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Vogtle Project

December 3, 1985

Mr. D. O. Foster
Vice President and General Manager
Vogtle Project
Waynesboro, GA 30830

RE: Readiness Review Program
Module 16
Nuclear Steam Supply System

LOG: RR-606

FILE: X7BD102

Dear Mr. Foster:

Pursuant to your instructions I am enclosing Module 16 of the Readiness Review Program entitled Nuclear Steam Supply System. 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 nuclear steam supply system.

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 and other descriptive documents. In concluding this verification process, the team then actually verified that the licensing commitments and the procedure and specification requirements identified were complied with.

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We are confident that the verification methodology used allowed the Readiness Review Team to properly appraise the actual condition of the nuclear steam supply system, 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 nuclear steam supply system 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 nuclear steam supply system is called into question. Therefore, the nuclear steam supply system 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,

W. C. Ramsey

William C. Ramsey

WCR/deg

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

VOGTLE ELECTRIC GENERATING PLANT

UNIT 1

READINESS REVIEW

MODULE 16 - NUCLEAR STEAM SUPPLY SYSTEM

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, an 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 design and construction activities associated with Vogtle-specific aspects of the nuclear steam supply system (NSSS) comply with licensing commitments and whether compliance with the commitments is verifiable with existing project documentation.

The scope of Module 16 for design includes an assessment of design control programs for the interfaces between the architect engineer [Bechtel Power Corporation (BPC)] and the NSSS supplier (Westinghouse). Technical evaluation of calculations and other design activities for the NSSS interface will be included in a separate Independent Design Review report. For construction, this module addresses the installation of the primary loop components (reactor, steam generators, reactor coolant pump, pressurizer, etc.) by Nuclear Installation Services Company (NISCO) and associated support activities (material control, storage, field construction engineering, etc.).

The program consisted of two separate reviews: design program verification and construction program verification.

In implementing 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's technical consultant provided independent technical oversight and concurrence, and Readiness Review quality assurance 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 two reviews and the method used in classifying findings resulting from the reviews are 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 concerns.
- Level II - Violation of licensing commitments or engineering requirements with no safety concerns.

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

Design Program Verification

The NSSS for the Vogtle Electric Generating Plant (VEGP) is supplied by Westinghouse. The design of the NSSS for VEGP is not unique, but is generic for several Westinghouse-supplied NSSSs, including several in commercial operation. Westinghouse designed the NSSS using functional groups who use the same procedures and policies to perform the same technical functions for each Westinghouse NSSS. These functional groups work under the Westinghouse QA program, which has been accepted by the USNRC for generic application. In addition, Vogtle-specific QA audits have verified that the QA program for Plant Vogtle has been properly complied with.

Because of the evidence of adequacy of the Westinghouse design program, established through numerous reviews by the NRC as well as numerous audits by Westinghouse customers, including GPC, the design verification scope concentrated on a review of the NSSS design interface (i.e., the flow of design information between Westinghouse and Bechtel) which provides the link between the Westinghouse-generic design and VEGP-specific design requirements.

Eleven key areas of the NSSS design interface between Bechtel and Westinghouse, such as pipe stress analysis and accident analysis, were reviewed to ascertain whether the interface activities were performed in a controlled and effective manner. The aspects considered were information transmittals required by each organization and receipt, correct internal distribution, and implementation of the information. The design program verification also ascertained whether the NSSS-related licensing commitments considered unique to VEGP had been incorporated into Bechtel project design criteria and other implementing design documents.

This verification resulted in four findings. One of these was classified as Level III, two as Level II, and one as Level I. The four findings were:

1. Finding 16-11 (Level II) resulted from a review of 10 CFR 50.55(e) reports, issued by GPC, associated with several Westinghouse-supplied components. In one report, commitments had been made to replace potentially defective pinion keys in certain Limitorque motor operators. The commitment to replace the pinion keys had not been followed through, nor was an effective tracking system in place to ensure proper followthrough of this commitment. The Project reviewed additional 10 CFR 50.55(e) reports and found that appropriate actions had been taken. The case of the pinion keys was considered to be an isolated oversight. The

Project has taken acceptable actions to upgrade their tracking system to include all past commitments made via 10 CFR 50.55(e) reports to ensure that commitments in 10 CFR 50.55(e) reports are properly tracked and implemented.

2. Finding 16-12 (Level III) involved inadequate documentation, in BPC pipe stress calculations, of the acceptability of calculated dynamic acceleration levels applied to Westinghouse-supplied valves. Within several pipe stress calculations only a reference was made to the project Design Criteria No. DC-1017, Stress Analyses Criteria, Rev. 3, for the allowable accelerations. No numerical comparison was documented in the body of the calculation. In addition one case was identified in which the Design Criteria No. DC-1017 did not contain the allowable acceleration levels for one type of Westinghouse supplied valve, even though the calculation had made reference to the Design Criteria Document. Additional project reviews determined that for all other valves requiring seismic qualification the vendor-supplied allowables are appropriately tabulated in DC-1017. This criteria has been revised to incorporate the missing allowables for the one valve identified above. Regarding the lack of appropriate documentation of comparing actual versus allowable accelerations in pipe stress calculations, it was determined that the problem exists for calculations performed prior to June 1982, at which time the calculation format was revised to include the appropriate comparison. Proper documentation of the calculated versus allowable dynamic acceleration comparison will be incorporated into the stress calculations (pre-1982) during the piping as-built reconciliation activities prior to fuel load.

3. Finding 16-13 (Level I) identified instances in which the instrument installation drawings issued by Bechtel did not fully incorporate Westinghouse installation requirements. Project review determined that this problem was due to the method in which installation details were issued for instrumentation and to lack of review of vendor requirements prior to issuing those details. It was determined that a total of 17 instruments had been installed using incorrect bolt size and 47 had been installed using incorrect torquing requirements as a result of this discrepancy. This finding was evaluated for potential reportability and was determined not to be reportable. However, the instruments in question were remounted in accordance with vendor requirements. Acceptable corrective action has also been taken in correcting the installation drawings and cross-referencing applicable vendor documents on the installation drawings to ensure that vendor installation requirements will be complied with for future instrument installations.

4. Finding 16-15 (Level II) stated that project procedures do not adequately outline the verification process for seismic qualification of Westinghouse NSSS equipment. The role

of Westinghouse, Bechtel, and others involved in the verification process is not defined by procedures. It could not be established by Readiness Review that a complete program exists for verification of NSSS equipment seismic qualifications (e.g., as qualified versus actual seismic levels). BPC has committed to expand the equipment qualification procedure to more completely address the seismic quailification verification process, for NSSS equipment, by December 1985.

In conjunction with effective implementation of corrective actions committed to by the Project in response to the identified findings, the design program verification results indicate that the Bechtel/Westinghouse interfaces are adequate. The identified findings do not constitute a trend which could adversely affect the adequacy of the NSSS interface controls between Bechtel and Westinghouse or the associated design activities.

Details of the design program verification are presented 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 incorporated licensing commitments into the implementing documents, whereas construction assessment determined whether the NSSS component installation met the design requirements.

During commitment implementation assessment, 11 licensing commitments were identified as the responsibility of construction for implementation. The Readiness Review construction team identified approved project documents utilized by construction that invoked, by reference or detailed directions, the requirements of each commitment.

During construction assessment, approximately 50 hardware elements and 800 records were assessed for compliance with the appropriate drawing and specification requirements.

This assessment resulted in five findings (16-6, 16-7, 16-8, 16-9, and 16-10). Of the five findings, none were categorized as Level I, three (16-6, 16-8, and 16-10) were categorized as Level II, and two (16-7 and 16-9) were categorized as Level III. Of those five findings, 16-8 involved incomplete code stamping of a component; 16-6, 16-7, 16-9, and 16-10 were documentation errors. Corrective action taken by the Project on each was adequate to correct the errors and preclude recurrence. None of the findings brought into question the acceptability of the components.

The NISCO installation program was found to be well-organized and controlled. The QA records were determined to be identifiable, retrievable, and effective at demonstrating the acceptability of the hardware installations.

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

<u>Readiness Review Team Conclusion</u>

Having performed a review of project documentation and the primary loop components, Readiness Review concludes that adequate controls exist to ensure the quality of work and the implementation of licensing commitments within the scope of this module.

Based on the results of the review and implementation of effective corrective actions committed to by the Project, it is the conclusion of the Readiness Review Team that the design and construction programs and processes associated with the NSSS, within the scope identified in this module, will produce a final product that meets licensing commitments and design requirements.

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1.0 INTRODUCTION

1.1 SCOPE

The review documented in this module was conducted to ascertain whether design and construction work activities associated with specific aspects of the nuclear steam supply system (NSSS) comply with licensing commitments and whether compliance with these commitments is verifiable with existing project documentation.

