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Vogtle Project
Readiness Review
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Vogtle Project

February 4, 1986

Mr. D. O. Foster
Vice President/Project Support
Waynesboro, Ga. 30830

RE: Readiness Review Program
Module 13B
Coatings

LOG: RR-712

FILE: X7BD102

Dear Mr. Foster:

Pursuant to your instructions I am enclosing Module 13B of the Readiness Review Program entitled Coatings. This module reports the work of the Readiness Review Team and has been prepared in order to present you with an accurate picture of the readiness for operations of the Vogtle Project, based upon a close examination of the protective coatings program.

The Readiness Review process included an initial assessment and review of basic licensing documents in order to identify Project commitments within the scope of the module. The Readiness Review Team then verified implementation processes designed to meet those commitments, including programs and controls relating to work within the scope of the module.

The team then engaged in a process designed to verify that implementation programs were operating as described in procedures, policy statements, and other descriptive documents. In concluding this verification process, the team then actually verified that the licensing commitments identified during the process were being fulfilled and met.

We are confident that the verification methodology used allowed the Readiness Review Team to properly appraise the actual condition of the protective coatings and provided a valid means of assessing the quality of the program, having also considered applicable past audits, inspection reports, and problems experienced by other utilities.

Based on the examinations, inspections, and evaluations of the review and the responses and corrective actions committed to by the Project, it is the conclusion of the Readiness Review Team that the design and construction programs that govern the protective coating processes have produced a final product that meets design requirements and licensing commitments. Additionally, none of the findings identified, either individually or collectively, are such that the adequacy of the project protective coatings is called into question. Therefore, the protective coatings program meets the FSAR commitments.

Members of the Readiness Review Team and I are prepared to discuss this module with you at your convenience. If we can provide you with any further information or assistance regarding this matter, contact me.

Very truly yours,

William C. Ramsey

WCR/bjd

cc: R. E. Conway
Readiness Review Board Members
Reading File
Document Control

0151m/029-6

VOGTLE ELECTRIC GENERATING PLANT

UNIT 1

READINESS REVIEW

MODULE 13B - COATINGS

PREFACE

Georgia Power Company (GPC), in order to gain added assurance of the operational readiness of the Vogtle Electric Generating Plant (VEGP), is conducting a pilot Readiness Review Program. The VEGP pilot Readiness Review Program is a systematic, in-depth self-assessment of work processes and verification of compliance with regulatory commitments. To accomplish the VEGP pilot Readiness Review Program, the work processes and regulatory commitments were divided into manageable segments called modules. There are approximately 20 modules. Each module is a predefined scope of VEGP activities.

Each module is intended to provide a brief description of the method of complying with project licensing commitments pertaining to the module scope and is not intended to make further commitments or to revise in any way prior commitments. If any differences exist between the commitments discussed in this document and the licensing documents, they are unintentional; and the licensing document governs.

Activities common to several modules are provided as General Appendixes. There are approximately 10 appendixes. These appendixes, as appropriate, are referenced in the modules and are augmented in each module with module-scope-specific details as needed.

The VEGP Readiness Review Program is being conducted on a schedule to provide added operational readiness assurance to GPC management in support of the VEGP Unit 1 operating license. However, conclusions reached regarding programmatic and technical adequacy through review of VEGP Unit 1 are indicative of Unit 2, since both units are being designed and constructed together under a single quality assurance program; with like management controls, procedures, etc.; and to the same specifications and criteria.

Stone and Webster Engineering Corporation has been contracted to provide technical management for, and technical personnel to implement, the Independent Design Review as a part of the Readiness Review program. Additionally, Stone and Webster is reviewing project responses to Readiness Review findings for technical adequacy.

The VEGP Readiness Review Program is not intended to eliminate or to diminish any authorities or regulatory responsibilities now assigned to or exercised by the Nuclear Regulatory Commission or GPC. Further, the Readiness Review Program is not intended to change the techniques of inspections or assurance of quality program activities. Rather, the VEGP Readiness Review Program is an added program initiated by GPC management to assess the VEGP and to provide additional feedback to management

so that they may initiate any needed corrective actions in an orderly and timely manner.

The scope of work processes and regulatory commitment compliance covered by each module will be assessed by, and the module prepared and reviewed by, individuals collectively familiar with the design, construction, and operational processes of nuclear power plants. It is the collective opinion of the Readiness Review Task Force, Readiness Review Board, and GPC management that, based on their experience, the methodology used in the module process will assess, on a programmatic basis, the adequacy of project commitment implementation.

Readiness Review Discrepancy Reports and resulting dispositions are reviewed by the Readiness Review Program quality assurance staff and are input into the normal project process for safety significance and potential reportability evaluations in accordance with regulatory requirements.

EXECUTIVE SUMMARY

Introduction

This module documents a review program to ascertain whether the design and construction aspects of protective coatings comply with licensing commitments and whether compliance is verifiable using existing project documentation.

The scope of this module includes the design and construction activities associated with protective coatings for the Vogtle Electric Generating Plant Unit 1. Coatings included in the scope of this module are those applied to the Unit 1 diesel generator fuel oil storage tank and those used within the Unit 1 containment.

The program consisted of three separate reviews: a design program verification, a construction program verification, and an Independent Design Review (IDR).

In conducting the above reviews, project documents such as design criteria, specifications, and procedures were reviewed along with results of past audits and inspections. In addition, the Readiness Review Board technical consultant provided independent technical oversight and concurrence, and Readiness Review Quality Assurance (QA) personnel provided QA surveillance of the review activities. Statements from the technical consultant and QA regarding their involvement and conclusions reached are provided in section 8 of this module.

A brief summary of the three reviews and the method used in classifying findings resulting from the reviews is provided below.

Finding Classification

Following evaluation, findings were subjected to categorization as follows to indicate their relative importance:

Level I - Violation of licensing commitments, project procedures, or engineering requirements with indication of safety concern.

Level II - Violation of licensing commitments or engineering requirements with no safety concern.

Level III - Violation of project procedures with no safety concern.

Design Program Verification

The verification of the design program was performed in two phases. Phase I consisted of a review to ascertain whether

licensing commitments were included in design criteria and other control documents.

Phase II consisted of a review of selected design documents for compliance with applicable procedures and industry standards (e.g., ANSI N45.2.11) as committed to in the Final Safety Analysis Report (FSAR). Design criteria, drawings, specifications, and design change documents, were included in this review.

The design program verification resulted in two findings (13B-20 and 13B-21). These were classified as Level II and Level III, respectively. Finding 13B-20 involved several equipment and material purchase specifications which did not specify ANSI N101.2 and ANSI N101.4 as governing documents. As the result of this finding, the Project has investigated 24 randomly selected specifications out of approximately 40 concerning equipment and material located inside the containment. It was revealed that 12 had specified the required ANSI standards. Of the remaining 12 specifications, 6 did not reference ANSI standards, but engineering-approved vendor coating procedures did invoke the appropriate ANSI standards; 5 did not require reference to ANSI, since the applicable coatings had been properly tracked as nonqualified in accordance with FSAR requirements; and 1 was used to order bulk materials which did not require coating. The Project has committed to review each specification (approximately 40) that requires coating requirements to ensure that applicable FSAR commitments are incorporated by March 22, 1986. To prevent recurrence, the Project has taken measures to assure that specifications requiring coating are reviewed by the Architectural discipline, which is responsible for the coating program. Project clarification and investigation, including action taken to prevent recurrence, has satisfactorily resolved any attendant concern.

Finding 13B-21 identified a noncompliance with the project procedures governing Field Change Requests (FCRs). Two Engineering approved FCRs were not incorporated into specification X1AJ07. In response to this finding, the Project has reviewed applicable FCRs and has incorporated them into the specification as appropriate. In addition, the Project has evaluated the effect of each specification change and has determined that the changes did not affect the acceptability of applied coatings.

Details of the design program verification are found in section 6.1.

Construction Program Verification

The construction program verification consisted of commitment implementation assessment and construction assessment. Commitment implementation assessment determined whether construction licensing commitments were incorporated into

implementing documents; construction assessment determined whether construction activities met the design and procedural requirements.

Commitment implementation assessment consisted of a review of the eight construction commitments identified in the commitment matrix (section 3.4). Five of these commitments were adequately traced to implementing documents from time of initial implementation to current status. The three remaining commitments could not be traced to implementing documents. These were reported in Readiness Review Finding 13B-6, which was classified Level II.

The discrepancies noted in Finding 13B-6 were in the areas of documentation distribution, material certification, identification of governing application criteria, and QA requirements for unqualified coatings. The requirements for documentation distribution and material certification, though not contained in the specification, were acceptably addressed by either a site procedure, receipt documentation, or inspection documentation. Application criteria and QA requirements for unqualified coatings, although conflicting or only partially addressed in the specification, were acceptably implemented in procedures. Specification X1AJ07 was revised to correct these discrepancies.

The construction assessment consisted of a technical review of the construction records and a walkdown inspection of applied coatings. This review assessed 24 items of hardware and approximately 411 QA records.

Eight findings were identified during construction assessment, of which five (13B-1, 13B-4, 13B-5, 13B-7, and 13B-10) were Level II findings and three (13B-2, 13B-3, and 13B-22) were Level III findings. There were no Level I findings.

Findings 13B-4, -5, and -7 identify discrepancies between Williams procedures, the specification, and records of field coating application. The assessment verified that the discrepancies between the Williams procedures and the specification and the discrepancies between Williams procedures and the records of field application had been previously approved by the appropriate authority. However, the appropriate change notice had not been generated to reflect the approved change in the specification and procedure. Therefore, it is concluded that the hardware had been coated in accordance with approved Bechtel and manufacturer requirements even though the specification and procedures do not reflect this. A general revision of the Williams procedures and the specification has addressed these discrepancies.

The remaining findings (13B-1, -2, -3, -10, and -22) identified discrepancies in QA. The discrepancies noted included errors in inspection documentation, inspector acceptance errors, and

deviation report dispositions not in accordance with procedures. None of these findings called into question the integrity of the applied coatings because they resulted from a failure to meet procedural acceptance criteria more stringent than, but within, those required by the coating specification; represented a small percentage of the total square footage; or were documentation or procedural errors without hardware implications. The specification and Williams procedures have been revised to clarify requirements.

Details of the construction program verification are found in section 6.2.

Independent Design Review

The Independent Design Review (IDR), conducted by Stone & Webster Engineering Corporation, evaluated the technical content of the engineering documents relating to the requirements for safety-related coatings on a sample basis. The documents reviewed included test report summaries, specifications, vendor procedures, and deviation reports.

The IDR identified a total of nine findings. Upon the presentation of additional information to the IDR team, four of them were classified as nonfindings. The five findings have been classified Level II (three findings) or Level III (two findings) since they were assessed to be deficiencies with no safety concerns.

In summary, all of the IDR findings have been satisfactorily resolved. The IDR team has concluded that, due to the limited number of findings and the corrective action taken in response to these findings, the safety-related coating requirements for Plant Vogtle are acceptable.

Readiness Review Conclusion

Having performed a review of the applied coatings and project documentation, and having evaluated the effectiveness of the corrective actions taken by the Project, Readiness Review concludes that adequate controls exist to ensure the quality of work performed. Moreover, none of the identified deficiencies, either collectively or individually, are such that the adequacy of any aspect of the VEGP applied coatings are called into question. Readiness Review further concludes that the design and construction programs and the application processes associated with coatings have produced a final product that is in compliance with licensing commitments and design requirements.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 INTRODUCTION

This module is one in a series of modules that provide an evaluation of the design, procurement, construction, and readiness for operation of the Vogtle Electric Generating Plant Unit 1 and common facilities. It is intended to describe the method of complying with the project commitments found in the FSAR and is not intended to make further commitments or revise in any way prior commitments. Any differences between the commitments discussed in this document and the FSAR, if any, are unintentional. In the unlikely event that a difference between this module and the FSAR should occur, the FSAR takes precedence in defining project commitments.

The scope of this module includes the design and construction activities associated with protective coatings for the Vogtle Electric Generating Plant Unit 1. Coatings included in the scope of this module are those applied to the Unit 1 diesel generator fuel oil storage tank and those used within the Unit 1 containment.

The effective date of this module is July 1, 1985. That is, changes in the included programs, organizations, commitments, etc., occurring after this date are not addressed.

1.2 MODULE ORGANIZATION

This module is divided into the following sections:

1. Introduction.

2. Organization and Division of Responsibility - A brief description of the project organizations and their division of responsibilities as they apply to this module. The overall project organization is discussed in Appendix A - Organization.

3. Commitments - This section contains project licensing commitments pertaining to coatings, within the scope of this module, as found in the FSAR, generic letters, and other documents. This section also lists documents that demonstrate implementation of these commitments.

4. Program Description - A brief description of the processes for design, procurement, and construction applicable to the scope of this module.

5. Audits - A description of the level of audit activity by QA or the NRC as it applies to this module. Also included in this section is a description of any special investigations performed on work contained in this module and past problems identified.

6. Program Verification - A description of the verification plan development, implementation, and results, including corrective actions.

7. Independent Design Review - A description of the program of technical review of the design process, its implementation, results, and corrective actions.

8. Assessment - The evaluations and conclusion, by the applicant's Readiness Review Task Force, the VEGP Readiness Review board, the Readiness Review program quality assurance staff, the IDR team, and the Readiness Review board module "expert", of the subject work are stated in this section. The section also identifies any action items still open and the scheduled closure date.

1.3 VOGTLE PROJECT STATUS (UNIT 1)

In the fall of 1980, coating inside Unit 1 containment ("N" system) began with the preparation of the substrate and subsequent application of specified coating system. The first "N" system coating was applied October 14, 1980.

As of July 1, 1985, the field coating of the Unit 1 and common structures was approximately 71-percent complete. Fuel load for Unit 1 is scheduled for December 1, 1986.

Coating of Unit 1 containment was approximately 84 percent complete and is scheduled for completion July 1, 1986.

The Unit 1 containment contains the following total estimated quantities:

Containment (Unit 1)	Estimated Quantities (ft^2)	Coated as of July 1, 1985 (ft^2)
Liner Plate and Dome	104,031	Approx. 99,500
Concrete	178,841	Approx. 138,000

2.0 ORGANIZATION AND DIVISION OF RESPONSIBILITY

Georgia Power Company (GPC) acting on its own behalf and as agent for the Oglethorpe Power Corporation, the Municipal Electric Authority of Georgia, and the City of Dalton, is responsible for the design, procurement, and construction of the Vogtle Electric Generating Plant (VEGP). The Western Power Division of Bechtel Power Corporation (Bechtel) is contracted by GPC to provide architect/engineering services. Bechtel is responsible for the design and preparation of specifications for the VEGP structures, systems, components, and equipment.

This section includes a brief description of the organization and responsibilities of GPC and Bechtel starting with the functional group level for design and construction activities related to coatings. It also includes the organization and responsibilities of the site contractor involved in the construction process. The section does not describe all organizations and responsibilities, only those pertaining to the content of this module.

2.1 DESIGN ORGANIZATION

A brief description of the Bechtel Power Corporation organization responsible for the architectural and engineering design of the VEGP is provided in this section.

2.1.1 CURRENT BECHTEL ORGANIZATION

The Bechtel Power Corporation (BPC) employs the matrix organization concept with an individual assigned as project engineering manager (PEM) who is assisted by the project engineer (PE)-home office, the PE-field office, and by functional group heads reporting to the PEM for the performance of functional tasks. Functional group heads receive project direction from the PE, while functional direction is provided to them by discipline chief engineers. The Bechtel PEM has been located at the VEGP site since February 1985. The current VEGP Bechtel Project Engineering Organization is shown in Figures 2.1-1 through 2.1-4.

Project engineering for the scope of coatings included in the scope of this module is composed of Home Office Engineering (HOE) and Project Field Engineering (PFE) organizations in coordination with the Materials & Quality Services (M&QS) department of the Research & Engineering group of Bechtel. Both HOE and PFE report to the PEM.

The Architectural Discipline of HOE has the responsibility for performing the principal design function as it applies to coating systems used in VEGP design. The Architectural discipline is responsible for providing coating requirements to be included in the material specifications prepared by other disciplines, such as Civil/Structural, Mechanical, Electrical, and Plant Design. Development of coating systems specifications and technical requirements is coordinated by the Architectural discipline with support from M&QS. M&QS acts as a consultant to HOE for issues relating to coating and corrosion problems.

The PFE is an extension of the HOE and is supervised by the project engineer-field who is assisted by the assistant project engineer-physical design, the civil/structural engineering group supervisor-field, the Architectural Discipline field, the building construction support engineering group leaders, and other groups (Figure 2.1-2). The PFE assists Construction in interpreting drawings and specifications, solving field problems, and coordinating field activities with HOE, including coating-related work.

M&QS serves Bechtel projects and divisions as an in-house consulting firm with a permanent staff of metalurgical engineers and consultants. The M&QS staff, headquartered in San Francisco, and a permanent staff located in the Bechtel Norwalk Office have supported the work covered in this module in the

areas of coating, corrosion, stress corrosion, and related problems.

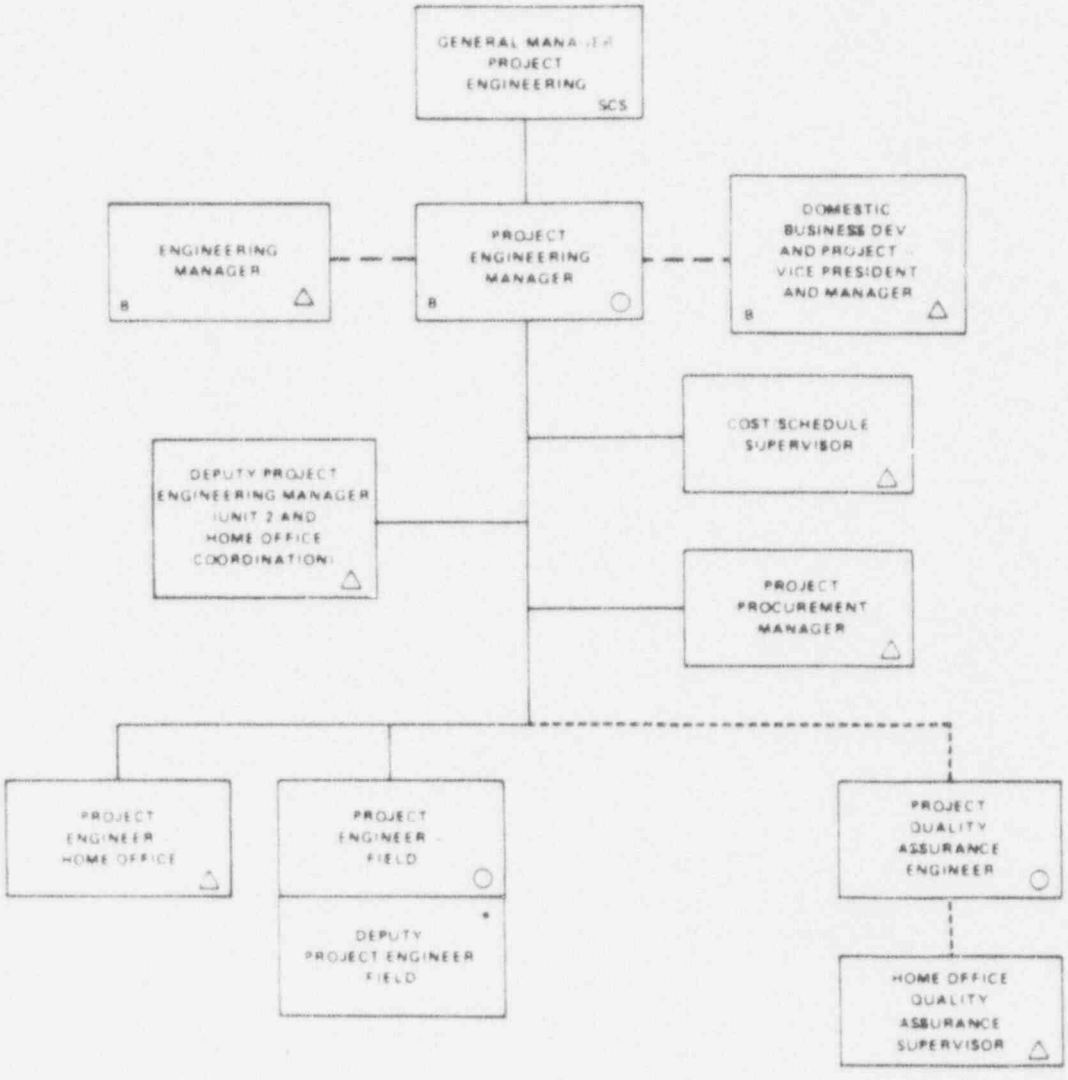
In addition, M&QS has a staff of consultants specializing in material selection and corrosion control. M&QS staff also review manufacturers' coating procedures as requested by the project engineering personnel responsible for the design.

M&QS provides input but does not produce any project-related design documents. Liaison between Project Engineering and M&QS coating specialists is the responsibility of the project Architectural Discipline.

2.1.2 BECHTEL ENGINEERING ORGANIZATION CHANGES

Bechtel PFE was established in April 1979 with the basic responsibilities of coordinating, reviewing, and approving Field Change Requests and Deviation Reports initiated by GPC Construction. They are responsible for assisting construction in the interpretation of design requirements and resolving field-related problems. Between April 1979 and December 1983, the basic responsibilities of HOE and the field organization for coating-related work did not change.

The role and responsibilities of Bechtel PFE evolved during the period from 1980 to early 1985. Key milestones in this organizational change were assignment of a PE-field in November 1983 and relocation of the PEM to the site in February 1985. An architect with specialized knowledge in coatings has been assigned to the PFE group to respond to field problems relative to field, applied, or field touch-up coatings. However, these changes did not affect coating-related work at VEGP.



LEGEND

———— PROJECT DIRECTION
- - - - - - - PROJECT COORDINATION
— — — — FUNCTIONAL DIRECTION

LOCATION

○ SITE

△ HOME OFFICE

* PART OF UNIT 1 COMPLETION ORGANIZATION

Figure 2.1-1 VEGP Bechtel Project Engineering Organization

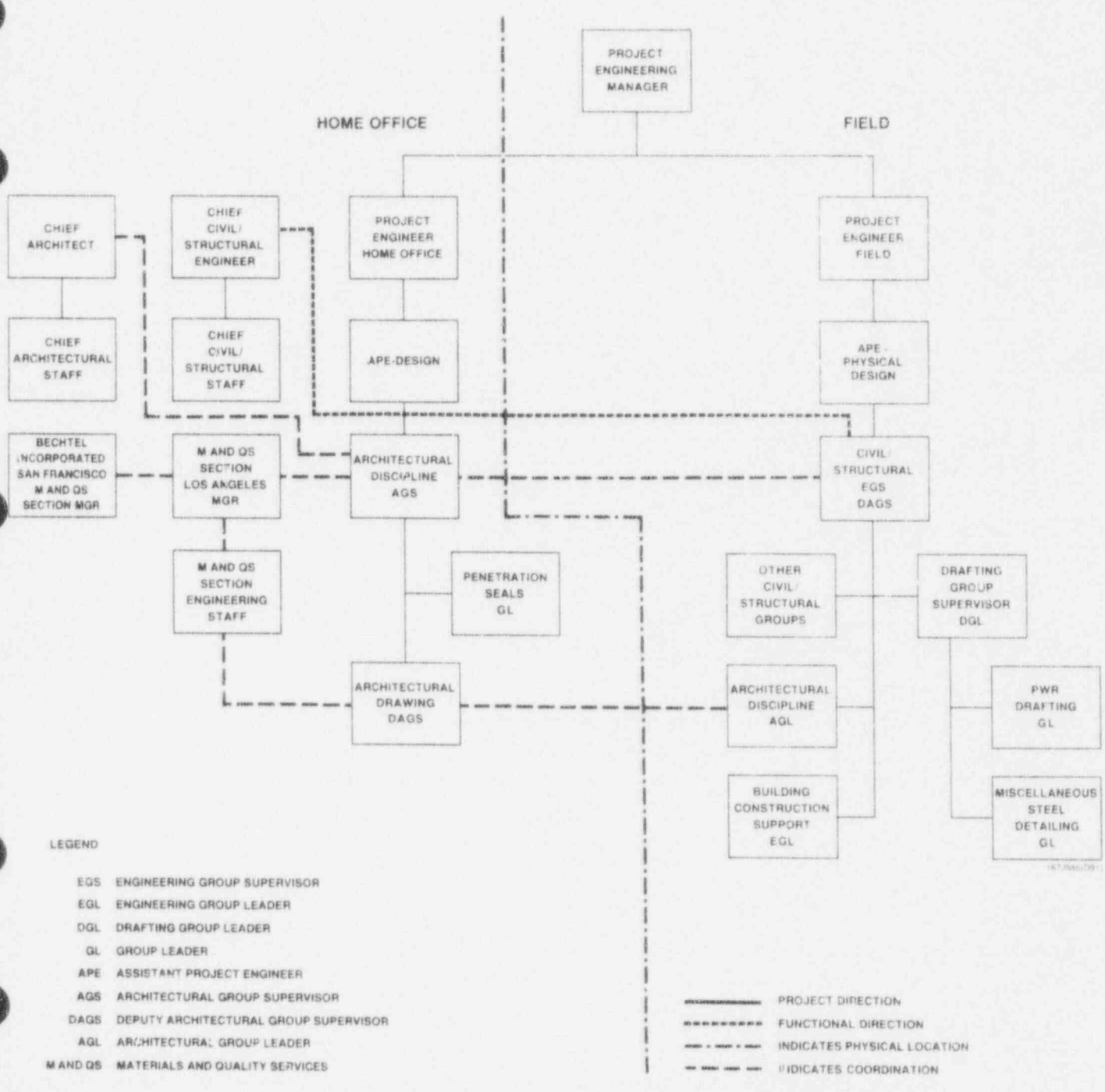


Figure 2.1-2 BPC Vogtle Project Architectural and Civil/Structural Engineering Organization (February 1985 to Present)

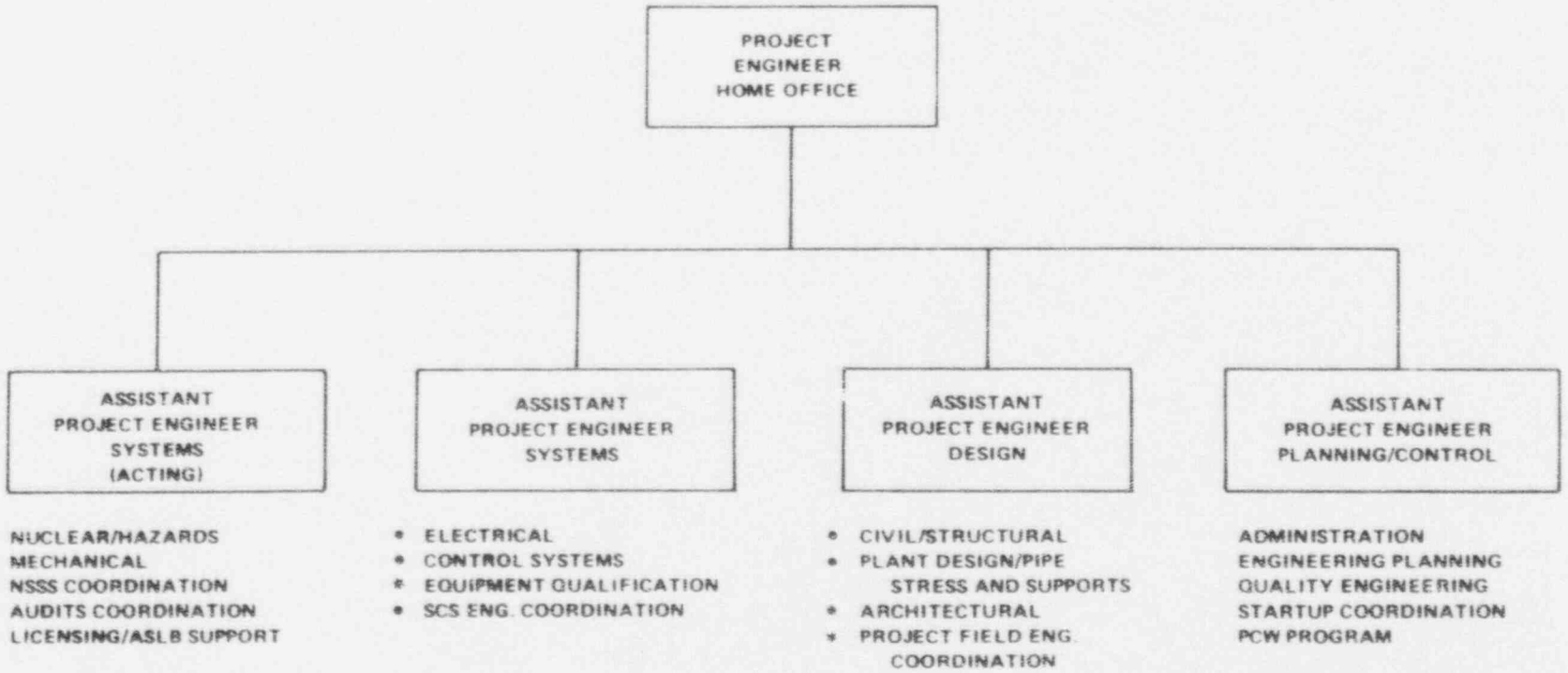


Figure 2.1-3 VEGP Bechtel Home (Functional) Engineering Organization

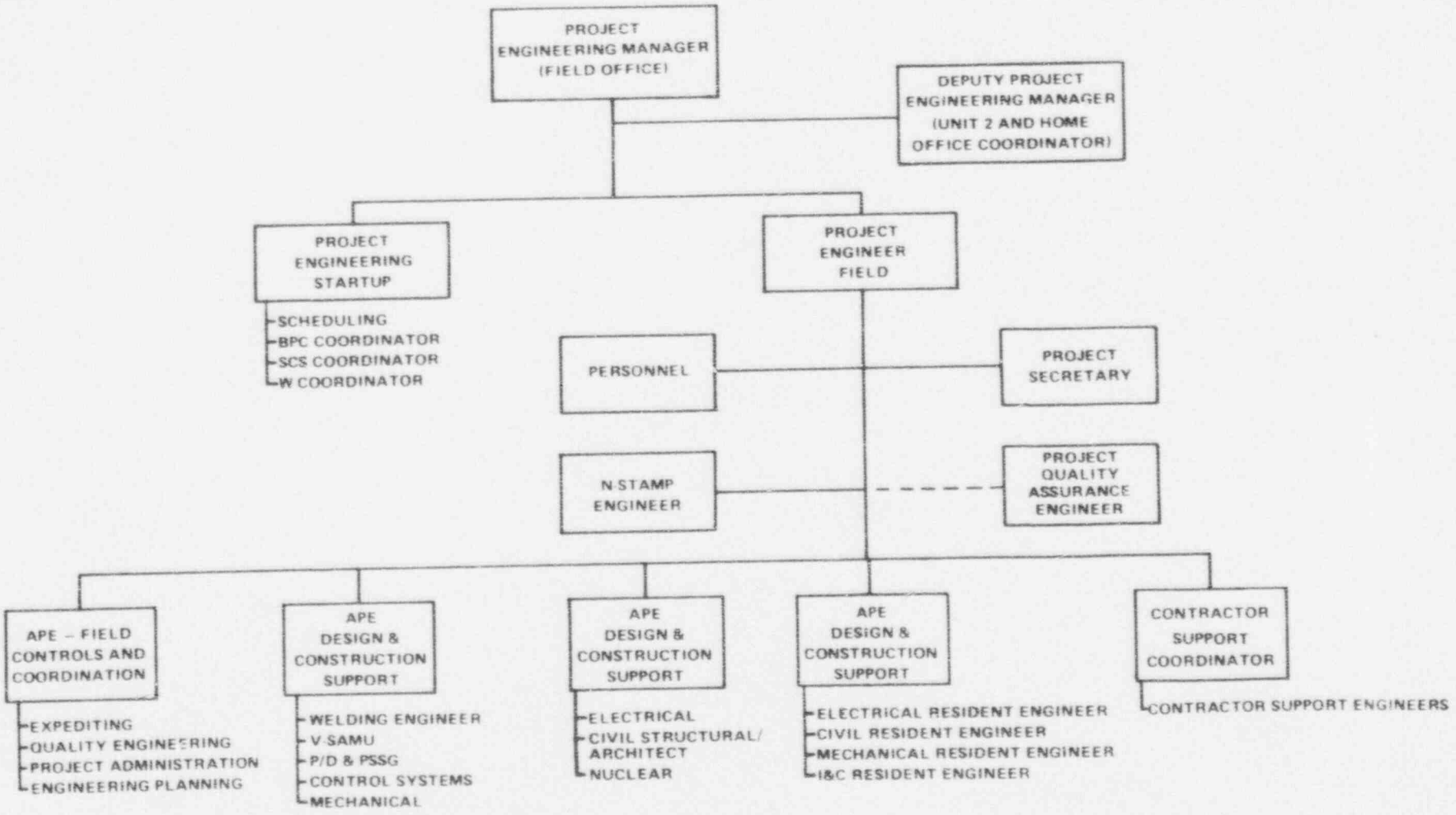


Figure 2.1-4 Bechtel Project Field Engineering

2.2 FIELD CONSTRUCTION ORGANIZATION

Georgia Power Company employs one contractor to perform work associated with this module. The contractor is Williams Contracting, Inc., the coatings contractor. Georgia Power directs and maintains technical control of the work through three departments; Field Construction Operations, the Civil Project Section, and the Civil Quality Control Section. The Administrative and Schedule/Budget Sections also interface with the contractor but do not directly affect the quality of the work. The following is a description of the overall responsibility of each contractor and GPC section along with a description of the responsibility of each individual within the organization.

2.2.1 GPC CIVIL PROJECT SECTION

The Georgia Power Company Civil Project Section provides technical direction and support for contractors performing civil work. This includes providing assistance in the following areas:

- Developing civil construction procedures and assuring they are in compliance with Bechtel specifications and any applicable codes.
- Resolving problems regarding civil work, including constructability issues, deviation reports, trends, field change requests, and open items.
- Assigning dispositions to deviation reports and open items.
- Providing material for the contractor by initiating purchase orders and releases as required.
- Providing schedule and budget input to various site organizations.
- Interfacing with Field Operations and Quality Control on problem identification and resolution.

2.2.2 GPC CIVIL QUALITY CONTROL

The Civil Quality Control (QC) Section implements the GPC field quality control program to verify quality compliance of field construction activities. This is done by conducting surveillance inspection of the work as it is being performed by contractor craftsmen and the documentation review of the contractor quality control inspection records.

The Civil QC inspectors inspect in accordance with established quality control procedures as required by the Vogtle Project quality assurance program, and to the requirements of the contractor's applicable procedures, construction specifications, and design drawings.

2.2.3 GPC FIELD CONSTRUCTION OPERATIONS

The Field Construction Operations Group directs work at Plant Vogtle and ensures work is completed in a timely manner. They interface with the site contractors to facilitate work flow. The lower tier operations groups help bring field conflicts and problems to the attention of the area engineers and inform QC when inspection hold points are reached. They maintain a watch for productivity and quality problems. The Field Construction Operations Group is responsible for survey and layout work on the project.

2.2.4 WILLIAMS CONTRACTING, INC.

Williams Contracting, Inc. (Figure 2.2-1) is responsible for requisitioning coating materials which have been receipt-inspected by Georgia Power Company Quality Control; the storage, handling, and issuance of these materials; substrate preparation; application of coatings; and inspection of the coatings as applied. Williams is also responsible for the development and implementation of application and quality control procedures. Williams work is performed under the guidance of Williams Contracting, Inc. quality assurance program.

Williams interfaces with the Civil Engineering Section to resolve construction problems, Field Change Requests (FCRs), Deviation Reports (DRs), and application procedure approvals. In addition, Williams interfaces with different coatings manufacturers in the development of application procedures for the specific coating systems that are required at Vogtle. The Williams Production Department also interfaces with the Williams Quality Control Section for required hold points, work acceptability, and resolution of any deficiencies. Their work sequence and direction is provided by the coordination group.

Williams Quality Control Section develops implementing acceptance procedures and verifies that surface preparation, material preparation, environmental conditions, and coating application conform to approved specifications, drawings, codes, and manufacturers' requirements. Williams QC Section personnel assist in the development of the forms, checklists, and other quality documents necessary to control activities and to demonstrate compliance with specified requirements.

