available by June 11, 1984
5. Allegation #10 - Date unknown for additional information
6. Allegation #12 - Information should be available by June 11, 1984

7. Allegation #14 - Requires additional on-site investigation

8. Allegation #15 - Information should be available by June 11, 1984

9. Allegation #17 - Requires additional information, date unknown

10. Allegation #21 - Date unknown for additional information

11. Allegation #24 - Date unknown

12. Allegation #26 - Date unknown

13. Allegation #40 - Date unknown

C. Not Substantiated and Resolved

1. Allegation #5

2. Allegation #7

3. Allegation #8

4. Allegation #23

5. Allegation #25

6. Allegation #29

7. Allegation #38

8. Allegation #39

9. Allegation #46

D. Unresolved and Require Additional Information/Investigation

1. Allegation #13 - Date unknown

2. Allegation #19 - Date unknown

3. Allegation #22 - Date unknown

4. Allegation #28 - Date unknown

5. Allegation #31 - Date unknown

6. Allegation #33 - Date unknown

7. Allegation #34 - Date unknown

8. Allegation #35 - Date unknown

9. Allegation #36 - Date unknown

10. Allegation #37 - Date unknown

11. Allegation #41 - Date unknown

12. Allegation #42 - Date unknown

13. Allegation #43 - Date unknown

14. Allegation #44 - Date unknown

15. Allegation #45 - Date unknown

16. Allegation #47 - Date unknown

17. Allegation #49 - Date unknown

18. Allegation #52 - Date unknown

19. Allegation #55 - Date unknown

20. Allegation #57 - Date unknown

21. Allegation #58 - Date unknown

E. Not in BNL's Scope of Work

1. Allegation 16

2. Allegation 18

3. Allegation 32

4. Allegation 50

5. Allegation 53

6. Allegation 54

7. Allegation 55

8. Allegation 56

9. Allegation 59

10. Allegation 60

F. Not Investigated to Date

1. Allegation 48

2. Allegation 51

ATTACHMENT A

ALLEGATION SORT BY ORIGINATOR

1. Individual A

a) Allegations 1 through 15

These allegations were generated from a review of Individual A's statement of 11/21/83 and its attachments. These allegations are the 15 statements discussed with Individual A by the NRC staff during the interview.