Within the design area, this module addresses the design interface between Bechtel Power Corporation (BPC) and Westinghouse. Specific BPC design activities regarding the Westinghouse-supplied NSSS systems are addressed in other modules (Table 1.1-1). Work activities considered Westinghouse generic are not addressed; however, this module addresses those Westinghouse activities considered Vogtle specific. Within the construction area this module addresses those activities involved with the installation of primary loop equipment only. Installation of other Westinghouse-supplied NSSS hardware is addressed in other modules (Table 1.1-1).

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

TABLE 1.1-1

MODULE HARDWARE/PROGRAMS

Module 4 - Mechanical Equipment and Piping

- o ASME Section III Components
  - Pumps (including drivers)
  - Valves (manual and power actuated)
  - Heat exchangers
  - Piping (including the installation program for the primary loop)
  - Etc.

Module 8 - Structural Steel

- o Pipe whip restraints (design only)

Module 11 - Pipe Supports

- o Pipe supports
- o Stress analysis
- o N-stamp program
- o Piping system as-built program
- o Pipe whip restraints (installation)

Module 16 - NSSS

- o Primary loop components
  - Reactor pressure vessel
  - Steam generator
  - Reactor coolant pump
  - Pressurizer
  - Primary loop piping (design interfaces only)
  - Etc.

Module 20 - Instrumentation and Controls

- o Instrumentation and controls

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 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 the nuclear steam supply system 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. Work Activities - 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 the NRC and various quality assurance organizations associated with the Vogtle Project as it applies to this module. Also included in this section is a description of special investigations performed on work discussed in this module and previously identified problems.

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

7. Independent Design Review - Provided as a separate report.

8. Assessment - Evaluations and conclusion of the subject work by the VEGP Readiness Review Board module expert, Readiness Review program quality assurance staff, Readiness Review Board, Engineering management and Construction management. In addition, this section contains a listing of finding items (section 6 of this module) still open and requiring project resolution. Resumes of Readiness Review Team members involved in the development of this module are also provided.

1.3 VOGTLE PROJECT STATUS

The Vogtle Project was reactivated in the spring of 1976 after a 2 year shutdown. Following reactivation, the architect-engineer, Bechtel Power Corporation, rebid mechanical equipment and piping contracts with the various suppliers, with the exception of the nuclear steam supply system which is supplied by Westinghouse.

The nuclear steam supply system equipment installer, Nuclear Installation Services Company, arrived at the Vogtle construction site in August 1982.

As of June 7, 1985 the approximate project status for Unit 1 and common systems within the scope of this module is as follows:

	Percent Complete
Design	94
Construction	85

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 (BPC) is contracted by GPC to provide architect/engineering services. BPC is the N-certificate holder for piping systems installed by Pullman Power Products (PPP), except portions of the nuclear steam supply system (NSSS) for which Westinghouse Electric Corporation (Westinghouse) has the N-certificate responsibility. When BPC acts as designee for GPC, BPC may perform activities assigned to GPC where specifically permitted by ASME section III, division 1.

Georgia Power Company is the owner and, as an approved material supplier authorized by BPC and Westinghouse, purchases and controls ASME items and provides onsite construction services for calibration, maintenance, documentation, document control, and nonconformance control.

Pullman Power Products is the installer (NA certificate holder) for ASME section III, division 1 piping systems and controls the scope of work for installation, field fabrication, operations, examinations, tests, and inspections. Those work activities performed by PPP are further defined and discussed in Modules 4 and 11, and are excluded from this module.

Westinghouse Electric Corporation is the NSSS supplier. Westinghouse Electric Corporation has N-stamp responsibility for the reactor coolant system, bottom-mounted instrument tubing, reactor vessel head vent system and O-ring seal leak detection leak-off appurtenance, pressurizer safety and relief valve assembly, and pressurizer surge line, with pending responsibilities for the resistance temperature detector bypass manifold.

Hartford Steam Boiler Inspection and Insurance Company is the authorized nuclear inspection agency (ANIA) contracted to perform the ASME Boiler and Pressure Vessel Code-required inspections at the VEGP jobsite.

Nuclear Installation Services Company is an installer (NA certificate holder) for ASME section III, division 1, class 1, 2, 3, and CS components, appurtenances, piping subassemblies, supports, and MC components and NF supports under the Westinghouse scope of supply.

This section includes a brief description of the organization and responsibilities of Georgia Power Company, Bechtel Power

Corporation, Westinghouse Electric Corporation, and Nuclear Installation Services Company as related to the scope of this module.

2.1 DESIGN ORGANIZATION

The two design organizations with responsibilities within the scope of this module are Bechtel Power Corporation and Westinghouse Electric Corporation.

2.1.1 BECHTEL ORGANIZATION

The Bechtel Power Corporation employs the matrix organization concept with an individual assigned as project engineering manager (PEM) and functional group heads reporting to him for the performance of functional tasks. Project direction is provided by the PEM, while functional direction is provided by discipline chief engineers.

The Bechtel engineering design effort involving data which requires interface with Westinghouse, the nuclear steam supply system (NSSS) vendor, is performed by the various technical disciplines. The nuclear discipline has responsibility for NSSS interface administration, but civil-structural, control systems, electrical, mechanical, and plant design disciplines from both Home Office Engineering (HOE) and Project Field Engineering (PFE) are also involved with the NSSS interface. Each discipline is supervised by an engineering group supervisor (EGS) who provides technical direction and guidance for the respective discipline. The discipline work is divided into several activities which are supervised by engineering group leaders reporting to the EGS. The details of the EGS's role and responsibilities are provided in Appendix A.

The organization of the various Bechtel disciplines is described in detail in the modules covering their primary areas of responsibilities, such as Modules 1, 4, 17, and 20.

2.1.2 WESTINGHOUSE ORGANIZATION

The Vogtle NSSS vendor is the Westinghouse Electric Corporation Water Reactor Divisions. The Water Reactor Divisions consist of several divisions, including the Electromechanical Division (EMD), Energy Systems Service Division (ESSD), Nuclear Components Division (NCD), Nuclear Fuel Division (NFD), Nuclear Operation Division (NOD), Nuclear Technology Division (NTD), and Plant Engineering Division (PED). The Vogtle NSSS is managed within Westinghouse by the project manager, Southern Company projects, NOD. The NSSS functions within Westinghouse report to this project manager on a matrix basis. For site-related matters, the project manager, Vogtle site reports directly to this project manager. Fuel-related matters are the responsibility of the Nuclear Fuel Division project manager for Vogtle. This organization is illustrated in Figure 2.1-1.

Westinghouse is organized on a functional basis. Design activities are performed by functional groups which perform the same function for each Westinghouse NSSS. The procedures and practices employed are the same for each NSSS and are not unique to the Vogtle NSSS. The scope of the Vogtle NSSS is defined by the NSSS contract between Georgia Power Company and Westinghouse Electric Corporation. The Vogtle NSSS, like other Westinghouse NSSSs, is designed under the Westinghouse Quality Assurance Program which is carried out in conformance to the quality assurance plan described in topical report WCAP 8370/7800. This plan has been submitted to and accepted by the USNRC for generic application to all safety-related work conducted in conjunction with design of commercial nuclear power plant projects. The American Society of Mechanical Engineers (ASME) regularly reviews the Westinghouse program, evaluating the areas of design control, interface control, and related disciplines. As a result, Westinghouse holds an ASME N certificate of authorization.

2.1.3 BECHTEL-WESTINGHOUSE NSSS INTERFACE

The primary interface for the NSSS is between the Bechtel project engineering manager, Plant Vogtle and the Westinghouse project manager, Southern Company projects. An interface exists at the plant site for disposition of deviation reports between the Bechtel project engineer-field and the Westinghouse Vogtle site manager. These interfaces are controlled by procedures within each respective organization.

The Bechtel project engineer has overall responsibility for the Bechtel interface for the NSSS. The day-to-day responsibilities are delegated to an assistant project engineer (APE), responsible for NSSS coordination. NSSS contract administration is assigned to the nuclear discipline. The NSSS engineering group leader (EGL) reports to the nuclear group supervisor on matters related to the NSSS nuclear discipline. The NSSS EGL also reports to the APE on the status of the NSSS interface. In the latter capacity, the NSSS EGL maintains logs necessary to identify and coordinate the NSSS interface and:

- o Develops and maintains guidelines for the handling and distribution of design information from Westinghouse;
- o Ensures that design information is formally documented;
- o Monitors open technical items between Bechtel and Westinghouse and ensures that such issues are resolved and their resolution is documented.

This organization is shown in Figure 2.1-2.