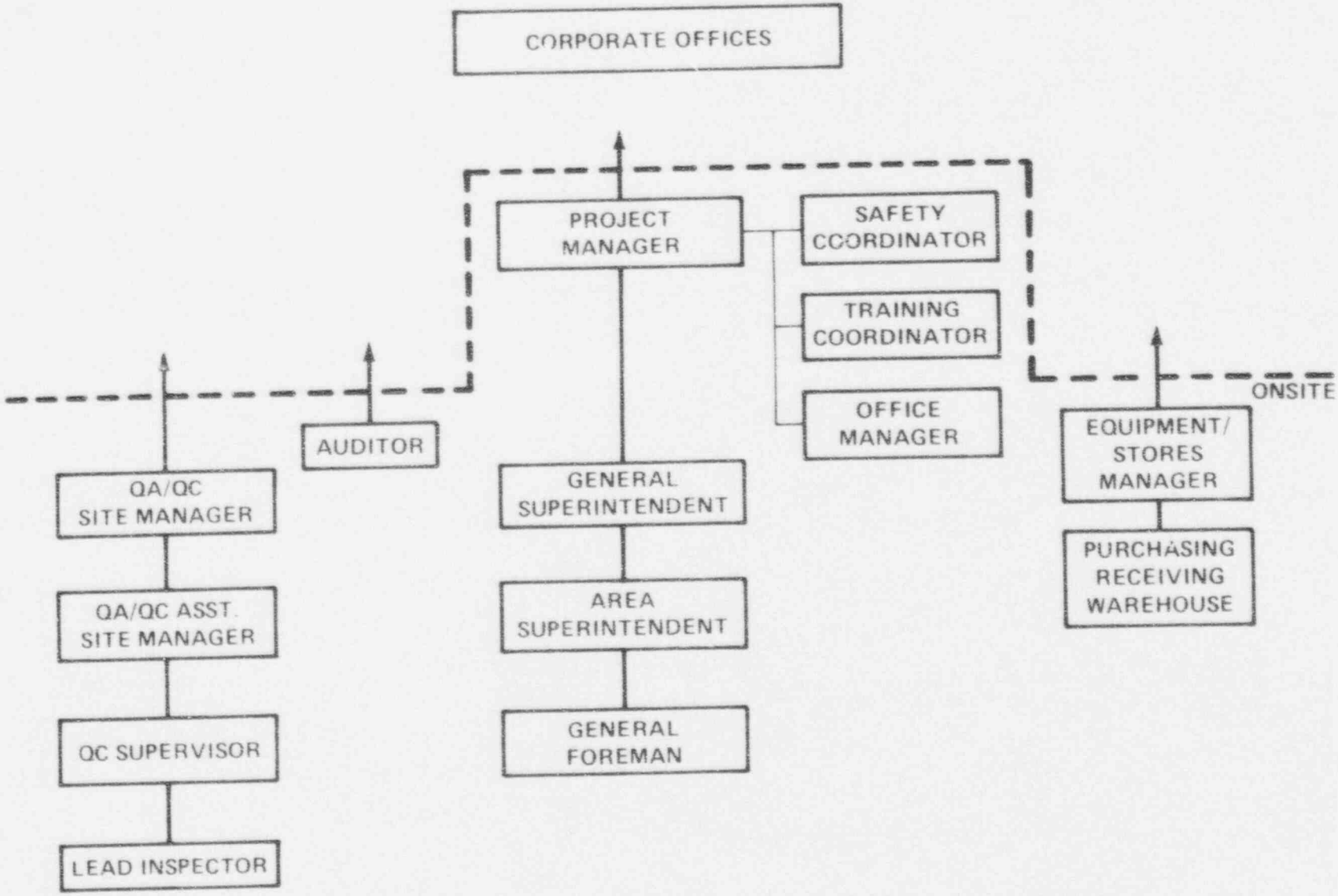


Figure 2.2-1 Williams Contracting Inc. Organization

3.0 COMMITMENTS

3.1 INTRODUCTION

This section contains, in matrix form, licensing and project commitments and the corresponding implementing documents. These are presented in two matrixes, the commitment matrix and the implementation matrix. A brief explanation of the development process for each matrix is also included.

Any differences between the commitments discussed in this section and the Vogtle Electric Generating Plant (VEGP) Final Safety Analysis Report (FSAR), if any, are unintentional, and the FSAR prevails.

3.2 DEFINITIONS

A commitment is an obligation to comply with an industry standard, Regulatory Guide, Branch Technical Position, or owner plan of specific action.

An implementing document is that working level document that identifies project commitments as they apply to the specific work activity.

3.3 SOURCES

Commitments covered by this module are identified from the following sources:

- o FSAR including responses to NRC questions.
- o Responses to Generic Letters.
- o Responses to I&E bulletins.

These sources are reviewed for commitments based upon guidelines developed from the definition.

Implementation of commitments stated in the commitment matrix are typically contained in:

- o Design criteria.
- o Equipment/material specifications.
- o Construction specifications.
- o Construction procedures.
- o Technical specifications.
- o Operations procedures.

3.4 COMMITMENT MATRIX

Once identified by the Readiness Review team, the commitments are placed on the commitment matrix. Information identifying the source, source section, subject, and module are also indicated on the matrix. Any relevant comments concerning the commitments or subject of the section are indicated in the remarks column.

The commitment matrix is presented at the end of this section. Commitments on the matrix are accurate as of July 1, 1985. This represents Amendment 16 of the FSAR.

Additionally, the project has a commitment to comply with 10 CFR 50, Appendix B Quality Assurance Criteria and other commitments such as ANSI N45.2 and N45.2.11. Although not identified as a specific commitment to this module, Readiness Review did consider the applicable requirements of these types of commitments in the preparation and assessment of the scope of work represented by this module.

COMMITMENTS

SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO.

EXPLANATION OF FIELDS

COMMITMENT SOURCE - The document containing the commitment (FSAR, Generic Letter, I.E. Bulletin Response, etc.)

COMMITMENT SECTION - Identifies the FSAR section, letter number, or question number

COMMITMENT SUBJECT - The subject of the FSAR section or Generic Letter

DOCUMENT/FEATURE - The document discussed in the FSAR section or the plant feature described in the FSAR section

RESPONSIBILITY - An X is placed under the heading for the organization responsible for implementation of the commitment

REF. NO. - A reference number that corresponds to the appropriate line entry in the implementation matrix

COMMITMENTS

MODULE 13B - SORTED BY SOURCE & SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	1. 9. 54	Q.A. REQUIREMENT FOR PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR PLANT	RG 1.54, REV. 0, 6/73	X	X	SEE TABLE 6.1.2-1 FOR CONFORMANCE	1603
FSAR	1. 9. 54	Q.A. REQUIREMENT FOR PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR PLANT	ANSI N101.4 (1972)	X	X	SEE TABLE 6.1.2-1 FOR CONFORMANCE	1604
FSAR	1. 9. 54	Q.A. REQUIREMENT FOR PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR PLANT	10CFR50, APP. B	X		SEE TABLE 6.1.2-1 FOR CONFORMANCE	1605
FSAR	6. 1. 2-2	CONTAINMENT COMPONENTS, COATING SCHEDULE	MATERIAL & MIN. THICKNESS OF COATINGS	X	X	TABLE	1316
FSAR	6. 1. 2. 1	ORGANIC MATERIALS PROTECTIVE COATINGS IN CONTAINMENT	ANSI N101.2(1972)	X			1317
FSAR	6. 1. 2. 1	ORGANIC MATERIALS PROTECTIVE COATINGS IN CONTAINMENT	RG 1.54, REV. 0, 6/73	X	X	SEE TABLE 6.1.2-1 FOR CONFORMANCE	1318
FSAR	8. 3. 1. 1	STANDBY POWER SUPPLY	FLOOR OF DIESEL GENERATOR BUILDING COATED WITH EPOXY TO PREVENT...INTERFERING WITH OPERATION OF ELECTRICAL EQUIPMENT	X	X	TO MINIMIZE DUST	4820
FSAR	9. 5. 4. 2	EMERGENCY DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEM PIPING AND TANK SURFACES	EXTERIOR SURFACES OF FUEL OIL STORAGE TANKS COATED WITH COAL EPOXY.	X	X	FOR CORROSION PROTECTION	3918

COMMITMENTS

MODULE 13B - SORTED BY SOURCE & SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	9. 5. 4. 2	EMERGENCY DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEM PIPING AND TANK SURFACES.	INTERIOR SURFACES OF FUEL OIL STORAGE TANKS PROTECTED BY INORGANIC ZINC COATING.	X	X	FOR CORROSION PROTECTION	3919
NRC QUEST. CORRES.	Q430. 20	FUEL OIL STORAGE TANK COATING	FUEL OIL STORAGE TANKS COATED INSIDE AND OUT. EXTERIOR COATED WITH ONE LAYER OF COAL TAR EPOXY WITH AVERAGE DRY FILM THICKNESS OF 22 MILS.	X	X	RESPONSE TO QUESTION	4141

3.5 IMPLEMENTATION MATRIX

After the commitments are identified, each team reviews the documents controlling its areas of responsibility to verify compliance with commitment requirements. The depth of verification is to the next level of detail below that stated in the commitment matrix. As an example, if a code is stated as a commitment, the verification will be to the sections within the code. If a code chapter is stated, the verification will be the subchapters.

IMPLEMENTATION

SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO.

EXPLANATION OF FIELDS

DOCUMENT/FEATURE - The document discussed in the FSAR section or the plant feature described in the FSAR section. (See Commitment Matrix.)

SECTION - The section of the document/feature that is being discussed

DESIGN LAST, CONST LAST - "Last" indicates the project document currently containing the information found in the commitment

DESIGN FIRST, CONST FIRST - "First" indicates the project document that first contained the information found in the commitment.

REF NO. - A reference number that corresponds to the appropriate line entry in the commitment matrix.

IMPLEMENTATION

MODULE 13B - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
MATERIAL & MIN. THICKNESS OF COATINGS		X1AJ07, REV. 22, SECT. 4.0, SCH.A 5/10/85	X1AJ07, REV. 0, SECT. 4.0, SCH.A 9/21/78	X1AJ07, REV. 22, 5-10-85, SCHEDULE A & B, 1XD01A12-1, REV. 9, 6-25-84	X1AJ07, REV. 0, 9-21-78, SCHEDULE A & B, 1XD01A12-1, REV. 0, 6-15-79		1316.00
ANSI N101.2(1972)		DC-1000-A, REV. 0, SECT. 10 6/19/79	DC-1000-A, REV. 0, SECT. 10 6/19/79				1317.00
RG 1.54, REV. 0, 6/73		X1AJ07, REV. 22, SECT. 1.3.1 5/10/85, DC-1000-C, REV. 3, 9-30-83, APPENDIX E, DC-1000-A, REV. 0, SECT. 10, 6/19/79	X1AJ07, REV. 0, SECT. 1.3.1 9/21/78, DC-1000-C, REV. 0, 2-28-74, APPENDIX E, DC-1000-A, REV. 0, SECT. 10, 6/19/79	X1AJ07, REV. 22, 5-10-85	X1AJ07, REV. 0, 9-21-78		1318.00
RG 1.54, REV. 0, 6/73		SEE REMARKS. FOR CONST. SPEC. SEE DETAIL BELOW	SEE REMARKS. FOR CONST. SPEC. SEE DETAIL BELOW	SEE DETAIL BELOW	SEE DETAIL BELOW	SEE REF. 1318 FOR DESIGN. CONSTRUCTION APPLICABLE TO NON-NSSS COMPONENTS ONLY	1603.00
RG 1.54	C.1 ANSI N101.4 SHOULD BE USED IN CONJUNCTION WITH ANSI N45.2	X1AJ07, REV. 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	X1AJ07, REV. 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	COATING MATERIALS FOR ITEMS WITHIN CONTAINMENT SHALL MEET REQUIREMENTS OF ANSI N101.2 WHENEVER POSSIBLE	1603.01

IMPLEMENTATION

MODULE 138 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
RG 1.54	C.1 ANSI N101.4 SHOULD BE USED IN CONJUNCTION WITH ANSI N45.2	X1AJ07, REV. 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	X1AJ07, REV 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	COATING MATERIALS FOR ITEMS WITHIN CONTAINMENT SHALL MEET SELECTED REQUIREMENTS OF ANSI N5.12 WHENEVER POSSIBLE	1603.02
RG 1.54	C.1 ANSI N101.4 SHOULD BE USED IN CONJUNCTION WITH ANSI N45.2	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2	COATING MATERIALS FOR ITEMS WITHIN CONTAINMENT ARE DOCUMENTED IN ACCORDANCE WITH ANSI N101.4	1603.03
RG 1.54	C.2 REFERENCE STANDARDS	X1AJ07, REV. 22, 5-10-85, SECT. 2.0	X1AJ07, REV. 0, 9-21-78, SECT. 2.0	X1AJ07, REV. 22, 5-10-85, SECT 2.0	X1AJ07, REV. 0, 9-21-78, SECT. 2.0	SSPC. ANSI N101.2, ANSI N5.12	1603.04
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM.	X1AJ07, REV. 22, 5-10-85, SECT. 8.3	X1AJ07, REV. 0, 9-21-78, SECT. 8.3	X1AJ07, REV. 22, 5-10-85, SECT. 8.3	X1AJ07, REV. 0, 9-21-78, SECT. 8.3	FORMS SIMILAR TO ANSI N101.4	1603.05
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM	X1AJ07, REV. 22, 5-10-85, SECT. 1.3.1	X1AJ07, REV. 2, 11-29-79, SECT. 1.3.1	X1AJ07, REV. 22, 5-10-85, SECT. 1.3.1	X1AJ07, REV. 2, 11-29-79, SECT. 1.3.1	SYSTEMS PREQUAL. TO ANSI N101.2	1603.06

IMPLEMENTATION

MODULE 13B - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM	X1AJ07, REV. 22, 5-10-85, SCHEDULE A	X1AJ07, REV. 0, 9-21-78, SCHEDULE A	X1AJ07, REV. 22, 5-10-85, SCHEDULE A	X1AJ07, REV. 0, 9-21-78, SCHEDULE A	SURFACE PREPARATION ILLUSTRATES PROCEDURE USED FOR TESTING	1603.07
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM	X1AJ07, REV. 22, 5-10-85, SCHEDULE A	X1AJ07, REV. 0, 9-21-78, SCHEDULE A	X1AJ07, REV. 22, 5-10-85, SCHEDULE A	X1AJ07, REV. 0, 9-21-78, SCHEDULE A	SURFACE PROFILE REQUIREMENTS ARE MET	1603.08
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM.	X1AJ07, REV. 22, 5-10-85, SECT. 7.6	X1AJ07, REV. 0, 9-21-78, SECT. 7.6	X1AJ07, REV. 22, 5-10-85, SECT. 7.6	X1AJ07, REV. 0, 9-21-78, SECT. 7.6	APPLICATION PER MANUFACTURER'S PROCEDURES	1603.09
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM.	X1AJ07, REV. 22, 5-10-85, SECT. 5.0	X1AJ07, REV. 0, 9-21-78, SECT. 5.0	X1AJ07, REV. 22, 5-10-85, SECT. 5.0	X1AJ07, REV. 0, 9-21-78, SECT. 5.0	INSPECTIONS AND NON-DESTRUCTIVE TESTS ARE PERFORMED	1603.10

IMPLEMENTATION

MODULE 13B - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM.	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2	NONCONFORMANCES ARE IDENTIFIED AND EVALUATED	1603.11
RG 1.54	C.3 PLANNED AND SYST. ACTIONS TO PROVIDE CONFIDENCE THAT COATINGS WILL PERFORM.	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2, 8.0	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2, 8.0	X1AJ07, REV. 22, 5-10-85, SECT. 3.2.2, 8.0	X1AJ07, REV. 0, 9-21-78, SECT. 3.2.2, 8.0	CERT OF COMPL. AND OR DOCUM. PROCEDURES ARE FURNISHED	1603.12
RG 1.54	D. COATINGS AND CLEANING MATLS. USED WITH STAINLESS STEEL	X1AJ07, REV. 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	X1AJ07, REV. 22, 5-10-85, SECT. 4.1.1	X1AJ07, REV. 0, 9-21-78, SECT. 4.1.1	LIMITS ON HALOGENS IN CLEANERS & SOLVENTS	1603.13
ANSI N101.4 (1972)		DC-1000-A, REV. 0, SECT. 10 6/19/79	DC-1000-A REV. 0 6/19/79, SECT. 10	X1AJ07, REV. 22, 5-10-85	X1AJ07, REV. 0, 9-21-78		1604.00
10CFR50, APP. B		X1AJ07 REV. 22 5/10/85, SEC. 3.2.2 DC-1000-A REV. 0 6/19/79 SEC. 3.1	X1AJ07 REV. 0 9/21/78 SEC. 3.2.2 LATEST				1605.00

IMPLEMENTATION

MODULE 13B - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
EXTERIOR SURFACES OF FUEL OIL STORAGE TANKS COATED WITH COAL EPOXY		X4AH03, REV. 8, SECT. 4.4.1 4/27/84	C-FCRB-9416, 11-11-83, TO X4AH03, REV. 6	X4AH03, REV. 8, 4-27-84, SECT. 4.4.1	C-FCRB-9416, 11-11-83, TO X4AH03, REV. 6		3918.00
INTERIOR SURFACES OF FUEL OIL STORAGE TANKS PROTECTED BY INORGANIC ZINC COATING		X4AH03, REV. 8, SECT. 4.4.2 4/27/84	X4AH03, REV. 3, SECT. 4.4.2 4/17/79	X4AH03, REV. 8, 4-27-84, SECT. 4.4.2	X4AH03, REV. 3, 4-17-79, SECT. 4.4.2		3919.00
FUEL OIL STORAGE TANKS COATED INSIDE AND OUT. EXTERIOR COATED WITH ONE LAYER OF COAL TAR EPOXY WITH AUG. DFT OF 22 MILS		X4AH03, REV. 8, SECT. 4.4.1 4/27/84	X4AH03, REV. 6, C-FCRB-9416, 11/11/83	X4AH03, REV. 8, 4-27-84, SECT. 4.4.1	C-FCRB-9416, 11-11-83, TO X4AH03, REV. 6	RESPONSE TO NRC QUESTION Q430.20	4141.00
FLOOR OF DIESEL GENERATOR BLDG. COATED WITH EPOXY TO PREVENT....INTERFERING WITH OPERATION OF ELECTRICAL EQUIP.		DWG 1X1D07A05, REV. 5	DWG 1X1D07A05, REV. 0	1X1D07A05, REV. 5, 7-10-85	1X1D07A05, REV. 0, 2-11-82		4820.00

4.0 PROGRAM DESCRIPTION

This section contains a description of the work process used by design and construction that is associated with coatings for VEGP Unit 1.

The program description is divided as follows:

4.1 Design
4.2 Materials
4.3 Training and qualification
4.4 Construction

This section should be reviewed with the following appendixes that will expand on certain phases of the operation as they apply:

Appendix C Procurement

Appendix D Document Control

Appendix E Material Control

Appendix F Inspector Qualification/Certification

Appendix G Measuring and Test Equipment

4.1 DESIGN ARCHITECTURE/ENGINEERING

This section describes the design architectural/engineering scope, workflow, documentation, and design control activities related to coatings utilized on the permanent plant items (visual structures, components, and equipment). The scope of this section includes requirements relating to coating materials and implementation of approved coatings systems for areas and equipment inside the unit containment building only; however, an overall program for VEGP is briefly described for reference.

The architectural discipline of Bechtel Home Office Engineering (HOE) is responsible for the coatings program implemented on the VEGP project. This program was implemented through architectural and civil design criteria, various procurement specifications for equipment, architectural finish schedule drawings, and the construction specifications for field coating application.

4.1.1 APPLICABLE REGULATORY GUIDE AND STANDARDS

The Regulatory Guide and standards applicable to coating activity covered by this module are as follows:

- Regulatory Guide 1.54, Quality Assurance for Protective Coatings Applied to Water Cooled Nuclear Plants.
- American National Standards Institute (ANSI):
  - N45.2 (1971) - Quality Assurance Program Requirements for Nuclear Power Plants.
  - N101.2 (1982) - Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities.
  - N101.4 - Quality Assurance Requirements for Protective Coatings Applied to Nuclear Facilities.
  - N5.12 - Protective Coatings (Paints) for the Nuclear Industry.

The extent of applicability of the above standards and Regulatory Guide is described in section 6.1.2 of the Final Safety Analysis Report (FSAR).

4.1.2 STRUCTURES DESCRIPTION

Containment structures within the scope of this module and other Seismic Category I structures associated with the coatings program are as follows:

- o Containment.
- o Containment internal structure.
- o Other Category 1 structures.
- o Control building (CB).
- o Auxiliary building (AUX).
- o Fuel handling building (FHB).
- o Nuclear service cooling water (NSCW) tower and valve house.
- o Diesel fuel oil storage tank pumphouse.
- o Auxiliary feedwater pumphouse.
- o Tanks (condensate, refueling, reactor makeup water storage tanks).
- o Tunnels.
- o Diesel generator building (DGB).

A description of these Category I structures is provided in sections 3.8.1, 3.8.3, and 3.8.4 of the FSAR.

Equipment, systems, components, and equipment associated with the containment building are described in sections 1.2.2 and 1.2.3 of the FSAR.

4.1.3 GOVERNING CONSIDERATIONS FOR COATINGS PROGRAM

The governing considerations applicable to the VEGP coating program are as follows:

- o Coating categories: shop and field coating.
- o Coating service areas: containment and other areas.
- o Coating material: acceptable types of systems.
- o Quality assurance (QA) requirements: documentation and qualification tests.

The VEGP implementation of the coatings program consistent with the above considerations is briefly described in the following sections.

4.1.4 COATINGS PROGRAM CATEGORIES

The coatings applied to VEGP permanent plant items are divided into two categories as follows:

- Shop Coatings Program: This program covers the ferrous metal items that will be primed and finish coated or primed only in the supplier's equipment or material fabrication shop. Details are described in section 4.1.10.

- Field Coatings Program: This program will include coating applications such as:

  - Field shop coating of liner plate.

  - Field shop coating (field-fabricated miscellaneous iron and sheet metal).

  - Field top coating of primed ferrous metals.

  - Touchup of shop-coated items.

  - Concrete surfaces.

  - Architectural paint finishes.

  Details of this program are discussed in section 4.1.11.

4.1.5 COATING SERVICE AREAS

Coating service areas are specified on the basis of expected environmental exposures depending upon the location in the plant. The expected service areas have been reduced to three basic designation as follows:

A. Areas within the containment building are identified as N areas. Items to be located in the containment building require N coatings.

B. Areas outside the containment, but where potential contamination from radioactive sources exists, are identified as D areas. D coatings can be the same as N coatings except that the QA program and quality documentation requirements of ANSI N101.4 are not required.

C. Areas other than N and D areas are identified as C areas. C-area coatings can be supplier's commercial standard providing the coating will withstand exposure to the anticipated service environment and storage during construction. C-area specifications provide material performance standards. Supplier's standard shop coatings may be accepted when submitted for review.

4.1.6 COATING SYSTEMS

The architectural discipline from HOE, with the consultative input from the Materials and Quality Services (M&QS) group of Bechtel, has developed coating systems to meet the requirements of the service areas, the surface to be coated, and the architectural and special service conditions as applicable.

4.1.6.1 Field Coating Systems

Field coating systems applied and utilized in the field at the VEGP jobsite are listed in schedule A of field coatings, specification X1AJ07, which includes the types of coating, manufacturer of acceptable coatings, product identification, surface preparation, number of coats, dry mill thickness to be applied, and inspection requirements. The coating systems acceptable for use on items located inside the containment building are prequalified to ANSI standards per Regulatory Guide 1.54 as applicable. These coatings are prequalified to the design basis accident (DBA) environmental conditions of ANSI N101.2 (1972) and the applicable portions of ANSI N5.12. Three primary systems are specified as follows:

- Inorganic zinc-rich coating with no finish coat (1XAJ07, system FN-3).
- Inorganic zinc-rich coating with expoxy sealer for concrete (1XAJ07, system FN-8).
- Clear epoxy sealer for concrete (1XAJ07, system FN-13).

In addition, schedule A of specification 1XAJ07 includes other qualified systems for touchup or repair of the primary coating system.

4.1.6.2 Unqualified Coatings

Schedule A of specification 1XAJ07 includes other unqualified systems for use where a qualified system cannot be used.

Unqualified coating basically involves a coating applied without required documentation, where the surface preparation, material, and application deviate from the recognized DBA test procedures

per ANSI N101.2 test criteria. The requirements of Regulatory Guide 1.54, ANSI N101.2, and associated documents of ANSI N101.4 and ANSI N5.12 are not imposed for unqualified coatings.

The use of these coatings is limited and is confined to the following areas:

- o Field repair to any Q-class coated item with less than 30 $in.^2$ of surface area such as:
  - Cut ends or otherwise damaged galvanizing.
  - Bolt heads, nuts, and miscellaneous fasteners.
  - Damage resulting from welding or other mechanical means.
  - Touchup of small production line items such as small motors, handwheels, electrical cabinets, control panels, loudspeakers, etc., where special painting requirements are impracticable.
  - Structural connections.
- o The following areas may be coated using an unqualified coating without being recorded in the unqualified coatings log:
  - Surfaces to be insulated.
  - Surfaces contained within a cabinet or enclosure; for example, the interior surface of ducts.
- o At the discretion of the responsible Georgia Power Company (GPC) coating engineer, concealed surface painting shall consist of one additional field coat of paint applied to the surfaces of structural steel or other ferrous metals (except for galvanized metals), over the coats of paint specified in schedule A prior to installation.
  - This requirement will not apply where the surfaces are embedded in, or fully encased in, masonry or concrete.
- o Concealed surfaces paint shall be the same as specified for the top coat of subject item in Schedule A.
- o Metal surfaces which cannot be cleaned to the required Steel Structures Painting Council standards can be coated under the following conditions:
  - The area affected is less than 10 percent of the total area.

- Construction restraints prohibit blasting, or access to power tool cleaning is limited.

- An inspection of the area has been made as to the level of cleanliness obtained and the methods used to clean the item.

4.1.6.3 Shop Coatings

The coatings provisions for items purchased from suppliers and equipment manufacturers are contained in the purchase specifications. For items located inside the containment building, the purchase specification specifies use of any of the prequalified coatings such as Ameron-Dimecote No. 6, Carboline-Carbozine No. 11, and Mobile Chemical Company's Mobilzinc No. 7. These coatings are prequalified for DBA tests per ANSI N101.2 by Bechtel through a nationally recognized testing laboratory, Oak Ridge National Laboratory, Knoxville, Tennessee.

Use of coatings of equal quality is permitted in the specification for the item. In such cases, the supplier of this item is required to furnish documentation of successful DBA test data from recognized testing facilities, in accordance with ANSI N101.2, and require certificate of compliance to meet the intent of ANSI N101.4 requirements.

4.1.6.4 Design Basis Accident Tests

Bechtel-approved coatings specified for use on items located inside containment were tested in accordance with the requirements of ANSI N101.2 and selected portions of ANSI N5.12. The tests were originally conducted in Oak Ridge National Laboratories. The test data and results were reviewed by experts from the M&QS Group of Bechtel, San Francisco, and Oak Ridge Laboratory for acceptance and approval for application inside containment. The architectural discipline has final approval of the coatings to be applied. The documents containing original test data and results of approved coatings systems are retained by the M&QS Group.

In cases where a supplier requests use of coatings other than those approved by Bechtel, the specification requires that the supplier submit DBA test data per Regulatory Guide 1.54 and ANSI N101.2 for evaluation by the HOE architectural discipline. After consultative approval by M&QS, the architectural discipline approves such coating if found to be acceptable.

4.1.7 COATING APPLICATION

Such items as structural plate steel shapes, miscellaneous steel, piping, pipe hangers, and valves will have shop-applied inorganic zinc primer only.

Equipment which is primed and top coated in the supplier's shop may have one of the following coating system applied:

- o N Areas: inorganic zinc primer with an epoxy top coat

  The majority of the coatings specified for use inside the containment are the inorganic type (ethyl silicate inorganic zinc). The mode of failure of inorganic zinc is powdering rather than blistering and delamination. This failure mode minimizes the accumulation of solid debris in the containment sumps. Any particles of appreciable size that do occur either settle out prior to reaching the sump screens or are trapped by the sump filter screens.

- o D areas

  - Inorganic zinc primer with one coat of epoxy finish

  - Epoxy primer with epoxy top coat

- o C areas: alkyd primer with alkyd finish coat

4.1.8 QUALITY REQUIREMENTS

The protective coatings used inside the containment building are prequalified coating systems. The coating materials are prequalified to DBA environmental conditions per ANSI 101.2 and applicable portions of ANSI N5.12. QA and documentation requirements are in accordance with ANSI N45.2-71 and ANSI N101.4 for both coating materials and the application procedures. The QA requirements are applicable to both the shop-coated items and to coatings applied in the field under GPC direction. Documentation is required as follows:

- o Product Identity Records for each batch of coatings or thinners used in accordance with the specification.

- o Certification from the coatings manufacturer, that it has conducted and maintained a documented and traceable quality program for all materials in accordance with the specification.

- o Coatings Material - Shipping and Receiving Records for each shipment received for coatings or thinners used in accordance with the specification.

- o Coatings Material Warehousing Record for each batch of all coatings or thinners used in accordance with the specification.

- o A Painter Qualification Record for each individual engaging in the actual application of N-area coatings.

- o Daily Environmental Reports corresponding to each day's surface preparation and/or application in accordance with the specification.

- o Daily Inspection Reports (surface preparation and application) for each day's coating activity.

4.1.9 DESIGN DOCUMENTS

The design documents produced relative to coating include:

- o Specifications:
  - Construction (field coating).
  - Material (procurement).
- o Drawings
  - Finish schedules.
  - Finish and door schedule details.

Engineering calculations are not required for coating.

These documents are tracked by the Control of Engineering Budgets and Schedules (CEBUS) computer program, which maintains a control log of design documents of Bechtel engineering work on VEGP. The procedures for control, issue, and revision of design documents are described in project procedures for each type of design document including design change documents.

4.1.9.1 Specification Development

The specifications relative to coating consist of field coating specification X1AJ07 and purchase specifications for permanent plant items (structures, components, and equipment). The HOE architectural discipline has the overall responsibility for the coating specifications. The material purchase specifications which include shop coating requirements are written and controlled by the applicable HOE discipline.

The specifications for coating requirements are selected from the Coating Specification Guidebook prepared for VEGP by the architectural discipline. Each responsible engineer (RE)

coordinates the selection of the appropriate coatings specification with the architect. The coating requirements for the respective items are incorporated into the body of the technical provisions of the specification.

The architect reviews the specification for compliance to the coating requirements when issued on a Design Review Notice (DRN). The draft of the specification is forwarded by the architect to the M&QS organization for review and comment. The M&QS reviewer forwards his review comments to the architect, who forwards comments to the RE for necessary action. The procurement process for permanent plant items is described in Appendix C, Procurement.

4.1.9.1.1 Purchase Specifications

Purchase specifications are written and controlled by Bechtel Power Corporation (BPC) HOE for items inside containment, except for the nuclear steam supply system (NSSS) and components furnished by Westinghouse Corporation, which has a contract with GPC.

For items within the scope of Bechtel work, an RE is assigned for the development, coordination, and administration of each purchase specification. The purchase specifications include coating requirements and invoke Regulatory Guide 1.54, ANSI N101.4, and ANSI N101.2 requirements, consistent with the FSAR commitments, as applicable.

4.1.9.1.2 Field Coating Specification

Field coatings specification X1AJ07, written and controlled by the architectural discipline, describes coating requirements for the field finish of shop-primed ferrous metal surfaces, uncoated shop- or field- fabricated items, repair of coatings, concrete surfaces, and architectural paint finishes. All coating material is purchased from qualified suppliers by GPC Construction, based upon the requirements specified in field coatings specification X1AJ07.

Coatings inside the containment that are potentially exposed to the effect of the DBA are designated as quality related and require compliance with ANSI N101.2 and ANSI 101.4 requirements to the extent described in the FSAR. The field coatings specification X1AJ07 provides the requirements for the quality-related coatings applied in the field.

Field coatings specification X1AJ07 includes requirements for coating materials and procedures for surface preparation, application, inspection, and documentation. Suppliers of shop-coated items are required to furnish details of materials and application procedures for field touch-up as necessary.

4.1.10 SHOP COATING PROGRAM

The specifications for coating requirements are incorporated into purchase specifications by BPC HOE. The accepted supplier is evaluated for compliance to the coating specifications for N areas as applicable. The coatings applied in the supplier's shop are controlled by the supplier's procedures, approved by engineering, which meet the requirements of the purchase specifications.

4.1.10.1 Review of Supplier Coatings Procedures

Prior to starting any coating work, each supplier of shop-coated items is required to submit its coating procedures for review and acceptance by HOE. The submitted procedures are logged and controlled through the review cycle in the Drawing and Data Control Center. The VEGP architect and M&QS review the procedures to ensure compliance with the specification requirements. Copies of supplier coating procedures, approved and accepted by Project Engineering, are retained in the M&QS files and the project files. Accepted (approved) procedures are returned to the supplier for use.

4.1.10.2 Supplier Compliance With Specification

The supplier's in-process coating work is reviewed through the Supplier Quality Surveillance Program (section 4.2). The vendor has the responsibility to control the coating work per specification requirements.

The supplier of acceptable materials must produce N-area coatings in accordance with an approved QA program, which provides for documentation in accordance with ANSI N101.4.

The supplier of coated items, upon shipment, shall provide a certificate of compliance to these QA and documentation requirements. Objective evidence of compliance with these requirements is provided to the purchaser on request.

4.1.11 FIELD COATING PROGRAM

The approach for field coatings is to field coat the field-fabricated ferrous metals and those items that do not ship well or store well and that may require unique installation. Generally, repair of all damaged coatings is accomplished after the installation of the item.

The VEGP plant coating requirements are shown on architectural design drawings, consisting of finish schedule and finish doors schedule details. The finish schedule shows finish coating

systems by room numbers (space numbers), by levels of building, and by material to be coated.

These drawings are developed and controlled by the architectural discipline. The architectal discipline coordinates the color scheme and coating requirements with GPC.

Field coatings, as described in this section and specified in specification X1AJ07, include:

- o Field finish of shop-primed ferrous metal surfaces.
- o Uncoated shop or field fabrication items.
- o Touch-up and repair of coatings.
- o Concrete and concrete block surfaces.
- o Architectural paint finishes.

Neither the coating materials and application procedures for lining of field-fabricated tanks nor the protection requirements for buried piping and vessels, are within the scope of the field coating program. Coating requirements for such items are included within the body of each individual equipment specification.

Items not coated in the supplier's facilities are coated at the Vogtle jobsite in accordance with field coating specification X1AJ07 and Regulatory Guide 1.54, which is imposed and implemented as follows.

- o Regulatory Guide 1.54 is imposed for items located within the containment building:
  - For shop priming of liner plate, structural steel, and fabricated shapes.
  - For shop priming of fabricated pipes, tanks, heating, ventilation, and air-conditioning (HVAC) ducts, and equipment.
  - For field finish painting of steel where called for in drawings and specifications.
  - For surfacing of concrete where indicated in drawings and specifications.
- o Regulatory Guide 1.54 is implemented by requirements as follows:
  - Use of specific coatings systems prequalified to ANSI N101.2.

- Surface preparation standards.

- Surface profile requirements.

- Application of the coating systems in accordance with the paint manufacturer's instructions.

- Inspections and nondestructive examinations.

- Identification of all nonconformances. Coatings which do not conform with Regulatory GUide 1.54 are limited in use and are evaluated on a case-by-case basis for impact on plant safety. An inventory of unqualified coatings is maintained to ensure appropriate control of coatings inside containment.

- Certifications of compliance and/or documentation procedures to satisfy project requirements.

4.1.12 WESTINGHOUSE COATING PROGRAM

The NSSS is coated in accordance with the Westinghouse in-house coating program approved by the Nuclear Regulatory Commission.

Westinghouse has developed an alternate approach to ANSI N101.4 for satisfying Regulatory Guide 1.54 for the NSSS components inside containment. Stringent requirements are specified for the painting of major components in Westinghouse Process Specifications, which are imposed on vendors by procurement documents. Large equipment must have coating systems qualified to meet ANSI N101.2; and requirements are defined for surface preparation, use of undercoating, and, where applicable, inspection.

4.2 COATING MATERIALS

Vogtle Electric Generating Plant (VEGP) is committed to meet the intent of American National Standards Institute (ANSI) N101.2(1972), Protective Coatings (paints) for Light Water Nuclear Reactor Containment Facilities, as well as the recommendations of Regulatory Guide 1.54, Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants, to the extent stated in section 6.1.2.1 (protective coatings) of the FSAR. The requirements of Regulatory Guide 1.54 are imposed on items located within the containment including structures, components, and equipment. The coating requirements for items located within the containment are included within the body of each individual purchase specification written for the item when the item is coated in the supplier's fabrication facilities. Items not coated in the supplier's facilities are coated at the Vogtle jobsite in accordance with field coating specification X1AJ07, which includes the requirements of Regulatory Guide 1.54 and ANSI standards for materials. The nuclear steam supply system (NSSS) and other items for which Georgia Power Company (GPC) has contracts with Westinghouse are coated in accordance with Westinghouse in-house coating programs approved by the Nuclear Regulatory Commission.