b) Allegation 16 - 11/21/83 Interview, pages 107 and 108

c) Allegation 17 - 11/21/83 Interview, pages 95 through 97

d) Allegation 18 - 11/21/83 Interview, pages 42 through 4

e) Allegation 27 - 08/24/83 OI Report, Attachment 22

f) Allegation 36 - 11/21/83 Interview, pages 87 and 88

g) Allegation 40 - 11/21/83 Interview, pages 90 and 91

h) Allegation 41 - 11/21/83 Interview, pages 90 and 91

i) Allegation 42 - 11/21/83 Interview, page 37

2. Individual B

a) Allegation 14b - 8/24/83 OI Report, Attachment 2, page 2

b) Allegation 16 - 8/24/83 OI Report, Attachment 2, pages 1 through 3

c) Allegation 19 - 8/24/83 OI Report, Attachment 2, page 1

d) Allegation 20 - 8/24/83 OI Report, Attachment 2, page 1

e) Allegation 34 - 3/3/84 Interview, page 119

f) Allegation 36 - 3/3/84 Interview, pages 115, and 117 through 119

g) Allegation 37 - 3/3/84 Interview, pages 30 through 33, 42 and 43

h) Allegation 42 - 3/3/84 Interview, pages 71 and 72

i) Allegation 43 - 3/3/84 Interview, pages 4, 5 and 19

j) Allegation 44 - 3/3/84 Interview, pages 6 and 7, plus 17 and 18

k) Allegation 45 - 3/3/84 Interview, pages 13 through 16, 29 and 30

l) Allegation 46 - 3/3/84 Interview, pages 45 and 46

m) Allegation 47 - 3/3/84 Interview, pages 51 and 52

n) Allegation 48 - 3/3/84 Interview, pages 72 and 73

o) Allegation 49 - 3/3/84 Interview, pages 91 and 92

p) Allegation 50 - 3/3/84 Interview, pages 100 through 103

q) Allegation 51 - 3/3/84 Interview, pages 111 through 114

r) Allegation 52 - 3/3/84 Interview, pages 26 and 121

s) Allegation 53 - 3/3/84 Interview, pages 123 through 125

t) Allegation 54 - 3/3/84 Interview, pages 126 and 127, 129 plus 130

u) Allegation 55 - 3/3/84 Interview, page 129

v) Allegation 56 - 3/3/84 Interview, pages 132 through 127

w) Allegation 57 - 3/3/84 Interview, pages 137 through 141

x) Allegation 58 - 3/3/84 Interview, pages 34 plus 142 and 143

y) Allegation 59 - 3/3/84 Interview, pages 33 and 34, plus 141 and 142

z) Allegation 60 - 3/3/84 Interview, page 144

3. Individual C

a) Allegation 16 - 8/24/83 OI Report, Attachment 4, pages 1, and 3-5

b) Allegation 20 - 8/24/83 OI Report, Attachment 4, page 1

c) Allegation 23 - 8/24/83 OI Report, Attachment 4, page 1

4. Individual D

a) Allegation 16 - 8/24/83 OI Report, Attachment 6, pages 1 and 2

b) Allegation 20 - 8/24/83 OI Report, Attachment 6, page 2

c) Allegation 21 - 8/24/83 OI Report, Attachment 6, page 2

d) Allegation 22 - 8/24/83 OI Report, Attachment 6, page 2

e) Allegation 23 - 8/24/33 OI Report, Attachment 6, pages 1 and 3

f) Allegation 24 - 8/24/83 OI Report, Attachment 6, page 2

g) Allegation 25 - 8/24/83 OI Report, Attachment 6, page 2

5. Individual E

   a) Allegation 16 - 8/24/83 OI Report, Attachment 8, pages 1-6

   b) Allegation 19 - 8/24/83 OI Report, Attachment 8, page 2

   c) Allegation 25 - 8/24/83 OI Report, Attachment 8, page 4

6. Individual F

   a) Allegation 14b - 8/24/83 OI Report, Attachment 10, page 1

   b) Allegation 16 - 8/24/83 OI Report, Attachment 10, pages 2 and 3

   c) Allegation 20 - 8/24/83 OI Report, Attachment 10, page 1

   d) Allegation 21 - 8/24/83 OI Report, Attachment 10, page 1

7. Individual G

   a) Allegation 25 - 8/24/83 OI Report, Attachment 18, page 3

8. Individual H

   a) Allegation 13 - 8/24/83 OI Report, Attachment 20, page 4

   b) Allegation 14 - 8/24/83 OI Report, Attachment 20, page 4

   c) Allegation 26 - 8/24/83 OI Report, Attachment 20, page 1

   d) Allegation 28 - 8/24/83 OI Report, Attachment 20, pages 1 and 2

   e) Allegation 29 - 8/24/83 OI Report, Attachment 20, page 2

   f) Allegation 30 - 8/24/83 OI Report, Attachment 20, page 2

   g) Allegation 31 - 8/24/83 OI Report, Attachment 20, page 2

   h) Allegation 32 - 8/24/83 OI Report, Attachment 20, page 3

   i) Allegation 33 - 8/24/83 OI Report, Attachment 20, pages 4 and 5

9. Individual I

   a) Allegation 14 - 8/24/83 OI Report, Attachment 20, page 3

   b) Allegation 16 - 8/24/83 OI Report, Attachment 24, page 2

10. Individual J

a) Allegation 14 - 1/4/84 Statement, Exhibit #1, page 3, item A

b) Allegation 17 - 1/4/84 Statement, Exhibit #1, page 3, item E

c) Allegation 34 - 1/4/84 Statement, Exhibit #1, page 3, item A

d) Allegation 35 - 1/4/84 Statement, Exhibit #1, page 3, item A

e) Allegation 36 - 1/4/84 Statement, Exhibit #1, page 3, item A

f) Allegation 37 - 1/4/84 Statement, Exhibit #1, page 3, item A

g) Allegation 38 - 1/4/84 Statement, Exhibit #1, page 3, item E

h) Allegation 39 - 1/4/84 Statement, Exhibit #1, page 3, item F

ATTACHMENT B

BNL LETTER REPORT of

February 24, 1984