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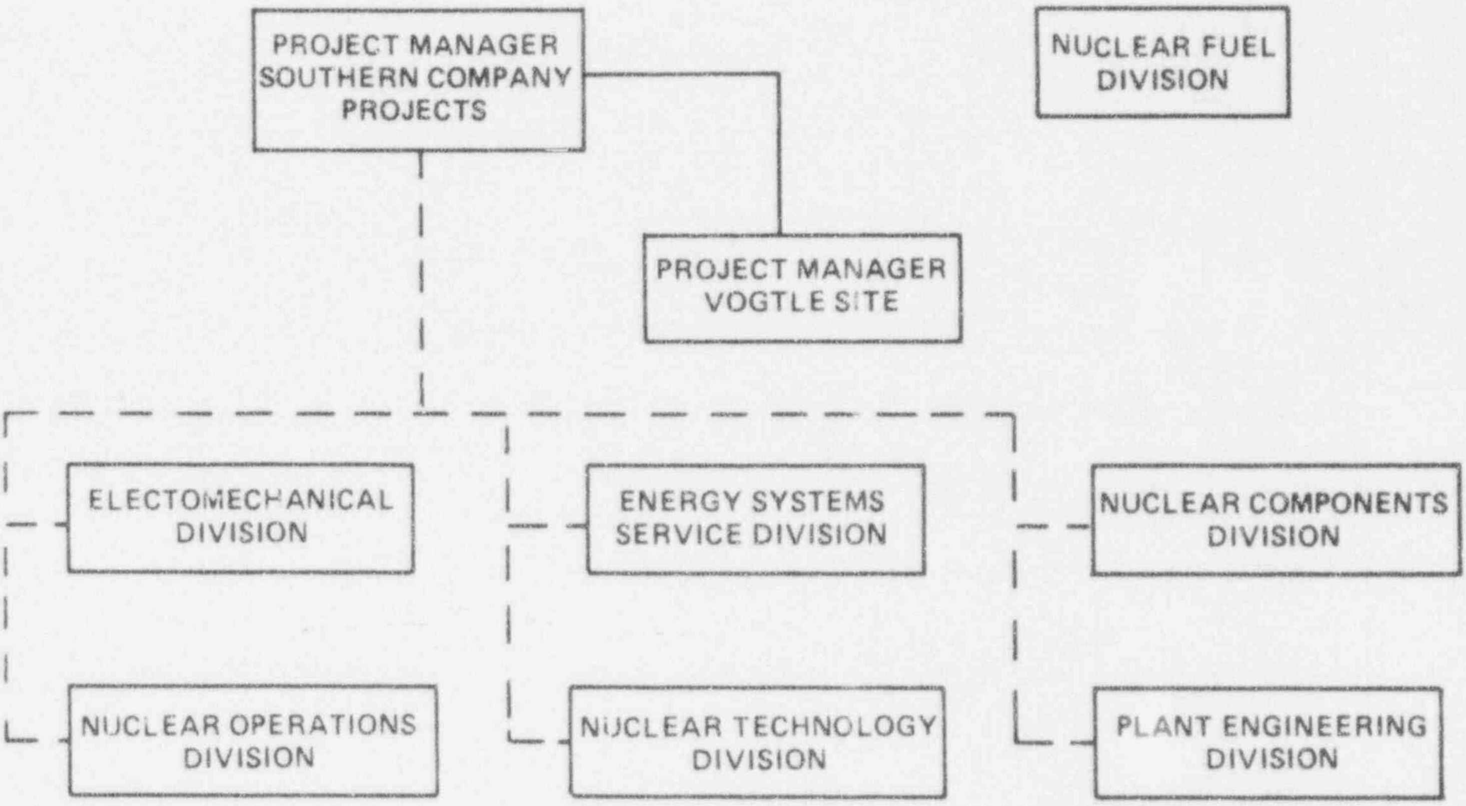

Figure 2.1-1 Westinghouse Organization

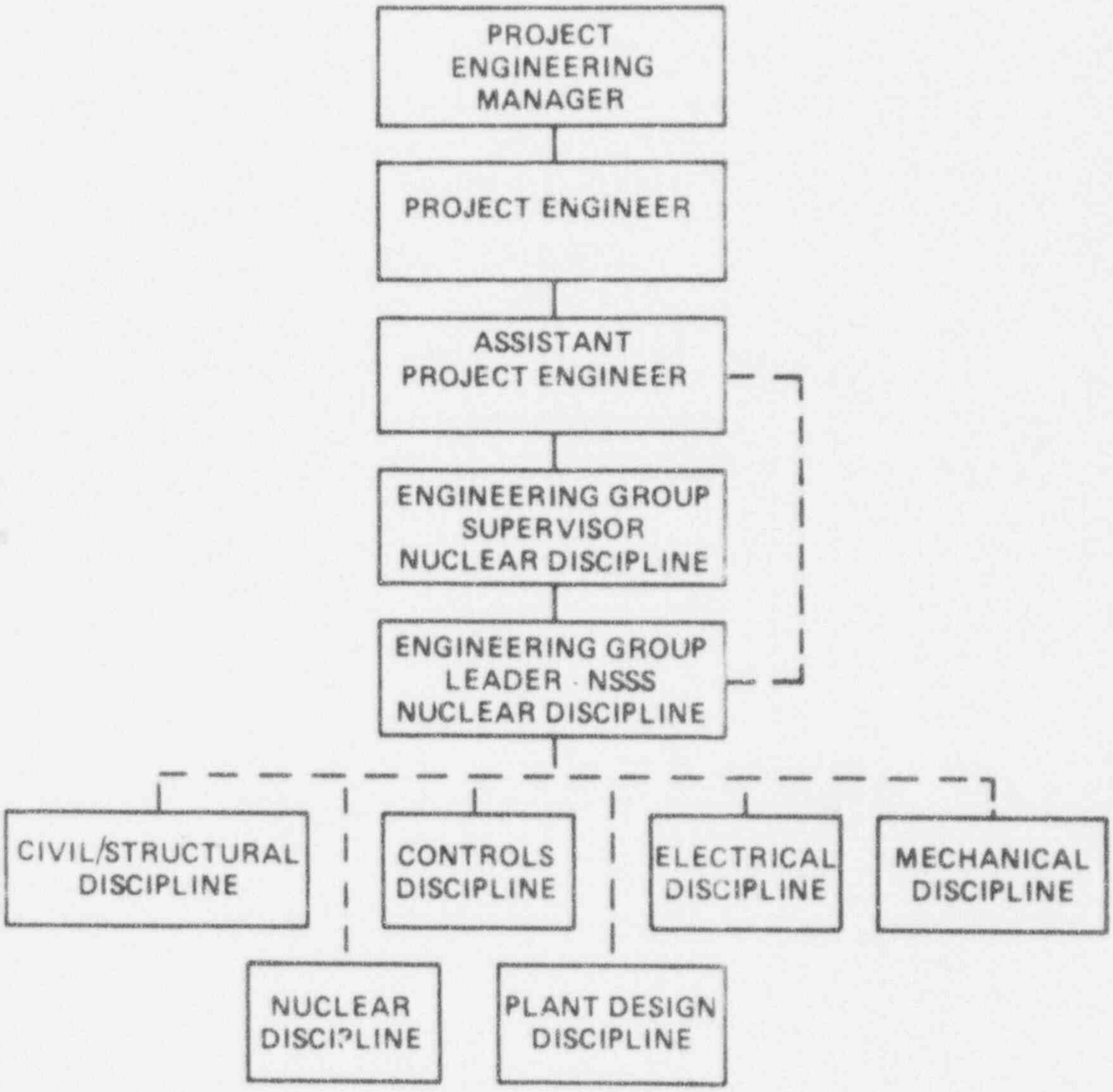

Figure 2.1-2 Bechtel NSSS Organization

2.2 CONSTRUCTION

Georgia Power Company (GPC) Nuclear Construction has responsibility for construction of Plant Vogtle. For direct work, Nuclear Construction employs Nuclear Installation Services Company (NISCO) for the installation of nuclear steam supply system (NSSS) equipment supports and installation and assembly of the NSSS equipment.

This section describes the organizations responsible for activities in the scope of this module.

2.2.1 GEORGIA POWER COMPANY - NUCLEAR CONSTRUCTION

GPC Nuclear Construction provides direction to the contractors on the schedule and budget, supplies all materials, provides drawings and specifications developed by Project Engineering, and performs the surveillance of construction activities.

These activities are provided through sections of the Nuclear Construction Department and are described below. Appendix A describes the current Nuclear Construction Department organization.

2.2.1.1 Mechanical Project Section

The Georgia Power Company Mechanical Project Section provides coordination and support for contractors. This includes providing assistance in the following areas:

- o Developing mechanical construction procedures and assuring they are in compliance with Project Engineering specifications and any applicable codes;
- o Resolving problems regarding mechanical work including constructability issues, deviation reports, trends, field change requests, and open items;
- o Dispositioning deviation reports and open items;
- o Providing material for the contractors by initiating purchase orders and releases as required;
- o Providing schedule and budget input to various site organizations;
- o Interfacing extensively with Coordination and Quality Control (QC) Groups on problem identification and resolution.

2.2.1.2 GPC Field Construction Operations - Coordination

The Site Coordination Group directs work at Plant Vogtle and ensures work is completed on time. They interface with the site contractors to facilitate work flow. The lower tier coordination 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 Site Coordination Group is responsible for survey and layout work on the project.