4.2.1 SPECIFICATIONS FOR COATING

Field coating specification X1AJ07 and the various purchase specifications which include coating requirements are written and controlled by Bechtel Power Corporation (BPC). The specifications for coating of NSSS items furnished by Westinghouse are written and controlled by Westinghouse.

Specifications which include coating requirements for which BPC has engineering responsibility are shown in Table 4.2-1.

GPC is the purchasing agent for materials to be used in field coating application. Williams Contracting Inc. is the field coatings application contractor under the direction of GPC construction. Williams receives all coating materials from GPC.

The procurement process and receipt and document review are described in Appendixes C and E.

4.2.2 SUPPLIER QUALITY SURVEILLANCE PROGRAM

Specifications referred to in this module require that suppliers of coating materials and fabricated items implement a quality assurance program which satisfies ANSI N45.2-71, ANSI N101.4, and Regulatory Guide 1.54 requirements. The quality assurance program manual describing the supplier's program is submitted to

BPC for review and approval. Once approved, this manual becomes the basic document to which the supplier's work is audited. Quality surveillance is based upon the technical requirements of the specification and the codes and standards referenced therein. Surveillance activity also includes witness and hold points on the in-process application of coating at the supplier's facility, in accordance with approved coating procedures.

An outline of the procedures that a supplier must follow to comply with ANSI standards in implementing requirements of the quality assurance program is given at the end of the proposal form in each specification. Supplier quality surveillance is implemented and records of the activities are maintained by Southern Company Services (SCS) in accordance with project procedures as explained in Appendix I. These procedures are in accordance with BPC standards.

The items (components, equipment, and materials) covered in the specifications listed in Table 4.2-1 require supplier quality surveillance. Although SCS manages the supplier surveillance program, the Bechtel Home Office Engineering Architectural Discipline maintains responsibility for review of coating material quality surveillance reports and for taking action when required by the surveillance reports.

4.2.3 SUPPLIER QUALITY VERIFICATION DOCUMENTATION

Each supplier must produce certified documentation when executing a quality assurance program. Requirements for this documentation were established by BPC and were based, in part, on the experience of BPC in interpreting and applying the 10 CFR 50 Appendix B criteria. These criteria require documented evidence that material and equipment conform to procurement requirements, and that this evidence be available at the site prior to installation or use of the item. VEGP is committed to meeting the requirements of ANSI N45.2.13-1976 and Regulatory Guide 1.123, to the extent stated in section 1.9.123 of the FSAR. In general, for coating this requires the types of documentation described in ANSI N101.4.

4.2.4 SUPPLIER DEVIATIONS

Vendor requests for approval to deviate from the requirements of a material specification are submitted on a Supplier Deviation Disposition Request (SDDR) form. These requests are reviewed and approved (or rejected) by the BPC architectural or other engineering group supervisor (EGS). In addition, the SDDRs approved by the EGS are reviewed and approved by BPC Quality Engineering, the BPC project engineer, and BPC Quality Assurance. The approval disposition of each request is

categorized as one of the following: Accept-As-Is, Repair, or Modify Buyer s Requirement.

Deviations or deficiencies can also be discovered during normal surveillance visits, full scope quality program audits, or progressive audits of the supplier's quality program. Such inspections and audits are conducted by BPC on items and materials covered by this module. A deviation discovered during a normal surveillance visit is documented on a Quality Surveillance Deficiency Report (QSDR). The QSDR is used to report a violation of procedures, nonconforming hardware, and/or deficiencies noted in the documentation that can be related to a single item or group of materials.

Discrepancies disclosed during QA audits are reported on an audit finding report (AFR) which covers lack of implementation to an established quality program requirement. Implementaion of corrective action is evaluated during reaudits. AFRs remain open until corrective action has been completed.

4.2.5 RECEIPT, RECEIPT INSPECTION, AND STORAGE

Coating materials are received and receipt inspected by Georgia Power Company (GPC). GPC quality control (QC) applies hold tags and forwards quality documentation to Document Review. Upon acceptance of the documentation, Document Review issues a Document Acceptance Report (DAR), GPC QC removes the hold tags, and the material may be issued for use.

GPC receipt inspection is covered in Appendix E, which includes receipt, receipt inspection, document review and acceptance, release for issue, and storage.

Storage, except incidental storage during receipt, is performed by the coating contractor, Williams Contracting, Inc., (Williams). Williams obtains material from GPC following GPC procedure GD-A-30.

Williams receives, stores, and issues coating material following their procedure WW-I-01. Controls are provided to ensure traceability through the receipt, storage and issue process. Quality class materials are segregated from non-quality materials. Deficient materials are controlled by hold tags which are placed and removed by Williams QC following Williams' procedures WC-008 and WW-I-01.

Storage facilities meet requirements for environmental control, restricted access and housekeeping. Facilities are inspected by Williams QC following Williams procedure WC-005 and WC-012 to ensure compliance.

TABLE 4.2-1 (SHEET 1 OF 2)

MATERIAL SPECIFICATIONS[a]

Items within Containment

Specification Number	Description
X1AJ07	Field Coatings
X1AH07	Radiation Shielding Doors
X1AH02	Watertight Doors
X2AG03	Category I Structural Steel
X2AG05	Embeds, Supports, and Restraints Inside Containment
X2AG06	Containment Liner Plate System
X2AG07	Containment Personnel Lock, Escape Lock, and Equipment Hatch
X2AG08	Pipe Whip Restraints (U Bars)
X2AG11[b]	SS Liner Plate for Spent Fuel Area and Reactor Refuelling Canal
X2AG15[b]	High Energy Line Restraints Assembly (EAM)
X2AH01	Miscellaneous Category I Steel
X2AH06[b]	Category 1 and Noncategory I Anchor Bolts Assemblies
X3AB03	Penetrations
X3AH01	Cable Trays and Fittings (BM)
X3AN03[c]	Lighting Panel Board (BM)
X5AC03	Small Butterfly Valves

(a) Partial list of specifications for items inside containment.
(b) Stainless steel items not involving coatings.
(c) FSAR excluded this equipment from Regulatory Guide 1.54 requirements.

TABLE 4.2-1 (SHEET 2 OF 2)

Specification Number	Description
X5AC07	Nuclear and Nonnuclear Solenoid Valves
X5AA05(c)	Containment Hydrogen Monitoring Equipment
X5AB01(c)	Miscellaneous Control Panels
X4AJ02	ESF HVAC Fans
X4AJ16	Containment Cooling Units
X4AJ34	Containment HVAC Units
X4AL01	Containment Polar Crane
X4AQ01	Shop Fabrication of Nuclear Piping
X4AQ03	Nuclear Pipe Supports
X4AR01	2 1/2 Inch and Larger Valves
X4AR04	Nuclear Service Diaphram Valves
X4AF18(c)	Miscellaneous Horizontal
X4AH06(c)	Centrifugal Pumps Shop Fabricated Tanks
X4AX03	Automatic Sprinklers

(a) Partial list of specifications for items inside containment.
(b) Stainless steel items not involving coatings.
(c) FSAR excluded this equipment from Regulatory Guide 1.54 requirements.

4.3 TRAINING AND QUALIFICATION

This section contains a description of the project programs for training and qualification of design engineers, Georgia Power Company (GPC) construction engineers, contractor staff and craft, and inspectors.

For inspectors the information contained should be reviewed along with Appendix F, Inspector Qualification/Certification.

4.3.1 ARCHITECTS-ENGINEERS (DESIGN)

Architectural and Engineering personnel assigned to the Bechtel Power Corporation (BPC) Home Office Engineering (HOE) organization and the Project Field Engineering (PFE) organization receive training to familiarize them with project procedures governing their assigned responsibilities. Section 6, Part A of the Project Reference Manual (PRM) establishes the program structure and requirements for indoctrination and training of BPC personnel assigned to the Vogtle Electric Generating Plant project. It defines procedures, responsibilities, documentation, and records maintenance for the BPC project training program. Participation in the program is mandatory for permanently assigned home office and jobsite personnel.

The overall training program includes training in the following subject areas:

- Quality program.
- Engineering indoctrination program.
- Project Reference Manual.
- Technical and specialized training.
- New arrival orientation.
- Quality Concern Program.

The project engineering manager or his designees are responsible for the formulation and implementation of the training program. The architectural and engineering group supervisors (AGS and EGS) are responsible for ensuring that assigned personnel attend mandatory training classes, receive training in the requirements and the use of the PRM, and learn the unique technical aspects of their work. The group supervisors identify the training requirements for each individual in their groups commensurate with assigned tasks, and maintains records of training in accordance with PRM part A, section 6. The project administrator receives and stores training records of personnel no longer assigned to the project.

4.3.2 GPC CONSTRUCTION ENGINEERS

This section discusses the training and qualification of GPC construction engineers and other personnel reporting to the civil project section supervisor who perform work related to the activities of this module.

Candidates for construction engineering positions are either degreed engineers or have construction experience. Normally, the new engineer is assigned pertinent procedures to read. Newly assigned engineers work with an experienced engineer who provides instruction on specifications and procedures, shows the new engineer how to use design drawings, and familiarizes him with plant orientation and site organization.

The civil project section supervisor is responsible for making certain his personnel are capable of performing the tasks assigned to them. Therefore, in addition to the on-the-job training just described, the supervisor trains his personnel on changes and revisions to specifications and procedures and provides them formalized training as necessary to maintain or upgrade job skills.

4.3.3 GPC SURVEILLANCE INSPECTORS (COATING)

This section contains a brief description of the training course used to qualify civil QC inspectors employed by GPC to perform surveillance inspection of coating work. Appendix F contains a detailed explanation of the certification program.

To perform inspection in this area, the inspector must be certified in Coating Inspection. An inspector certified in this area is qualified to inspect coatings; waterproofing; and receipt, storage, and handling. The applicable training course for this area is Coating Inspection.

Coating Inspection is a 40-hour course that provides basic information required to inspect paints and coatings. The course also provides the inspector with recommended and specified techniques of inspection which enable him to locate and use coating work application procedures and the coating work inspection procedures, standards, specifications, and drawings. In addition, the coatings surveillance inspection includes, but is not limited to, monitoring environmental conditions, measuring the profile of blasted steel, measuring dry film thickness, and inspecting coated surfaces for defects, along with a review of contractor QC documentation for completeness.

4.3.4 CONTRACTOR

The training and certification of contractor personnel to perform installation work associated with coatings is discussed

in this section. The primary contractor employing personnel to perform this work is Williams Contracting, Inc.

Georgia Power Company reviews and approves training programs established by the contractors.

4.3.4.1 Williams Contracting, Inc. Quality Control

Williams inspectors performing coating work inspections are qualified and certified in accordance with ANSI N45.2.6-78. Training is conducted and certification is obtained in accordance with Williams Quality Control Procedure WC-016, Inspector Qualification and Certification Procedures.

Successful completion of the Williams Contracting QA/QC Inspector Training Program certifies the personnel to perform inspections in the following areas:

- o Surface preparation prior to application of coatings.
- o Application of coating materials.
- o Surface preparation prior to application of fireproofing materials.
- o Documentation of coating inspections.

The training program enables the inspector to become proficient and to improve his skills commensurate with time in grade. In addition, the program includes the required data to ensure the inspectors are knowledgeable of the information needed to perform their duties.

The following requirements are completed and documented during the training program:

- o Formal inspection training.
- o Formal applicator training.
- o On-the-job training.

Course material is presented according to a preplanned outline developed by the QA/QC administrator. The outline consists of the material required for each phase of training. Training records are retained in the personnel file.

4.3.4.2 Williams Contracting, Inc. Craft

Williams employs personnel who are classified as either journeymen or apprentice painters working out of local 1730 in Augusta, Ga. Before becoming a journeyman, an individual serves

at certain apprenticeship levels for prescribed periods set forth by International Union Bylaws. Throughout the course of apprenticeship, the painter learns the different methods of surface preparation and application, and becomes familiar with the physical characteristics of the more commonly used coating materials.

The journeyman is able to perform what is required to complete a specific contract, whether it is preparing concrete or steel to receive a primer or finish coat or the application of the coating material.

Williams craft personnel all go through Williams' training program. Training that is of a generic nature is provided throughout the painter's term of employment. Other training that is of a specific nature is given prior to the painter performing any work in that area. The Contractor Training Section, managed by Georgia Power, gives a directive to the training coordinator on certain areas within the craft's responsibility. This directive may be to develop a training program for the application of a specific coating system with a conventional spray gun or with an airless spray gun, administer a test on the course, and keep the results on file with the individual's training record. Some of the coating systems used at Vogtle with a test administered and placed on file with the individual's record are:

- Concrete; FN-13, FN-15, and FN-19

  1. Surface Preparation Techniques

     - Solvent cleaning.
     - Hand tool cleaning.
     - Power tool cleaning.
     - Blasting.

  2. Application Techniques

     - Roller.
     - Brush.
     - Trowel.
     - Conventional spray.
     - Airless spray.
     - Paint mitt.

- Steel; FN-2, FN-3, FN-6, FN-7, FN-8, FN-10, FN-12, FN-27, FN-31, FN-34, FN-35, and FN-36

  1. Surface Preparation Techniques

     - Solvent cleaning.
     - Hand tool cleaning.
     - Power tool cleaning.
     - Blasting.

2. Application Techniques

- Roller.
- Brush.
- Trowel.
- Conventional spray.
- Airless spray.

The classroom instruction includes a review of the applicable system requirements with relation to the contractor's responsibility and any hold points that would involve Quality Control. The training also includes hands-on practical (skills) training.

4.4 PREPARATION, APPLICATION, AND INSPECTION

The following section contains a brief description, flow chart, and list of procedures and specifications applicable to preparation, application, and inspection work relevant to Module 13B.

The flowchart (Figure 4.4-1) illustrates the contractor's work activity as well as the resulting inspection and engineering activities required to support, inspect, and document these work processes. Each organization listed in the left hand margin of the flowchart is responsible for the activities shown to the right of it. The nodes (circles) denote the starting and completion points of work activities. Between the nodes are descriptions of the work activities performed and the applicable procedure governing that work activity. The dotted lines with directional arrows indicate the flow of documentation or instructions for an activity. The flowchart does not contain the flow of documents, such as Deviation Reports or Field Change Requests, as they may be generated at any time.

The description preceding the flowchart defines which contractor is responsible for the work noted on the flowchart and which QC organization performs the required inspection. A general description, procedures, and codes governing the processes are given.

4.4.1 COATINGS

This section covers the receipt, storage, application, and inspection of coatings inside the containment.

Coatings material is purchased and received by Georgia Power Company; stored and applied by Williams Contracting, Inc. Receipt, storage, application, and inspection are performed following the procedures listed in Table 4.4-1 and specification X1AJ07. The work is governed by Regulatory Guide 1.54, Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants and, in addition, specified portions of the following:

- ANSI N101.2, Protective Coatings (Paints) for Light Water Nuclear Realtor Containment Facilities (material qualification only).
- ANSI N101.4, Quality Assurance For Protective Coatings applied to Nuclear Facilities.
- ANSI N5.12, Protective Coatings (Paints) for the Nuclear Industry.
- Bechtel drawings 1X1D01A12-1 and 2X1D01A12-1.

Figure 4.4-1 is a flowchart showing the activities for the receipt, storage, application, and inspection of coatings in the containment with the applicable specification and procedures noted.

Coating touchup and repair of surface area of less than 30 square inches area are excluded from Regulatory Guide 1.54 coverage, as is the shop coating of small "production" items where special coating requirements would be impractical. These categories of coatings, inside the containment, must be quantified as "unqualified coatings."

Unqualified coatings and a Unit 1 diesel generator fuel oil storage tank (outside the containment) were assessed in this module. The procedures and flow of activities for these coatings are similar to those shown in Figure 4.4-1; however, Quality Assurance and documentation requirements of Regulatory Guide 1.54 are not imposed.

TABLE 4.4-1
COATINGS IN CONTAINMENT
APPLICABLE PROCEDURES

GEORGIA POWER COMPANY

GD-A-30	Receipt, Receipt Inspection, Storage, and Handling
WH-A-01	Material Issue
DC-A-06	Review and Control of Quality Assurance Documentation

WILLIAMS Contracting, Inc.

WW-I-01	Receipt, Storage, Issue, and Control of Coating Materials
WC-002	Coating Inspection Report
	Application Procedures (W-2, W-3, W-6, W-7, W-8, W-8A, W-10, W-13, W-14, W-19KL, W-26, W-27, W-31, W-40, WH-78, WH-260)

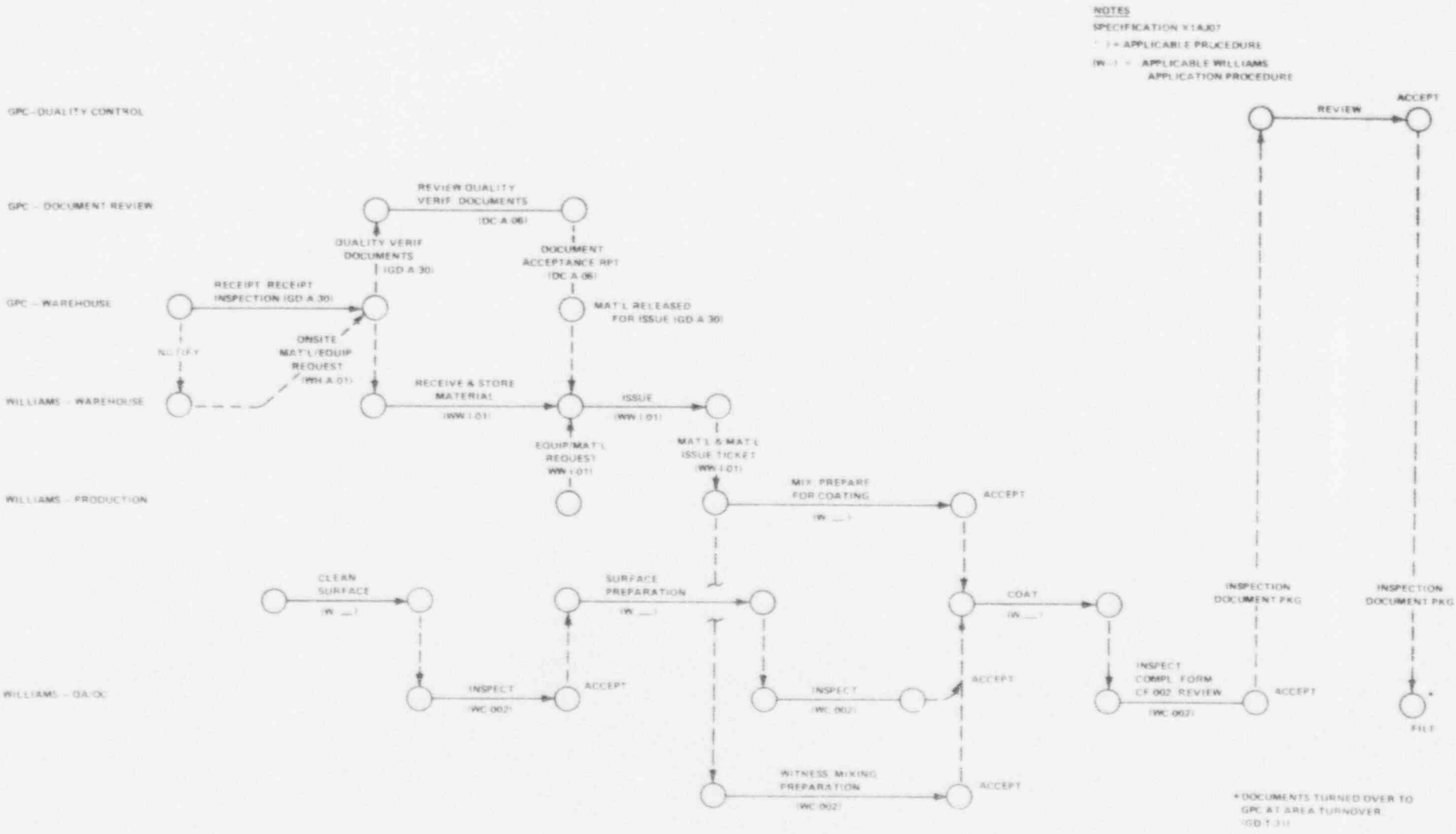


Figure 4.4-1 Coatings Activity Flow

5.0 AUDITS AND SPECIAL INVESTIGATIONS

This module section contains a discussion of the Quality Assurance (QA) audit process, NRC inspections, and special evaluations performed in the area of coatings. The prime purpose of this section is to provide an evaluation of findings which were reviewed to determine their importance and impact on the verification process. These audits have been performed throughout the Plant Vogtle design and construction program by QA organizations. These onsite audits have been performed by Georgia Power Company QA and Bechtel Power Corporation QA. Also, regularly scheduled and periodic NRC inspections and investigations, including the Systematic Assessment of Licensee Performance (SALP) evaluations and a special investigation by the regional Construction Assessment Team (CAT), have been conducted. Plant Vogtle was also 1 of 22 utility sites that initially participated in the onsite investigations and evaluations of the Institute of Nuclear Power Operations (INPO). An offshoot of the pilot INPO program and the subsequent followup onsite investigation was the Self-Initiated Evaluation (SIE) program.

This section is divided into two parts: 5.1, Design Audits, and 5.2, Construction Audits. Section 5.1 is limited to discussion of audits pertaining to design-related items. Section 5.2 is limited to discussion of audits pertaining to construction related items. These subsections briefly explain organizations, programs, investigations, evaluations, and audits, and list findings or violations that are applicable to this module.

Identification of audits in this module section indicates areas that required emphasis in the Readiness Review assessment.

5.1 QA AUDITS OF DESIGN

The Project's design effort has been audited by QA organizations, as described in this section, to verify compliance with criteria of 10 CFR 50, Appendix B and project requirements such as FSAR, Design Criteria Manual, project procedures manuals, etc.

Audits that specifically pertain to coatings were those performed by Georgia Power Company and Self-Initiated Evaluations.

These QA audits and audit findings have been categorized by auditing organizations in the paragraphs below.

5.1.1 GEORGIA POWER COMPANY QA AUDITS

Seventeen audits conducted by GPC Quality Assurance identified 18 findings pertaining to the scope of this module.

GPC conducted eight audits in which coatings were specifically reviewed. These audits, as they pertain to design activities, are as follows:

Audit Number	Date	Number of Findings
CD 06-80/18	05-16-80	2
CD 06-81/22	04-28-81	1
CD 06-81/51	08-13-81	2
CD 06-82/68	07-26-82	1
CD 06-83/49	06-23-83	2
CD 06-83/71	10-14-83	1
CD 06-83/104	12-29-83	1
CD 06-84/57	08-20-84	2

All but three of the findings issued which pertain to this module related to noncompliance or omissions in procedures by the onsite coatings supplier or deficiencies or omissions in the onsite coating supplier quality assurance manual. These concerns were satisfactorily resolved by changes to cited documents, and since hardware was not affected, these findings were deemed to be minor.

Two of the remaining three findings revealed inconsistencies in complying with Regulatory Guide 1.54, which resulted in changes to the FSAR. In one case (CD 06-83/49) which dealt with unqualified paint being applied in the containment the condition was resolved by issue of a specification revision and an FSAR change which addressed the condition by providing quantified criteria for acceptance of the cited condition. The other FSAR change addressed by CD 06-81/51 resolved the condition cited by providing an alternate means of complying with Regulatory Guide 1.54. Audit CD 06-83/104 resulted in an FSAR change to document

the as-built condition of the coatings applied by the supplier of the fuel oil storage tanks.

Six audits performed by GPC on other activities in which coatings were cited are listed below:

Audit Number/Activity	Date	Number of Findings(*)
MD 01-82/113 Large pipe	11-08-82	1
MD 03-83/108 Pumps	12-12-83	1
MD 05-84/64 Tanks	08-30-84	1
MD 11-83/47 Hangers	06-23-83	1
MD 13-84/34 Liner Plate	05-23-84	1
MD 05-83/100 Storage Tank	11-03-83	1

These findings generally documented field and supplier procedural noncompliance and omissions. For example, in the first three audits listed in this category, the equipment suppliers implemented new procedural controls that satisfactorily resolved the concern. Audits MD 13-84/34, MD 05-84/64, and MD 01-82/113 resulted in findings being resolved by revision of the Bechtel specification.

Further, none of the above cited conditions were determined to be reportable to the NRC under the criteria of either 10 CFR 50.55(e) or 10 CFR 21.

5.1.2 NUCLEAR REGULATORY COMMISSION INSPECTIONS

The NRC has performed two inspections in which the programs and processes involved the scope of Module 13B. There were no findings which concerned the design scope of this module.

5.1.3 SELF-INITIATED EVALUATION

The Self-Initiated Evaluation was a task force review of Vogtle engineering and construction activities. Using INPO evaluation criteria, the review documented Item 4-6, a concern with the coating on bolts and rusted steel surfaces. This concern was satisfactorily resolved with a specification change to allow inspection of these items as required. The specification change also provided surface preparation and inspection requirements for previously coated items requiring touch-up. Closeout of this concern also resulted in training of personnel and reviewing previously coated, installed bolts and nuts. The coatings were touched up as required.

(*)Findings as they relate to coatings only, and not the number of findings identified in the audit.

5.2 CONSTRUCTION AUDITS

5.2.1 PROJECT AUDITS

5.2.1.1 Georgia Power Audit Findings

The GPC QA Department has conducted 22 audits that addressed the programs and processes involved with coatings. Those 22 audits resulted in 24 findings and 2 observations that are listed in the findings matrix at the end of this section.

For Module 13B, each audit was reviewed and categorized into one or more of the eight categories listed below.

Category	Audit Frequency	No. of Audit Findings
Materials	16	6
Train/qual.	8	4
Application	7	5
Inspection	7	1
Testing	4	3
M&TE	3	0
Doc. control	6	2
QA records	7	5

Each finding was reported to project management and received an evaluation that included an assessment of its impact on the project, corrective action, and action to preclude recurrence. No audit finding within the scope of Module 13B was reportable in accordance with 10 CFR 50.55(e).

The areas most directly reflecting the quality of the field coatings are materials, application, and inspection. Eleven findings have been issued in these areas. Of these, only five were written against Williams Contracting. Fifteen audits have been conducted since 1981 which included these areas with only two findings, one each in the areas of application materials, being issued.

The application finding was not against improper application, but rather on unreasonable delay in repairing a deficient coating that had been applied by another vendor. The materials finding was against detail problems in segregation of "Q" and "non-Q" materials, with no indication of loss of "Q" material identity or improper handling of "Q" materials.

The remaining six findings in these areas document problems with vendor-supplied shop coatings and the application of unqualified coatings by other contractors for touchup and marking. In each case, the nature of the problem and the corrective actions taken were adequate to prevent recurrence.

In October 1985 the GPC QA Department conducted an annual assessment audit of Williams Contracting Inc. (CP01/CP14-85/86, November 27, 1985). Since the audit was conducted subsequent to the effective date of this module, the audit and audit findings are not included in the table or on the matrix. However, the Readiness Review Team assessed the audit for impact on the module.

The audit showed that Williams has not fully implemented their documented quality program and has not adequately developed certain program requirements established by regulatory commitments. Ten audit finding reports were issued as a result of this audit. Four findings were categorized as Major, four findings were categorized as Significant, and two findings were categorized as Minor.

The audit concluded that "the knowledge of the Williams Quality Control personnel in the specification, codes, and application procedures is sufficient to provide acceptable coatings." The audit also found no evidence "that the program weaknesses had adversely affected coatings applied to hardware."

The Readiness Review Team has reviewed the audit and is in agreement with its conclusions. The responses to the audit findings have not been completed by Williams or accepted by QA. Therefore, they have not been reviewed by the Readiness Review Team.

5.2.1.2 INPO Evaluations

The Vogtle project has participated in two INPO construction project evaluations, one in 1982 and one in 1984. The 1982 pilot evaluation was the first time the evaluation criteria had been applied in the industry. From these evaluations, one finding resulted.

The Williams quality assurance program was judged to be inadequate because it did not meet certain requirements of 10 CFR 50, Appendix B. The program did not provide for a comprehensive system of audits, nor did it clearly define who was responsible for performing audits. As a result of this finding, Williams revised their Quality Assurance Manual to provide for audits twice annually and to designate who is to perform the audits. The manual was further revised to define the responsibilities of the quality assurance/quality control administrator, and to establish procedure review, approval responsibilities, and authority. In addition, GPC QA periodically audits Williams to ensure that applicable standards are adhered to and that proper documentation is prepared.

5.2.1.3 Self-Initiated Evaluation

During September and October 1982, the project initiated an evaluation of design and construction activities which was conducted by a team of nonproject senior technical and management personnel from Georgia Power Company, Southern Company Services, and Bechtel Power Corporation. The evaluation assessed many of the programs and activities on the project using the INPO criteria for construction project evaluations. From this evaluation the following findings resulted:

- o Coating of bolts and rusted steel surfaces

  A problem was found to exist in that some bolts and rusted steel surfaces had inadequate field coating, and that this condition was directly related to the lack of inspection requirements in specification X1AJ07. The problem was corrected by:

  - Revising the specification to place inspection requirements at the discretion of the GPC coating engineer.

  - Revising the specification to define the cleaning requirements for touchup coating of field bolts and nuts.

  - Inspecting previously coated field bolts and nuts for potential problems and performing additional cleaning and touchup as required.

  - Retraining craft personnel, with additional training, inspection, etc., to be implemented as required.

- o Lack of certification of coating inspection personnel

  The coating contractor was not qualifying and certifying inspection personnel to all the requirements of ANSI N45.2.6 and 10 CFR 50, Appendix B, section 2. To correct this condition, GPC reviewed the contractor's qualification and certification program and requested those changes necessary to bring the program into compliance with ANSI and federal requirements. The GPC QC organization was given direct responsibility for contract administration of the QC portion of the contractor's QA program, including approval of certification procedures and training curriculum.

5.2.2 NRC INSPECTIONS

One NRC inspection addressed coatings and resulted in one unresolved item and no violations.

5.2.3 PAST CONSTRUCTION PROBLEMS

Problems which could adversely affect the safety of operations of the plant at any time during its expected lifetime are to be reported to the NRC according to criteria in the Code of Federal Regulations [10 CFR 50.55(e)].

Of the 87 potentially reportable problems identified to the NRC as of July 1, 1985, none have pertained to the subject of coatings.

DESIGN AUDITS

SORTED BY INITIATING ORGANIZATION AND AUDIT NUMBER

EDIT NO.	INIT ORGAN	AUDIT NUMBER	DATE	DESIGN CRIT	CALCU-LATIONS	DRAW-INGS	SPEC	SUPPLR DATA	DEVIAT. REPORTS	TRAIN PRGM	DESIGN REVIEW	DESIGN DOC CNT	DESIGN CHANGES	MISC

EXPLANATION OF FIELDS

For convenience, categories were combined where appropriate. The following is a listing of combinations and explanations:

EDIT NO. - Used for complete entry/corrections

INIT ORGAN - Initiating or responsible organization: BPC, GPC, NRC, SCS

AUDIT NUMBER - Number applicable to specific audit

DATE - Date of audit, finding, or report

DESIGN CRIT - Design Criteria, FSAR

CALCULATIONS - Calculations, Failure Modes and Effects Analyses (FMEAs), engineering studies

DRAWINGS - (Self-explanatory)

SPEC - Design specifications, procurement specs, construction specs, bid evaluations

SUPPLR DATA - Supplier data includes expediting, inspections, Supplier Deviation Disposition Requests (SDDRs)

- Supplier data package problems

DEVIAT. REPORTS - Deviation Reports, Nonconformance Reports, reportable items

TRAIN PRGM - Training program for design personnel

DESIGN REVIEW - Design reviews of engineering documents, Design Review Notices (DRNs), and interface between engineering disciplines

DESIGN DOC CNT - Document Control - records, correspondence, design control (of design documents), manual control Project Reference Manual (PRM)

DESIGN CHANGES - Field Change Requests (FCRs), Design Change Notices (DCNs), greenlining, Field Engineering Change Orders (FECOs)

MISC - Licensing deviation disposition requests procedures, miscellaneous design audits

DESIGN AUDITS

MODULE 13B - SORTED BY INIT. ORGANIZATION & AUDIT NUMBER

EDIT NO	INIT ORGAN	AUDIT NUMBER	DATE	DESIGN CRIT	CALCULATIONS	DRAWINGS	SPEC	SUPPLR DATA	DEVIAT. REPORTS	TRAIN PRGM	DESIGN REVIEW	DESIGN DOC CNT	DESIGN CHANGES	MISC	WEST. SCOPE
151	GPC-QA	CD06-80/18	05-16-80	X			128,129	128,129			X				
323	GPC-QA	CD06-81/22	04-28-81				188	188			X	X			
152	GPC-QA	CD06-81/51	08-13-81	X			235	236			X				
153	GPC-QA	CD06-82/68	07-16-82	X			318				X	X			
326	GPC-QA	CD06-83/01	02-09-83				X			X					
154	GPC-QA	CD06-83/10 4	12-29-83	X			548I				X		X	LEVEL I	
155	GPC-QA	CD06-83/49	06-23-83	X			442,444				X	X		LEVEL I	
329	GPC-QA	CD06-83/71	10-14-83	X			506	506			X	X			
330	GPC-QA	CD06-[illegible]	[illegible]-20-84				674,672	672							
407	GPC-QA	MD01-82/11 3	11-08-82				366				X	X			
429	GPC-QA	MD03-83/10 8	12-12-83				X	529				X			
895	GPC-QA	MD03-84/26	04-16-84				X					X			
453	GPC-QA	MD05-83/10 0	11-03-83				X	522							
892	GPC-QA	MD05-84/64	08-30-84				X		685						
893	GPC-QA	MD06-83/61	07-25-83				X								
226	GPC-QA	MD11-83/47	06-27-83				447				X		X		
894	GPC-QA	MD13-84/34	05-23-84				627				X				

DESIGN AUDITS

MODULE 13B - SORTED BY INIT. ORGANIZATION & AUDIT NUMBER

EDIT NO	INIT ORGAN	AUDIT NUMBER	DATE	DESIGN CRIT	CALCUL ATIONS	DRAW- INGS	SPEC	SUPPLR DATA	DEVIAT. REPORTS	TRAIN PRGM	DESIGN REVIEW	DESIGN DOC CNT	DESIGN CHANGES	MISC	WEST. SCOPE
896	NRC-INS	84-14	07-24-84				X					X			
825	NRC-INS	84-27	10-19-84				X								

CONSTRUCTION AUDITS

EDIT NO.	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MATE-RIAL	TRAIN/ QUAL	FABRI-CATION	INSPEC-TION	TEST-ING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS

EXPLANATION OF FIELDS

EDIT NO. - Internal reference numbers

INITIATING ORGANIZATION - The organization performing audit or inspection:

- GPC - QA = Georgia Power Company QA Department
- HART-N-616 = Hartford Steam Boiler and Inspection Company
- NISCO = Nuclear Installation Service Company
- NRC-INS = Nuclear Regulatory Commission Inspection Report
- West = Westinghouse
- BPC = Bechtel Power Corporation
- SCS = Southern Company Services
- INPO = Institute of Nuclear Power Operations

AUDIT NUMBER - Identification number of audit or inspection assigned by initiating organization

DATE - Date of audit or report receipt date

MATERIAL - Material, storage, damage, handling, cleanliness, etc.

TRAIN/QUAL - Training and qualification of personnel

FABRICATION - Manufacturing/installation activities

INSPECTION - Inspection and nondestructive examination

TESTING - Pressure tests, flow tests, load tests, etc.

MEASURE & TEST EQ - Measurement and test equipment

DOCUMENT CONTROL - Document control

QA RECORDS - Quality Assurance records

CONSTRUCTION AUDITS

MODULE 13B - SORTED BY INIT. ORGANIZATION & AUDIT NUMBER

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
99	GPC-QA	CD06-80/18	05-16-80	X	X				X	X	X	
100	GPC-QA	CD06-80/47	12-19-80	153,154	155					X	156	
101	GPC-QA	CD06-81/22	04-28-81	188	X		188			X	X	
102	GPC-QA	CD06-81/51	08-13-81	X	X		X			X	236	
103	GPC-QA	CD06-82/10	03-18-82	X			X	X				
104	GPC-QA	CD06-82/68	07-16-82	X			X		X			
105	GPC-QA	CD06-83/01	02-09-83		387, 062-OBS , 061-OBS					386		
106	GPC-QA	CD06-83/104	12-29-83			548		X	X			
107	GPC-QA	CD06-83/49	06-23-83	X		444,443						443 CLOSED. SEE CD06-85/24.
108	GPC-QA	CD06-83/71	10-14-83					505,506		507	508,509	
109	GPC-QA	CD06-84/20	04-03-84	X	X						X	
110	GPC-QA	CD06-84/57	09-20-84	X	672		X	673				
1743	GPC-QA	CD06-84/70	01-29-85	747							747	
114	GPC-QA	CD06-85/24	04-01-85	X								
440	GPC-QA	MD02-83/94	11-11-83		526	X	X					
453	GPC-QA	MD03-83/108	12-12-83	X								
460	GPC-QA	MD03-84/26	04-16-84			604						

CONSTRUCTION AUDITS

MODULE 13B - SORTED BY INIT. ORGANIZATION & AUDIT NUMBER

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
506	GPC-QA	MD05-84/35	06-25-84			X						
508	GPC-QA	MD05-84/64	08-30-84	X		685						
511	GPC-QA	MD06-81/46	07-29-81	X			X					
599	GPC-QA	MD11-83/47	06-27-83	447		X						
605	GPC-QA	MD11-84/08	01-30-84	616								
1295	NRC-INS	84-27	10-19-84				X					

FINDINGS

MODULE 13B - SORTED BY FINDING NUMBER

INIT ORG	AUDIT NUMBER	FINDING NUMBER	LEVEL	DATE	SUBJECT	REMARKS	NUMBER
GPC-QA	CD06-83/01	061-OBS		01-26-83	INSPECTION TRAINING & QUALIFICATION - LEVEL I INSPECTION PERSONNEL HAVE BEEN CERTIFYING APPLICATORS INDICATING ACCEPTABILITY OF INSPECTION RESULTS.	ANSI N45.2.6-1978, TABLE I	616
GPC-QA	CD06-83/01	062-OBS		01-26-83	TRAINING & QUALIFICATION - EVEN THOUGH THE COATING APPLICATOR TRAINING CLASS RELATES TO USE OF EQUIPMENT AND INSPECTION TOOLS, IT IS NOT A PREREQUISITE FOR CERTIFICATION.	WILLIAMS CONTRACTING QAM, SECT. 9.2.1, DATED 08-25-82.	618
GPC-QA	CD06-80/18	128		04-14-80	COATINGS - DESIGN - ESTABLISH A QA MANUAL	ANSI N45.2 & N101.4, GPC QA PROCEDURE QA-04-06	685
GPC-QA	CD06-80/18	129		04-14-80	COATINGS - DESIGN - COATINGS APPLICATION & INSPECTION PROCEDURES.	SPEC. X1AJ07, ANSI N101.4, PSAR SEC. 17	686
GPC-QA	CD06-80/47	153		12-11-80	COATINGS - MATERIALS - OUT OF DATE COATING MATERIALS.	GPC FIELD PROCEDURE CD-T-15, PARA. VII. B.	710
GPC-QA	CD06-80/47	154		12-11-80	COATINGS - MATERIALS - COATING MATERIAL I.D. & CONTROL.	GPC CD-T-15, REV. 1, PARA VII.C., SPEC. X1AJ07.	711
GPC-QA	CD06-80/47	155		12-11-80	COATINGS - TRAINING - QUALIFICATIONS - QUALIFICATIONS OF COATINGS APPLICATION PERSONNEL.	ANSI N101.4 - 1972, PARA 5.3 10CFR50, APP. B., CRITERIA II, V, & IX.	712
GPC-QA	CD06-80/47	156		12-11-80	Q.A. RECORDS - VALID IF STAMPED, INITIALED, ETC. BY AUTHORIZED PERSONNEL.	ANSI N45.2.9, PARA. 3.2.1	713
GPC-QA	CD06-81/22	188		04-17-81	COATINGS - MATERIALS - INSPECTIONS - COATINGS MATERIALS STORAGE PROBLEMS	ANSI N45.2.2, PARA. 6.2 AND 2.3, PROCEDURE GD-T-09, PARA. VIK	745
GPC-QA	CD06-81/51	235		07-16-81	COATINGS - DESIGN - BECHTEL SPECS. NOT COORDINATED WITH OTHERS.	10CFR50 APP. B, CRITERIA III, ANSI N101.4, SECT. 1.2.2.1	792

FINDINGS

MODULE 13B - SORTED BY FINDING NUMBER

INIT ORG	AUDIT NUMBER	FINDING NUMBER	LEVEL	DATE	SUBJECT	REMARKS	NUMBER
GPC-QA	CD06-81/51	236		07-16-81	COATINGS - Q.A.RECORD - CORRECT WILLIAMS CO. QUALITY ASSURANCE PROGRAM	10CFR50, APP. B, CRITERIA II-1	793
GPC-QA	CD06-82-68	318		06-15-82	COATINGS - DESIGN - REVISE WILLIAMS' QA PROGRAM.	VOGTLE QAM - 2.4, 2.8.E	875
GPC-QA	MD01-82/113	366	III	11-08-82	LARGE BORE PIPING - DESIGN - FIELD REPAIR PROCEDURE - CONTROL AND APPLICATION INADEQUATE	PULLMAN INSTRUCTION 39	2455
GPC-QA	CD06-83/01	386	II	01-13-83	COATINGS - TRAINING - QUALITY CONTROL AND TRAINING MANUAL	WILLIAMS QA MANUAL, SECT. 6.6.3, 6.4.3, 10CFR50, APP. B, CRITERIA VI	943
GPC-QA	CD06-83/01	387	II	01-13-83	COATINGS - TRAINING & QUALIFICATIONS - QUALIFICATION PROCEDURES, LOGS.	ANSI N101.4-1972, SECT. IX	944
GPC-QA	CD06-83/49	442	I	05-31-83	COATINGS - DESIGN - IDENTIFY AND QUANTIFY UNQUALIFIED COATINGS.	10CFR50, APP. B, CRITERIA III, X1AJ07R/12, SECT. 1.4.1.A	999
GPC-QA	CD06-83/49	443	III	05-31-83	COATINGS - FAB - MATERIALS	WESTINGHOUSE PROCEDURE SPECIFICATION 597755R/5, SECTION 1.9, ANSI N101.2-72, ANSI N5.12-74 (CLOSED, REF. CD06-85/24)	1000
GPC-QA	CD06-83/49	444	I	05-31-83	COATINGS - MATERIAL - NEED TO DEVELOP QA PROGRAM TO MEET SPECIFICATION	ANSI N101.4-72, SECT. 1.24, SPEC. X1AJ07R/12, SECT. 5.1.3.	1001
GPC-QA	MD11-83/47	447	I	05-25-83	PIPE HANGERS - COATINGS - MATERIALS - UNQUALIFIED COATING	X1AJ07, REV. 12, PARA. 1.3.1, 4.1, 4.1.1-D	1004
GPC-QA	CD06-83/71	505	II	08-22-83	COATINGS - INSPECTION - QA/QC ADMINISTRATOR GETS REVIEW BY WILLIAMS PROJECT MAN.	10CFR50, APP. B., CRITERION I	1062
GPC-QA	CD06-83/71	506	III	08-22-83	COATINGS - INSPECTION - REVISING VARIOUS PROCEDURES	10CFR50, APP. B., CRITERIA V.	1063

FINDINGS

MODULE 13B - SORTED BY FINDING NUMBER

INIT ORG	AUDIT NUMBER	FINDING NUMBER	LEVEL	DATE	SUBJECT	REMARKS	NUMBER
GPC-QA	CD06-83/71	507	II	08-22-83	COATINGS - DOCUMENT CONTROL - RECEIPT, STORAGE HANDLING OF DOCUMENTS.	10CFR50, APP. B., CRITERIA VI	1064
GPC-QA	CD06-83/71	508	III	08-22-83	COATINGS - QA RECORDS - CONTROLLED DOCUMENTS NOT MAINTAINED PROPERLY.	10CFR50, APP. B., CRITERIA VI	1065
GPC-QA	CD06-83/71	509	II	08-22-83	COATINGS - QA AUDITS, RECORDS - REVISE QA PROGRAM.	ANSI N45.2.12, 1977, SECT. 4.4.	1066
GPC-QA	MB05-83/100	522	II	11-03-83	STORAGE TANKS - DESIGN - MFG CERTIFICATION OF PAINTING INADEQUATE. COATING PROCEDURE NOT APPROVED BY BECHTEL	RECO PROCEDURE ES-129	2486
GPC-QA	MD02-83/94	526	III	10-17-83	COATINGS - TRAINING & QUALIFICATION - CERTIFICATION OF ABRASIVE BLASTING PERSONNEL.	WILLIAMS CONTRACTING PROCEDURE W-P8, SECT. V-A.1.	1083
GPC-QA	MD03-83/108	529	III	12-12-83	COATINGS - DESIGN - DIESEL FUEL OIL TRANSFER PUMP COATING PROCEDURE NOT APPROVED BY BECHTEL	X4AF04, REV. 4, PARA. 4.4.2.C	1086
GPC-QA	CD06-83/104	548	I	12-07-83	COATINGS - FAB. & INSTALLATION - WRONG COATING FOR TANK INTERIOR		1105
GPC-QA	MD03-84/26	604	III	03-26-84	COATINGS - FAB. & INSTALLATION - NO COATING OF AUXILIARY COMPONENT COOLING PUMP AS REQUIRED - NONCONFORMANCE DISPOSITION NOT PROMPTLY IMPLEMENTED	10CFR50, APP. B., CRITERIA XVI. (CLOSED 05-07-84)	1161
GPC-QA	MD11-84/08	616	III	01-30-84	COATINGS - MATERIALS - CONTROL USE OF KRYLON SPRAY PAINT.	SPEC. X4AZ01, DIV. P9, TABLE II, REV. 8.	1174
GPC-QA	MD13-84/34	627	III	05-23-84	LINER PLATE - DESIGN - COATING DATA ON TRADE NAME NOT AVAILABLE	TRADE NAME - NU-FRENCH DELETED FROM BPC DWG	2487
GPC-QA	CD06-84/57	672	III	07-26-84	COATINGS - TRAINING - Q. A.	SPEC. X1AJ07, REV. 17, PARA. 3.2.2.D.	1230

FINDINGS

MODULE 13B - SORTED BY FINDING NUMBER

INIT ORG	AUDIT NUMBER	FINDING NUMBER	LEVEL	DATE	SUBJECT	REMARKS	NUMBER
GPC-QA	CD06-84/57	673	III	07-26-84	COATINGS - TESTING - DESIGNATE PERSON RESPONSIBLE FOR AIR QUALITY TESTING DURING AIR SPRAY PAINTING.	X1AJ07,REV. 17, PARA. 7.5.1.B.	1231
GPC-QA	CD06-84-57	674	III	07-26-84	COATINGS - DESIGN - CHANGE SPECIFICATIONS	SPEC. X1AJ07,REV. 17, CSCN 94, PARA. 1.	1232
GPC-QA	MD05-84/64	685	II	08-09-84	COATINGS - FAB. & INSTALLATION	X4AH07, REV. 2, PARA. 4.4.2.6.a.	1243
GPC-QA	CD06-84/70	747	I	01-29-85	DEFICIENCIES IN THE WILLIAMS DOCUMENTED Q.A. PROGRAM	WILLIAMS Q.A. MANUAL SECT. I,II,III,IX,X, XVIII,IV. GPC FIELD PROCEDURE GD-A-10. (CLOSED, MAY 28, 1985)	1303
GPC-SW		SW-C-38		08-12-81	COATINGS - SPECIFICATIONS CONFLICT WITH CODE		1374
GPC-SW		SW-C-53		02-23-83	BONDING OF COATINGS TO FLOOR		1378
GPC-SW		SW-C-57		09-06-83	TOUCH UP COATINGS BY UNQUALIFIED CRAFT		1382
GPC-SW		SW-C-63		08-31-84	COATINGS - BUILDING MILLAGE NOT ALLOWED BY MANUFACTURER	(CLOSED, REF. CD06-85/24)	1400
INPO		PS.16b		1982	WILLIAMS QA PROGRAM INADEQUATE		1469
INPO		QP.3-1		1984	CHECKLIST FOR INSPECTORS		1441
NRC-INS	84-27	84-27-01	URI	10-01-84	ADEQUACY OF COATINGS CONTRACTOR QC INSPECTOR AND APPLICATION PROCEDURES		1706
SIE		DC.4-06		1982	COATING OF BOLTS		1881
SIE		TN.3-01		1982	COATING ENSPECTOR QUALIFICATION		1939

FINDINGS

MODULE 13B - SORTED BY FINDING NUMBER

INIT ORG	AUDIT NUMBER	FINDING NUMBER	LEVEL	DATE	SUBJECT	REMARKS	NUMBER
GPC-QA	CP01/CP14-85/56	875	II	11-27-85	FAILURE TO CHANGE AN FSAR COMMITMENT PRIOR TO ISSUING A SPEC. CHANGE		2391
GPC-QA	CP01/CP14-85/56	876	III	11-27-85	WEAKNESSES IN THE APPROVAL AND ISSUE OF CONTROLLED DOCUMENTS		2392
GPC-QA	CP01/CP14-85/56	877	III	11-27-85	WEAKNESS IN THE STORAGE OF QUALITY MATERIALS USED IN COATING SYSTEMS INSIDE CONTAINMENT		2393
GPC-SW		SW-C-38		08-12-81	COATINGS - SPECIFICATIONS CONFLICT WITH CODE		1374
GPC-SW		SW-C-53		02-23-83	BONDING OF COATINGS TO FLOOR		1378
GPC-SW		SW-C-57		09-06-83	TOUCH UP COATINGS BY UNQUALIFIED CRAFT		1382
GPC-SW		SW-C-63		08-31-84	COATINGS - BUILDING MILLAGE NOT ALLOWED BY MANUFACTURER	(CLOSED, REF. CD06-85/24)	1400
INPO		PS.16b		1982	WILLIAMS QA PROGRAM INADEQUATE		1469
INPO		QP.3-1		1984	CHECKLIST FOR INSPECTORS		1441
NRC-INS	84-27	84-27-01	UR1	10-01-84	ADEQUACY OF COATINGS CONTRACTOR QC INSPECTOR AND APPLICATION PROCEDURES		1706
SIE		DC.4-06		1982	COATING OF BOLTS		1881
SIE		TN.3-01		1982	COATING ENSPECTOR QUALIFICATION		1939

6.0 PROGRAM VERIFICATION

This section describes the activities undertaken to ascertain whether the design and construction work processes have been adequately controlled to ensure implementation of licensing commitments and whether the results of these work processes conform to project procedures and design requirements.

Section 6.1 describes design program verification; section 6.2 addresses construction program verification.

Resulting findings were subject to categorization as follows:

I - Violation of licensing commitments, project procedures, or engineering requirements with indication of safety concern.

II - Violation of licensing commitments or engineering requirements with no safety concerns.

III - Violation of project procedures with no safety concerns.

Section 6.1 (Table 6.1-8) and section 6.2 (Table 6.2-1) provide a listing of the identified findings and their assigned level of importance.

6.1 DESIGN PROGRAM VERIFICATION

The following sections describe the design program verification, resultant findings, and corrective actions. This verification was performed by the Readiness Review civil design team. The two members of the team have a cumulative professional experience of 35 years in design engineering. Approximately 180 manhours were expended during the actual verification.

The design program verification was directed toward the programmatic aspects of design. The programmatic verification is a systematic review of design documents to determine whether the design control process has functioned effectively and whether licensing commitments were adequately implemented in design documents.

Design program verification took place in two phases. Phase I consisted of verifying licensing commitments in the design and was divided into two parts. In part 1, commitments identified within the scope of this module were reviewed for proper implementation in design basis documents (i.e., criteria), and in part 2, selected commitments were further reviewed for implementation in the detail design documents (i.e., specifications and drawings).

Phase II consisted of a review of design documents for compliance with applicable procedures. Industry standards for quality; e.g., ANSI N45.2 and N45.2.11, were used as reference documents in the review of the design documents.

Section 6.1.1 provides a summary of the verification results, section 6.1.2 provides a description of the verification scope and plan, and section 6.1.3 provides a description of the verification results.

6.1.1 SUMMARY

The design documents for the coating program consisted of field coating specifications and material purchase specifications of Category 1 equipment and components inside the containment. Material purchase specifications included the coating requirements. The design program for coatings does not involve engineering design calculations typical to other design items. The design program verification included review of the design documents listed in Table 6.1-1 during Phase I and Phase II.

During the verification activities, two findings were issued by the design group. In one case, three specifications out of eight reviewed did not include reference to ANSI N101.2 and ANSI N101.4 as committed in the FSAR for the coating requirements and the other involved the field change requests (FCRs) relative to coating, which contained minor irregularities in compliance with the project procedures. Project

investigation, clarification, and corrective action as applicable has satisfactorily resolved both the findings and there is no safety concern.

6.1.2 SCOPE AND PLAN

This section describes the scope of the design verification for Module 13B and the plan implemented during the verification.

6.1.2.1 Scope of the Verification

The objective of the design program verification was to ascertain, by sampling, whether the documents which specify the technical requirements for coatings have been adequately controlled and whether the design documents have properly implementated the licensing commitments in design. The scope of this verification included the design documents described in section 4.1. Following are the documents included in the verification.

- o Design documents
  - Design Criteria.
  - Specifications
  - Drawings.

- o Design change documentation

  - Deviation Reports (DRs).
  - Field Change Request (FCRs).

The sample size and number of documents pertaining to this module is summarized in Table 6.1-1 at the end of this section.

6.1.2.2 Verification Plan

The verification of the licensing commitments in design documents was performed in two phases. In phase I, engineering documents were reviewed to determine whether commitments were included in the design basis documents (design criteria) or other appropriate design documents. In phase II, the detail design documents (i.e., specifications) were reviewed to ascertain whether the design control process was adequately implemented.

During phases I and II, commitments were verified by reviewing engineering documents (criteria, drawings, and specifications) which covered technical requirements as applicable. The design change documents, FCRs and Deviation Reports (DRs), were reviewed for compliance with appropriate procedures and for the technical justification for the change they represented.

6.1.2.2.1 Phase I Verification

During phase I, licensing commitments were selected for review and implementation. The review consisted of two parts. In part 1, documents were reviewed to ascertain whether each commitment was included in the design criteria or other appropriate design document; in part 2, selected commitments were reviewed to ensure that the design commitments were implemented in the second order design documents; namely, specifications. Parts 1 and 2 of the phase I review were accomplished as follows:

6.1.2.2.1.1 Part 1, Commitments in Design Criteria. In part 1 of phase I, commitments identified from the FSAR or other source documents were reviewed (refer to section 3.4 of this module), to ascertain whether the commitments were included in the project criteria or other appropriate design documents. Based upon the identified commitments, an implementation matrix was developed to identify the design document in which the commitment is incorporated (section 3.5). The implementation matrix identifies the criteria revision where the commitment was first implemented and the most recent revision that includes the commitment. In this manner, the commitment matrix provides a cross-reference between design criteria (or other design documents) and commitments. The design criteria sections which address coating requirements are listed in Table 6.1-2.

These steps ensure that commitments were recognized by the design engineering group as a requirement for the detail design or construction, as appropriate.

6.1.2.2.1.2 Part 2, Implementation in Detail Design. In part 2, a sample of commitments was selected for review to ascertain whether they have been correctly implemented in detail design documents. The documents reviewed (Tables 6.1-3 and 6.1-4) included representative samples of specifications.

The commitments subjected to detailed review were selected on the basis of their overall relationship to the detail coating requirements inside the containment. The key commitments relative to coatings pertain to RG 1.54 which specifies the following ANSI documents as being an acceptable basis for meeting Quality Assurance requirements:

- ANSI N 101.4. - Quality Assurance for Protective Coatings applied to Nuclear Facilities.
- ANSI N 101.2 - Protective Coatings for Light Water Reactor Containment Facilities.

These were verified in the material specifications.

As a result of this review, one finding (13B-20) was issued.

6.1.2.2.2 Phase II, Programmatic Verification of Design Control Process

In phase II, a sample of material specifications drawings and design change documents was reviewed to ascertain whether programmatic requirements of design control processes have been met. This ensures technical requirements have been adequately incorporated into the detail design, coordination among entities participating in the detail design was adequate, and changes in the design have been controlled.

Selected specifications (Table 6.1-4) and drawings (Table 6.1-5) implementing coating requirements were reviewed to ensure compliance with the design control program. Checklists identifying the aspects of the design control program being verified were developed. Design change documents listed in Tables 6.1-6 and 6.1-7 were also reviewed to ensure that design requirements were controlled, approved, and appropriately considered for the impact of changes they represented. This review revealed that project specifications and coating-related drawings were controlled in compliance with the project procedures. The review of design change documents revealed minor irregularities in compliance with project procedures but did not represent any safety concern. As a result of this review, one finding was issued.

6.1.3 RESULTS AND DISCUSSION

The results of the phase I and phase II verification are described in this section. Included in the description are the number and type of documents reviewed and a description of the finding.

6.1.3.1 Phase I (Commitment Verification) Results

In the first part of the phase I review, two design criteria sections in the Design Manual and one drawing were reviewed, including previous revisions as applicable. The sections from the Design Manual are DC-1000-C and DC-1000-A which are listed in Table 6.1-2. No findings resulted from this review. Section 3.5 of this module contains the implementation matrix.

During part 2 of phase I, representative commitments were selected for a detailed technical verification in implementing specifications. These commitments were selected based upon their technical significance and the broadness of their application.

In the phase I part 2 verification, one field coating and seven material purchase specifications were reviewed. The material purchase specifications reviewed included selected equipment inside the containment. Tables 6.1-3 and 6.1-4 provide the list of specifications reviewed. The specifications were also selected for programmatic review, discussed in the following section.

One finding (13B-20) resulted from this review.

6.1.3.2 Phase II Design Program Verification Results

During phase II, a programmatic review of design control processes as applied to design documents was performed. This review was performed both for design documents and design change documents associated with the coating specifications.

Documents reviewed included specifications pertaining to equipment inside the containment, coating finish schedule drawings, and design change documents. The emphasis of the review was to verify that the design process has been controlled in accordance with licensing commitments. This was done by ascertaining whether the design process has complied with applicable project procedures and other documents governing design control (e.g., ANSI N45.2.11) and whether appropriate design coordination has been maintained.

6.1.3.2.1 Specifications

Engineering specifications which include coating requirements for vendor equipment and materials located inside the containment and construction specification X1AJ07 were within the scope of this module. These were included in the programmatic review. The specification sections reviewed were written by design engineering to cover both coating application in suppliers' shops and field activities. The review ascertained that the specifications met the programmatic requirements of project procedure PRM C-26. The review concerned approval, review, and incorporation of Construction Specification Change Notices (CSCNs) in design specifications. The review concluded that the specifications which contained coating requirements were being handled satisfactorily according to project procedures.

No findings resulted from this review.

6.1.3.2.2 Drawings

Two drawings which provide a tabulation of the coating finish schedule within the scope of this module were reviewed. One drawing pertains to the containment and equipment building

finish schedule and the other pertains to the diesel generator building finish schedule. These drawings are listed in Table 6.1-5. These drawings were reviewed for conformance to the project procedures and a licensing commitment to coat the diesel generator building floor with epoxy coating. The review indicated that drawings were issued in compliance with project procedures and the licensing commitment was complied with.

No findings resulted from this review.

6.1.3.2.3 Deviation Reports

The DR review for this module began by computer sorting the DR log to list the DRs pertaining to coatings. From this listing of DRs, five related to coatings were selected for review. They were selected because of their Use-As-Is disposition.

The review sample was reviewed for:

- Clear identification of:
  - deviations.
  - deviation source or cause.
  - disposition.
- Incorporation of justification.
- Effect on design documents.
- Required interface review.
- Required approvals.
- Evaluation by QA as a potential recurring problem.

Table 6.1-6 is a listing of the deviation reports reviewed.

The review of five DRs issued during 1983 disclosed that coating DRs did not adequately provide information, including technical justification for the Use-As-Is disposition. Based upon Readiness Review Team (RRT) discussions with engineering personnel and QC personnel, it was determined that the nonconformance was properly resolved. However, a similar condition was noted by the IDR team who had issued a finding (13B 19). As a result no finding was issued by the design program verification team.

6.1.3.2.4 Field Change Requests

After a preliminary computer sort and final manual sorting, it was determined that there were approximately 200 FCRs related to coatings. From this sample, 10 were selected for detailed

review. The final review sample was selected based on the following:

- o The sample covered different time periods.
- o Changes requested were varied so that various provisions of the specifications were represented by the sample.

The review sample is shown on Table 6.1-7. The FCRs were reviewed for attributes such as:

- o If BPC Project Field Engineering (PFE) dispositioned the FCR, was there BPC Home Office Engineering (HOE) concurrence?
- o Was interdiscipline design review required?
- o Was the justification documented?
- o Was the design/specification change issued as required?

It was determined that FCRs related to coating were appropriately dispositioned, and were subjected to appropriate interdiscipline review. However, some minor discrepancies were observed. These are discussed in the following section 6.1.4.

One finding (13B-21) resulted from this review.

6.1.4 FINDINGS, PROJECT RESPONSES, AND TASK FORCE CONCLUSIONS

During the design program verification process described in section 6.1.2, questions were raised which either required clarification and resolution by project personnel or led to the issuance of a finding. The item determined to be a finding was documented and dispositioned using the Readiness Review Finding Form. The finding was categorized as described in section 6.0.

The design program verification relative to coating activity resulted in two findings, 13B-20 and 13B-21, which were designated Level II and Level III, respectively (Table 6.1-8). Finding 13B-20 concerns several purchase specifications for equipment inside the containment which did not specify compliance with ANSI N101.2 and ANSI N101.4 as a requirement for coating as committed to in the FSAR. The second finding (13B-21) concerns FCRs pertaining to coating, which were coordinated with HOE only for information and not for their concurrence, as required by the procedure. Also some general type changes requested by the field were not incorporated into project specification X1AJ07 via construction specification change notice, but the FCRs were used to implement work.

The findings and project responses are presented as follows:

o Finding 13B-20 (Level II)

PSAR section 1.9.54 has committed to quality assurance requirements for protective coatings inside the containment being compatible with ANSI N101.4 (1972) and ANSI N101.2 as required by Regulatory Guide 1.54. The requirements are further described in detail in section 6.1.2 of the FSAR.

Description: Three out of seven material specifications issued for purchases of structures, components, and equipment inside the containment; namely, X4AL01, Containment Building Polar Cranes; X2AG03, Category I Structural Steel; and X3AB03, Electrical Penetrations, did not specify ANSI N101.4 and ANSI N101.2 as standards.

Project Response: Project Specification X3AB03 for penetrations does not specify ANSI N101.2 or ANSI N101.4 because these standards do not apply to the electrodeposited zinc plating system specified for the electrical penetrations terminal boxes. In the industry, plating is not considered a protective coating and has not been tested to ANSI N101.2 criteria. The plating of the penetrations failed while in storage on site. Penetrations were refinished in the site coating facility prior to their installation in accordance with Specification X1AJ07, coating system FN-3, which is a qualified system.

Specifications X4AL01 and X2AG03 do not specifically reference ANSI N101.2 and ANSI N101.4 standards, but the approved vendor's coating procedures do reference and provide objective evidence that the vendor's coating systems conform to licensing commitments. These procedures are identified below.

A. Procedure 9510-AX4AL01-3 requires compliance with ANSI standards N101.2 and N101.4 in paragraph 5, Coating Material Requirements.

B. Procedure 9510-A2AG03-89-1 invokes ANSI N101.4 in paragraph 1.1, Scope, and the coating system described in the procedure is in full compliance with ANSI N101.2.

Other specifications covering coated materials for use inside the containment were examined to determine whether they referenced the required ANSI standards as required by the FSAR.

There are approximately 40 specifications concerning equipment and materials inside the containment. Twenty-four of the 40 were randomly selected. Of the 24

specifications selected, 12 specified the required ANSI standards, 6 were silent on ANSI but the submitted vendor procedures invoked the required ANSI standards, and 5 specifications and the associated vendor procedural commitments furnished by these 5 specifications were excluded from FSAR requirements for non-qualified coating inventories. The rationale for excluding these vendor specifications is addressed in Finding 13B-6 as follows.

> "The listed items which are excluded in RG 1.54 per FSAR paragraph 6.1.2.1.6 do not require specified inspection requirements because they are either not coated, in which case inspection requirements are not needed, or are coated with one of the four unqualified FN systems, in which case the FN system specifies the inspection requirement as either none or at the direction of the field coatings engineer.
>
> "Specification revision 24, paragraph 11.8 lists the site documentation requirements and the coated items which may have unqualified coatings applied. since the finish schedule drawings address items which require coatings and the systems to be used, the items not to be coated need not be addressed in the specification.
>
> "The FSAR, in section 6.1.2, has stated that painted areas of valve operators, miscellaneous parts on the reactor coolant pump drives, and instrumentation are insignificant. It has also stated that certain small production line items are not committed to the requirement of RG 1.54 and, therefore, are not required to be treated as an unqualified coating. Therefore, the unqualified tracking method described in the specification is acceptable and is in accordance with the FSAR commitments."

The remaining specification (X2AH01) did not specify the required ANSI standards. However, this specification, and the impact of not addressing ANSI, is covered under Finding 13B-12 as follows:

> "Specification X2AH01 - This specification formed a part of several purchase orders (POs) to furnish a variety of miscellaneous steel shapes.
>
> The first purchase order was to Steel Incorporated to furnish shop-coated fabricated steel. The specification did not require that coatings be done in accordance with the coating manufacturer's requirements, nor were any coatings procedures found to substantiate that the coatings manufacturer's requirements were invoked. However, the PO issued June 2, 1980 was for furnishing cable tray support material, which is required by X2AH01 to be

galvanized. The fact that only galvanized material was used was substantiated by review of the PO PSQ 221 A, dated September 30, 1980, October 3, 1980, and October 23, 1980, which inspected and released only galvanized material. Therefore, painting procedures would not have been applicable to this purchase order.

"We have reviewed 33 purchase orders written against specification X2AH01 and found that 25 required the material purchased to be galvanized. The remaining eight purchased bulk steel, steel sheets, nuts, bolts, washers, and Nelson studs and had no coating requirements and therefore do not require the commitment that coatings be applied in accordance with the coating manufacturer's standards.

"In order to preclude any problem with coatings since additional POs may be issued under X2AH01, we will revise coating requirements by January 30, 1986.

"Specification X2AH01 does not specifically reference ANSI N101.4, but the documentation required by section 16, Quality Assurance Program, complies with ANSI N101.4 requirements.

"We have reviewed an additional 24 specifications for equipment located inside the containment and have found that all but 5 met ANSI N101.2 and ANSI N101.4 standards, either within the specification or in the approved vendor submittals (as discussed earlier).

"The equipment purchased under the five specifications not meeting ANSI standards is classified under paragraph 6.1.2.1.C of the FSAR which takes exception to RG 1.54 for small production line items. These specifications are as follows:

X4AL05	Miscellaneous Hoists
X3AN08	Lighting Panelboards
X4AF18	Miscellaneous Horizontal Centrifugal Pumps
X5AA05	Containment Hydrogen Monitoring Equipment
X5AB01	Miscellaneous Control Panels

Specification X2AH01 is to be revised by January 30, 1986, to correct the deficiencies identified."

Therefore, as a result of the specification review, there is no broadness issue involved.

Readiness Review Conclusion: The project response is acceptable. The investigative action has revealed that in several specifications, although ANSI N101.2 and ANSI N101.4 were not specified, the approved vendor procedures

had included and complied with ANSI N101.2 and N101.4 requirements. Five cases involved small production line items for which unqualified coating are technically acceptable, as described in the FSAR. Project has committed to revise the affected specifications to include ANSI N101.2 and N101.4 requirements, as applicable, to the extent committed in the FSAR. Based upon the clarification and corrective action taken by the Project, and based upon the detailed assessment of unqualified coatings inside the containment performed in response to Audit Finding Report 442 (June 23, 1983) and Deviation Report CD-4825 (October 21, 1983), the Readiness Review Team considers the issue adequately addressed. The Readiness Review Team has assigned Level II to Finding 13B-20 because it involved an FSAR commitment. There is no safety concern.

o Finding 12B-21 Level III

A review of 10 FCRs issued against the specification for field coatings (X1AJ07) revealed the following:

A. FCRs issued against the home office controlled specification are approved in the field and forwarded to the HOE for information only. Example: C-FCRB-14,969.

B. FCRs approved to make general type changes to specification X1AJ07 without the issuance of a CSCN. Examples: C-FCRB-14,969, C-FCRB-14,433, C-FCRB-13,934 and C-FCRB-13,989.

C. FCRs approved to provide an alternate surface preparation method (general) without a specification change. The specification was later revised to provide a different method. The FCR that was issued without making a specification change is still active and may not be valid. Reference: C-FCRB-14,683 (FN-3), (FN-12), X1AJ07, Revision 22 and 20.

D. FCR approved to change a Westinghouse requirement for touch-up coating without any evidence (noted on the FCR or produced during the review) of Westinghouse being notified. Reference C-FCRB-14,969.

Project Response: Item A: All coating FCRs have had home office concurrence by telephone prior to PFE signout. Box "yes" (Home Office Concurrence Required) of line 16a of FCR (Form 701095F) should have been checked, instead of box "no" (Forwarded to Home Office Information Only). This was done for C-FCRB-14,969. Based on our review of several coating FCRs, this was the only FCR on which Home Office concurrence was required but was not so indicated

on the FCR form. We therefore consider this an isolated event.

Item B: Two of the four FCRs referenced, C-FCRB 12,934 and 13,989 were classified CSCN NA in Block 6 of the FCR form, indicating that in the judgement of the dispositioning engineer, the change was isolated in nature and therefore did not require a specification change. The rationale for these dispositions is as follows:

1. FCR C-FCRB-13,934 was written to touchup small minor items such as "holidays" on the top and end of welds that connect unistrut to the containment liner plate. Small work such as this is dispositioned as NA/NA.

2. FCR C-FCRB-13,989 was written to address small particles of epoxy coating that could not be removed by power tool cleaning from tiny crevices in the weld bead.

3. With respect to FCR C-FCRB 14,969 and 14,433 we concur that these FCRs should not have been NA/NA. FCR C-FCRB-14,969 was a generic repetitive change allowing substitution of materials. FCR C-FCRB-14,433 was a design change providing an option for hand tool cleaning or power tool cleaning. In response to Finding 13B-6, all issued FCRs, including FCR-14,433, were reviewed and incorporated into the specification revision. As stated in the response to Finding 13B-6,

   "Specification revision 24 has been completed which included incorporation of the following:

   - o Readiness Review deficiency findings.
   - o FCRs.
   - o Correspondence issued to clarify application action items.
   - o FSAR commitments.
   - o Procedures for unqualified coatings.
   - o Reorganization of requirements for N, C, and D area coatings.
   - o Specification changes which affected existing hardware.

   "In addition, a review was performed to evaluate the effect of each specification change made. This evaluation verified that the changes did not affect the acceptability of the existing coatings applied."

Item C: FCR C-FCRB-683, was not intended to be a generic or general revision to the specification but was limited to a specific area of the Unit 2 containment and to specific items - embeds and unistrut.

Item D: C-FCRB-14,969 was written against a Westinghouse coating. Specification X1AJ07, paragraph 1.2 specifically excludes touch-up and repair of Westinghouse coatings. The Westinghouse field engineer signed and concurred with the FCR, as permitted by PRM part C, section 17.8.

Readiness Review Conclusion: The project response is acceptable. Project has revised specification X1AJ07 to incorporate generic changes requested in the FCRs. Other cases of procedural violations identified in the finding do not represent a trend and are judged to be isolated instances. The project clarification is adequate. There is no safety concern.

6.1.5 FINDING SIGNIFICANCE

Finding 13B-20 (Level II), pertaining to specifications for equipment and materials inside the containment, involved violations of FSAR commitments as well as failure to include governing technical requirements for coating in the specifications. The project has reviewed approximately 24 out of 40 specifications covering equipment and materials inside the containment. All but five met ANSI N101.2 and N101.4 standards, either within the specifications or in the approved vendor submittals. The five were excepted in the FSAR from compliance with the commitment. This finding was categorized as Level II because of violation of the commitment. Based upon review conducted by the project and their response, it is concluded that there is no safety concern.

Finding 13B-21 (Level III) is nontechnical in nature and involved minor violation of design change control procedures of the project. The project has reviewed FCRs for overall implication. This corrective action will prevent recurrence. There is no safety significance associated with this finding.

Collectively, these findings do not represent a safety concern nor did they require any repair or rework of the completed work.

TABLE 6.1-1

SUMMARY OF DOCUMENTS REVIEWED

Document Type	Number Reviewed	Total Number[a]
Design Documents		
Criteria	2	2
Drawings	2	2
Specifications		
Procurement	7	40
Construction	1	1
Design Change Document		
Field Change Request	10	< 200
Deviation Reports	5	Not Established

a. Total number are for documents relative to this module.