The Site Coordination Group reports to the building manager.

2.2.1.3 Warehouse

The warehouse is responsible for the receipt, storage, and issue of materials, components, and equipment for the project.

The warehouse personnel, along with GPC QC, ensure that correct materials are received and issued to the contractors.

2.2.1.4 GPC Mechanical Quality Control Section

GPC Mechanical QC is responsible for performing receiving inspections, storage inspections, and inspections of equipment maintenance.

Additionally, Mechanical QC performs a random review of the radiographic film produced by the contractors.

Quality Control personnel performing inspections or reviews are certified to ANSI N45.2.6 and/or SNT-TC-1A.

2.2.1.5 GPC - Quality Control Surveillance Section

The QC Surveillance Section performs an overview of contractor QC activities. These overviews are performed at random and consist of:

- Daily observations of the contractor craft and QC inspectors for compliance with specifications and procedures;
- Sampling of completed work that has received final inspection by contractor QC to ascertain compliance with drawings, specifications, and procedures.

The GPC surveillance inspectors are certified to ANSI N45.2.6 and/or SNT-TC-1A requirements and report areas of noncompliance to Project Engineering on a Deviation Report.

2.2.1.6 GPC Drawing Control Section

GPC Drawing Control provides drawings and specifications to the contractors and GPC sections.

Drawing Control receives copies of drawings and specifications from Project Engineering and makes distribution to affected holders by way of a controlled distribution list.

Drawing Control is also responsible for issuing change documents and notifying recipients of any documents that have been voided or superseded.

Additionally, Drawing Control audits the contractors and GPC sections drawing control to ensure proper control and handling is maintained.

2.2.1.7 GPC Document Review Section

GPC Document Review reviews documentation provided upon receipt from the vendors and determines compliance with the purchase order and specification. Upon acceptance, Document Review allows issue of vendor-supplied materials, components, or equipment.

Additionally, Document Review is responsible for maintaining quality assurance documentation, documentation supplied by other GPC sections and vendors, and documents turned over to GPC by the contractors.

Document Review is discussed in more detail in Appendix E.

2.2.2 NISCO

The NISCO site organization is presented in Figure 2.2-1. The responsibilities and duties of key position personnel are described as follows:

2.2.2.1 Site Manager

The NISCO site manager reports to the NISCO project manager. He is directly responsible for all production activities at the jobsite. His duties include:

- Reviewing and approving field purchase requisitions;
- Providing direction to site personnel;
- Arranging transfer of quality records to GPC upon completion of the project;

- Assuring compliance of production personnel with the NISCO QA manual, including implementing any necessary changes resulting from QA, ANIA, or ASME audits;
- Liaison with GPC site representatives.

2.2.2.2 Lead Engineer

The lead engineer reports directly to the site manager and is responsible for the performance of ASME Code work on the project. He receives technical direction from the manager, project engineering.

2.2.2.3 Superintendents

Superintendents report directly to the site manager and are responsible for production work performed by the crafts, and for compliance with the Process Control Sheets.

2.2.2.4 Field QA/QC Manager

The field QA/QC manager reports to the manager, quality assurance and is responsible for all field QA/QC activities. He is assisted in his duties by the field QC engineers. His responsibilities include:

- Supervising all QA/QC activities;
- Directing the gathering, filing, and indexing of QA records at the site;
- Reviewing and approving Process Control Sheets;
- Reviewing Process Control Sheets and drawings with the authorized nuclear inspector (ANI) for establishment of hold points;
- Reviewing and approving heat treatment charts and making them available for review by the ANI;
- Assuring that required personnel qualification records are at the jobsite and procedures are qualified, as required by ASME Code;
- Supervising and monitoring of nondestructive examination (NDE) services subcontractors and heat treatment subcontractors, as applicable;
- Review and approval of material certifications and data reports, and submitting them to the ANI;

- Liaison with the ANI for all jobsite activities;
- Coordinating QC activities with the site manager to assure that all QC requirements are properly scheduled and met;
- Presenting proposed Use-As-Is and Repair nonconformance dispositions to the ANI for ASME code items;
- Providing monthly QA program status to the manager, quality assurance;
- Ensuring proper control and correction of nonconforming conditions;
- Approval of NISCO and vendor quality documents relating to site activities;
- Maintaining vendor performance file;
- Distribution of the approved vendors list (AVL).

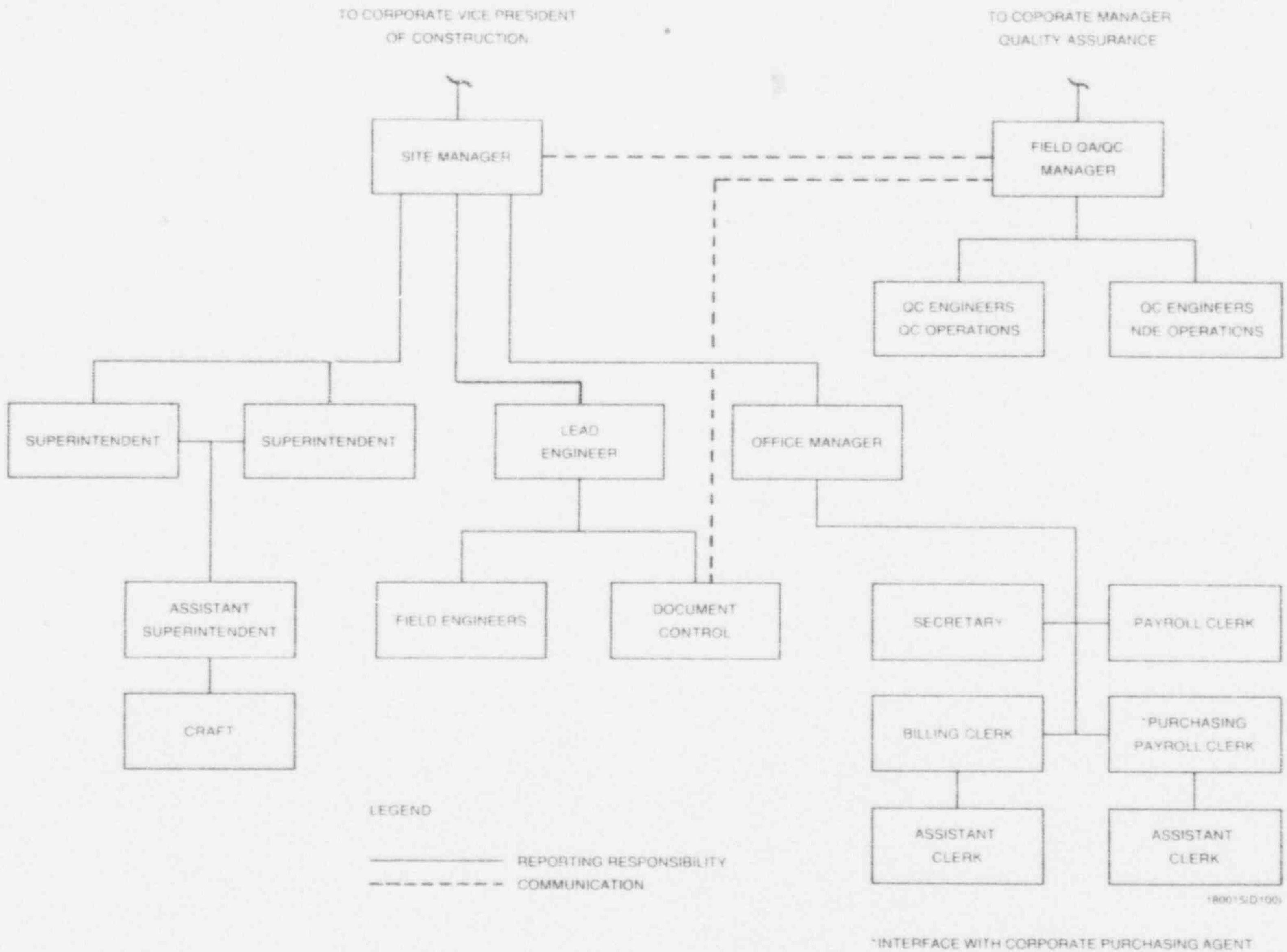

Figure 2.2-1 Nuclear Installation Services Company Site Organization

2.3 NUCLEAR INSTALLATION SERVICES COMPANY TRAINING AND QUALIFICATION

Nuclear Installation Services Company (NICSO) staff and supervisory personnel at Plant Vogtle are indoctrinated to the requirements of the NISCO quality assurance program requirements in accordance with NISCO procedure ES-118, Quality Indoctrination Program, which is administered by the field QA/QC manager. Specific personnel applicability and the minimum subject matter requirements for each are as follows:

- o Site manager

  -QA manual: all sections,

  -Engineering specifications: all,

  -Welding procedure specifications: all;

- o Lead engineer

  -QA manual: all sections,

  -Engineering specifications: all,

  -Welding procedure specifications: all;