TABLE 6.1-2

DESIGN MANUAL REVIEW PHASE I, PART 1

Section	Description
DC-1000-C (Appendix E)	General Design Criteria (Civil/Structural)
DC-1000-A	General Design Criteria (Architectural)

TABLE 6.1-3

COMMITMENT VERIFICATION MATRIX PHASE 1, PART 2 (SHEET 1 OF 2)

Subject Description	FSAR Section	Commitment	Design Criteria Section	Design Document Type	Number	Comment
RG 1.54 Rev. 0 6/73 [ANSI N101.4 (1972)]	1.9.54 1.9.54	1603 1604	DC-1000-C Rev. 3 9/30/83 Appendix E DC-1000-A Rev. 0 6/19/79 Section 10 (See Comment)	Spec.	X1AJ07	DC-1000-A mentions compliance with governing NRC guide, but does not spell out RG 1.54. The requirements of RG 1.54, namely ANSI N101.4 (1972), have been specified.
ANSI N101.2 (ANSI N101.4, 1972)	6.1.2.1	1317	(See above)	Spec Rev. 22	X1AJ07 5/10/85	Complies
				Spec. Rev. 5	X2AG03 8/26/83	Finding 13B-20
				Spec. Rev. 8	X2AG06 2/1/85	Complies
				Spec. Rev. 2	X4AL01 12/16/83	Finding 13B-20
				Spec. Rev. 7	X4AJ16 7/26/84	Complies
				Spec. Rev. 11	X4AR01 2/3/84	Complies

TABLE 6.1-3 (SHEET 2 OF 2)

Subject Description	FSAR Section	Commitment	Design Criteria Section	Design Document Type	Number	Comment
ANSI N101.2	6.1.2.1	1317	(See above) Sheet 1 of 1	Spec. Rev. 6	X3AB03 6/15/84	Finding 13B-20
				Spec. Rev. 3	X2AG07 10/18/84	Complies

TABLE 6.1-4

SPECIFICATION WHICH INCLUDE FIELD AND SHOP COATINGS
INSIDE CONTAINMENT

Number	Title/Description	Reviewed for Phase I	Reviewed for Phase II	Associated Finding
X2AG03	Category I Structural Steel	X	X	13B-20
X2AG06	Containment Liner Plate System	*	X	
X4AL01	Containment Building Polar Bridge Cranes	X	X	13B-20
X4AJ16	Containment Cooling Units	X	X	
X4AR01	Nuclear Service Valves	X	X	
X3AB03	Specifications for Penetrations	X	X	13B-20
X2AG07	Furnishing Containment Personnel Lock. Escape Lock and Equipment Hatch	X	X	
X1AAJ07	Field Coatings	X	X	

*. Does not require shop coating.

TABLE 6.1-5

DRAWINGS, COATING AND FINISH SCHEDULE DRAWINGS

Number	Title/Description	Reviewed for Phase I	Reviewed for Phase II	Associated Finding
1X1D01A12-1	Containment Building and Equipment Building Finish Schedule		X	None
1X1D07A05	Diesel Generator Building Finish and Door Schedule Detail	X	X	None

TABLE 6.1-6

DEVIATION REPORTS REVIEWED (a)(b)

DR Number:

CD-2492

CD-3214

CD-3687

CD-4825

WC-84-085

a. Reviewed programmatically.
b. No findings was issued by Programmatic Verification Team.

TABLE 6.1-7

FIELD CHANGE REQUESTS REVIEWED (a)

Number	Title/Description
C-FCRB-14969	Provide compatible coating for field touch-up to Westinghouse equipment.
C-FCRB-14485	Deletion of temperature/pressure curve in specification.
C-FCRB-14683	Previously blasted surfaces to be cleaned by power tool.
C-FCRB-14433	Option to use power tool cleaning.
C-FCRB-14404	Include touch-up requirement for Westinghouse and GE equipment.
C-FCRB-13,989	Allow adhering Amercoat 90 to remain for anchor profile and weld crevice.
C-FCRB-13,934	Allow coating of specific items with Carbo Zinc II.
C-FCRB-13,764	Allow alternate surface preparation for FN-34 and W-27 coating system.
C-FCRB-14,317	Coating on piping receiving insulation.
C-FCRB-14,576	Add FN-6 system and clarify first and second coats in coating system FN-36 and FC-36.

Finding 13B-21 was issued as a result of programmatic review which involved minor violations of project procedures.

a. Programmatic review.

TABLE 6.1-8

READINESS REVIEW FINDING SUMMARY (SHEET 1 OF 2)

Finding Number	Finding	Level	Resolution/ Project Response	Conclusion/Assessment	Finding Category*
13B-20	Several specifications concerning equipment and materials used inside the containment did not specify ANSI N101.2 and N101.4 as governing documents in compliance with RG 1.54 as committed in the FSAR.	II	24 specifications out of 40 reviewed by Project revealed that 12 had specified ANSI; 6 were silent on ANSI but engineering approved vendor procedures had invoked ANSI; 5 did not reference ANSI but the applicable coatings had been properly inventoried as nonqualified; and 1 had been used for glavanized and bulk materials which did not require coatings. Project investigation has concluded overall compliance with the licensing commitment	Project evaluations have resolved concern associated with the finding by their investigation. Their response is adequate. There is no safety concern.	B
13B-21	Minor irregularity in compliance with the project procedures governing Field Change Requests (FCRs) approved by engineering. Two FCRs did not receive	III	Project investigation of other FCRs revealed that lack of concurrence by HOE was isolated event; the project has revised specification to incorporate general type changes.	Project response is acceptable. There is no safety concern.	D

TABLE 6.1-8 (SHEET 2 OF 2)

Finding Number	Finding	Level	Resolution/ Project Response	Conclusion/Assessment	Finding Category*
	HOE approval and concurrence and several general type changes requested by the field were approved without follow-up construction specification change requests (CSCN) as required by the project procedures.		The assessment by Project indicated that there was no impact as the result of the revision incorporated on coating work completed earlier.		

*Category: (A) Design Criteria; (B) Design and Construction Specifications; (C) Design Drawings; (D) (D) Design Interface Control

6.2 CONSTRUCTION

This section contains a description of the construction assessment program which was intended to evaluate the adequacy of the application of field coatings. The assessment was divided into two parts: Commitment implementation and construction assessment. The commitment implementation identified nine construction-related licensing commitments and traced implementation as recorded in section 3 of this module. The construction assessment consisted of a technical review of the construction records and a walkdown inspection of coated hardware within the scope of Module 13B. This review assessed 24 items of hardware and approximately 411 quality assurance (QA) records.

The Readiness Review Team for Module 13B consisted of three team members with a combined total experience of 51 manyears. These team members devoted approximately 200 manhours to the investigation and resolution of the implementation process and 950 manhours to the investigation and resolution of the assessment process.

6.2.1 SUMMARY EVALUATION

Nine findings were identified during the assessment of construction activities in Module 13B. The construction team assessed the impact of the findings on the project and classified each with respect to the following categories:

- Category A - Paperwork.
- Category B - Hardware.
- Category C - Programmatic.

The findings, their level of importance, and their categories are given in Table 6.2-1. Of the nine findings, one was identified during commitment implementation and eight were identified during construction assessment.

An analysis of the findings shows that the coating specification did not meet FSAR commitments to administrative and documentation requirements, Williams procedures did not incorporate specified documentation requirements, and changes to application procedures, approved by appropriate authorities and implemented in the field, had not been properly incorporated into Williams procedures and the specification.

Finding 13B-6 identified areas in which the specification does not comply with FSAR commitments. The discrepancies noted were in documentation distribution, material certification, and identification of governing criteria and quality assurance requirements for unqualified coatings. The requirements for

documentation distribution and material certification, though not contained in the specification, were acceptably addressed by either a site procedure, receipt documentation, or inspection documentation. Specification X1AJ07 was revised to correct these discrepancies. All other FSAR commitments were adequately traced to implementing documents from time of initial implementation to current status.

Findings 13B-4, -5, and -7 identify discrepancies between Williams procedures, the specification, and field coating application. The assessment verified that the discrepancies between the Williams procedures and the specification and the discrepancies between Williams procedures and the field application had been previously approved by the appropriate authority. However, the appropriate change notice had not been generated to reflect the approved change in the specification and procedure. Therefore, it is concluded that the hardware had been coated in accordance with approved Bechtel and manufacturer requirements even though the specification and procedures do not reflect this. Revision of the Williams procedures and specification X1AJ07 has addressed these discrepancies.

The remaining findings (13B-1, -2, -3, -10, and -22) identified discrepancies in quality assurance documentation. The discrepancies noted included errors in inspection documentation, inspector acceptance errors, and deviation report dispositions not in accordance with procedures. None of the findings called into question the integrity of the applied coatings because they resulted from procedural acceptance criteria more stringent than those required by the coating specification, represented a small percentage of the total square footage of the entire coating system addressed, or were caused by a lack of clarity in the procedures and the specification. The specification and Williams procedures have been revised to clarify requirements.

It is the conclusion of the Readiness Review construction team that the application and inspection for the coating systems installed for VEGP meet the technical requirements of the specification, Williams procedures, manufacturer, and FSAR.

6.2.2 COMMITMENT IMPLEMENTATION

Section 3.4 contains the commitment matrix for the commitments identified by the FSAR that are applicable to Module 13B. After identification of the commitments, the Readiness Review construction team reviewed each construction commitment and identified the project document and revision that currently implements the commitment. Additionally, a review was performed to identify the project document and revision that initially implemented the commitment. Eight construction commitments were identified and reviewed.

Five commitments were traced from initial implementation in design specifications, design drawings, and construction procedures to current status. Three commitments related to implementation of Regulatory Guide 1.54 and ANSI N101.4 were found to be not fully implemented. The findings were deficiencies in specification and procedural requirements. The FSAR commitments to ANSI N101.4 and Regulatory Guide 1.54 were followed in application and inspection activities even though these commitments were not specifically or completely prescribed in the specification and procedures.

One Readiness Review Finding (RRF) initiated as a result of this review is described below:

- Readiness Review Finding 13B-6 (Level II)

  Description: Three of the eight FSAR commitments involved requirements from Regulatory Guide 1.54 and ANSI 101.4. Coatings Specification X1AJ07 does not completely implement FSAR commitments to Regulatory Guide 1.54 and ANSI N101.4. Deficiencies noted were in the areas of documentation distribution, materials certification, identification of governing application criteria, and quality assurance requirements for unqualified coatings.

  Project Response: The following actions were taken to address the specific findings noted.

  1a. The distribution of documentation is outlined in the Williams procedure. The distribution is acceptable. This method of specifying the distribution of documents is acceptable to Project Engineering and meets the intent of ANSI N101.4.

  1b. Specification X1AJ07, revision 24, includes this requirement in section 11.7.2 which states "Alternate documentation forms to those suggested in ANSI N101.4, section 7.4 through 7.8 which provide at least the same degree of documentation as those suggested in ANSI N101.4, section 7.4 through 7.8 can be used."

  2. The statement in specification X1AJ07 which called for application according to manufacturer's recommendations unless noted otherwise has been deleted. The deletion is justified since Williams application procedures are required to be reviewed and approved by the coating manufacturer.

  3. The listed items which are excluded in Regulatory Guide 1.54 as stated in FSAR paragraph 6.1.2.1.6 do not require specified inspection requirements because they are either not coated, in which case

inspection requirements are not needed, or are coated with one of the four unqualified FN systems, in which case the FN system specifies the inspection requirement as either none or at the discretion of the field coatings engineer.

4. Specification revision 24, paragraph 11.8 lists the site documentation requirements and the coated items which may have unqualified coatings applied. Since the finish schedule drawing addresses items which require coatings and the systems to be used, the items not to be coated need not be addressed in the specification.

   Section 6.1.2 of the FSAR has stated that painted areas of valve operators, miscellaneous parts on the reactor coolant pump drives and instrumentation are insignificant. It has also stated that certain small production line items are not committed to the requirement of Regulatory Guide 1.54 and, therefore, are not required to be treated as an unqualified coating. Therefore, the method of tracking unqualified coatings described in the specification is acceptable and is in accordance with the FSAR commitments.

Specification revision 24 has been completed which included incorporation of the following:

- o Readiness Review deficiency findings.
- o Field Change Requests (FCRs).
- o Correspondence issued to clarify application action items.
- o FSAR commitments.
- o Procedures for unqualified coatings.
- o Reorganization of requirements for N, C, and D area coatings.
- o Specification changes which affected existing hardware.

In addition, a review was performed to evaluate the effect of each specification change made. This evaluation verified that the changes did not affect the acceptability of the existing coatings.

Readiness Review Conclusion: The Readiness Review Team concurs with the project response. The FSAR commitments to ANSI N101.4 and Regulatory Guide 1.54 administrative

and documentation requirements were followed in application and inspection activities even though these commitments were not specifically or completely prescribed in the specification and procedures.

6.2.3 CONSTRUCTION ASSESSMENT

The assessment plan was developed to provide an appraisal of documentation associated with the receipt, storage, issuance, and application of coating materials; and to provide a visual walkdown of the coating system as applied. Development of the plan consisted of the selection of items and activities for assessment, determination of a sampling method for each item or activity, and preparation of detailed checklists for assessment (Figure 6.2-1 through Figure 6.2-10).

6.2.3.1 Assessment Item Selection

The assessment items selected included coated items and programmatic activities supporting and controlling the coating program. Areas chosen to provide an evaluation of coatings subject to FSAR commitments included a Unit 1 diesel fuel oil storage tank and a representative sample of "N" area (inside containment) coatings. In addition, historical information such as audit reports, Nuclear Regulatory Commission (NRC) inspection reports, Institute of Nuclear Power Operation (INPO) evaluations, and NRC Construction Appraisal Team reports from VEGP was reviewed to identify generic or significant problem areas that would warrant assessment. Construction programmatic requirements associated with offsite coating of structural steel are excluded from the construction team assessment.

Coated commodity items, such as hangers or liner plate, were sampled for assessment during a preliminary walkdown of the Unit 1 containment. Coated equipment items were selected from design documents. Documentation and walkdown samples for the selected equipment items were chosen at random. Programmatic documentation directly associated with the activities and materials involved in coating the selected items was sampled at random for assessment. Where the programmatic documentation had no direct relationship to the coating of specific items, or where the documentation directly associated with the selected items would not yield a sufficient sample, the application date for the selected items was used as a target for sampling.

Coated items and programmatic activities selected for assessment are as follows:

- Coated Structural Steel Commodity Items (Total of 16):
  - Structural steel and miscellaneous beams.

- Pipe hangers.
- Liner plate.
- Concrete embeds.
- Unistrut on embeds.
- Unistrut on liner plates.

o Coated Concrete Commodity Items (Total of 4):

- Walls.
- Ceiling.

o Coated Equipment Items (Total of 4):

- Polar crane.
- Accumulator tank.
- Lube oil drain tank.
- Emergency diesel fuel oil storage tank (outside Unit 1 containment).

o Programmatic Activities.

- Material receipt.
- Material storage and issue.
- Control of unqualified coatings.
- Painter certification.
- Inspection certification.
- Measuring and test equipment.
- Deviation reports.

6.2.3.2 Assessment of Coated Items

The coatings on selected items were assessed by a review of the applicable documentation and a visual walkdown examination of the coated component for compliance with specification, code, and procedure requirements.

6.2.3.2.1 Application Documentation

Application documentation in the Williams quality control (QC) files was reviewed following a detailed checklist (Figure 6.2-5). Daily Inspection Reports, Hold Point Inspection Reports, and Coating Inspection Reports were reviewed to ensure that environmental conditions were recorded, that the application surface was inspected before and after preparation, that the compressed air supplies were verified to be clean, that the mixing of coating materials was witnessed and that the coating application was inspected and accepted. Recorded data was checked against the application procedure for the coating system used to ensure that the specified criteria were complied with.

Thirty-three Surface Preparation Inspection Reports were reviewed. Thirty-one were found to be correct; two showed no record of required surface profile inspection. This deficiency was documented by RRF 13B-2. In five cases, surfaces were prepared by hand tool cleaning when the procedure called for power tool cleaning. Since the surface achieved by hand tool cleaning met the requirements of the applicable procedure and the specification, no finding was issued.

Of the 33 records for thinning and coating materials, 31 showed the material was used without thinning or was thinned in accordance with the applicable procedure. In one case a thinning procedure not approved for "N" area coatings was used, and in another, the wrong thinner for the temperature range was used. Two findings (13B-4 and 13B-5) were issued to document these deficiencies.

In all, 537 individual entries on the inspection reports were reviewed. Six were incomplete or contained errors that could be resolved by reference to other entries on QC documents. One finding (13B-3) was written to document these errors for correction.

The findings resulting from the application documentation assessment are as follows:

- Readiness Review Finding 13B-2 (Level III)

  Description: In two cases out of 33, surface preparation inspection reports do not document inspection of required substrate surface profile comparable to standard GPC-SP15 when the surface is not prepared by sandblasting.

  Project Response: The profile for surfaces prepared by the alternate power tool procedure, such as the two cited, has always been inspected and accepted by comparison to standard GPC-SP15 by Williams QC. A single visual inspection of the surface is made,

verifying both "bright metal" cleanness and surface profile. In the past, this single inspection of two attributes was documented by a single entry annotating the surface acceptance block, indicating acceptance of the surface and annotating the surface profile as "N/A."

This practice contrasts with that followed for blasted surfaces. For blasted surfaces a visual inspection for cleanness by comparison to Steel Structures Painting Council (SSPC) standards is followed by a separate measurement of surface profile. This visual inspection is documented by annotating the surface acceptance block and entering the measured value in the surface profile block.

The practice of marking the surface profile entry "N/A" for GPC-SP15 inspections was questioned in May 1985 during Georgia Power Company (GPC) QC review of coating documentation. Williams agreed that separate documentation of surface profile acceptance would be a better practice and so directed their QC inspectors.

The change was to documentation practice only, with no change in inspection or acceptance criteria. No substandard surfaces were accepted or coated as a consequence of the earlier inspection practice.

Readiness Review Conclusion: Readiness Review concurs with the project response. Williams QC has reviewed a sampling of 12 reports documenting inspection of surface profile to GPC-SP15. This review shows current practice as stated in the response. Williams QC procedures, in effect prior to May 1985, show quantitative examples for the surface profile entries, supporting their statements of past practice.

o Readiness Review Finding 13B-3 (Level III)

Description: In 6 cases out of approximately 537, entries on application inspection reports are incomplete or erroneous. This RRF also documents three additional instances of similar problems with Deviation Reports and the Unqualified Coatings Log.

Project Response: The incomplete or erroneous entries identified have been corrected. None indicated a deficiency in the coating applied. The errors found represent a small portion of the entries assessed and are, therefore, isolated. No further investigative action is indicated.

Readiness Review Conclusion: The errors cited in this finding are minor oversights or recording errors; e.g., referenced attachment document missing, wrong

manufacturer's product number recorded which identified the wrong coating color, numbers in batch identifier transposed. The correct information is obvious by reference to other QC document entries. Accordingly, Readiness Review concurs with the project response.

- Readiness Review Findings 13B-4 and 13B-5 (Level II)

  Description: In 2 cases out of 33 reviewed, the coating materials were improperly thinned.

  - Thinner for Keeler and Long D-1 epoxy was used outside the approved temperature range (13B-4).

  - A 50-percent cutback of Keeler and Long Sealer 4129 is not approved for use in the containment, but was used on the secondary shield wall (13B-5).

  Project Response: Approval for the use of these thinning techniques was received from the appropriate authorities and documented in correspondence, but the application procedures were not revised to allow the 50 percent cutback thinning. Applications in violation are documented in Deviation Reports WC-85-247 and WC-85-248, written August 2, 1985, and dispositioned Use-As-Is.

  Letter files, procedures, and specification revisions have been reviewed to identify any similar implementation of changes before application procedures are revised. During the review, two additional instances were found where alternate procedures were informally approved, but these alternates were never used. In addition, an instance was found where an alternate thinning procedure was used once followed by informal approval. This instance has been documented by Deviation Report WC-85-251, written September 4, 1985, and dispositioned Use-As-Is.

  The application procedures and specification X1AJ07 have been revised.

  Readiness Review Conclusion: Readiness Review concurs with the project response. The construction team has sampled the files reviewed and found the review was comprehensive.

6.2.3.2.2 Walkdown

The coatings on the selected items were visually examined for the attributes as listed on the walkdown checklist (Figure 6.2-9). Acceptance criteria were obtained from specification X1AJ07 and the appropriate Williams procedures. Dry film thickness was measured for coatings on steel substrates

following the procedures of Standard SSPC-PA2-73T, Measurement of Dry Paint Thickness with Magnetic Gauges.

Readiness Review Team members conducting the walkdown had experience in supervision, inspection or application of coatings, and were familiar with the use of magnetic gauges for the measurement of dry film thickness.

Coatings on 22 items were examined, representing a total of 158 inspection attributes. The polar crane and the diesel fuel oil storage tank were not included in the walkdown since a Deviation Report exists for rework of their respective coatings. Twelve attribute discrepancies were noted and documented on Readiness Review Finding 13B-10.

None of the discrepancies noted were considered to call into question the integrity of the applied coating due to the small percentage of the total square footage containing discrepancies and due to the procedural acceptance criteria being more stringent than the specification requirement.

The finding resulting from the walkdown assessment is described as follows:

- Readiness Review Finding 13B-10 (Level III)

  Description: In 12 instances coatings examined failed to meet acceptance criteria as detailed below.

  - Overspray on stainless steel pipe (2 cases).
  - Contaminants (lint and dirt) contained within coatings (3 cases).
  - Pinholes in concrete coating (1 case).
  - Run or drip in intermediate coat was top coated (1 case).
  - Excessive dry film thickness (2 cases).
  - Sag in coatings (1 case).
  - Overspray coated over (1 case).
  - Insufficient dry film thickness (1 case).

  Project Response: The sags, runs, and lint contaminants cited are considered to be within acceptance criteria. ANSI N101.4 and communications from design engineering support this position, although Williams QC procedure WC-010, Acceptance of Coatings, does not. Williams has

revised its procedure to clarify acceptance criteria for runs and sags.

Deviation Report WC-85-246 was initiated July 18, 1985, to document the remaining findings and was dispositioned Use-As-Is for the high millage findings; Repair or Rework for the pinholes, dirt, overspray, and sag.

Additional investigation was conducted by Williams QC as follows:

- Six areas of concrete coating were reinspected for pinholes. None were found.

- Fifty field-coated embeds were reinspected for containments. Two were found to have containments and were documented on Deviation Report WC-85-262, written October 2, 1985, and dispositioned Rework.

- One thousand square feet of liner plate was reinspected for runs and sags. None were found.

Readiness Review Conclusion: Readiness Review concurs with the project response. The out-of-specification dry film thicknesses were located in areas of touchup and repair. Small areas of discrepant film thickness can easily occur at or adjacent to overlaps in repairs and do not reflect overall deficiencies in application. The dirt contaminants reported were in embed coatings and represented less than 4 percent of the area of embed coatings assessed and investigated. The remaining deficiencies noted were in less than 1 percent of the areas assessed and investigated.

6.2.3.3 Programmatic Activities

Required programmatic activities associated with coatings were assessed by a review of the documentation required by the applicable procedure or by applicable sections of the coatings specification, X1AJ07. The specific programs reviewed, the method of assessment used, and the results are contained in the following paragraphs.

6.2.3.3.1 Material Receipt

One material product used in each of the selected coating samples was traced by batch number to the purchase order and receiving records in the GPC Document Review vault. Each receiving document package was assessed following a Materials Checklist (Figure 6.2-3).

In addition, for equipment items selected, the quality records were assessed following a Vendor Applied Coatings Checklist (Figure 6.2-10) to assure that coatings applied off site were applied as required by the applicable specifications.

The batch materials used on 23 coating samples were successfully traced to a receiving document package with a correct Receiving Inspection Report.

Specification X1AJ07 requires a Product Identity Certification for each batch of material shipped and also a certification that each type of material supplied met the temperature/pressure curve for VEGP. Forty-four manufacturer's Product Identity Certifications were assessed with no discrepancies found. None of the receiving records assessed included certification that the material supplied met the temperature/pressure curve for VEGP. Specification language indicates the coating materials are specified to have been prequalified. This is identified by Readiness Review Finding 13B-1.

Quality documentation for four equipment items with vendor-applied coatings was reviewed. Two items had been recoated in the field, one had unqualified coatings which had been quantified and accepted; one had acceptable documentation. The Readiness Review Team found that all four items had had documentation or quality problems which were properly documented with Audit Finding Reports or Deviation Reports. No findings were issued as a result of the assessment of vendor-applied coatings.

The Readiness Review Finding as a result of the material documentation assessment is described as follows:

- Readiness Review Finding 13B-1 (Level II)

  Description: No certification that the material supplied had been tested to the Vogtle Nuclear Plant Temperature/Pressure Curve was found in any of the receipt document packages sampled.

  Project Response: Engineering has reviewed and accepted the ANSI N101.2 DBA curve as encompassing the VEGP temperature/pressure curve. Specification X1AJ07 has been revised to require certification of the material to meet the intent of ANSI N101.2.

  Readiness Review Conclusion: Readiness Review concurs with the response. All products assessed were certified to ANSI N101.2 on one or more Product Identity Certifications.

6.2.3.3.2 Material Storage and Issue

The Williams warehouse records were assessed to ensure that coatings material was properly controlled in accordance with the Williams receipt, storage and issue procedures; specification X1AJ07; and ANSI N101.4. Coatings batch numbers for the selected samples were obtained from the application inspection reports and the warehouse stock inventory records for these batch numbers were assessed for compliance using the Williams Report and Issue Checklist (Figure 6.2-4).

Inventory records for the 22 coated items selected in the containment were successfully retrieved. All were found to be correct and complete with the data required in accordance with specification X1AJ07 and ANSI N101.4.

Williams QC records of storage warehouse temperatures were assessed to ensure that temperatures were properly recorded and met specification X1AJ07 requirements for maximum and minimum range. Records were checked for the date the material was issued for use on the selected sample.

Twenty-one temperature records for coatings material used inside containment were reviewed. All were found to be correctly recorded and within the specified temperature range.

There were no Readiness Review Findings as a result of the assessment of Williams receipt, storage, and issue of coatings materials.

6.2.3.3.3 Control of Unqualified Coatings

The maintenance of unqualified coatings quantities as required by specification X1AJ07 and Williams procedure WC-014 was assessed by a review of Williams QC records of unqualified coatings. Samples were selected using target dates and the documents were reviewed following the Unqualified Coatings Checklist (Figure 6.2-6).

Twenty-two records of unqualified coatings were reviewed. One logging error (transposed dates) was found. This item was documented as part of Readiness Review Finding 13B-3 which documented similar errors in application documentation and is reported in section 6.2.3.2.

There were no other Readiness Review Findings as a result of the assessment of unqualified coatings.

6.2.3.3.4 Painter Certification

The certification of the painter applying coatings to the selected samples was assessed or, where painters performing the

work were not required to be identified, the certification of a painter logged as certified on the application date was assessed. The assessment was performed following the painter certification checklist (Figure 6.2-7). Twenty-three certifications were reviewed and found to be correct.

6.2.3.3.5 Inspector Certification

One inspector performing an inspection function associated with each selected item was chosen for assessment. The assessment was performed using the inspector certification checklist (Figure 6.2-7). Twenty-three certifications were reviewed to ensure the inspector was properly certified to perform the inspection at the time performed. All records reviewed were found to be correct.

6.2.3.3.6 Measuring and Test Equipment (M&TE)

One item of Measuring and Test Equipment (M&TE) used for application inspection of each selected item was chosen for assessment. The assessment was performed following the M&TE checklist (Figure 6.2-7). Records for 23 items of M&TE were assessed. The assessment found the equipment was properly calibrated, and controlled.

6.2.3.3.7 Deviation Reports

Forty-eight Deviation Reports were selected for assessment from the Williams Deviation Report Log. The assessment was performed following the Deviation Report checklist (Figure 6.2-8). The reports were reviewed for compliance with Williams QC procedure WC-008. Two minor errors in documentation (one incorrect procedure reference, one attachment missing) were noted and reported on Readiness Review Finding 13B-3 together with similar problems in application documentation. This finding was described in section 6.2.3.2. The Independent Design Review Group (IDR) identified four Deviation Reports within the scope of the construction assessment with discrepancies similar to those reported as Readiness Review Finding 13B-19 (section 7). The Readiness Review construction team reported these Deviation Reports as Readiness Review Finding 13B-22 (Revision 1). All four Deviation Reports were cases of lost, broken, or out-of-calibration measuring and test equipment. Two of the reports cited equipment used to measure ambient conditions. Upon investigation, both of those Deviation Reports were shown to have been acceptably handled, leaving two reports to be addressed in Readiness Review Finding 13B-22.

- Readiness Review Finding 13B-22 Revision 1 (Level III)

  Description: In two instances Deviation Reports reviewed failed to meet the requirements of site procedure GD-T-01 as detailed below:

  - CD-3378. The disposition of Obtain Valid Documentation is not applicable. The dry-film gauge in question was not used by QC to verify acceptance but was used by production personnel.

  - CD-3423. The justification for the Hardware Not Affected disposition does not support the disposition. Justification supports out of specification coating which requires Engineering disposition.

  Project Response: The two DRs cited have been rejustified or redispositioned: CD-3378 to show that the gauge was not used for acceptance, CD-3423 to require reinspection of the applicable coating. Reinspection showed the coating acceptable. A review of the handling of DRs reporting indeterminate dry-film thickness due to out-of-calibration, lost, or broken M&TE showed that disposition and justification for such DRs initiated prior to June 30, 1983, was not always correctly handled.

  All such DRs issued prior to June 30, 1983 have been reviewed. Twenty-eight were reviewed and five required revised disposition or justification.

  Readiness Review Conclusion: Readiness Review concurs with the project response.

6.2.3.3.8 Williams Procedures

In conjunction with the installation and programmatic assessments, the Readiness Review Team reviewed the applicable Williams procedures, coating specification X1AJ07, and specified requirements of ANSI N101.4. Seven instances were found where Williams procedures did not incorporate requirements. Readiness Review Finding 13B-7 was issued to document those deficiencies.

The Readiness Review Finding resulting from the review of the Williams procedures is as follows:

- Readiness Review Finding 13B-7 (Level II)

  Description: Williams Contracting procedures do not meet all the requirements of coating specification X1AJ07 and ANSI N101.4. Seven deficiencies were noted

in documentation format, documentation requirements, and application procedures.

Project Response: Of the seven items cited, one has been corrected by revision of the Williams application procedures, one by revision of the Williams warehouse procedure, one by revision of the Williams QA Manual, and four by revision of specification X1AJ07.

Readiness Review Conclusion: Readiness Review concurs with the project response. The specification changes clarify the acceptability of Williams application and inspection procedures. The Williams procedure and QA manual changes formally prescribe practices already in effect and assessed. None of these require any change to Williams application or inspection activities nor do they call into question any applied coatings. The review of correspondence files, procedures, and specification revisions performed in response to Findings 13B-4, -5, and -6 also provides assurance that problems similar to those cited in this finding have been identified.

TABLE 6.2-1

CONSTRUCTION FINDINGS

Level of Importance[a]	RRF Number	Category[b]	Description
II	13B-1	C	Certification that material meets the Vogtle temperature/pressure curve not on file.
III	13B-2	A	Inspection reports do not record inspection of surface profile.
III	13B-3	A	Errors in QC documentation.
II	13B-4	C	Procedure not followed in thinning coating materials.
II	13B-5	C	Procedure not followed in thinning coating materials.
II	13B-6	C	Specification does not completely implement commitments.
II	13B-7	C	Contractor's procedures do not meet specification requirements.
III	13B-10	B	Coatings do not meet acceptance criteria.
III	13B-22	A	Procedures not followed in disposition of Deviation Reports.

a. Level I - Violation of licensing commitments, project procedures, or engineering requirements with indication of safety concern.
Level II - Violation of licensing commitments or engineering requirements with no safety concerns.
Level III - Violation of project procedures with no safety concerns.

b. Category A - Paperwork concern
Category B - Hardware concern
Category C - Programmatic concern

Module 13B

Construction Assessment Checklist Instructions

Section II Coatings

Select a minimum of twenty-one field coated items randomly from Unit 1 containment. Select six structural steel items including three pipe or electrical hangers and three structural or miscellaneous steel members. Seven concrete items shall be selected including three coated concrete walls, one coated concrete floor and three embeds. Select four containment liner plate items and four equipment items. For equipment items include one emergency diesel fuel oil storage tank (outside Unit 1 containment) and three items from different vendors inside Unit 1 containment, including one accumulator tank. Each item shall be assessed for conformance to the applicable procedure for material receipt, application documentation and walkdown. In addition, shop coatings on equipment items shall be assessed for conformance to specification requirements for receipt documentation and by walkdown.

Complete section II.A of the Construction Assessment Checklist to identify the particular item selected. Assign each item an assessment number for traceability. Enter the assessment number, the item description and the Williams file identification number on each sheet of the Construction Assessment Checklist.

Using the Williams application records, determine the coating system used for the selected item. Select one product used and trace the batch number through the Williams warehouse records. Record the product data, batch number and purchase order data in section II.B of the Construction Assessment Checklist.

Review the receiving documentation in the Document Review Vault for the purchase order, purchase order number and purchase order release number identified. Complete section II.B of the Construction Assessment Checklist. Confirm that a Receiving Inspection Report is in the package, is complete and correct. Check that the documents in the package received from the manufacturer include a Manufacturers Product Identity Certificate Record, a certificate that the product meets ANSI 101.2 requirements and the Vogtle temperature/pressure curve, and, for thinner, a certificate that the product contains less than 50 parts per million of chlorides or fluorides.

Check that the batch number on the manufacturer's certificates matches the batch number from the Williams application records. Document any discrepancies with a Readiness Review Finding (RRF) report.

Figure 6.2-1 Checklist Instructions (Sheet 1 of 5)

Review the Williams warehouse records and confirm that the selected product shipment was properly controlled through receipt and issuance. Complete section II.C of the Construction Assessment Checklist. Check that the Williams records include a Coatings Location Stock Notice and Receipt Document package to support entry of the shipment into inventory. Confirm that an Equipment Material Request and a copy of the Material Issue Ticket are in the file to document issue of the product and batch number to coat the selected item. Check that the documents reviewed have been executed in accordance with Williams procedure WW 1-01. Document any discrepancies with a Readiness Review Finding (RRF) report.

Review the Williams' Quality Control records to ensure that the Williams' storage facilities were inspected for temperature in accordance with Williams QC procedures WC-005. Complete section II.D of the Construction Assessment Checklist. Check that the warehouse temperatures were recorded and meet the requirements of the manufacturer and specification X1AJ07, for the date of issuance. If the material was issued before the date of application confirm that a temporary storage facility had been authorized in accordance with Williams procedure WC-005 and that the storage facility temperatures were recorded and acceptable for the date of issuance. If the material was issued on the date of application, mark "NA" in the checklist entries for temporary storage. Check the inspection reports for sign-off and acceptance. Document any discrepancies with a Readiness Review Finding (RRF) report.

For the items selected in section II.A of the Construction Assessment Checklist complete section II.E. Enter the Item/No. and the required coating system no. from Construction Specification X1AJ07. From the Daily Inspection Record (CF-002) enter the Dry Film Thickness (DFT) of the material applied, if the amount entered is not within the limitations for that system a Readiness Review Finding (RRF) report will be initiated. List the material used that is recorded on the Daily Inspection Record, if it is not approved on the coating schedule for the system the team member will initiate a Readiness Review Finding (RRF) report.

Enter the Williams system no. in the space provided under the application environmental conditions (temperature). From the Williams system list the required information for the material, substrate, and ambient temperatures. From the Daily Inspection Record list that recorded and ensure that it is within the allowable range. In addition list the pertinent data for humidity from the Williams system no. and that recorded on the Daily Inspection Record. Any discrepancies will be documented on a Readiness Review Finding (RRF) report.

Under the surface preparation section list the required Williams system no. procedure(s), profile, the white blotter test if applicable, and that data obtained from the Daily Inspection

Figure 6.2-1 Checklist Instructions (Sheet 2 of 5)

Record and Hold Point Inspection Record (CF-017). Any discrepancies will be recorded on a Readiness Review Finding (RRF) report.

The information to be recorded in the coatings application section is obtained from the applicable Williams system no. under the Required column. The mixing as witnessed by QC will be documented on the Hold Point Inspection Record with the actual thinning amount and application method being recorded on the Daily Inspection Record. Any discrepancies will be documented on a Readiness Review Finding (RRF) Report.

In the inspection document section the team member will ensure the applicable report is on file and reviewed for completeness with the correct entries made. Any discrepancies will be documented on a Readiness Review Finding (RRF) Report.

For those areas not applicable on the Construction Assessment Checklist for application the team member will enter N/A in the appropriate space. In addition, it may be necessary to utilize more than one page of the same checklist to record additional data. If this is the case the sheet will be attached to the primary checklist.

Complete section II.F of the Construction Assessment Checklist for selected items fabricated on site and coated in the Williams' Coating Facility. Review fabrication and installation records to identify the applicable coating application records. For items not coated in the Williams' Coating Facility mark section II.F "NA". Confirm that the data recorded on the Daily Coating Work Inspection Report, Coating Facility Only Bulk Report meets applicable applications procedures and specification X1AJ07. Check that inspections were performed and accepted in accordance with Williams QC procedure WC-003. Document any discrepancies with a Readiness Review Finding (RRF) report.