- o Field engineers

  -QA manual: Sections 2.0, 5.0, 6.0, 7.0, 9.0, 10.0, 11.0, 14.0, and 17.0,

  -Engineering specifications: as applicable,

  -Welding procedure specifications: as applicable;

- o Field QA/QC manager

  -QA manual: all sections,

  -Engineering specifications: all,

  -Welding procedure specifications: all;

- o QA/QC engineers

  -QA Manual: sections 1.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 12.0, 13.0, 14.0, 15.0, 16.0 and 17.0,

  -Engineering specifications: all,

  -Welding procedure specifications: all;

o Documentation clerks

-QA manual: sections 3.0, 12.0, and 17.0,

-Engineering specifications: as applicable,

-Welding procedure specifications: none;

o Staff purchasing agents

-QA manual: sections 4.0 and 17.0,

-Engineering specifications: as applicable,

-Welding procedure specifications: none;

o Craft supervisor

-QA manual: sections 1.0, 3.0, 5.0, 6.0, 7.0, 11.0, 14.0, and 17.0,

-Engineering specifications: as applicable,

-Welding procedure specifications: all;

o Craft foreman

-QA manual - Section 5.0, 6.0, 7.0, 11.0, 14.0, and 17.0,

-Engineering specifications: as applicable,

-Welding procedures specifications: as applicable;

o Craft personnel

-QA introduction letter,

-Engineering specifications: as applicable,

-Welding procedure specifications: as applicable,

-Quality memos: as applicable,

-Job requirements.

Field QC engineers are also trained to the requirements of ES-116-1, Qualification and Certification of Nondestructive Examination Personnel, and ES-116-2, Qualification and Certification of Inspection Personnel, to ANSI N45.2.6, as applicable for their respective areas of activity.

Training and certification of NDE personnel to ES-116-1 complies with the requirements of:

- ASNT-SNT-TC-1A (1975);
- AWS-D1.1;
- ASME Boiler and Pressure Vessel Code section III, Division 1;
- ASME Boiler and Pressure Vessel Code section V;
- ASME Boiler and Pressure Vessel Code section VIII;
- ANSI Power Piping Code B31.1.

Training and certification of other QA/QC inspection personnel to ES-116-2 is in compliance with ANSI N45.2.6 (1978). NISCO procedure ES-117, Inspection, Testing, and Examination Personnel Training, details the recommended subject matter, length of study, and texts to be used in the training of personnel under the requirements of ES-116-1 and ES-116-2.

QA auditors are trained and certified to NISCO procedure ES-116-3, which complies with the requirements of ANSI standards N45.2, N45.2.10, N45.2.12, and N45.2.23.

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 Final Safety Analysis Report, if any, are accidental, and the FSAR prevails.

3.2 DEFINITIONS

Commitments are defined as the project obligations to regulatory guides, industry standards, branch technical positions, and other licensing requirements to the extent defined in the Final Safety Analysis Report.

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 report are identified from the following sources:

- o Final Safety Analysis Report including responses to Nuclear Regulatory Commission 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 is 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 in the commitment matrix. Information identifying the source, source section, subject, and module are also indicated in the matrix. Any relevant comments concerning the commitments or subject of the section are indicated in the Remarks column.

The commitments included in this section address the Vogtle-specific commitments. Commitments pertaining to the nuclear steam supply system (NSSS) are considered generic because of the functional organization of the NSSS supplier, Westinghouse. These commitments are not included in the commitment matrix because of their generic nature and the frequent and detailed level of review that Westinghouse receives from the Nuclear Regualtory Commission.

COMMITMENTS

SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	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

MODULE - The Readiness Review modules applicable to the commitment under discussion

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 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	1. 9. 4	ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIATION CONSEQUENCES OF A LOCA.	RG 1.4, REV. 2, 6/74	16	X		SEE 15.6.5-5 FOR CONFORMANCE	2021
FSAR	1. 9. 7	CONTROL OF COMBUSTIBLE GAS CONCENTRATIONS IN CONTAINMENT FOLLOWING A LOCA	RG 1.7 , REV. 2, 11/78	18A,16 ,21W	X		REF. 6.2.5.1.1 FOR CONFORMANCE.	204[illegible]
FSAR	1. 9. 29	SEISMIC DESIGN CLASSIFICATION	RG 1.29, REV. 3, 9/78	04,16, 11	X		REF. TABLE 3.2.2-1	1532
FSAR	1. 9. 31	CONTROL OF FERRITE CONTENT IN STAINLESS STEEL WELD METAL	RG 1.31, REV. 3, 04/78	08,04, 16,18, 11,14	X		SEE 5.2.3.4.6 SEE NUMBER 256 FOR IMPLEMENTATION	1855
FSAR	1. 9. 36	NON-METALLIC THERMAL INSULATION FOR AUSTENITIC S.S.	RG 1.36, REV. 0, 2/73	10,14, 16,21W	X		REF. 5.2.3.2.3 & 6.1.1.1.3	1536
FSAR	1. 9. 37	QA-REQUIREMENTS FOR CLEANING OF FLUID SYS. & ASSOC. COMPONENTS	RG 1.37, REV. 0, (MARCH 73)	03,16, 04	X		REF. 5.2.3.4.1, 17.1.2, 17.2, RG. 1.88, RG. 1.33 & RG. 1.37 (3/73)	1537
FSAR	1. 9. 37	QA-REQUIREMENTS FOR CLEANING OF FLUID SYSTEMS & ASSOC. COMPONENTS	ANSI N45.2.1-1973	03,16, 04	X	X	REF. 5.2.3.4.1, 17.1.2, 3.8.1, RG. 1.88, RG. 1.33, RG. 1.37, (3/73)	1538
FSAR	1. 9. 37	QUALITY ASSURANCE REQUIREMENTS FOR CLEANING OF FLUID SYSTEMS AND ASSOCIATED COMPONENTS OF WATER-COOLED NUCLEAR POWER PLANTS. (1.9.37.2)	R.G. 1.37, 3/73	03,16, 04	X	X	CONFORMS FOR DESIGN AND CONSTRUCTION QAP WITH EXCEPTIONS AND CLARIFICATIONS. CONFORMS FOR OPERATION QAP WITH CLARIFICATIONS.	3201

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	1. 9. 37	QA-REQUIREMENTS FOR CLEANING OF FLUID SYSTEM AND ASSOCIATED COMPONENTS	10CFR50, APP. B	03,16, 04	X		REF. 5.2.3.4.1, & 17.1.2, SECT. 17.2, RG. 1.88, RG 1.33, RG. 1.37 (3/73)	4681
FSAR	1. 9. 44	CONTROL OF USE OF SENSITIZED S. S.	RG 1.44, REV. 0,5/73	16,21W	X		REF. 5.2.3.4	1541
FSAR	1. 9. 45	RCPB LEAK DETECTION SYSTEM	RG 1.45, REV. 0,5/73	16	X		REF. 5.2.5	1542
FSAR	1. 9. 46	PROTECTION AGAINST PIPE BREAK INSIDE CONTAINMENT	BTP MEB 3-1, BTP ASB 3-1	04,16, 21W	X		REF. TABLE 3.6.1-2 & SECT. 3.6, WCAP-8172-A, ANSI 20.2 DRAFT IN LIEU OF RG 1.46	1543
FSAR	1. 9. 48	DESIGN LIMITS & LOADING COMBIN. FOR SEISMIC CAT. I FLUID SYSTEM COMPONENTS	RG 1.48, REV. 0, 5/73	11,16, 18,21J ,21W	X		REF. 3.9.N.3 & TABLES 3.9.N.3-3 THROUGH 3.9.B.3-10	1544
FSAR	1. 9. 50	CONTROL OF PREHEAT TEMPS. FOR WELDING OF LOW-ALLOY STEEL	RG 1.50, REV. 0, 5/73	16,21W	X		REF. 5.2.3, WCAP-8577	1546
FSAR	1. 9. 53	APPLICATION OF SINGLE-FAILURE CRITERION	RG 1.53, REV. 0, 6/73	12,04, 16,20, 06,18, 21W	X		REF. 7.1.2.6 & 15.0.8	1551
FSAR	1. 9. 61	DAMPING VALUES FOR SEISMIC DESIGN	RG 1.61, 10/73	16,19, 21J,21 W	X			2188
FSAR	1. 9. 82	SUMPS FOR EMERGENCY CORE COOLING AND CONTAINMENT SPRAY SYSTEMS	RG 1.82, 6/74	04,16, 07A	X		SEE FSAR 6.2.2.2	711

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MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	1. 9. 84	DESIGN AND FAB. CODE CASE ACCEPT. ASME III, DIV. 1	RG 1.84, REV. 20, 11/82	18,08, 04,16, 11,20	X		REF. TABLE 1.9-1, PARA. 5.2.1.2, TABLE 1.9-3	1565
FSAR	1. 9. 85	MATERIAL CODE CASE ACCEPT. ASME III, DIV. I	RG 1.85, REV. 20, 11/82	08,18, 04,16, 11,20	X		REF. TABLE 1.9-2, 1.9-3, PARA. 5.2.1.2	1569
FSAR	1. 9.116	Q.A. REQUIREMENTS FOR INSTALLATION, INSPECTION & TESTING OF MECHANICAL EQUIPMENT AND SYSTEMS.	RG 1.116, REV. 0, 6/76	03,04, 16,20, 05,14, 11		X	REF. CHAPTER 17, VEGP-QAP, RG'S 1.58, 1.88, 1.74, 1.33, 1.37, 1.38, 1.39.	1578
FSAR	1. 9.116. 1	Q.A. REQUIREMENTS FOR INSTALLATION, INSPECTION & TESTING OF MECHANICAL EQUIPMENT & SYSTEMS	ANSI N45.2.8-1975	03,04, 16,20		X	REF. CHAPTER 17, VEGP-QAP, RG'S 1.58, 1.88, 1.74, 1.33, 1.37, 1.38, 1.39.	1579
FSAR	1. 9.139	GUIDANCE FOR RHR	RG 1.139, REV. 0, 5/78	07A,03 ,04,16 ,21W	X		SECTION 5.4.7	1611
FSAR	3. 1. 4	CONFORMANCE WITH NRC GDC, FLUID SYSTEMS	10CFR50, APP. A, GDC 41	16,18A ,04,21 W	X			808
FSAR	3. 1. 4	NSSS COMPONENTS DESIGN CLASSIFICATION	ANSI N18.2-1973	16,21W	X		SEE GDC 30	1727
FSAR	3. 1. 4	CONTAINMENT ATMOSPHERE CLEANUP	RG 1.4	16	X		REMOVAL OF PARTICULATE FISSION PRODUCTS BY THE CSS	1740
FSAR	3. 2. 2	VEGP CLASSIFICATION SYSTEM	RG 1.29	04,18, 16,11, 21W	X			1754

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MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	3. 2. 2-1	CLASSIFICATION OF STRUCTURES, COMPONENTS AND SYSTEMS	NOTE (t): HEAT EXCHANGER ASME III	16,21W	X		TABLE 2.2.2-1	847
FSAR	3. 2. 2-1	PRINCIPAL CODES AND STANDARDS FOR T.3.2.2-1	TEMA-C OR TEMA-R TUBULAR EXCH. MFR. ASSOC. CLASS C OR R	04,16, 21W	X		TABLE 3.2.2-1, NOTE (g)	859
FSAR	3. 2. 2-1	PRINCIPAL CODES AND STANDARDS FOR T.3.2.2-1	ASME III, CLASS 1,2,3 OR MC, NF, OR CS	04,08, 16,11, 18,21W	X		TABLE 3.2.2-1	880
FSAR	3. 2. 2-1	PRINCIPAL CODES AND STANDARDS FOR TABLE 3.2.2-1	NEMA MG1 1972 (NATIONAL ELECTRICAL MFRS. ASSOCIATION) MOTORS/GENERATORS	16,21W	X			867
FSAR	3. 2. 2-2	CONST. CODES/STDS. Q.G.-B FOR PRESSURE VESSELS, PIPING, PUMPS, VALVES, ATM. STORAGE TANKS, 0-15psig STORAGE TANKS, SUPPORTS, METAL CONT. COMP, CORE SUPPORT STRS.	ASME III, SUBSECTION NC, CLASS 2	04,18, 16,08, 21W	X		TABLE 3.2.2-1, NOTE (g) SUBSECT. NF FOR SUPPORTS, SUBSECT. NE, CLASS MC FOR METAL CONT. COMP., SUBSECT. NG FOR CORE SUPPORT STRS. NSR	885
FSAR	3. 2. 2-2	CONST. CODES/STDS. Q.G. - A. FOR PRESSURE VESSELS, PIPING, PUMPS, VALVES, SUPPORTS	ASME III, SUBSECTION NB, CLASS 1	16,21W	X		TABLE 3.2.2-2, QGA SUBSECTION NF FOR SUPPORTS	888
FSAR	3. 2. 2-2	CONST. CODES/STDS. Q.G. - C. FOR PRESSURE VESSELS, PIPING, PUMPS, VALVES, ATM. STORAGE TANKS, 0-15psig STORAGE TANKS, SUPPORTS.	ASME III, SUBSECTION ND, CLASS 3	18B,20 ,04,16 ,18A,2 1W	X		TABLE 3.2.2-2, QGC SUBSECTION NF FOR SUPPORTS	889

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MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	3. 6. 2. 3. 2	BREAK PROPAGATION, LARGE RCS PIPING	PROPAGATION OF BREAK TO UNAFFECTED LOOPS PREVENTED	04,16	X			1841
FSAR	3. 6. 2. 3. 2	BREAK PROPAGATION, LARGE RCS PIPING	PROPAGATION OF BREAK IN AFFECTED LOOP DOES NOT EXCEED 20% OF FLOW AREA OF RUPTURED LINE	04,16	X			1842
FSAR	3. 6. 2. 3. 2	SMALL RCS BRANCH LINE BREAK PROPAGATION	TOTAL BREAK AREA LIMITED TO 12.5 SQ. IN.	16,21W	X			963
FSAR	3. 6. 2. 5. 2	PRIMARY & SECONDARY STRESS INTENSITY RANGES (RCL)	ASME III NB-3650 (WCAP-8082-P-A AND WCAP-8172-A)	16	X			967
FSAR	3. 8. 3. 2	CONTAINMENT INTERNAL STRUCTURES, CODES AND STANDARDS (COMPONENT SUPPORTS)	ASME III, SUBSECTION NF, 1977 INCLUDING WINTER 1977 ADDENDA	11,08, 16,21W	X	X	SEE OTHER SUBSECTIONS OF FSAR 3.8.3 FOR MORE SPECIFIC DETAILS	1997
FSAR	3. 8. 3. 4. 6	CONT. INT. STRUCTURES BOLTS ATTACHING PRESSURIZER BASE TO STEEL SUPPORT FRAME	ASME III, SUBSECTION NF	16	X			4695
FSAR	3. 8. 3. 6-1.G	MATERIAL FOR STEEL LINEAR SUPPORTS OF RCS	ASME III, SUBSECTION NF	16	X			1785
FSAR	3. 9. B. 3. 1. 2	DESIGN AND NORMAL CONDITIONS	ASME III, NB-3112 & NB-3113	21L,11 ,16	X			1658
FSAR	3. 9.B. 3-1	LOAD COMBINATIONS FOR ASME III, DIV. I, CODE CLASS 1, 2, & 3 COMPONENTS AND SUPPORTS	LOAD COMBINATIONS	21J,11 ,16	X			1660

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MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	3. 9.N. 1. 4.1	CRITICAL DAMPING FOR OBE & SSE SEISMIC ANALYSIS	2% AND 4% RESPECTIVELY	16	X			4732
FSAR	3. 9.N. 1. 4.1.C	LOADING CONDITIONS-SEISMIC	RCS SEISMIC ANALYSIS - 6 STATISTICALLY INDEPENDENT TIME - HISTORY INPUTS: 3 TRANSLATIONAL ACCELERATIONS, 3 ROTATIONAL ACCELERATIONS	16	X			4755
FSAR	3. 9.N. 1. 4.8.A	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - DESIGN	LOADS COMBINED BY ALGEBRAIC SUM.	16	X			4757
FSAR	3. 9.N. 1. 4.8.B	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - NORMAL, UPSET	DYNAMIC LOADS COMBINED USING SQUARE ROOT OF SUM OF SQUARES (SRSS)	16	X			4759
FSAR	3. 9.N. 1. 4.8.C	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - EMERGENCY	NORMAL LOADS COMBINED ALGEBRAICALLY. DYNAMIC LOADS COMBINED BY SRSS	16	X			4760
FSAR	3. 9.N. 1. 4.8.D	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - FAULTED	LOCA & SSE LOADS COMBINED BY SRSS ON LOAD COMPONENT BASIS	16	X			4761
FSAR	3. 9.N. 1. 4.8.D	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - FAULTED	SUSTAINED LOADS (WT. EFFECTS) ARE COMBINED WITH SRSS RESULTS BY ALGEBRAIC SUM	16	X			4762
FSAR	3. 9.N. 1. 4.8.D	STRESS CRITERIA - CL.1 COMP. & COMP. SUPPORTS - FAULTED	OTHER DYNAMIC LOADS COMBINED USING SRSS.	16	X			4763