For each assessment select an entry on the Unqualified Materials Coating Log (Form CF-014A). Use as a target date the application date of the coating assessed. Complete section II.G of the Construction Assessment Checklist. For each Unqualified Materials Coating Log entry selected. Confirm that an Authorization Form (CF-014B) is on file and has been executed in accordance with Williams procedure WC-014. Check the Unqualified Materials Coating Log to ensure that the quality for the unqualified coating application has been recorded. Document any deficiencies with a Readiness Review Finding (RRF).

Select one of the painters identified in the application documentation and complete section II.H of the Construction Assessment Checklist. If no specific painter is identified in the application records select a painter.

Figure 6.2-1 Checklist Instructions (Sheet 3 of 5)

From the Painters Qualification Certification Log (form CF-007) identified as certified for the selected material and application on the date applied. Confirm that the Williams' Quality Control Records including records of Qualification (form CF-013) and Certification (form CF-009) for the painter selected and date of application and that these records have been properly executed in accordance with Williams' procedures WC-013 and WC-009 respectively. Document any discrepancies with a Readiness Review Finding (RRF) report.

Select at random an inspection performing or accepting one of the coatings inspections reviewed. Complete section II.I of the Construction Assessment Checklist. Confirm that the Williams' Quality Control records document that the inspector was certified for the activity performed on the date and activity was performed. Document any discrepancies with a Readiness Review Finding.

Select at random one item of measuring and test equipment used in performing the inspections performed. Complete section II.J of the Construction Assessment Checklist. Confirm that the GPC M&TE records show the M&TE to be in calibration on the date used. Document any discrepancies with a Readiness Review Finding (RRF) report.

Using the Williams' Deviation Report Log select two deviation reports (DRs) dated on or immediately following the application date of the assessed coating. Complete section II.K of the Construction Assessment Checklist checking the DRs to ensure they were executed in accordance with Williams' procedure WC-008 and proper approvals and acceptance are documented on the reports. Document any discrepancies with a Readiness Review Finding (RRF) report.

Walkdown and physically inspect each of the twenty one items selected for assessment. Visually inspect the coating surface and the adjacent areas for the surface and application attributes listed on the Construction Assessment Checklist. Measure the dry film thickness of coatings applied to selected steel items using a calibrated dry film thickness gage, observe an in-process coating application in Unit 1 Containment. Note the system, application method and painter, confirm that the painter is certified for the system and application method in use. Complete section II.L of the Construction Assessment Checklist. Document any deficiencies with Readiness Review Findings.

For walkdown of equipment items shop coated by the vendor the walkdown shall include an assessment of the vendor-applied shop coating to ensure that the shop coating conforms to the applicable purchase specification. Use a second copy of the Construction Assessment Checklist section II.L, Walkdown to Document the shop coating assessment.

Figure 6.2-1 Checklist Instructions (Sheet 4 of 5)

Complete section II.M of the Construction Assessment Checklist for each equipment item. Enter the purchase order number and specification number for each equipment item. From the purchase specification obtain the shop coating requirements and receipt document requirements to document the shop coating. Confirm that the receipt documents on file in the document review vault meet the requirements. Document any discrepancies with a Readiness Review Finding (RRF) report.

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Figure 6.2-1 Checklist Instructions (Sheet 5 of 5)

MODULE 13

CONSTRUCTION ASSESSMENT CHECKLIST

Reciept, Storage, Application, Walkdown

11 Coatings: Specification X1AJ07

A. Identification

Assessment No. _____

Description: _____

Identifying Number: _____

Location: _____

_____

Drawing No.: _____

Remarks: _____

_____

_____

_____

_____

_____

_____

_____

_____

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Figure 6.2-2 Assessment Identification

Assessment No. _____ Item _____

No. _____

B. Materials:

	Accept.	Not Accept.	Resolution
Coating _____			
Mfr. _____			
Product _____			
Batch No. _____			
PO No. _____ Item No. _____			
PO Rec No. _____			
Date Received _____			
1. Receiving Inspection Report? (In file, signed, insp. perf)	_____	_____	_____
2. Mfrs product identify cert. record? Batch number correct?	_____	_____	_____
3. Cert. that mat'l meets ANSI 101.2 & Vogtle temp/pressure curve?	_____	_____	_____

Storage Location _____

Remarks _____

_____

_____

_____

_____

Section Completed by _____ Date _____

Figure 6.2-3 Materials Checklist

Assessment No. _____ Item _____

No. _____

C. Williams Receipt & Issue

Procedure WW-1-01	Accept.	Not Accept.	Resolution
Coating _____			
Mfr. _____			
Product _____			
Batch No. _____			
1. Stock inventory record on file and correct.	_____	_____	_____

Date Stocked _____

Storage Location _____

Date Issued _____

Expiration Date _____

Remarks _____

_____

_____

_____

_____

Section Completed by _____ Date _____

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Figure 6.2-4 Williams Receipt and Issue Checklist (Sheet 1 of 2)

Assessment No. _____ Item _____

No. _____

D. Storage

	Accept.	Not Accept.	Resolution
Procedure WC-005,			
Procuct _____			
Batch No._____			
Storage WHSE No. _____			
Date Issued _____			
1. WHSL, TEMP. Documented & Meets Specification (form CF-005-A)	_____	_____	_____
Therm. Contr. No._____			
Accept. by _____			
Applic. Date _____			

Remarks _____

_____

_____

_____

_____

Section Completed by _____ Date _____

0046n/3/015-6

Figure 6.2-4 Williams Receipt and Issue Checklist (Sheet 2 of 2)

Assessment No. _____ Item No. _____

E. Application Data

System No. _____ Description _____

Mfr. _____

Primer:	Product _____	Batch No.	_____
	Thinner _____	Batch No.	_____
Intermed:	Product _____	Batch No.	_____
	Thinner _____	Batch No.	_____
Top Coat	Product _____	Batch No.	_____
	Thinner _____	Batch No.	_____

M&TE Control Numbers

Sling Psychometer _____

Contact Thermometer _____

Dry Film Gage _____

Inspector _____

Acceptance _____

Figure 6.2-5 Application Checklist (Sheet 1 of 4)

ASSESSMENT NO. _____
COATING SYSTEM NO. _____
ITEM/NO. _____

		REQ'D	Actual		Accept.	Not Accept.	Resolution
System	1st Coat (DFT)	_____	_____	MILS	_____	_____	_____
	2nd Coat (DFT)	_____	_____	MILS	_____	_____	_____
	3rd Coat (DFT)	_____	_____	MILS	_____	_____	_____
	4th Coat (DFT)	_____	_____	MILS	_____	_____	_____
Material as per Specification		_____			_____	_____	_____
Application Environmental Conditions (Temperature)							
Per Williams System No. _____ Insp. Rpt. No. _____							
Material			_____		_____	_____	_____
Normal		_____					
Minimum		_____					
Maximum		_____					
Substrate			_____		_____	_____	_____
Normal		_____					
Minimum		_____					
Maximum		_____					
Ambient			_____		_____	_____	_____
Normal		_____					
Minimum		_____					
Maximum		_____					
Humidity			_____		_____	_____	_____
Normal Range		_____	_____		_____	_____	_____
Dew Point		_____	_____		_____	_____	_____
Surface Preperation							
Procedure (Solvent)		_____	_____		_____	_____	_____
Procedure		_____	_____		_____	_____	_____
Profile		_____ MILS	_____	MILS	_____	_____	_____
Procedure (Alt.)		_____	_____		_____	_____	_____
White Blotter Test		_____	_____		_____	_____	_____

REMARKS: _____

_____

Section Completed by _____ Date _____

Figure 6.2-5 Application Checklist (Sheet 2 of 4)

ASSESSMENT NO. _____
COATING SYSTEM NO. _____
ITEM/NO. _____

		Actual	Accept.	Not Accept.	Resolution
Coatings Application					
Mixing	Required (witnessed)		_____	_____	_____
Powered	_____				
Manual	_____				
Straining	_____				
Thinning			_____	_____	_____
Maximum Amount	_____	_____			
Type Thinner	_____	_____			
Alt. Thinner	_____				
Application Method					
Spray	_____				
Brush	_____				
Roller	_____				
Inspection Documents					
Daily Inspection Record (CF-002)			_____	_____	_____
Acceptance of Coatings (CF-010)			_____	_____	_____
Hold Point Inspection Record (CF-017)			_____	_____	_____

REMARKS: _____

_____

Section Completed by _____ Date _____

0048m/2/015-6

Figure 6.2-5 Application Checklist (Sheet 3 of 4)

Assessment No. _____ Item _____

No. _____

F. Shop Application

	Accept.	Not Accept.	Resolution
Fabrication ID No. _____			
Date Fabricated _____			
Date(s) Coated _____			
Date(s) Issued _____			
Ambient Conditions, Air Supply?	_____	_____	_____
Surface Prep.?	_____	_____	_____
Coating System, Products Correct?	_____	_____	_____
Product _____ Batch No. _____			
Product _____ Batch No. _____			
Thinner Type, Amount?			
Product _____ Batch No. _____			
Application Method, Film Thickness			
Inspection & Accept. Sign-off?	_____	_____	_____

Remarks _____

_____

_____

_____

_____

Section Completed by _____ Date _____

0046m/5/015-6

Figure 6.2-5 Application Checklist (Sheet 4 of 4)

Assessment No. _____ Item _____

No. _____

G. Unqualified Coatings

	Accept.	Not Accept.	Resolution
Item _____			
Number _____			
Location _____			
System _____			
1. Authorization Form (CF-014B) on file and properly executed?	_____	_____	_____
2. Quantity Applied Logged? (Form CF-014A)	_____	_____	_____

Inspector _____

Remarks _____

_____

_____

_____

Section Completed by _____ Date _____

0046m/6/015-6

Figure 6.2-6 Unqualified Coatings Checklist

Assessment No. _____ Item _____

No. _____

H. Painter Certification

	Accept.	Not Accept.	Resolution
Appl. Date _____ Painter _____			
MFR. _____ Product _____			
Applic. Method _____			
Painter Certified (Log - Form CF-007) _____			
Certification Certificate? (CF-009)	_____	_____	_____
QC Accept./Date _____			
Qualification Record (CF-013) Inspector/Date _____	_____	_____	_____
Accept./Date _____			

Remarks _____

_____

_____

_____

Section Completed by _____ Date _____

0046m/7/015-6

Figure 6.2-7 Painter and Inspector Certification and M&TE Checklist (Sheet 1 of 2)

Assessment No. _____ Item _____

No. _____

I. Inspector Certification

	Accept.	Not Accept.	Resolution
Inspector _____			
Item _____			
Date _____ Level _____	_____	_____	_____
Remarks _____			
_____			
_____			
_____			

J. Measuring & Test Equipment

1. Item _____			
Contr. No. _____ Date _____	_____	_____	_____
Remarks _____			
_____			
_____			
_____			
_____			

Section Completed by _____ Date _____

0046n/B/U15-6

Figure 6.2-7 Painter and Inspector Certification and M&TE Checklist (Sheet 2 of 2)

Assessment No. _____ Item _____

No. _____

K. Deviation Reports

	Accept.	Not Accept.	Resolution
Procedure WC-006			
1. Number _____			
Number _____			

Remarks _____

_____

_____

_____

Section Completed by _____ Date _____

7046m/9/015-6

Figure 6.2-8 Deviation Reports Checklist

Assessment No. _____ Item _____

No. _____

L. Walkdown

	Accept.	Not Accept.	Resolution
Coating System _____			
Dry Film Thickness _____			
Substrate _____			
Coating Surface:			
1. Smooth - No hollows to hold liquid.*	_____	_____	_____
2. No coating over overspray.	_____	_____	_____
3. Conc: Voids Filled?	_____	_____	_____
4. Fins, Protrusion, Loose Mat'l Removed?	_____	_____	_____
5. No pin holes.	_____	_____	_____
Steel: No burrs, slivers, scars, weld splatter.	_____	_____	_____
7. Equipment: Scratches or gouges filled?*	_____	_____	_____
Application:			
8. No holidays, skips, sags mudcracking, blistering, containments.	_____	_____	_____
9. Items not to be painted protected? (stems, shafts, name plates, gage, glass,etc)	_____	_____	_____
10. Overspray, spotting, drips cleaned up?	_____	_____	_____

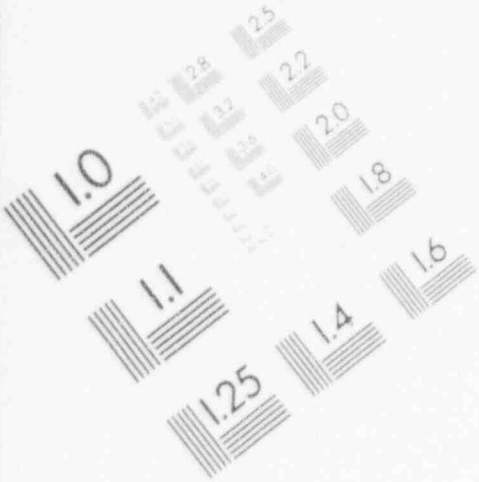
Section Completed by _____ Date _____

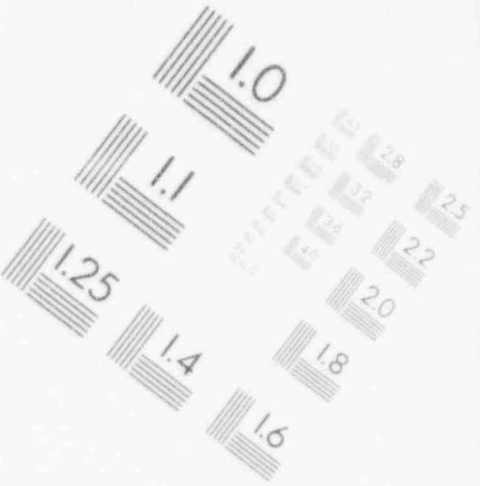
0046m/10/015-6

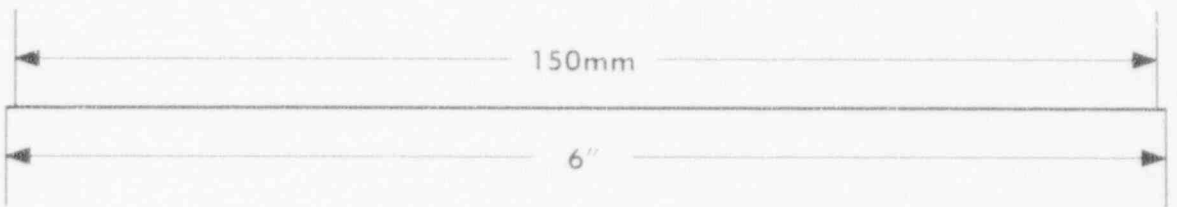
Figure 6.2-9 Walkdown Checklist (Sheet 1 of 2)

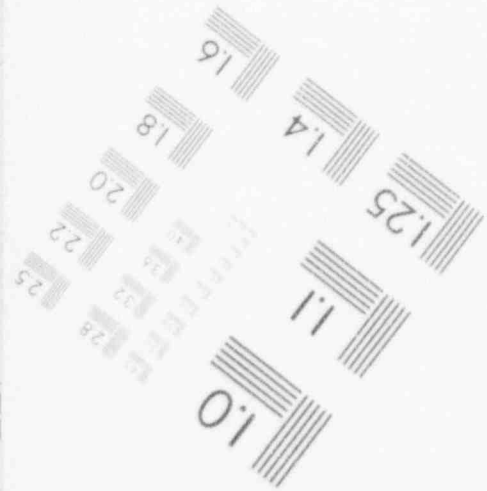
2

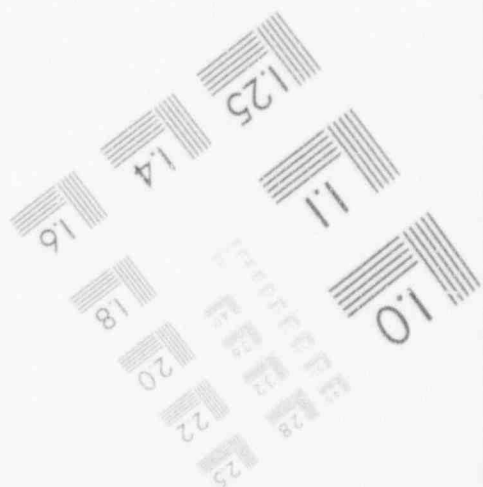
IMAGE EVALUATION TEST TARGET (MT-3)











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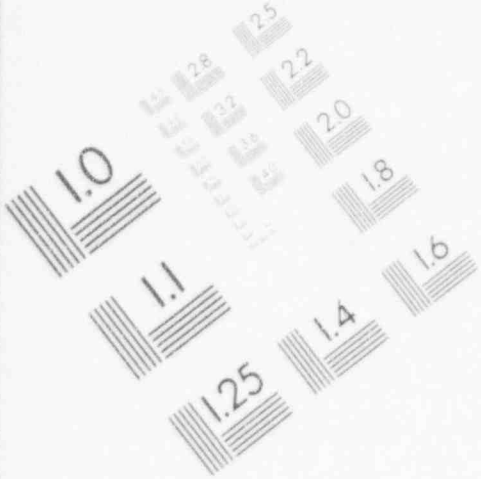
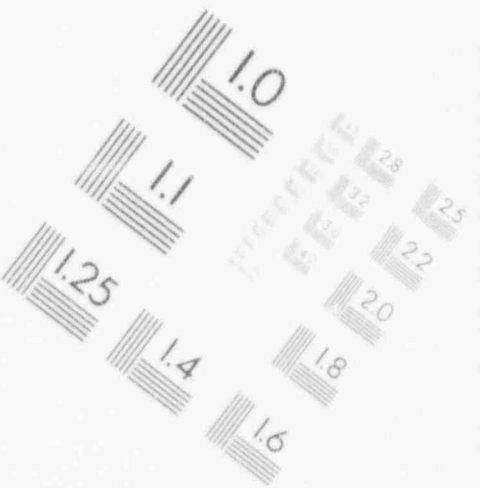
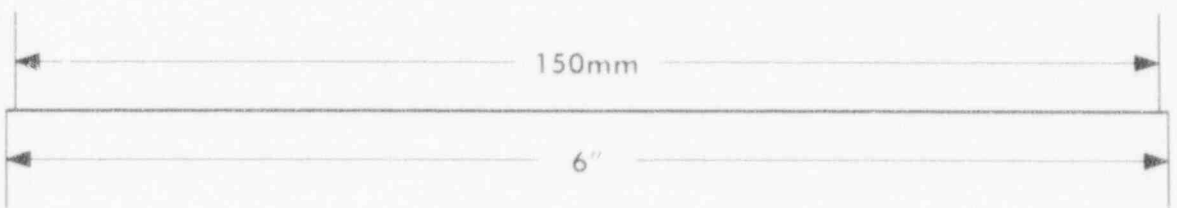
P.O. BOX 338
WEBSTER, NEW YORK 14580
(716) 265-1600

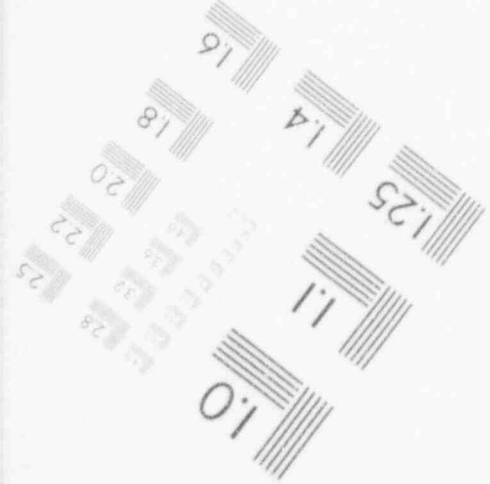
2

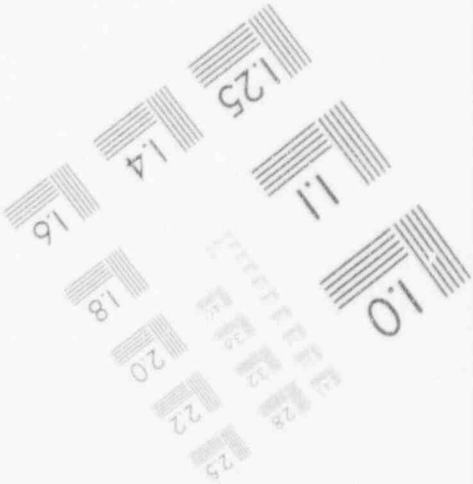
IMAGE EVALUATION TEST TARGET (MT-3)











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(716) 265-1600

Assessment No. _____ Item _____

No. _____

	Accept.	Not Accept.	Resolution
11. Dry Film Thickness (steel)?			

Gage Control No. _____

*Mechanical damage to coating after application is not an application deficiency. Note only if coating has received final acceptance.

Remarks _____

_____

_____

_____

Section Completed by _____ Date _____

0046m/11/015-6

Figure 6.2-9 Walkdown Checklist (Sheet 2 of 2)

Assessment No. _____ Item _____

No. _____

	Accept.	Not Accept.	Resolution
M. Vendor-Applied Coating to Equipment			
P.O. No. _____			
SPEC. No. _____			
Specified Coating Requirements			
_____			
_____			
_____ _____			
Specified Receipt Document			
_____			
_____ _____			
_____			
_____			
_____			

Remarks _____

_____

_____

_____

_____

Section Completed by _____ Date _____

0046m/12/015-6

Figure 6.2-10 Vendor-Applied Coatings Checklist

X7BD102-IDRR-13B
J.O.No. 15224
January 29, 1986

Vogtle Electric Generating Plant

Independent Design Review

Module Report

(Module No. 13B)

Coatings

Prepared for

Georgia Power Company

Readiness Review Program

Approved By:

Module Team Leader

Project Manager

Stone & Webster Engineering Corporation
Boston, Massachusetts 02107

INDEPENDENT DESIGN REVIEW REPORT

TABLE OF CONTENTS

APPENDICES

SUMMARY

This Independent Design Review (IDR) of safety related coatings at the Vogtle Electric Generating Plant (VEGP) was conducted by Stone & Webster Engineering Corporation as part of the Vogtle Project Readiness Review Program.

The review identified a total of nine findings. Four of the findings were later considered to be nonfindings, based on further information and five are considered to be deficiencies with no safety concern.

Based on the review performed, the limited number of findings and the corrective action taken in response to the IDR findings the team considers the requirements for safety related coatings to be technically acceptable.

7.0 INDEPENDENT DESIGN REVIEW

7.1 INTRODUCTION

This report describes the Independent Design Review (IDR) of coatings inside the containment at the Vogtle Electric Generating Plant (VEGP). This IDR was conducted by Stone & Webster Engineering Corporation (SWEC) as part of the Vogtle Project Readiness Review Program (RRP). The IDR described in this review covers the design/engineering activities of Module 13B-" Coatings".

The review was conducted at Plant Vogtle during the week of June 24, 1985. The review team was composed of one SWEC materials engineer experienced in the specification and qualification of nuclear power plant coatings, who had no previous association with the Vogtle Project. This reviewer has over six years experience in materials selection, testing, welding, corrosion and protective coatings for oil field, process and power plant application.

This report has been organized into six basic sections as follows:

7.1 Introduction

7.2 Scope - Provides an outline of the scope of the IDR review for this module.

7.3 Review Methodology - Provides the methodology utilized in the review.

7.4 Review Summary - Provides a summary of the review and its results at the time that the review itself was conducted. It does not address or consider the resolution of review findings. These are included in Sections 7.5 and 7.6.

7.5 Review Findings - Includes the findings from the review, the project response and the IDR assessment of that response.

7.6 Conclusions - Presents the overall evaluation and conclusions of the IDR team with respect to the work reviewed under the scope of this module.

7.2 SCOPE

This review assesses the technical adequacy of the protective coating systems inside the containment. The focus of this review was limited to the technical content of the coating design documents (specifications, procedures, deviation reports, etc) to ascertain whether the project licensing commitments were implemented in a technically adequate manner. The extent of this review has been established on a sample basis described in Section 7.3. The project activities reviewed included:

1. Engineering specification requirements for coating type, thickness, surface preparation, application methods and inspection requirements for steel and concrete surfaces.

2. Coating application procedure requirements for qualification of applicators, monitoring of ambient conditions, methods of determining coating thickness and use of thinning and cleaning materials.

3. Design Basis Accident (DBA) testing and acceptance criteria for coatings to be DBA qualified.

4. Evaluation and dispositioning of deviations from project requirements for the above items.

A separate programmatic verification of the design process was performed by other members of the Readiness Review Team to ensure that the project licensing commitments were correctly carried through the various levels of governing design documents and procedures. The results of this programmatic verification effort can be found in Section 6.1 of this module.

7.3 REVIEW METHODOLOGY

This review effort was initiated with discussions between the team leader and the reviewer (Appendix 7B), at which time the reviewer was given a briefing on the Readiness Review Program and his role in the review. A single team leader and a combined review plan (Appendix 7A) was utilized for Modules 13B and 13C due to the limited manpower necessary for review of the specialized topics. The combined review plan was prepared and provided to the reviewer defining the scope, method, limits and key attributes of the review. The methodology utilized consisted of a review of project licensing documents, specifications, coating application procedures, coating contractors quality control procedures, and Design Basis Accident (DBA) testing results for coatings inside the containment.

The methods of evaluating the adequacy of the project's implementation of technical commitments in the area of protective coatings within the containment consisted of a review of the documents and interviews with project personnel to clarify questions regarding the method of meeting the licensing commitments. The evaluation consisted of the following tasks:

Review of FSAR

Review of Specifications for Licensing Commitments and Adequacy of Information

Direction to Implement/Satisfy the Commitments

Review of Contractors Coating Application Procedures for specification commitments and technical adequacy.

Review of Contractors Quality Control Procedures for specification commitments and technical adequacy.

Review of Deviation Report Dispositions for licensing commitment compliance and technical adequacy.

Review of Project DBA Testing Results for adequacy in implementing project licensing commitments.

Site Walkdown.

Specific methodology for each area of review is discussed in the following sections.

Also a review of the VEGP project SAR Sections 3.11.B, 6.1.1.1 and 6.1.2.1, describing the licensing requirements for protective coatings to be used inside the containment, was performed to determine the project licensing commitments, technical positions, and applicable code requirements.

7.3.1 Specifications

The specifications listed in Appendix 7C were reviewed for consistency with the technical requirements specified in the project licensing documents for both shop and field containment coating work. These specifications were selected for review since they cover the major portion of the coating work inside containment.

7.3.2 Field Coating Application and Quality Control Procedures

Contractor coating procedures listed in Appendix 7C were selected to cover the range of coating systems used inside the containment. These procedures were then reviewed for adequacy of surface preparation methods, specification of ambient conditions during application and curing, use of proper application equipment and techniques, use of proper thinning and cleaning materials and specification of inspection requirements.

Williams Contracting Inc. Quality Control Procedures were also reviewed for qualification of application and inspection personnel, use of proper methods for determining surface cleanliness and profile, use of proper methods to determine coating film thickness, and coating storage requirements and controls for products to be used inside the containment.

7.3.3 Deviation Report Dispositions

The review of Deviation Report dispositions consisted of a review of Non-Conformance Reports and Deviation Reports. Both reports have the same purpose and use; however, the title of the report was changed in late 1981 from Non-Conformance Report to Deviation Report (DR).

The Civil DR Log was first reviewed to identify DRs that applied to coating systems inside the containment. The log contains a listing of all civil DRs; concrete, soils, structural steel as well as coatings, and a short description of the problem. DRs were selected for screening based on the information in the log. Copies of these DRs were then reviewed to select a sample for detailed review. The sample was chosen based on the engineering importance of the problem. The sample included DRs for all phases of the review and covers the full construction time span. Nineteen (19) DRs were selected for detailed review after the initial screening.

The DRs were then reviewed for technical adequacy, including appropriateness of disposition, completeness of information, and the validity of the basis of acceptance (i.e., experience, judgment, or comparison to a previously evaluated DR).

7.3.4 DBA Test Results

The project DBA testing results were reviewed for completeness and compliance with the project licensing commitments. In addition the project specifications and contractor procedures were reviewed to determine the technical adequacy of the means utilized to track, limit and/or assess the amount of unqualified coatings inside containment.

7.3.5 Site Walkdown

Coatings on steel and concrete in selected portions of Unit No. 1 Containment were visually examined for overall quality of appearance and indication of proper application. Additionally coating work at the on-site coating facility was also observed.

7.4 REVIEW SUMMARY

7.4.1 General

This section presents a summary of the IDR following the review itself but prior to the resolution of the review findings. Individual findings are resolved in Section 7.5 and the overall IDR evaluation is provided in Section 7.6.

7.4.2 Specifications

Specification Nos. X2AG03 (Category I Structural Steel), X2AH01 (Furnishing, Fabrication, and Delivering Miscellaneous Category I Steel), and X5AC03 (Small Butterfly Valves)

The review of these specifications indicated that they have not addressed all of the coating requirements of ANSI 101.2 and ANSI 101.4, both of which are committed to in the FSAR.

The coating requirements invoked in these specifications only address the degree of surface cleanliness, surface profile, coating products and dry film thickness (DFT) to be used, the required documentation and the DBA testing requirements for qualifying coating systems. These specifications do not address the frequency of inspections, mixing and application requirements, correction of deficiencies, the commitment to apply the coatings in accordance with the coating manufacturers requirements, or applicator qualification requirements.

In lieu of specifying these requirements the project ensured compliance of some of these requirements by requiring the submittal of vendor surface preparation, application and inspection procedures for review and approval by BPC. This is an acceptable alternate approach for assuring compliance.

All three of these specifications require the submittal of the contractor's surface preparation, application, and inspection procedures; however, the review of these procedures does not appear to assure conformance with the project commitments. The Ingall's procedure which was reviewed and approved for specification X2AG03 lacked sufficient detail and clarity (see discussion below) to assure that the coatings were properly applied. The project was unable to locate a procedure which should have been submitted under specification X2AH01 (Finding 2).

Ingall's Steel Shop Procedure for Surface Preparation and Coating, Revision A, November 28, 1978

This procedure covers the shop coating application work to be performed under the X2AG03 contract. The procedure lacks sufficient detail to assure that the coating work is completed in compliance with the project licensing commitments. The following are specific deficiencies noted in this procedure:

1. References to codes and specifications are not clearly identified by revision or code date. The FSAR commits to using the latest published issue of Steel Structures Painting Council, ANSI N101.2

or ANSI N5.12. The only document referenced by code date was the 1963 edition of SSPC-SP10.

2. The FSAR commits to applying the coating systems in accordance with the paint manufacturer's detailed instructions. This procedure states that "the paint shall be mixed, thinned and applied in accordance with the manufacturer's instructions;" however, no reference was made to the manufacturer's written application instructions (by date or revision) nor was there any evidence that the contractor's application instructions were approved by the coating manufacturer in writing.

3. The application procedure does not indicate the frequency of inspection for surface profile.

4. The procedure states that blasting products shall be removed by blowing off with oil and moisture free compressed air but it does not reference a test for the cleanliness of compressed air nor does it discuss the cleanliness of compressed air used for other coating operations.

5. This procedure does not address inspection requirements for ambient conditions.

6. This procedure details the method and frequency of DFT testing for D area coatings but these requirements are not imposed for coatings used inside the containment.

7. The procedure does not address correction of deficiencies.

8. This procedure does not address the qualification of coating applicators.

Specification No. X1AJ07, Field Coatings

Table 6.1.2-1 of the FSAR commits to using the latest published issue of Steel Structures Painting Council (SSPC), ANSI N101.2 and sections, where applicable, of ANSI N5.12.

Section 2.0 of this specification references applicable documents but it requires the Contractor to provide a listing of Codes, Standards and Specifications including effective issue. It is possible that the project commitment to the latest issue of these documents may have been met; however, it is not clear as to how the Contractor is made aware of this commitment (Finding 7).

Section 7.2 allows the application of zinc rich coatings at ambient and substrate temperatures down to 35F and allows the application of coatings within 2F of the dew point. Section 7.6.1 prohibits the application of protective coatings when the ambient temperature is below 50F or when the surface temperature is less than 5F above the dew point. Williams application procedures adhere to the more stringent requirements but this discrepancy should be clarified (Finding 8).

Coating system FN-8 is for field touch-up of shop applied inorganic zinc using an epoxy primer with an epoxy finish coat. As the system is written Amercote 90N is to be used as the touch-up for all three specified inorganic zincs (Amercote 6N, Valspar 13F1200 and Carbo Zinc 11SG*); with the finish coating being Amercote 90N, Valspar 89 Series, and Carboline 191HB over Amercote 6N, Valspar 13F1200 and Carbo Zinc 11SG, respectively. However, the DBA testing data provided by Bechtel for this project do not indicate supporting data for the following systems:

Shop Primer	Touch-up	Finsh Coat
Valspar 13F1200	Amercote 90N	Valspar 89 Series
Carbo Zinc 11SG*	Amercote 90N	Carboline 191HB

*Carboline has recently changed the product designation for the Carbo Zinc 1[illegible] product. The nuclear certified grade is called Carbo Zinc 11SG. With the exceptions noted above this specification was found to comply with the intent of the project licensing commitment and appears technically adequate.

7.4.3 Field Coating Application and Quality Control Procedures

Williams Contracting Inc. Coating Application Procedures (W-3, 6, 7, 8A, 13, 14, 27, 31)

The field coating application procedures in Section 2.2 comply with the intent of the project licensing commitments, and with the exceptions noted below, appear to be technically adequate. The procedures have been reviewed and approved by the coating manufacturers, thus complying with the project commitment to apply coatings in accordance with the paint manufacturer's detailed instructions. These procedures establish quality control hold points for required inspections, establish surface preparation requirements, list coating materials to be used (including thinners and cleaners), specify limitations on ambient conditions during application, provide instructions for mixing and application and outline inspection requirements.

All of the Williams Contracting Inc. coating application procedures reviewed allow coating materials to be used after they have been stored outside the specified storage temperature range if the materials are brought into the specified temperature range and allowed to stabilize for at least 24 hours prior to application. The intent of this requirement is to allow the use of materials which were temporarily stored outside the required temperature range during shipment or any other reason. However this section does not limit the length of exposure outside the required temperature or provide guidance that defines temporary. Extended storage of coating products outside of the recommended temperature range may be detrimental to the products; specifically the shelf life of catalyzed systems may be reduced by storage at higher than recommended temperatures (Finding 6).

Williams' coating application procedures do not specify the effective issue dates for referenced Steel Structures Painting Council Documents (Finding 7).

Williams Contracting Inc. Quality Control Procedures, Revision 27 February 5, 1985.

Williams Quality Control Procedures address how to fill out the appropriate inspection forms but do not completely address the required inspections or acceptance criteria.

General Procedures and WC-010 address some of the inspection requirements and WC-002 and WC-003 discuss the forms to be used for recording the coatings inspection data. The field coating systems establish hold points but it is not clear what inspections are to be performed or who is responsible for the inspection. Generally application procedures are written and directed toward the production personnel while quality control procedures address those tasks to be performed by inspection personnel. Application procedures can be written to incorporate all inspections; however, procedures of this type should clearly delineate responsibility for the inspections (Finding 5). Specific examples of these deficiencies are:

1. The inspection procedures do not address the frequency of the ambient conditions check. Procedures WC-002 and 003 specify the type of equipment to be used for this inspection but there is no requirement for the frequency.

2. Procedures WC-002 and WC-003 require that the surface preparation, profile and inspection method be reported. These documents do not address the method or frequency of these inspections. Through discussions with G. Neely, with Williams Contracting Inc., the reviewer determined that the inspectors are verifying the degree of surface cleanliness using the SSPS Vis-1 standard, 1963 issue; however, this requirement is not specified in any of the documents. The surface profile for power tool cleaned surfaces is being inspected using GPC-SP15 but again this standard is not referenced in any of the procedures. Also, GPC-SP15 is for profile only, not the degree of cleanliness.

3. Section 7.5.1 B. of X1AJ07 requires that the compressed air for coatings operations shall be checked twice per shift for cleanliness using the white blotter test. Williams' Quality Control Procedures do not require this inspection. Through discussions with G. Neely only the compressed air used for blowdown of the surfaces has been tested in the past; however, current practice is to inspect all compressed air utilized for the protective coating work.

4. Williams' coating system W-19 KL, Coating of Concrete Floor with Epoxy, allows laitance to be removed by chemical treatment. The procedure specifies that the surface after treatment should have a pH in the range of 7.5 to 9.5 prior to coating. Williams inspection procedures do not cover this inspection requirement.