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	3. 9.N. 3	ASME CLASS COMPONENTS	ASME III	11,16		X		4739
FSAR	4.A. 1.A	CORE EXIT THERMOCOUPLE MONITORING SYSTEM - CABLE ROUTING	RG 1.75	16	X		AMEND. 15	4951
FSAR	4.A. 1.B	CORE SUBCOOLING MARGIN MONITOR - CABLE ROUTING FROM SENSOR TO DISPLAY	RG 1.75	16	X		AMEND. 15	4952
FSAR	5. 2. 1.1	COMPLIANCE WITH CODES AND CODE CASES	10CFR50, SECTION 50.55a	16,21W	X			188
FSAR	5. 2. 3. 2.2	COMPATIBILITY WITH EXTERNAL INSULATION AND ENVIRONMENTAL ATMOSPHERE	RG 1.36	16	X			211
FSAR	5. 2. 3. 3. 2	CONTROL OF WELDING FOR FERRITIC MATERIAL	ASME III & IX	16		X		4997
FSAR	5. 2. 3. 4. 4	PREVENTION OF IGA	NO BLOCK WELDING MAX 350 DEGREE INTERPASS TEMP. EXERCISE WELD PROCED. APPROVAL	16		X		4998
FSAR	5. 2. 3. 4.6	NDE METHODS	ASME III	21W,16		X		226
FSAR	5. 2. 3. 4.6	WELD MATERIAL AND WELD PROCEDURE QUALIFICATION FOR AUSTENITIC S/S	ASME III & IX	21W,16		X		223
FSAR	5. 4. 14. 4	RC COMPONENT SUPPORTS TESTS & INSPECTIONS	ASME V	21W,16		X	MODIFIED BY ASME III, NF	315

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	6. 1. 1. 1	ESF MATERIALS SELECTION & FABRICATION	ASME III, NC-2160 & NC-3120	04,11, 16,20, 21W	X			322
FSAR	6. 1. 1. 1	ESF MATERIALS SPEC. REQUIREMENTS	ASTM/ASME COMPLIANCE - NA/NCA-1220	04,11, 16A,20	X			326
FSAR	6. 1. 1. 1	ESF CONST. MATERIALS CONTAINMENT PENETRATION MATERIALS	ASME III, NC-2000 & NE-2000	16,04, 20,21W	X			327
FSAR	6. 1. 1. 1.1	MATERIAL SPECS FOR ESF COMPONENTS IN QUALITY GROUP B	ASME III, NC-2000, CLASS 2	04,11, 16,20, 18A,06 ,21W	X			324
FSAR	6. 1. 1. 1.1	MATERIAL SPECS. FOR ESF COMP. IN QUALITY GROUP C	ASME III, ND-2000, CLASS 3	04,11, 16,20, 18A,21 W	X			325
FSAR	6. 1. 1. 1.2	ESF CONSTRUCTION MATERIALS- WELD MAT'L FOR JOINING FERRITIC BASE MAT'LS	ASME II, PART C, SFA 5.1, 5.2,5.5,5.17,5.18 & 5.20	04,11, 16,20 18A	X			328
FSAR	6. 1. 1. 1.2	ESF CONST. MAT'LS-WELD MATERIALS FOR JOINING NI-CR-FE ALLOYS	ASME II, PART C, SFA 5.11 & 5.14	04,11, 16,20	X			329
FSAR	6. 1. 1. 1.2	ESF CONST. MAT'LS FOR JOINING AUSTENITIC S.S	ASME II, PART C, SFA 5.4 & 5.9	04,11, 16,20, 21W	X			330
FSAR	6. 1. 1. 1.2	ESF CONST. MAT'LS WELD MATERIAL QUALIFICATION	ASME III & IX	04,11, 16,20, 21J,18 A	X			331

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	6. 1. 1. 1.2	ESF CONST. MAT'LS AUSTENITIC S.S. UTILIZED IN FINAL HEAT TREATED COND.	ASME II	04,16, 20,18A	X			332
FSAR	6. 1. 1. 1.2	ESF CONST. MAT'L-COLD WORKED AUST. S.S.	LIMITED TO NO GREATER THAN 90,000psi YIELD STRENGTH	16,20, 18A	X			333
FSAR	6. 1. 1. 1.2	ESF CONSTRUCTION MATERIALS	COMPONENTS IN CONTACT WITH BORATED WATER ARE FABRICATED OF OR CLAD WITH AUSTENITIC STAINLESS STEEL OR EQUIV. CORROSION-RESISTANT-MATERIAL	04,16, 21W	X			2030
FSAR	6. 1. 1. 1.3.A	ESF MAT'LS INTEGRITY OF SAFETY RELATED COMPONENTS	RG 1.31	04,08, 20,16	X			256
FSAR	6. 2. 2. 2	CSS SAFETY DESIGN BASES	CSS AUTOMATICALLY PLACED IN OPERATION ON RECEIPT OF TWO OUT OF FOUR CONTAINMENT PRESSURE (HIGH-3) SIGNALS	16,20, 21W	X			2403
FSAR	6. 2. 2. 2	CSS SYSTEM INSTRUMENT APPLICATIONS	IEEE 279	16,20, 21W	X			2406
FSAR	6. 2. 2. 2	DESIGN BASIS FOR CONTAINMENT SPRAY	SINGLE ACTIVE FAILURE PLUS LOSP (INJECTION) AND SINGLE ACTIVE OR PASSIVE FAILURE PLUS LOSP (RECIRCULATION)	16,04, 21W	X			2479

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	6. 2. 2. 2	CONTAINMENT SPRAY SYSTEM CODE AND STANDARDS	ASME III, CLASS 2	16,04, 21W	X		TALLE 3.2.2.1(P.6)	2480
FSAR	6. 2. 2. 2	CONTAINMENT SPRAY SYSTEM CODE AND STANDARDS	ASME III, CLASS 3	16,04, 21W	X		TABLE 3.2.2.1(P.6)	2481
FSAR	6. 2. 2. 2	CONTAINMENT SPRAY SYSTEM CODE AND STANDARDS	NEMA-MG1	16,04, 21W	X		TABLE 3.2.2.1(P.6)	2483
FSAR	6. 2. 2. 2	CONTAINMENT SUMP FLUID pH AT END OF INJECTION PHASE	MINIMUM pH OF 8.5	16,04, 21W	X			2485
FSAR	6. 2. 2. 2	MATERIAL THAT CAN COME IN CONTACT WITH RECIRCULATION FLUID	AUSTENITIC S.S.	16,04, 21W	X			2486
FSAR	6. 2. 2. 2	DESIGN OF THE CONTAINMENT EMERGENCY CORE COOLING SYSTEM SUMPS	RG 1.82	16,04	X			2515
FSAR	6. 2. 2. 2. 2. 3	NPSH AVAILABLE TO THE CONTAINMENT SPRAY PUMPS	RG 1.1	16.04, 21W	X			2512
FSAR	6. 2. 2. 2.1	CONTAINMENT SPRAY SYSTEM (CSS) SAFETY DESIGN BASES	RG 1.32	16,21W	X			2402
FSAR	6. 2. 2. 2.2	SPRAY ADDITIVE EDUCTORS	MAX SPRAY pH OF 10.5	16,21W	X			2514
FSAR	6. 2. 2. 2.3	CSS SAFETY EVALUATION	DESIGNED TO CATEGORY I AND QUALITY GROUP B REQUIREMENTS	16,21W	X			2404

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
FSAR	7. 1. 2. 1.10	ESF MOTOR SPECS	STARTING VOLTAGE AT LEAST 75% OF RATED VOLTAGE OF 4 KV (AND ABOVE) AND 460 VOLTS.	16	X			4484
FSAR	9. 2. 8. 3	AUXILIARY COMPONENT COOLING WATER SYSTEM - RCP THERMAL BARRIER	RETURN LINE AUTOMATICALLY ISOLATED IN CASE OF A CRACK IN RCP THERMAL BARRIER	16	X			4996
FSAR	9. 3. 4. 1.3.5	LEAKAGE PROVISIONS	CVCS COMPONENTS, VALVES & PIPING WHICH SEE RADIOACTIVE SERVICE ARE DESIGNED TO LIMIT LEAKAGE TO ATMOSPHERE.	16,21W	X			3455
FSAR	17. 1. 2	GPC QA PROGRAM REQUIREMENTS: CLEANING OF FLUID SYSTEMS AND COMPONENTS	RG. 1.37	03,04, 16	X			3361
I.E.B. CORRES.	C-80/08/05	VACUUM CONDITION RESULTING IN DAMAGE TO CVCS HOLDUP TANKS.	LOW PRESSURE PROCESS OR HOLDUP TANKS THAT CAN CONTAIN RAIOACTIVE MATERIAL ARE DESIGNED WITH FEATURES TO PRECLUDE VACUUM CONDITIONS	04,16, 21W	X		RESPONSE TO IEB 80-05	4674
I.E.B. CORRES.	C-81/11/20	GATE-TYPE VALVE CLOSURE AGAINST DIFF. PRESS.	MAXIMUM PRESSURES (psi) AS FLOW APPROACHES ZERO (TABLE). (AFFECTED VALVES WILL BE MODIFIED.)	16	X		RESPONSE TO IEB 81-02	4680