5. Williams Contracting Inc. is in the process of implementing a new Production Personnel Qualification Procedure, WC-006 (Revision 5/16/85) for the qualification of coating applicators. The previous procedures only addressed the proper method of filling

out the appropriate form and not the method of qualification. The new procedure provides more detail about the method of qualification and the required inspections; however, the specific procedure for qualification is still not addressed. WC-006 does not detail the specific substrate to be coated (i.e., concrete, steel test panel), the coating products to be used (the same products which are to be applied or generically equivalent products) or the equipment to be used. WC-006 does not specify whether the qualification must be performed on a test panel or whether in process work may be used for qualification.

7.4.4 Deviation Report Dispositions

After initially screening the DR log, twenty-three deviation reports were selected for detailed review; nineteen of them upon detailed review were found to address coating requirements inside the Unit No. 1 Containment. Out of the nineteen applicable DRs, nine of the evaluations, justifications, or dispositions were considered deficient creating a concern about the adequacy of coating systems inside the containment (Finding 4). The nine deficient DR's are described below. The nineteen DRs reviewed spanned a time period from August 1982 to February 1985.

1. DR No. CD-3182 concerns the application of Carbo Zinc 11SG, to the liner plate, supports and support shoes, over small amounts of rust and surfaces without a profile while the surface temperature was only 0 to 2F above the dew point. The second part of the DR addresses non-qualified coatings. The disposition was to repair the areas where the coating was applied over rust with the rest of the non-conforming condition being statused as use-as-is.

   No justification is provided in this DR for the use-as-is and no procedure or inspection requirements are provided for the rework areas.

2. DR No. CD-3214 concerns the application of coating materials applied outside of the conditions specified in X1AJ07. No justification was provided for the use-as-is disposition for this DR.

3. DR No. CD-3248 concerns coating systems which were not completed and accepted by GPC Quality Control Coating Inspector prior to equipment being installed making the area inaccessible. Four deficiencies were observed in a 3 ft x 9 ft area; the coating was cracked in two places, holidays were found in the top coat, there were holidays and regions of bare metal on exposed steel that was touched-up, and the exposed steel did not receive a finish coat. The disposition was use-as-is.

   The justification for the acceptance of the crack was that hairline cracks will not affect the performance of the coating system. This justification is not clear as to why cracks are acceptable as they may indicate serious coating deficiencies.

   The justification for accepting the exposed steel which had regions of bare metal and holidays after touch-up is not clear. The justification provided was that the steel was shop coated.

The justification for the remaining two items on this DR is acceptable. The holidays found in the top coat on the walls was dispositioned use-as-is since the intermediate coat will prevent contaminants from penetrating to the concrete. The exposed steel which did not receive a finish coat are embedments which are not in use.

4. DR No. CD-3275 concerns over-spray of 191HB on primed pipe hanger brackets. The prime coat on the brackets was not inspected since the work plan called for these brackets to be sandblasted; however, a stainless steel spray pipe was too close to the brackets to allow sandblasting. The disposition was to prepare the surface in accordance with SSPC-SP 2 or 3 and apply a coat of 191HB.

   The method of repair for this deviation does not address the procedure or inspection requirements for the repair. Additionally the use of 191HB for the touch-up of Carbo Zinc 11SG does not appear to be a DBA qualified system.

5. DR No. CD-3306 concerns the subdivision of full kits of Carboline 191HB which was not allowed by the coating application procedure. The disposition was to use-as-is since the division of the kits was measured, and witnessed by QC and the coating manufacturer does not prohibit the subdividing.

   The DR indicates that the measuring was done using scribed pails. While subdivision of coating kits is an acceptable practice if properly controlled, it should not be done without using calibrated measuring equipment. It is not clear that the scribed pails are accurate enough for the correct subdivision of coating kits.

6. DR No. CD-3346 concerns a lost hi-low thermometer used for recording temperatures in a paint storage area. The disposition and justification for this DR are not clear. The approved disposition states "void." The justification states that Williams' QC performs a final inspection of coating materials after they are applied and fully cured and that any problems which may have been caused by improper paint storage would have been revealed by this inspection.

   Coating materials may be affected by storage outside the coating manufacturer's recommended conditions. Altered coatings may appear visually acceptable and yet fail under DBA conditions.

7. DR No. CD-3378 concerns the use of a DFT gage that was found to be out of tolerance. The disposition and justification for this DR are not clear. The approved disposition and action to resolve are to obtain valid documentation and to evaluate the work completed with this item; however, no inspections were required. The justification provided was that the error would have resulted in a heavy coat of zinc which will not affect the coating. Attachment 5 to this DR indicates that the gage in question was only used by Williams' Production Crew and not Williams' QC; however, this attachment was not referenced in the DR.

   At the time of the calibration, the DFT gage was reading 3.5 mils for the 8.16 mils reference shim and 6.0 for the 14.8 mils reference shim.

Excessive DFT in an inorganic zinc rich coating may alter the DBA performance of the coating even if the coating is free of visible defects.

8. DR No. CD-3410 concerns a broken sling psychrometer. The disposition is not clear but it appears that the work was accepted as is. The justification states, "The item was within calibration when it was broken, no further evaluation required," and references Attachment 2 which states, "A critical error in the surface temperature humidity conditions would lead to a coatings failure, this has not happened to date."

   The acceptance of coatings, applied outside of the coating manufacturer's recommended ambient conditions, based upon visual inspection, is not valid. Altered coatings may perform satisfactorily under normal conditions but fail in a DBA.

9. DR No. CD-3423 concerns the use of a DFT gage which was found to be out of tolerance on two occasions; in the first instance the gage was reading low, in the second case the gage was found to be reading high. The disposition of this DR was that the hardware was not affected.

   The justification for the low reading gage was that if a coating is applied at higher than the specified DFT it is still suitable as long as it does not mud crack. Inorganic zinc, specifically Carbo Zinc 11SG, may not mud crack until in excess of 13 mils of coating is applied; however, this material may fail under DBA conditions with thicknesses in excess of 7 to 8 mils.

   The justification for the high reading gage was that the gage was calibrated and found to be grossly high against all of the standards and that high readings of this magnitude would automatically be rejected as outside of the specified DFT range. This justification does not adequately address the deviation. The gage was reading very high when calibrated; however, the condition of the DFT gage at the time of the actual measurements cannot be determined by this.

7.4.5 DBA Test Results

The FSAR commitments in terms of DBA testing of protective coatings to be used inside the containment do not clearly specify the testing conditions. FSAR Section 6.1.2.1 references subsection 3.11.B.1 for DBA conditions. Subsection 3.11.B.1 does not specifically reference conditions for DBA testing of coatings; however, under equipment qualification it references Figure 3.11.B.1-1. Figure 3.11.B.1-1 shows the combined LOCA & MSLB envelope curve and a second curve which is not identified. The second curve peaks at 300F and, based upon discussions with W. Bedall and K. Flemming with BPC, is the DBA curve for the protective coatings. Revision 18 to the FSAR is to incorporate Figure 6.1.2-1 which shows the 300F curve to be used for coating qualification.

Other than the apparent lack of data noted in Section 7.4.2 for the FN 8 coating system, the DBA test results provided by BPC or available from ...e

coating manufacturers support the coating systems to be used inside the containment.

7.4.5.1 Qualified Coatings

Specifications X2AG03, X2AH01 and X5AC03 do not specifically state the DBA test requirements for the coatings to be used; however, they do require that nuclear grade products be utilized for N area coatings. The coating manufacturers contacted by the reviewer stated that a product purchased as a nuclear grade product would meet all of the DBA testing performed on that product and that it is not necessary to specify the product by reference batch. Since BPC has verified that the products and coating systems used have the appropriate DBA test data, this is an acceptable approach.

With the exception of the FN-8 system discussed in Section 7.4.2, specification X1AJ07 complies with the intent of the project licensing commitments and appears technically adequate. Section 1.3.1 discusses the licensing commitment to Regulatory Guide 1.54 for coatings used within the containments. This section outlines those areas which are qualified and comply with Regulatory Guide 1.54 and must be tested in accordance with ANSI N101.2 and the applicable sections of N5.12. Coatings which are not required to be qualified are also outlined. Section 4.1.1 B addresses the project commitment for coating materials to be used within the containment to meet the requirements of ANSI N101.2 and the applicable sections of ANSI N5.12.

Except for coating system FN-8 (Finding 3) the DBA test data provided by BPC support qualification for all of the qualified touch-up systems and systems to be applied over steel that are to be used inside the containment. Additionally the coatings manufacturers have supporting data for the qualified concrete coating systems to be used inside the containment.

However, recent industry experience indicates that CARBO Zinc 11SG may not completely cure or may cure to inadequate hardness even when cured in accordance with the coating manufacturer's recommendations. This inadequate cure or hardness may lead to the premature failure of topcoated inorganic zinc in the event of a DBA.

The specifications and procedures for the application of inorgainc zinc coatings inside the containment at Plant Vogtle do not include a requirement for the verification of complete cure of inorganic zinc rich primers. As the failure of an untopcoated inorgainc zinc rich primer will not adversely effect the safe shutdown of the plant in the event of a DBA only topcoated zinc rich primers need be inspected for complete cure (Finding 1).

7.4.5.2 Unqualified Coatings Inside the Containment

Williams Contracting Inc.'s procedure WC-014 applies to unqualified coating systems applied by Williams inside the containment. This procedure complies with the intent of the project licensing commitments to minimize the quantity of unqualified field applied coatings used inside the containment.

In response to Audit Finding Report 442 BPC reviewed the specifications which allow the use of unqualified shop applied coatings on equipment to be

placed inside the containment. BPC's letter to Mr. O. Batum, Manager, Project Engineering & Licensing, Southern Company Services, Inc., from M. Malcom, Project Engineering Manager, Los Angeles Power Division, dated August 18, 1983 discussed these findings. The letter quantifies the amounts of unqualified shop applied coatings supplied to date and states that it is not anticipated that additional items with unqualified coatings will be ordered for use inside the containment.

The project licensing documents, Section 6.1.1.1.2 of the FSAR, commit to limiting the amount of zinc to be used inside the containment. Table 6.2.5-6 lists the Zinc Inventory in Containment including zinc pigmented coatings. However, no effort has been made to verify the amount of zinc, from protective coating, used inside the containment (Finding 9).

7.4.5.3 Coatings for Diesel Fuel Oil Storage Tanks

INPO Report 2-84 discusses the reaction of diesel fuel oil with inorganic zinc coatings in storage tanks. With certain grades of diesel fuel oil a reaction can occur with inorganic zinc coatings to produce an insoluble reaction product which may clog fuel filters and foul injectors in diesel engines thus preventing startup. The diesel fuel storage tanks for Plant Vogtle are coated with untopcoated inorganic zinc. While these tanks are outside of the containment, the IDR team felt this condition significant enough to review.

BPC, in a letter to Mr. G. Bockhold, Jr. of Georgia Power Company (GPC) from Mr. Malcom of BPC dated July 16, 1984, advised GPC of this potential problem. Bechtel advised GPC that diesel fuel oil, to be stored in tanks coated with inorganic zinc coatings, must be purchased with a neutralization number of 0.10 or less. BPC also recommended inspection of the coating system before the tank is placed in service, monitoring the quality of fuel during long-term storage, and keeping the tanks full to minimize water vapor condensation and the collection of water.

This approach by BPC is considered technically acceptable.

7.4.6 Site Walkdown

A walkdown of the Unit No. 1 Containment coatings and the on-site coating facility was performed to review conformance to the project licensing commitments, specifications and procedures. The review of the coatings was limited to a visual examination of selected portions of previously coated areas and the preparation for application of the second coat of Keeler & Long 4000 (using coating system FN-14) being applied to one of the stair wells inside the unit No. 1 Containment. The walkdown found the coating work to be consistent with the project specifications and licensing commitments and resulted in no concerns or observations.

7.5 REVIEW FINDINGS

During this review, the following findings were identified by the IDR team. Immediately following each of the concerns is the response provided by the project to the issues raised and the IDR team's assessment of that response.

Upon completion, the findings have been classified into levels of importance to the potential impact on plant safety. The following levels are used:

I Violation of licensing commitments, project procedures, or engineering requirements with indication of safety significance.

II Violation of licensing commitments or engineering requirements with no safety concerns.

III Violation of project procedures with no safety concerns.

IV Non-finding based on additional information/clarification supplied by the project.

Finding 1 - Lack of Primer Curing Verification (RRF 13B-17)

There is no requirement for the verification of complete cure of inorganic zinc primers which are to be top coated. Industry experience indicates that Carbozinc 11SG may not completely cure or may cure to an inadequate hardness which may lead to a premature failure of topcoated systems in the event of a DBA.

Project Response

There is no requirement within ANSI or any other Code or Standard to test or verify the cure or hardness of an inorganic zinc primer prior to top coating, nor is there a requirement by the coating manfacturer to check hardness or cure prior to top coating. It is therefore not a requirement of this project.

However, inorganic zinc that has not cured properly can be detected by the following procedures:

1. Solvent wipe the surface. Surfaces are at times solvent wiped. (Carboline 15 Solvent was used) prior to top coating. This is considered a way to show an unsound, uncured inorganic zinc coating; however, all surfaces have not been solvent wiped.

2. Clean the zinc with 1000 psi (or greater) water wash. This not only cleans the zinc, but would remove any and all unsound, uncured inorganic zinc. This was done for any surface that was to be topcoated for both Unit 1 and Unit 2 (See attached notarized affidavit).

3. Apply a finish coat of epoxy. If epoxy was applied to an unsound, uncured inorganic zinc, the epoxy upon receiving its cure may also show adhesion problems.

   - The epoxy would split, exposing the zinc or substrate.

   - The epoxy would delaminate from the surface.

Although there are causes other than manufacturing error that result in uncured inorganic zinc, Carboline was asked to report on all batches used within the Containment buildings at Plant Vogtle as follows:

1. Georgia Power Company sent to Carboline a list of all carbon Zinc 11 batches used at the Vogtle jobsite.

2. Carboline has recorded within their computer all "problem" batches since January 1, 1981. A "problem" batch is defined as any material that has been reported to have had a problem with adhesion, delamination, cohesion or cure.

   Carboline states: "None of the batches listed have a reported problem". Since all surfaces have been high pressure washed which would detect any and all uncured zinc; and further, since all batches of inorganic zinc used have been verified to be good

material, there is sufficient evidence to support the position that:

1. We did not have any uncured inorganic zinc.

2. That the present procedures are adequate to detect any uncured zinc.

Associated Reports:

1. Carboline letters dated July 16, 1985 and July 31, 1985.

2. Williams Contracting, Inc. affidavit dated September 24, 1985.

Root Cause of Finding:

The finding is not valid.

Action Taken To Prevent Recurrence:

This problem (incomplete cure of inorganic zinc and/or hardness) has not been evident and present procedures are adequate to detect any uncured inorganic zinc.

Future Commitments:

Georgia Power Company Quality Control shall monitor ANSI 101.4 Product Identity Record Forms to assure acceptable material is used.

IDR Assessment

The IDR team concurs that either solvent wiping or high pressure (1000 psi) water washing of inorganic zinc will demonstrate unsound uncured inorganic zinc. Since all surfaces primed with inorgainc zinc that were topcoated have been water washed the IDR team concurs that any uncured inorgainc zinc would have been detected and removed. The IDR team also concurs that a specific cure hardness test is not required since the Vogtle surface preparation procedures would detect and remove any unsound material. The IDR team therefore concludes that the project has had no uncured inorganic zinc; because of the surface preparation procedures used, a specific cure hardness test is not required and no further action is necessary.

Finding Level IV

Finding 2 - Lack of Adequate/Approved Painting Procedures (RRF 13B-12)

Specification X2AG03, X2AH01 and X5AC03 lack sufficient detail on the coating requirements to assure that the coatings are applied in accordance with the FSAR commitments. These procedures only outline the shop applied coatings system to be used. All three specifications require that surface preparation, application and inspection procedures should be submitted by the contractor for review and approval; however, the approved procedure submitted for the X2AG03 contract did not adequately cover these requirements and there was no indication that procedures for X2AH01 were submitted. The application procedures for X5AC03 were not available for review.

The following are samples of the deficiencies which were noted in the coating specifications and procedures:

1. None of the specifications referenced the commitment to apply coatings in accordance with the coating manufacturers requirement.

2. The application procedure approved for X2AG03 does not include specific instructions from the coating manufacturer, either by inclusion or reference by date, regarding surface preparation, mixing or application.

3. The procedure for X2AG03 does not address corrective action for deficiencies and inspection requirements or frequencies (i.e., surface cleanliness, cleanliness of compressed air and dry film thickness).

4. X5AC03 does not limit the maximum dry film thickness.

5. X2AG03 and X2AH01 do not reference ANSI N101.4; however, this is an FSAR commitment.

Project Response

The three specifications listed in this finding as lacking sufficient detail to assure compliance with FSAR comitments were reviewed along with appropriate vendor submittals and found that the total documentation in fact, properly addresses FSAR commitments on coatings including surface preparation, application and inspection procedures.

The detail review of the samples of deficiencies listed in the finding had the following results: (Numbered quotations are as listed in the finding).

1. "None of the specifications referenced the commitment to apply coatings in accordance with the coating manufacturing requirements."

   The finding is true. However, the commitment that coatings be applied in accordance with the several coating manufacturer's requirements was implemented by approval of the vendors coatings procedures which specifically included the coating manufacturer's requirements as follows:

   a) Specification AX2AG03 - This specification formed a part of the purchase order to Ingalls Steel for Category 1 structural steel.

Coating manufacturer's requirements were envoked by vendor's procedure AX2AG03-89-1.

Ingalls Iron Works was contacted by telephone to confirm their method of substrate preparation. He informed us that they utilize wheelabrators using iron shot or grit.

b) Specification No. X5AC03 - "Small Butterfly Valves" does not specifically address the manufacturer's requirements but Section 4.4.3.3, Paragraph 4, requires application in accordance with ANSI N101.4 which requires commitment to application in accordance with manufacturer's requirements. Coating manufacturer's requirements were invoked by vendor's procedures:

AX5AC03-5042-1, AX5AC03-263-2
AX5AC03-5043-1, AX5AC03-5044-1
AX5AC02-16-2

c) Specification X2AH01 - This specification formed a part of several purchase orders to furnish a variety of miscellaneous steel shapes.

The first purchase order was to Steel Incorporated to furnish shop coated fabricated steel. The specification did not require that coatings be done in accordance with the coating manufacturer's requirements, nor were any coatings procedures found to substantiate that the coatings manufacturer's requirements were invoked. However, the P.O. issued June 2, 1980 was for furnishing cable tray support material, which is required by X2AH01 to be galvanized. The fact that only galvanized material was used was substantiated by review of the P.O. PSQ 221 A, dated September 30, 1980, October 3, 1980, and October 23, 1980, which inspected and released only galvanized material. Therefore, painting procedures would not have been applicable to this purchase order.

We have reviewed 33 purchase orders written against specification X2AH01 and found that 25 required the material purchased to be galvanized. The remaining eight purchased bulk steel, steel sheets, nuts, bolts, washers, and Nelson studs and had no coating requirements and therefore do not require the commitment that coatings be applied in accordance with the coating manufacturer's standards.

In order to preclude any problem with coatings since additional P.O.'s may be issued under X2AH01, we will revise coating requirements by January 3, 1986.

2. "The application procedure approved for X2AG03 does not include specific instructions from the coating manufacturer, either by inclusion or reference by date, regarding surface preparation, mixing or application."

Application Procedure No. 9510-AX2AG03-89-1, Paragraph 1, requires shop surface preparation and coating application in accordance with ANSI N101.4 which requires commitment to manufacturer's recommendations.

We have compared the manufacturer's data sheets against the submitted procedures and have found the procedures are more complete than the data sheets and meets or exceeds all manufacturer's requirements.

Finally, FSAR Section 6.1.2-1 requires that coatings be applied in accordance with manufacturer's instructions, it does not require manufacturer's data sheets or requirements to be included by reference or attachment."

3. "The procedure for X2AG03 does not address corrective action for deficiencies and inspection requirements or frequencies (i.e., surface cleanliness, cleanliness of compressed air and dry film thickness)."

The specification did not address corrective action, etc., because Engineering did not want the vendor to do touchup work. All repairs required to steel as it arrived at the site resulting from damage during transportation, erection and other activities, have been made in the field under Specification No. X1AJ07.

4. "X5AC03 does not limit the maximum dry film thickness."

On small valves, it is almost impossible to adhere to a uniform maximum thickness of coating and therefore, was not included in the specification. If the coating is sound, with no evidence of mudcracking, crazing, runs or sags, it is acceptable. Should inorganic zinc fail under DBA conditions, it will come off as a powder and not affect the performance of the sump. None of the valves are topcoated and therefore, there is no safety concern.

5. "X2AG03 and X2AH01 do not reference ANSI N101.4, however, this is an FSAR commitment."

While ANSI N101.4 is not specifically referenced in Specification No. X2AG03, approved vendor procedure No. 9510-AX2AG03-89-1 specifically invokes ANSI N101.4 under Paragraph 1.1 - scope.

Specification No. X2AH01 does not specifically reference ANSI N101.4, but the documentation required by Section 16, "Quality Assurance Program," complies with ANSI N101.4 requirements.

We have reviewed an additional twenty-four (24) specifications for equipment located inside containment and have found that all but five (5) met ANSI N101.2 and ANSI N101.4 standards, either within the specification or the approved vendor submittals.

The equipment purchased under the five specifications not meeting ANSI standards are classified under Paragraph 6.1.2.1.C of the FSAR which takes exception to Regulatory Guide 1.54 for small "production line" items. These specifications are as follows:

X4AL05	Miscellaneous Hoists
X3AN08	Lighting Panelboards
X4AF18	Miscellaneous Horizontal Centrifugal Pumps

X5AA05 Containment Hydrogen Monitoring Equipment
X5AB01 Miscellaneous Control Panels

Therefore, no further review for "broadness" of this finding is necessary.

Associated Reports:

Application procedures for X5AC03

Root Cause of Finding:

Failure to follow procedures.

Originating discipline did not circulate DRNs to all affected disciplines.

Action Taken to Prevent Recurrence:

Project issued a memorandum reminding the disciplines to submit future specifications for review by the architectural discipline for coatings compliance.

Future Commitments:

Revise Specification No. X2AH01 to correct deficiencies by January 3, 1986.

IDR Assessment

1. The IDR team agrees that the specifications need not explicitly require application of coatings in accordance with manufacturer's instructions. An acceptable method for insuring this is to require submittal of vendor procedures for approval. At the time of the review procedures for Specifications X2AH01 and X5AC03 were not available for IDR review nor was any reason given as to why they may not have been required. In addition, procedure AX2AG03-89-1 did not appear to contain this requirement. Based upon the project's response the IDR team has reexamined procedure AX2AG03-89-1 and found that Section 3.1.1.1 does require that the paint shall be mixed, thinned, and applied in accordance with manufacturer's instructions. The referenced procedures for Specification X5AC03 have been reviewed by the IDR team and do invoke the manufacturer's requirements. Since the submitted procedures for AX2AG03 and X5AC03 do require application in accordance with manufacturer's requirements and there was no need to have a procedure submitted under X2AH01, since no material has been coated under this specification, the IDR team has concluded that the project has been adequately implementing this requirement by their review and approval of vendor procedure submittals.

2. The IDR team agrees that the FSAR requires coatings be applied in accordance with manufacturer's instructions, but does not require the instructions be included by reference or attachment to specifications and procedures. Procedure AX2AG03-89-1 does include specific instructions for surface preparation in Section 2.0 and does contain all the manufacturer's requirements for mixing, thinning, and application in

the data on Form CP-1, which is required to be completed by the manufacturer. In addition, review of the approved procedures for Specification X5AC03 determined that the manufacturer's requirements were incorporated in these procedures. The IDR team therefore has concluded that the manufacturer's requirements are being incorporated in the approved vendor procedures and the manufacturer's data sheets do not have to be included by reference or inclusion.

3. The project response regarding corrective action is acceptable and explains why there are no touchup requirements in the specification. The IDR team agrees that this is an acceptable way to preclude touchup. Since there are no approved touchup systems in the specification, the vendor would not have any such work approved by QC prior to shipment. The IDR team therefore concurs that these requirements do not have to be in the specification.

   With regard to inspection requirements, the IDR team has reviewed Procedure AX2AG03-89-1 again and found that inspection for surface cleanliness is required by Form CP-13 (Daily Inspection Report). The frequency of inspection is adequately covered by the referenced standard (SSPC-SP10) for surface preparation and the surface profile described in Section 2.1.3 of the procedure. Based on the information provided by the project in Item 1a of their response, that Ingall's Steel uses wheelabrators for blasting, there is no need for cleanliness inspection of compressed air. Re-examination of procedure AX2AG03-89-1 by the IDR team also noted that standard SSPC-PA2 has been referenced as the means to measure dry film thickness for "D" areas coating. BPC has confirmed with Ingall's that this was also intended and has been used for dry film thickness of "N" area coatings. The IDR team therefore has concluded that inspection requirements have been adequately described in the procedure.

4. The project response is acceptable. The IDR team agrees that there is no need for such a requirement since the valves are not topcoated.

5. The IDR team agrees that procedure AX2AG03-89-1 invokes ANSI N101.4 and that this is an acceptable means of implementing the commitment. The team also reviewed X2AH01 and concurs that the documentation required by Section 16 meets ANSI requirements, and the requirement to meet ANSI N101.4 need not be spelled out explicitly. Based on these facts and the additional review performed by BPC, the IDR team concludes that the commitment to ANSI N101.4 is being adequately addressed either in the specifications or procedures.

In summary based on the project response, review of procedures for Specification X5AC03 and re-examination of procedure AX2AG03-89-1, the IDR team considers this matter to be a nonfinding since the technical requirements for application, inspection, and documentation of safety related coatings were adequately addressed in the project documents. Further, the corrective action indicated in the project response is considered by the IDR team to be for clarification only.

Finding Level IV

Finding 3 - Use of Unspecified /Unqualified Touch-up Painting System (RRF 13B-15)

Field coating system FN-8 in Spec. X1AJ07 specifies touch up of inorganic zinc shop primed surfaces, with Amercoat 90N. 90N is only to be used per Spec. X1AJ07, for a finish coat over Amercote D6N and is not included as a finish coat over Carbozinc 11SG and Valspar 13F1200. Williams Procedure W-8A uses Amercote 90N for touch-up and finish coat irrespective of primer used. Additionally there are no DBA test results for Carbozinc 11SG and 13F1200 touched up with Amercote 90N and finish coated with Carboline 191HB or Valspar 89 series, respectively, as required by the specification.

Project Response

Coating System Sheet FN-8 in X1AJ07 has been misleading. The intent is not to touch-up the inorganic zinc primer with Amercoat 90N and then apply a finish coat using another manufacturer's product (i.e., Mobil 89 series or Carboline 191HB). The Amercoat 90N is the only prequalified product that can be used for touch-up and finish coat to the listed inorganic zinc primers. If the primer is intact, the manufacturer's respective finish coat may be used (i.e., Carboline 191HB applied over Carbo Zinc 11, or Mobil 89 series applied over Mobil Zinc 13-F-1200). There are DBA test results for all coating systems described above. The coating system sheet has been revised to clarify the use of these products (C-FCRB-15,988).

This clarification should explain the reason Williams Procedure W-8A uses Amercoat 90N for touch-up and finish coat. Procedure W-8A does not identify the primer for two reasons. DBA data supports the use of Amercoat 90N applied over all the primers specified in System FN-8. The scope of Coating System FN-8 is controlled by schedules "B" and "C" in X1AJ07.

IDR Assessment

The IDR team has reviewed the specificiation revision as shown on C-FCRB 15988, and agrees that this will eliminate the ambiguity in the description of system FN-8. The DBA test data supplied by BPC and reviewed by the IDR does support DBA qualification of Amercoat 90N as a touch-up and finish coat over all the specified primers. Since Williams procedure W-8A uses Amercoat 90N for touch-up and finish coat and does not permit an Amercoat 90N touch-up to be topcoated with another manufacturer's material the IDR team concludes that only qualified coating systems were actually used. Therefore this is considered a document ambiguity only and no further action is required.

Finding Level III

Finding 4 - Coating System-Deviation Report Deficiencies (RRF 13B-19)

Nineteen (19) coating related deviation reports were selected during the IDR for a detailed review of the engineering evaluations performed and the technical adequacy of the resulting dispositions. Of these nineteen (19) examined in detail, nine (9) of the DR evaluations, justifications or dispositions were found to be deficient. As a result of such a high percentage of deficiencies, it is questionable that the dispositioning of coating related DR's has resulted in coating systems that are within the parameters of the systems tested to the DBA conditions.

The specific deficiencies in the nine (9) DR's are described below:

CD-

3275 The method of repair does not address the touch-up of the primer. The DR does not address inspection requirements. The use of 191HB for the touch-up of CZ-11 does not appear to be a DBA qualified system.

3410 The acceptance of coatings, applied outside of the coating manufacturer's recommended ambient conditions, based upon visual inspection is not valid. Altered coatings may perform satisfactorily under normal conditions but fail in a DBA.

3423 This DR addresses two conditions: 1) a DFT gage reading low and 2) a DFT gage reading high. The justification for 1) is not acceptable. CZ11SG may not mud crack until film thicknesses in excess of 13 mils have been achieved but CZ11SG may fail under DBA conditions with thicknesses in excess of 7 to 8 mils with no visible mudcracking. The justification for 2) does not adequately address the deviation. If the gage was reading high when calibrated but the readings taken before calibration were in an acceptable range, it is not clear that these readings are correct.

3306 Subdivision of coating kits should not be done without the use of calibrated measuring equipment.

3346 Justification is not clear. Coating materials may be effected by storage outside of the coating manufacturers recommended conditions. Altered coatings may appear visually acceptable under normal conditions but fail in a DBA.

3378 The justification for acceptance is not clear; at the time of calibration, the DFT gage was reading 3.5 mils for the 8.16 mil standard and 6.0 mils for the 14.8 mil standard. Excessive film thicknesses on inorganic zinc may result in a coating without visual defects; however, the performance of the coating system in a DBA may be altered.

3248 This DR dispositions four deficiencies. 1) It is not clear why a crack observed in the coating system will not affect performance. Cracks may indicate serious coating deficiencies. 2) Reasoning acceptable. 3) The deviation states that the exposed steel that

was touched up was not acceptable due to holidays and bare metal and yet the justification for acceptance "as is" states that the plate was shop coated. The justification for accept "as is" on 3) is not clear. 4) Justification is acceptable.

3214 The justification for this DR is not clear.

3182 The DR states that coatings were applied over rust, steel without a profile and while the surface temperature was 0° to 2°F above the dew point. The disposition requires rework of those portions of the coating applied over the rust. The balance of the non-conforming conditions are acceptable "as is." No justification is provided for acceptance and no procedure or inspection requirements are provided for reworked areas.

Project Response

This finding enumerates nine DR's against coatings, identifies Bechtel as the responsible organization, and questions the ability of the resultant coating system to remain within the DBA tested parameters.

Only five of the enumerated DR's are against Bechtel documents. We address these five DR's hereinafter. The four remaining DRs were against field coating procedures, were dispositioned by GPC, and were not forwarded to Project Engineering. However, all DRs with a "use as is" disposition, whether stated or understood, are required to be reviewed by Project Engineering.

Finding 13B-22 addresses this dispositioning requirement and these four DRs will be reviewed under the response to Finding 13B-22.

CD-3275

The DR's method of repair does not address the touch-up of the primer and inspection requirements because it is not necessary since the referenced Specification No. X1AJ07 covers these subjects in paragraphs 7.3.2 "Surface Preparation, Touch-up Areas" and 5.0 "Inspection and Tests."

The use of 191HB for the touch up of CZ-11 is a DBA qualified system. See attached copy of memo dated October 2, 1985, on DBA Testing.

FSAR Sections 6.1.2.1 specifically states and Section 6.1.2.1E which is being revised and will specifically state that the project will meet the intent of ANSI N101.2, and the intent of ANSI is that the coatings remain intact during a LOCA condition. The DBA test panels show no evidence of the coating delaminating, only a few minute blisters. Therefore, since the tests show that the coating will not fail, the intent of ANSI N101.2 has been met.

CD-3306

The DR states that "the materials were measured and witnessed by Williams' QC." This is an acceptable procedure to the manufacturer of 191HB. The DR also states that the Williams procedure prohibiting subdivision of the kits

was in process of revision to permit subdivision of the kits as allowed by the manufacturer.

CD-3248

This DR enumerated four deficiencies.

With respect to 1), it is not clear from reading the DR whether the two cracks described are hairline cracks, which may have resulted from substrate movement, and consequently would not jeopardize the DBA performance of the coating; or whether these cracks are "mud cracks" induced by excess millage of undercoat, which mudcracking could affect DBA performance.

Bechtel Power Corporation has inspected the area in question and found the following:

1) Due to the installation of HVAC equipment defects such as cracks and holidays cannot be located in the coated surface of the concrete substrate wall.

2) The coating around the perimeter of the embedded steel plate has spilled exposing the concrete substrate.

3) The embedded steel plates appear to be coated with an epoxy applied over bare steel. The coating has failed at the interface of the concrete and steel around the entire perimeter of the embed plate. One embed plate has a pipe support installed with control equipment lines in place, the weld around the bracket at the embed plate requires a touchup coating application.

The reason for the spalling around the embed plates note in #2 and #3 above is due to differential movement of the steel and concrete. The thin layer of hard epoxy coating cannot bridge the crack between the steel and concrete wall. This is not an indication of coating failure or poor application, but substrate related.

The reasoning for accepting dispositions 2) and 4) were found acceptable.

With respect to 3), while the justification was not clear, none-the-less the embed plate is not used and the quality of the coating on this one plate will have no effect on plant safety.

CD-3214

The application of inorganic zinc coatings when the surface temperature is only 2 degrees F above the dew point and after ensuring that the surface is dry was proven acceptable in our response to Finding 13B-11. Please refer to that finding response documentation.

CD-3182

Surface temperature as it relates to dew point is discussed in resporse to Finding 13B-11. Procedures or inspection requirements for the reworked

areas are not included in the DR because the referenced Specification No. X1AJ07 covers those requirements adequately.

The coating of steel with CZ-11 over a substrate that does not have the specified profile is not a qualified system. The approved "recommended disposition" states that areas coated will be documented and quantified as an unqualified coating. These areas have been documented and quantified.

Based on our above review of the five DRs, we do not have any evidence which would indicate that the parameters of the coating system provided, are different from the DBA tested system.

Associated Reports:

"Summary of Supportive Data for Field Coating Specification No. X1AJ07," transmitted by letter DAH-105-01, dated October 2, 1985, is attached.

System FN-6, Revision 0, Specification X1AJ07.

Root Cause of Finding:

Failure to follow procedures.

Action to Prevent Recurrence:

None, as stated above, the disposition of the DR's does not jeopardize the coatings systems' performance under DBA.

Future Commitments:

None

IDR Assessment

CD-3275

(a) The IDR team agrees that the DR need not describe explicitly touch-up and inspection requirements since these are covered in the referenced specification.

(b) The DBA test results (summarized in DAH-105-01) for touch-up of CZ-11 with 191HB do not meet the letter of ANSI N101.2 since some of the intact blisters are larger and more frequent than permitted. However, we do concur that the intent of ANSI N101.2, and the only safety issue, is that the coatings remain intact during a DBA. The IDR team concurs that FSAR Section 6.1.2.1 states that the intent of ANSI N101.2 is committed to, revision of Section 6.1.2.1E will further clarify this point. The team therefore concludes that this DR was properly evaluated and dispositioned adequately.

CD-3306

This material, 191HB, has a mixing ratio of component parts of one to one. Therefore calibrated equipment is not required. The components need only be

mixed one to one. Measuring and witnessing by QC is sufficient to ensure that equal parts were used, since the exact amount of each part used does not need to be known. The IDR team therefore has concluded that this DR was properly dispositioned.

CD-3248

(a) Since the only visible cracks are around the perimeter of the embedded plate we concur that the cracks are due to substrate movement and not coating related. The IDR team therefore concludes that this DR was properly dispositioned even though the process of evaluation was not completely described.

(b) The DR did state that the plate would not be used. The IDR team agrees that the coating quality on one embed will not effect plant safety and that while the DR could have been clearer it has been properly dispositioned.

CD-3214

The IDR team concurs, based on the response to Finding 13B-11, that this DR was properly dispositioned.

CD-3182

(a) Based on the response to Finding 13B-11 we concur that acceptance of that portion of the coating applied to a surface with a temperature of 0° to 2°F above the dew point was proper.

(b) The IDR team concurs that the DR need not include rework instructions or inspection requirements since these are included in Specification X1AJ07, to which this DR applies.

(c) After re-examination of the DR we concur that the use-as-is disposition for the coating applied over steel without a profile is appropriate since the approved disposition does require that it be quantified and considered unqualified and the DR does include the quantity.

Based on the additional information provided in the project response the IDR team concludes that DR's being dispositioned by the design agency (BPC) were being properly evaluated and dispositioned correctly and consistent with the systems as tested for DBA conditions. We agree, based on examination of the remaining four DR's cited in the finding, that these were "use as is" dispositions that were not, but should have been, forwarded to BPC for review. This issue is addressed in Finding 13B-22 (see Section 6.2.3.3).

Finding Level II

Finding 5 - Painting Procedures-Incomplete Inspection and Qualification Requirements (RRF 13B-14)

Williams Contracting Incorporation Quality Control Procedures address how to fill out the appropriate inspection form but do not completely address the required inspections or acceptance criteria. Examples include:

1. The frequency of the check of ambient conditions.

2. Basis for acceptance of surface cleanliness (i.e., SSPC-Vis1).

3. Basis for acceptance of surface cleanliness or profile for power tool cleaned surfaces.

4. The painter qualification procedure does not address which substrate should be used (Concrete or Steel), required application equipment (i.e., does airless spray application qualify an applicator for conventional spray?) and coating materials to be used (i.e., generic coating types or the actual coating to be used.

Project Response

These items have been addressed on a prior audit, (AFR 747) by GPC QA and corrective action is in progress.

The revision date of procedure #WC-006, as reviewed by the Readiness Review Team Item #4 of the finding, was 5/16/85.

This procedure as well as procedures WC-002, WC-010 and WC-012 (attached) have already been revised to address the deficiencies identified by Readiness Review Finding #13B-14

A Georgia Power Company quality Assurance Audit (AFR No. 747) previously identified the items addressed in this finding. As corrective action, Williams' procedures have been extensively revised to include required inspections and acceptance criteria. Prior to this, inspections were performed as required by the specification, utilizing the acceptance criteria established by the specification and applicable manufacturer's recommendations.

IDR Assessment

The IDR team has reviewed procedures WC-002, WC-006, WC-010 and WC-012 as revised in response to AFR 747 and Readiness Review Finding 13B-14. Review of these procedures indicate that inspection responsibilities, required inspections, inspection hold points, and acceptance criteria have been defined and with the revision to WC-006 the painter qualification procedure now provides instruction that require definition of the substrate, application method, coating system, etc, for which the painter's qualification was performed.

The IDR team, based on this sample review of revised procedures, considers that the corrective action taken in response to AFR 747 is adequate and will result in complete and detailed contractor QC procedures. During the

review, discussions with coating inspectors, coating supervisors and observation of in-process work indicated that the proper inspections were being performed with adequate acceptance criteria and that the coating work was being performed with quality worksmanship. Therefore no further action is considered necessary and the IDR team considers this finding resolved.

Finding Level II

Finding 6 - Use of Improperly Stored Coating Materials (RRF 13B-16)

Williams application procedures and WC-005 allow coating materials which have been stored outside of the coating manufacturers recommended storage temperatures to be used once the materials have been brought back to the required temperature range for 24 hours (regardless of length of time outside manufacturer's recommendation). Extended storage of products outside of the recommended temperature range may be detrimental to the products.

Project Response

The time span a product can violate the manufacturer's recommended storage temperatures is minimal. Williams QC is required by their procedure WC-005 to inspect the paint storage cabinets every work day. This verification ensures identification of deviations in a timely manner.

If the temperature leaves the required storage range, the incident is documented and the paint is transferred to the permanent storage facility. This is also required by Willimas Procedure WC-005. The permanent storage facility provides a controlled environment where the paint temperature will stabilize over 24 hours.

In addition, Quality Control's visual inspection of the mix, required by procedure WC-010, application, and cure of the paint will detect any defects. Manufacturers describe the visual defects as precipitation or conglomeration of materials. This will also affect the curing of the paint. Based upon visual inspection, any questionable areas of coating are removed and recoated.

IDR Assessment

The project response satisfactorily resolves the IDR finding. The IDR team was concerned that Williams application and inspection procedures permitted unlimited storage of coating products outside of the manufacturer's recommended storage temperature which could lead to invalidating the product shelf-life. The IDR team, upon further examination, agrees that procedure WC-005 requires daily inspection of the paint storage cabinets and therefore the time products will be stored outside of the manufacturer's recommendation is limited to 24 hours. Procedural requirements (WC-010) to witness mixing application and cure of painting products ensure that any products detrimentally affected by such limited exposure are detected. The IDR team therefore concludes that the system in use at Vogtle to control storage of coating products is adequate and the concern expressed by this finding is not valid.

Finding Level IV

Finding 7 - Inadequate Referencing of Painting Codes (RRF 13B-13)

Section 6.1.2 of the FSAR commits to using the latest published issue of Steel Structures Painting Council. It is not clear what revision dates are being followed. Specification X1AJ07 and Williams application procedures do not specify an effective issue date for the SSPC documents referenced. Specification X2AG03 and X2AH01 required the latest revision in effect at the time of the award of the contract. The shop application procedure for the X2AG03 contract lists the 1963 edition of SSPC-SP10 but does not specify the dates for other referenced documents.

Project Response:

Paragraph 2.0 of Specification No. X1AJ07 states that, "The Contractor shall provide to the Purchaser a listing of Codes (including the ffective issue date) which govern the work performed.

The effective issue date for the steel structures painting council (SSPC) standards referenced should have been included in the Williams application procedures. The shop application procedures for Specification No. X2AG03 should have specified dates for all referenced documents.

A review of all coating standards referenced in specification X1AJ07 has been made and the only standard that would have an effect on coating performance would be SSPC-SP10, 1982 edition, because this edition is less stringent than previous issues and DBA testing was done to the 1971 standard.

The actual work performance has been reviewed for conformance to this requirement. The review confirmed that the field coating contractor has not used the 1982 edition of SSPC-SP10. He has used the 1963 edition and therefore the work performance at the jobsite has not been affected, because the 1963 edition is as stringent as the 1971 edition.

All vendor procedures for coating of steel inside containment issued after the 1982 revision of Steel Structures Painting Council standards, were reviewed to determine if in fact this issue of the standard was used for surface preparation.

There were four specifications inside containment that were issued after 1982. Three of the specifications were NSSS installation specifications and had no coating requirement. One specification, X4AJ34 "Containment ESF HVAC Fans," did not have an effective code date for SSPC-SP10 surface preparation. A review of this matter with the vendor, disclosed that the work was done under the 1971 version of the SSPC standard. Therefore the work would comply with the requirements for approved surface preparation because all DBA testing was performed in accordance with this version of the standard.

Associated Reports:

None

Root Cause Of Finding:

Failure to follow procedures.

Not listing, in the project specifications and vendor procedures, the effective issue date for the codes used. Not sending the vendor coating procedures to the architectural discipline for review.

Action Taken To Prevent Recurrence:

Specification No. X1AJ07, Paragraph 2 has been revised to change the wording "including effective issue" to read as follows: "The latest published code at the time of the contract award." This revision is dated December 16, 1985.

Future Commitments:

Any future specifications with "N" area requirements shall include the statement, "The latest published code at the time of the Contract Award." However, it is not the intent to revise existing specifications (except as stated above) to incorporate this statement.

IDR Assessment

The IDR team concurs with the project that the only revised SSPC standard issued since the start of the project that would have an effect on coating performance is SSPC-SP10. Since BPC's review has determined that all work to date has been done to either the 1971 or the equally stringent 1963 standard, the IDR team concudes that the requirements of Section 6.1.2 of the FSAR have been met. Revision of X1AJ07 to specifically instruct the vendor to use the latest published code at contract award and the commitment to include a similar requirement in any future specification satisfactorily resolves the finding.

Finding Level III

Finding 8 - Painting Specification - Conflicting Requirements (RRF 13B-11)

Paragraphs 7.2 and 7.6 of specification X1AJ07 contain conflicting requirements regarding ambient conditions during coating application. 7.6.10 prohibits the application of coating materials below 50 degrees F. 7.2.1 allows inorganic zinc to be applied down to 35 degrees F. Paragraph 7.6.1 F requires that the surface temperature be at least 5 degrees F above the dew point during coating application. Paragraph 7.2.6 requires the surface temperature to be at least 2 degrees above the dew point during coating application.

Project Response

1. Paragraph 7.6.1.D is a "general" statement for all coatings while Paragraph 7.2.1 refers specifically to inorganic zinc which can be applied at a lower temperature. These requirements will be clarified in a revision to Specification No. X1AJ07.

2. Paragraph 7.6.1.F requires that the surface temperature be at least 5 degrees Fahrenheit (F) above the dew point during coating application while Paragraph 7.2.6 requires the surface temperature to be at least 2 degrees F above the dew point during coating application.

   An FCR was written to lower the dew point to 2 degrees above the dew point for inorganic zinc only. Paragraph 7.2.6 was changed to 2 degrees, but due to an oversite, Paragraph 7.6.1.F was not. FCRB-14,485 was issued in April, 1985 reinstating the 5 degree above dew point requirement in Paragraph 7.2.6.

The attached letter from Williams Contracting, Inc. confirms the fact that only CZ-11 was applied at less than 5 degrees F above dew point and that activity was closely monitored by the Quality Control department to assure that the substrate was dry prior to and during the coating application.

The attached Carboline letter dated September 17, 1985, points out that the whole intent is to be sure that the surface be dry prior to top-coating and if the surface is dry, there would be no problem with the application of Carbo Zinc 11.

It is evident that where the 2 degree above dew point requirement was followed, the surface was dry during application because had the surface not been dry, rust would be seen through the existing applied inorganic zinc. In addition, if the substrate was wet, gross unbonding of the inorganic zinc would occur within forty-eight (48) hours after application. The coated surfaces have been inspected and none of the above deficiencies exist.

Furthermore, if the temperature continued to fall after the application, the added humidity or moisture on the applied inorganic zinc would have assisted in its cure. It is an industry practice to use a mist or water spray directly over the applied coating to speed the cure of zinc.

Associated Reports:

1. William Contracting, Inc. letter dated September 3, 1985.

2. Carboline letter dated September 17, 1985.

Root Cause of Finding:

An oversight by the responsible engineer to coordinate specification requirements.

Action Taken To Prevent Recurrence:

Specification No. X1AJ07 has been revised to correct deficiencies and is currently being reviewed in-house prior to issue. The specification is estimated to be issued by November 7, 1985.

Future Commitments:

Issue specification by November 7, 1985.

IDR Assessment

FCRB No. 14,485 and the revision of the specification will remove the specific inconsistencies. The general ambient temperature requirement of 50°F is more stringent than the 35°F specifically permitted for inorganic zinc (Section 7.2.1). Therefore, no deficiency exists in the ambient temperature conditions specified.

In reviewing the Williams Contracting Incorporated application procedures, the IDR team noted that these procedures retained the more stringent requirement that the surface temperature be a minimum of 5°F above the dewpoint. It was also noted by the IDR during review of Deviation Report dispositions that Williams QC had been inspecting for dew point temperature requirements. DRs 3182 and 3214 were written by Williams QC for violation of the 5°F minimum requirement during application of Carbozinc 11 SG. The project has informed the IDR team that the 2°F above dew point requirement was used only for Carbozinc 11 SG and that QC was aware of this exception in the specification. The IDR team concurs with the project and Carboline that the key element is that the surface be dry prior to application of the coating. The IDR team does not agree that rust would necessarily be seen through inorganic zinc. However, if the surface were wet after surface preparation flash rusting would immediately occur and be visible to the QC inspectors prior to coating application. The team agrees that if the surface was wet, the inorganic zinc would shortly evidence disbondment, whether this would occur within 24, 48, or 72 hours etc., is a subjective judgement. The IDR team therefore concludes that 2°F above the dewpoint, while not desirable, is permissible for inorganic zinc. Since the Williams application procedures require 5°F above the dewpoint, and Williams QC was inspecting for this requirement, the IDR team has concluded that other coatings would not have been applied at 2°F without being detected by QC and identified on a Deviation Report. Therefore revision of the specification to reinstate the 5°F above dewpoint minimum surface temperature requirement is considered sufficient corrective action to resolve the finding.

Finding Level II

Finding 9 - Control of Zinc Inside Containment (RRF 13B-18)

Section 6.1.1.1.2 of the FSAR limits the amount of zinc going into the containment. However, there is no verification of the amount of zinc being used in protective coatings inside the containment.

Project Response

Verification of the amount of zinc being used in protective coating inside the containment is not required because the film thickness of the inorganic zinc paint is controlled by the field coating Specification No. X1AJ07. Quality Control has monitored the application to assure that the 4.5 mil thickness permitted by the specification was not exceeded. Sampling of the inspection reports showed that the overall average dry film thickness is 3.76 mils for the containment liner plate (see Attachment 1, Memorandum from Dean Brunton to Wynn Bedall).

Section 6.1.1.1.2 of the FSAR does not limit the amount of zinc going into the containment, but does reference Table 6.2.5-6 which lists the expected amounts of zinc in the containment protective coatings. This value is not a design limit, but was used in the post-accident hydrogen production analysis. In addition, neither standard Review Plan (NUREG-0800) 6.1.1 nor SRP 6.2.5 limits the use of zinc inside the containment. These documents state that hydrogen generation resulting from the corrosion of metals by the containment sprays during design basis accident should be controlled as described in Regulatory Guide 1.7, and the proposed operation of the combustible gas control equipment is acceptable if there is an appropriate margin (e.g., on the order of 0.5 v/o) between the limiting hydrogen concentration limit and the hydrogen concentration at which the equipment would be actuated.

Nuclear Calculation No. X6CAB.01.0 was performed to estimate the total amount of zinc used in the protective coatings inside the containment using information from manufacturer's paint data sheet, specification for field coating (specification No. X1AJ07), and estimated total zinc based paint surface areas. The total zinc based paint surface areas were provided by all disciplines and were based on civil/structural Calculation No. X2CJ2.3.0, vendor supplied information on Specification No. X4AJ16 (transmittal letter VB 3528), and material takeoffs from quantity tracking system. Calculation results were transmitted to Westinghouse for hydrogen generation analysis (BW-3900, dated February 9, 1983).

Calculation No. X6CAB.01 had been revised to include the updated zinc inventory data (e.g., zinc in decking, grating, cable tray, conduit and boxes, snubbers, and zinc-based paint). The average dry film thickness and uncertainties in surface areas of zinc-based paint were included in the calculation. Calculation result shows that the total weight of zinc in the inorganic zinc based paint is 21,860 lb with a total painted surface area of 466,215 ft^2 and the total BOP zinc inventory inside containment (e.g., zinc indecking, grating, cable tray, conduit and boxes, snubbers and zinc-based paint) is 34,851 lb with a surface area of 617,333 ft^2. This represents a 2.8 percent weight increase and 11.4 percent surface area increase of the total zinc. Since the hydrogen generation rate due to aluminum and zinc corrosion is less than 2/3 of the total hydrogen generation rate in the

first 14 days after a Loss of Coolant Accident (LOCA) (See FSAR Figure 6.2.5-6), and FSAR Figure 6.2.5-5 shows that the hydrogen concentration inside the containment without a hydrogen recombiner will not reach 4 volume percent until 14 days after a LOCA, this increase is judged to be within the calculation accuracy of the hydrogen generation analysis.

In addition, hydrogen recombiners are provided to maintain the hydrogen concentration inside the containment at less than 4 volume percent. FSAR Figure 6.2.5-5 shows that with a single 100-scfm recombiner started on the second day or when the bulk containment concentration reaches 3.5 volume percent, the hydrogen concentration is quickly reduced, thus showing ample margin in the hydrogen control system. Our experience in performing the hydrogen generation analysis on other nuclear projects indicates that the impact to the hydrogen generation analysis due to the above zinc inventory increase is minimal and that the hydrogen recombiner is adequate to handle the hydrogen generated inside the containment.

In conclusion, it is the intent of the FSAR to minimize, not limit, the amount of zinc. Zinc quantities inside the containment are calculated by the Nuclear Group in Calculation No. X6CAB.01. This calculation is included in our calculation verification program and will be reviewed annually for design changes. A letter to Westinghouse transmitting the revised zinc inventory, based on our current calculation review, is being prepared and will be issued to Westinghouse for evaluation as part of our work in progress. Further, sampling of the inspection report demonstrated thickness is within the specification limit.

Therefore, based on the above evaluation, we believe this item should not be classified as a Readiness Review finding.

Associated Reports:

None

Root Cause of Finding:

Not applicable

Action Taken To Prevent Recurrence:

Not applicable

Future Commitments:

Not applicable

IDR Assessment

Calculating the amount of zinc being used in protective coatings inside the containment based upon actual average coating thickness is an acceptable method of assessing the coatings contribution to hydrogen generation. Review of the hydrogen recombiner capacity against the results of revised Calculation No. X6CAB.01 is considered adequate to ensure that the amount of zinc inside containment is acceptable. Implementation of a tracking program is not required since the calculated quantities are based on actual site conditions. The IDR team therefore considers this finding resolved, since Calculation X6AB.01 results, described in the project response, demonstrate that the amount of hydrogen generation is not sensitive to variation in the coating thickness.

Finding Level IV

7.6 CONCLUSIONS

The Independent Design Review (IDR), conducted by Stone & Webster Engineering Corporation, evaluated the technical content of the engineering documents relating to the requirements for safety related coatings on a sample basis. The documents reviewed included test report summaries, specifications, vendor procedures, and deviation reports.

The IDR identified a total of 9 findings. Upon the presentation of additional information to the IDR team, four of them were classified as nonfindings. The five findings have been classified Level II (three findings) or Level III (two findings) since they were assessed to be deficiencies with no safety concerns.

In summary, all of the IDR findings have been satisfactorily resolved. The IDR team has concluded that, due to the limited number of findings and the corrective action taken in response to the IDR findings the safety related coating requirements for Plant Vogtle are acceptable.

APPENDIX 7A

INDEPENDENT DESIGN REVIEW PLAN

X7BD102-IDRP 13-2 Revision 0
Stone & Webster Engineering Corporation
Boston, Massachusetts
J.O.NO. 15224

INDEPENDENT DESIGN REVIEW PLAN

VOGTLE ELECTRIC GENERATING PLANT

MODULE NO. 13
POST TENSIONING AND
COATINGS

APPROVAL

TEAM LEADER _____ DATE: 6/11/85

IDRG MANAGER _____ DATE: 6/11/85

TABLE OF CONTENTS

1.0 OBJECTIVE

This portion of the Independent Design Review (IDR) addresses the technical adequacy of the engineering of the containment shell, containment post tensioning system, and coating systems inside the containment.

The purpose of this review plan is to define the scope, the review method, and the engineering activities to be reviewed to make an assessment of the engineering.

2.0 SCOPE

The effort will consist of a review of selected portions of:

1. The design of the containment wall, dome and mat structure and post-tensioning system

2. Engineering specifications for procuring, fabricating, and installing the containment post-tensioning system

3. The completeness and technical adequacy of the in-service inspection program for the containment post tensioning system

4. The coating requirements for steel and concrete surfaces

5. Procedures for coating application

6. Design Basis Accident (DBA) testing and acceptance for coatings inside the containment

7. Project procedures to inventory, evaluate and accept coatings inside the containment that have not been qualified for the DBA environment.

8. Change evaluation for dispositioning of Deviation Reports for post tensioning and coatings

The review will be conducted to ascertain whether the Plant Vogtle licensing commitments have been incorporated into the engineering and design of the containment structure post-tensioning system and coating systems. The review will include licensing commitments, design criteria, codes and standards, and calculations.

3.0 REVIEW METHOD

The Independent Design Review (IDR) for this module will evaluate project design criteria, calculations, drawings, specifications, coating application and test procedures and design change documentation. This review will encompass the documents listed in Attachment 1. Independent verification calculations will not be prepared during this review.

3.1.1 Containment Structure/Post-Tensioning

3.1.1.1 Design Calculations and Drawings

The reviewer will use the FSAR as a basis to understand the project licensing commitments. The design criteria will be evaluated to ascertain whether the commitments have been correctly translated into the document through codes and standards, design loads, analysis methods, and load combinations.

Design calculations will be evaluated for the proper input from the design criteria, correct design conditions, the proper use of design codes and allowable design stresses, consideration of creep, shrinkage, loss of prestress, and deflections.

The design drawings will be reviewed to ascertain whether the information from design calculations is correctly shown on the design drawings. The tendon size, material, location, and end anchorage details shown on the drawings will be reviewed for a representative sample of the tendons and compared to the requirements shown in the calculation.

3.1.1.2 Engineering Specifications

A review of the specifications for furnishing, fabricating, and installing the containment post-tensioning system will be performed.

The reviewer will use the FSAR as a basis to understand the project licensing commitments. The specification will be reviewed for proper material specifications, traceability requirements, sequence of tensioning, tendon location tolerance, tendon force tolerance, tendon qualifications, and anchorage qualification, inspection procedures and specification of coating material.

3.1.1.3 Change Evaluation

A sample of Deviation Reports (DR) associated with post-tensioning will be selected for review. The reviewer will evaluate the engineering basis of the disposition for completeness and technical adequacy.

3.1.1.4 In-Service Inspection/Surveillance Program

The in-service inspection program and procedure for the post-tensioning system will be reviewed during the IDR. Procedure requirements for frequency of inspection, tendon sample selection, tendon liftoff (prestress level) tests, material tests, and inspection requirements for filler grease will be reviewed for technical adequacy and compliance with FSAR requirements.

3.1.2 Containment Structure Coating Systems

3.1.2.1 Surface Preparation

Project specifications and construction procedures will be reviewed to determine the adequacy of surface preparation methods (abrasive blasting,

power tool cleaning, etc) and the adequacy of construction procedures used to verify surface cleanliness prior to coating application.

3.1.2.2 Coating Application

Coating application requirements in the specifications and procedures will be reviewed for qualification of applicators, adequate monitoring of ambient conditions during application and curing, use of proper methods to determine coating film thickness and the use of proper thinning and cleaning materials.

3.1.2.3 DBA Coating Qualification

Project specification will be reviewed to assess the adequacy of the requirements of coatings to be qualified to the DBA environment, including proper specification of containment environmental conditions for prequalification testing and/or specification of proper acceptance criteria.

3.1.2.4 Unqualified Coatings

The adequacy and completeness of project requirements for monitoring unqualified coatings inside the containment will be reviewed. Means to inventory and assess the unqualified coatings will be evaluated for technical adequacy.

The adequacy and completeness of project procedures for maintaining accountability of zinc coatings used inside the containment will be reviewed. Means to inventory their hydrogen generation during a LOCA will be evaluated.

3.1.2.5 Site Walkdown

Coatings on steel and concrete in selected portions of the containment structure will be visually examined for overall quality of appearance and indication of proper application. Where the project work schedule permits, in-process surface preparation and coating application will be observed for consistency with project specification and procedure requirements.

3.1.2.6 Change Evaluation

A sample of Deviation Reports (DRs) associated with coating application will be selected for review. The reviewer will evaluate the engineering basis of the disposition for completeness and technical adequacy.

4.0 SCHEDULE

Activity	Location	Date
Review Preparation	SWEC Boston, Mass.	6/10 to 6/14
Review of Project Engineering Design Documents-Post Tensioning Only	Bechtel Offices Norwalk, Calif.	6/17 to 6/21

Activity	Location	Date
Reviewer Reports: Project Engineering Review	SWEC Boston, Mass.	7/12/85
Findings of Project Engineering Design Review Submitted	SWEC Boston, Mass	7/10/85
Review of Specifications, Procedures, DR's & Site Walkdown	Plant Vogtle	6/24 - 6/28
Reviewer Reports: Specifications, DR's and Site Walkdown	SWEC Boston, Mass.	7/12/85
Findings of Specifications DR's and Site Walkdown Review Submitted	SWEC Boston, Mass.	7/10/85
Draft Module Report for SWEC Review		7/26/85
Module Report for Review Board		8/7/85

Documents

A. Readiness Review Task Force Module No. 13 - Licensing Commitment Matrix

B. FSAR (Chapters 1.9, 3.8, 6.1, and 6.2)

C. Design Criteria

General Design Criteria DC-1000-C
Containment Structure DC-2148

D. Containment Structure Design Report

E. Containment Structure Design Calculations

F. Containment Structure Reinforcing Drawings

G. Containment Structure Post-Tensioning System Drawings

H. In-Service Inspection/Surveillance Procedures for the Containment Post-Tensioning System

I. Specifications for:

Furnishing, Fabricating, and Installing Containment Post-Tensioning System

Field Applied Coatings

REVIEWERS' ASSIGNMENTS

Reviewer	Area of Review
J.A. Curtin	Containment Structure Post-Tensioning Design In-service Inspection Program
P. McHale	Post-Tensioning Specification Change Evaluation
M. Schneider	Coating-Surface Preparation Coating-Application DBA Testing of Coatings Unqualified Coatings/Zinc Accountability Site Walkdown

APPENDIX 7B

REVIEW TEAM MEMBERS

IDR REVIEW TEAM

Review Area	Name	Organization
Team Leader	J. Curtin	SWEC
Coating Specifications	M.D. Clark	SWEC
Coating Applications and QC Procedures	M.D. Clark	SWEC
Coating Deviation Report Dispositions	M.D. Clark	SWEC
Site Walkdown	M.D. Clark	SWEC

APPENDIX 7C

DOCUMENTS REVIEWED

7.C.1 General

1. Ingall's shop procedure for "Surface Preparation and Coating," Bechtel Log No. AX2AG03-89-, Revision A (November 28, 1978)

2. "Power Tool Cleaning of Carbon Steel, DBA Qualification Test," Bechtel National, Inc., Downey, California, Dated November 13, 1979

3. FSAR Sections 6.1.1.1, 6.1.2.1, and 3.11.B

4. Bechtel Power Corporation Correspondence from F. B. Marsh, Project Engineering Manager, Western Power Division, to Mr. J. A. Bailey, Project Licensing Manager, Southern Company Services, dated February 19, 1985, regarding FSAR Change Notices.

5. Bechtel Power Corporation Correspondence from M. Malcom, Project Engineering Manager, Los Angeles Power Division, to Mr. G. Bockhold, Jr., General Manager, Vogtle Nuclear Operations Department, Georgia Power Company, dated July 16, 1984, regarding Diesel Fuel Oil Storage.

6. Bechtel Power Corporation Correspondence from M. Malcom, Project Engineering Manager, Los Angeles Power Division, to Mr. O. Batum, Manager, Project Engineering & Licensing, Southern Company Services, Inc., dated August 18, 1983, regarding Audit Finding Reports 442, 443, 444.

7.C.2 Specifications

1. Specification No. X2AG03, Category I Structural Steel, Revision 6 (August 26, 1983)

2. Specification No. X2AH01, Furnishing, Fabrication, and Delivering Miscellaneous Category I Steel, Revision 11 (October 16, 1984)

3. Specification No. X1AJ07, Field Coatings, Revision 22 (May 10, 1985)

4. Specification No. X5AC03, Small Butterfly Valves, Revision 11 (April 8, 1985)

7.C.3 Williams Contracting Inc. - Application Procedures

1. System W-3, Revision 4 (Novemeber 28, 1984)

2. System W-6, Revision 3 (April 3, 1985)

3. System W-7, Revision 1 (June 14, 1984)

4. System W-8A, Revision 2 (September 25, 1984)

5. System W-13, Revision 1 (December 20, 1983)

6. System W-14 KL, Revision 2 (December 21, 1983)

7. System W-27, Revision 4 (November 7, 1984)

8. System W-31, Revision 5 (September 25, 1984)

7.C.4 Quality Control Procedures

1. Williams Contracting Inc. Quality Control Procedures, Plant Alvin Vogtle, Revision 27 (February 5, 1985)

7.C.5 Coating Deviation Reports

CD-2285

CD-2305

CD-3182

CD-3214

CD-3248

CD-3275

CD-3306

CD-3346

CD-3378

CD-3404

CD-3410

CD-3413

CD-3423

CD-3507

CD-4746

CD-4825

CD-4840

CD-5060

CD-7260

DRS Nos. CD-3770, CD-5017, CD-7432, and CD-7678 were selected for examination at the time of the onsite review. Upon subsequent evaluation, these

DR's were found to apply to coatings, outside of the containment. No additional evaluation of these DRs was performed.

APPENDIX 7D

PERSONNEL CONTACTS

7.D Personnel Contacted - Plant Vogtle Site

W.Bedal	Architectural Engineering Group Supervisor, Bechtel (Norwalk, CA)
D. Hill*	M & QS Coating Supervisor, Bechtel, (Norwalk, CA)
K. Flemming	Senior Architect, Bechtel
D. Brunton	Civil Engineer, GPC
L. Bishop	Civil QC, GPC
D. Hadley	Level II Inspector, Williams Contracting Inc.
G. Neelly	QA/QC Site Manager, Williams Contracting Inc.
D. Innes	Civil Section Supervisor, GPC
L. Robison	Asst. Resident Engineer, BPC (PFE)
R. Malin	Civil Sect Supervisor, BPC (PFE)

* Contacted by telephone

8.0 PROGRAM ASSESSMENT/CONCLUSIONS

8.1 SUMMARY OF OPEN CORRECTIVE ACTION

8.1.1 SECTION 6.1 ENGINEERING

- Finding 13B-20

  Action: Revise procurement specification for materials and equipment to reflect commitments relative to American National Standards Institute (ANSI) N101.4 and N101.2 as applicable.

  Responsible Organization: Bechtel Power Corporation home engineering office.

  Completion Date: March 22, 1986.

8.1.2 SECTION 6.2 CONSTRUCTION

Corrective actions committed to by the Project have been completed as of January 23, 1986.

There are no open items.

8.2 QA STATEMENT

The process for the development of this module was monitored by the Readiness Review Quality Assurance (QA) staff for general adequacy.

The primary focus of the monitoring effort was the identification, documentation, analysis, and resolution of Readiness Review Findings. The finding reports issued by the Readiness Review Team and their responses were reviewed, individually and collectively, for root causes and generic issues; i.e., trends. Based upon review of the responses and commitments to individual finding reports and generic concerns, the resolutions were determined to be adequate. All findings were initially distributed to project QA for review for reportability [10 CFR 21, 10 CFR 50.55(e)] in accordance with existing QA procedures. In addition, findings were screened by Readiness Review to determine whether any required additional evaluation by the project for reportability. No findings requiring additional evaluation were identified.

Other monitoring activities consisted of reviewing personnel qualification and training records for the team members, reviewing the verification plan, and reviewing completed checklists to assure adequate identification of findings. Additionally, an independent reverification was performed on a sampling basis under Readiness Review QA overview to determine the adequacy of the Commitment/Implementation matrixes and the Design/Construction verification efforts.

Based upon these monitoring efforts, this module and the Readiness Review Team conclusions are judged to be acceptable.

J. Taylor
Readiness Review Team
Quality Assurance Representative

John H. Draggs
Readiness Review Team
Quality Assurance Representative

Technical Consultant's Certification

Based on a review of this Module 13B, Report of Protective Coatings, and appropriate project documents such as construction specifications, construction application procedures, and engineering reports, I certify that to the best of my belief and knowledge the information and conclusions contained herein are factually and technically correct. Under the program described in Section 4 of this report and on the basis of corrective action described in Sections 6 and 7, the commitments of the Vogtle Electric Generating Plant Final Safety Analysis Report are being implemented. The design and construction programs that relate to protective coating materials and their application have produced a final product that meets design requirements and licensing commitments.

Max J. Schnieder III

Max J. Schnieder III

Coatings - Module 13B

Readiness Review Board Acceptance

The Readiness Review Board has been apprised of the scope and content of Module 13B, Coatings.

The Board has reviewed the program verification, as well as corrective actions, both proposed and implemented, by the Vogtle Project. Based upon this review and based upon the collective experience and professional judgement of the members, the Readiness Review Board is of the opinion that the corrective actions proposed are acceptable, and that the coatings at Plant Vogtle are sound and comply with commitments set forth in the Final Safety Analysis Report and acceptable practices.

APPROVED: _____ DATE: _____

Doug Dutton
Chairman, Readiness Review Board
Vogtle Electric Generating Plant

0149m/030-6

Georgia Power Company
Project Management
Post Office Box 282
Waynesboro, Georgia 30830
Telephone 404 724-8114
404 554-9961

Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202
Telephone 205 870-6011

Vogtle Project

Date: January 29, 1986

Re: Plant Vogtle - Units 1 & 2
Readiness Review Module 13B
File: X7BD102

From: O. Batum

To: W. C. Ramsey

Engineering has reviewed Module 13B, Coatings, for general accuracy and completeness. To the best of our knowledge and belief, the module is a complete and accurate representation of the Coatings, and the engineering process and commitments related thereto.

Ozen Batum
Deputy to Vice President
Project Engineering

xc: Project File

Interoffice Correspondence

Georgia Power

January 23, 1986

MEMO TO: W. C. Ramsey

FROM: M. H. Googe

RE: Plant Vogtle Units 1 & 2
Readiness Review Module 13B

FILE NO: X7BD102

CORRESPONDENCE NO: MQC-879

SECURITY CODE: NC

Nuclear Construction has reviewed Module 13B. To the best of our knowledge and belief, the module is a complete and accurate representaion of the site coatings installation program and commitments relateo thereto.

M. H. Googe
Project Construction Manager

GAB/ms

8.6 RESUMES

The resumes which follow present a brief professional listing of those people instrumental to the development of Module 13B.

JOSEPH ARBAIZA, Senior Quality Engineer, Team Member

Mr. Arbaiza has been employed by Bechtel Power Corporation since 1973.

Mr. Arbaiza has held the positions of project quality engineer (PQE) on Grand Gulf Nuclear Station (GGNS), Unit 2, and deputy PQE on GGNS, Unit 1. His duties included reviewing project engineering and vendor documents for compliance with engineering and quality program requirements, preparing and revising project engineering procedures, and representing the project engineer on matters related to quality (audits, training, etc.).

Education:

Finlay College
B.S., Mechanical Engineering

P.E., State of California

GEORGE M. CREIGHTON, Civil Quality Control Inspector, Team Member

Mr. Creighton has been employed by Georgia Power Company since 1980.

He holds several Level II inspection certifications, has over 8 years of quality control and inspection experience, and has participated in the inspection of reinforcements, cadwelds, modular insert plate assemblies, Unistrut, pipe sleeves, anchor bolts, core drilling weldings, and expansion anchors.

RAMON F. DINSDALE, Senior Field Engineer, Team Member

Mr. Dinsdale has been employed by Bechtel Power Corporation since 19 9.

Eight of his 16 years of generating plant construction experience were in the nuclear field. He has held the positions of field engineer, area engineer, lead civil engineer and scheduler. Mr. Dinsdale has extensive computer assisted engineering experience.

Education:

Utah State University
B.S., Civil Engineering
M.S., Civil Engineering

W. RODGER DUNCAN, Construction Engineer, Team Member

Mr. Duncan began his employment with Georgia Power Company in 1979.

Mr. Duncan has held positions in civil and mechanical engineering departments in the fields of soils, steel and concrete structures, and heating, ventilating, and air-conditioning.

Education:

Georgia Institute of Technology
Bachelor of Civil Engineering

BILL LUNDEEN, Engineering Geologist, Team Member

Mr. Lundeen began his career with Bechtel Power Corporation in 1978.

Mr. Lundeen has 31 years of experience in field and office studies in engineering geology and mining geology with the last 20 years specializing in major engineering structures such as fossil fuel and nuclear power plants, dams, and reservoirs.

Education:

University of California, Los Angeles
B.A., Geology

JAMES L. MARTIN, Quality Assurance Engineer, Design Team Member

Mr. Martin's 19-year career includes 16 years in the nuclear industry, 4 in submarines and 12 in power plants. In addition to quality assurance engineering assignments at Enrico Fermi, Limerick, Oconee, Edwin I. Hatch, and Grand Gulf, Mr. Martin has had design responsibilities at Davis-Besse and Hatch. During his association with the nuclear Navy, he designed piping systems and equipment foundations.

Education:

Richland Technical College
A.S., Civil Engineering Technology

M. R. THAKAR, Project Engineer, Team Leader

Mr. Thakar has been employed by Bechtel Power Corporation since 1965.

He has over 15 years of nuclear power construction experience and has held supervisory and engineering management positions at San Onofre Nuclear Generating Station, Vogtle Electric Generating Plant, Palo Verde Nuclear Generating Station, and the South Texas Nuclear Project.

Other engineering experience involves fossil fuel electric generating plants and various industrial construction projects.

Education:

Sardar Vallabhbhai University (Gujarat State, India)
B.S., Civil Engineering

University of Iowa
M.S., Civil Engineering

Pepperdine University, Los Angeles, California
Master of Business Administration

P.E., State of California
P.E., State of Georgia

PETER R. THOMAS, Supervising Construction Engineer, Team Leader

Mr. Thomas has been employed by Bechtel Energy Corporation since 1961.

His 24 years of generating plant construction experience include the positions of field cost engineer, civil superintendent, senior civil field engineer, project field engineer, chief field construction engineer, assistant project manager, and project superintendent.

Previous nuclear experience includes 14 months as project field engineer, San Onofee Nuclear Generating Station, and 2 1/2 years as project services superintendent at South Texas Project.

Education:

Stanford University
Master of Science - Civil Engineering - Construction
Bachelor of Science - Civil Engineering

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