COMMITMENTS

MODULE 16 - SORTED BY SOURCE AND SECTION

COMMITMENT SOURCE	COMMITMENT SECTION	COMMITMENT SUBJECT	DOCUMENT/ FEATURE	MODULE	RESPONSIBILITY DESIGN	RESPONSIBILITY CONST	REMARKS	REF NO
NRC QUEST. CORRES.	Q210. 46	STRESS LIMITS USED IN ANALYSIS OF VALVE DISCS IN CLASS 1 VALVES GREATER THAN 4 INCH	PRIMARY MEMBRANE IS < OR = 1.0 Sm PRIMARY MEMBRANE PLUS BENDING IS < OR = 1.5 Sm	16	X		Sm=DESIGN STRESS INTENSITY PER ASME III, TABLES I-1.0	4987
NRC QUEST. CORRES.	Q210. 46	STRESS LIMITS FOR VALVE DISCS IN CLASS 2 AND 3 VALVES WHERE ANALYSIS IS REQUIRED	PRIMARY MEMBRANE IS < OR = 1.0 S, PRIMARY MEMBRANE PLUS BENDING IS < OR = 1.5 S	16	X		S = ALLOWABLE STRESS VALUES PER ASME III, TABLES I-7.0 & I-8.0	4991
NRC QUEST. CORRES.	Q480. 6	CONTAINMENT EMERGENCY SUMPS DESIGN CAPABILITY	DIFFERENTIAL PRESSURE INDUCED BY 50% BLOCKAGE WITH DEBRIS	16	X		RESPONSE TO QUESTION	4153

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.

IMPLEMENTATION

SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	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
MODULE	- The Readiness Review modules applicable to the section under discussion
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 contained the information found in the commitment when the a ctivities governed by the document first began.
REF NO.	- A reference number that corresponds to the appropriate line entry in the commitment matrix.

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS
10CFR50, SECTION 50.55a		16	DC-1201-2.0, REV. 2, 3-9-84	DC-1201-2.0, REV. 0, 5-11-78			
RG 1.36		16	SEE REMARKS				SEE REF. NO. 1536 FOR DESIGN IMPLEMENTATIO N
ASME III & IX		16			NISCO PROCEDURES E.S.-300, REV. F, 4-8-83, E.S.-GWP-BMI-1, REV. E, 1-14-85, E.S.-8.7, REV. C, 8-23-84	NISCO PROCEDURES E.S.-300, REV. C, 8-26-82, E.S.-GWP-BMI-1, REV. A, 6-7-83, E.S.-8.7, REV. A, 3-20-84	
ASME III		16			SEE REMARKS	SEE REMARKS	SEE REF. NO. 315 FOR CONSTRUCTION IMPLEMENTATIO N
RG 1.31		16	DC-1206-1.0, REV. 2, 4-28-83, X4AQ01-10.3G, REV. 16, 7-20-84, X4AQ10-6.4D.12, REV. 5, 12-17-84	DC-1206-1.0, REV. 2, 4-28-83, X4AQ01-10.3G, REV. 13, 11-8-82, X4AQ10-6.4D.12, REV. 2, 7-1-81			
ASME V		16			NISCO NDE PROCEDURES E.S.-8.7, REV. C, 8-23-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. E, 7-25-84, E.S.-100-4-1, REV. C, 6-21-84, E.S.-100-5, REV. C, 3-9-83, E.S.-116-1, REV. I, 11-3-82	NISCO NDE PROCEDURES E.S.-8.7, REV. A, 3-20-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. A, 8-25-82, E.S.-100-4-1, REV. A, 6-21-84, E.S.-100-5, REV. C, 3-9-83, E.S.-116-1, REV. H, 10-12-82	

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
ASME III, NC-2160 & NC-3120		16	DC-1204-2.OC.1, REV. 2, 2-11-83, DC-1205-2.0B.1, REV. 2, 3-17-83, DC-1206-2.0B, REV. 2, 4-28-83, DC-1302-2.2, REV. 5, 4-18-83	DC-1204-2.0, REV. 0, 3-13-78, DC-1205-2.0, REV. 0, 12-13-77, DC-1206-2.0, REV. 0, 1-6-78, DC-1302-2.1, REV. 2, 8-28-74				322.00
ASME III, NC-2000, CLASS 2		16	DC-1204-2.0C.1, REV. 2, 2-11-83, DC-1205-2.0B.1, REV. 2, 3-17-83, DC-1206-2.0B, REV. 2, 4-28-83	DC-1204-2.0, REV. 0, 3-13-78, DC-1205-2.0, REV. 0, 12-13-77, DC-1206-2.0, REV. 0, 1-6-78				324.00
ASME III, ND-2000, CLASS 3		16	DC-1205-2.0B1, REV. 2, 3-17-83, DC-1206-2.0B, REV. 2, 4-28-83	DC-1205-2.0, REV. 0, 12-13-77, DC-1206-2.0, REV. 0, 1-6-78				325.00
ASTM/ASME COMPLIANCE, NA/NCA-1220		16	X4AQ37-6.1D, REV. 11, 12-20-84	X4AQ37-6.1D, REV. 0, 3-24-80				326.00
ASME III, NC-2000 & NE-2000		16	X4AQ10-5.1, REV. 5, 12-17-84	X4AQ10-5.1, REV. 2, 7-1-81				327.00
ASME II, PART C, SFA 5.1, 5.2, 5.5, 5.17, 5.18 & 5.20		16	X4AQ37-5.0A, REV. 11, 12-20-84	X4AQ37-5.0A, REV. 0, 3-24-80				328.00
ASME II, PART C, SFA 5.11 & 5.14		16	X4AQ37-5.0A, REV. 11, 12-20-84	X4AQ37-5.0A, REV. 0, 3-24-80				329.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS
ASME II, PART C, SFA 5.4 & 5.9		16	X4AQ37-5.0A, REV. 11, 12-20-84	X4AQ37-5.0A, REV. 0, 3-24-80			
ASME III & IX		16	X4AQ37-5.0A, REV. 11, 12-20-84	X4AQ37-5.0A, REV. 0, 3-24-80			
ASME II		16	DC-1000-M-3.1.2, REV. 2, 4-12-78	DC-1000-M-3.1.2, REV. 0, 5-1-73			
LIMITED TO NO GREATER THAN 90,000 psi YIELD STRENGTH		16	DC-1204-4.OL, REV. 2, 2-11-83, DC-1206-4.ON, REV. 2, 4-28-83	DC-1204-4.OL, REV. 1, 3-30-79, DC-1206-4.ON, REV. 1, 1-25-79			
RG 1.82, 6/74		16	DC-1204-1.0, REV. 2, 2-11-83, DC-1206-1.0, REV. 2, 4-28-83	DC-1204-1.0, REV. 1, 3-30-79, DC-1206-1.0, REV. 1, 1-25-79			
10CFR50, APP. A, GDC41		16	DC-1206-3.1B, REV. 2, 4-28-83, DC-1508-3.1A, REV. 6, 8-5-83, DC-1513-3.1.1A, REV. 0, 6-3-83	DC-1206-3.1B, REV. 0, 1-6-78, DC-1508-3.1A, REV.6, 8-5-83, , DC-1513-3.1.1A, REV. 0, 6-3-83			
NOTE (t): HEAT EXCHANGER, ASME III		16	WESTINGHOUSE EQUIPMENT SPECS - SEE REMARKS				PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE
TEMA-C OR TEMA-R, TUBULAR EXCH. MFR. ASSOC. CLASS C OR R		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78			

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
NEMA MG1 1972 (NATIONAL ELECTRICAL MFRS ASSOC.) MOTORS/GENERATORS		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78				867.00
ASME III, CLASS 1, 2, 3 OR MC, NF, OR CS		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78				880.00
ASME III, SUBSECTION NC, CLASS 2		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78				885.00
ASME III, SUBSECTION NB, CLASS 1		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78				888.00
ASME III, SUBSECTION ND, CLASS 3		16	DC-1010-T2, REV. 4, 6-29-83	DC-1010-T2, REV. 0, 8-4-78				889.00
TOTAL BREAK AREA LIMITED TO 12.5 SQ. IN.		16	DC-1018-APP. D, REV. 2, 10-11-83	DC-1018-APP. D, REV. 2, 10-11-83				963.00
ASME III, NB-3650 (WCAP-8082-P-A AND WCAP-8172-A)		16	DC-1018-3.3B.1, REV. 2, 10-11-83	DC-1018-3.3B.1, REV. 2, 10-11-83				967.00
RG 1.29, REV. 3, 9/78		16	DC-1010-1.0, REV. 4, 6-29-83	DC-1010-1.0, REV. 1, 4-11-79				1532.00
RG 1.36, REV. 0, 2/73		16	DC-1201-1.0, REV. 2, 3-9-84, DC-1204-1.0, REV. 2, 2-11-83, DC-1206-1.0, REV. 2, 4-28-83	DC-1201-1.0, REV. 2, 3-9-84, DC-1204-1.0, REV. 0, 3-13-78, DC-1206-1.0, REV. 2, 4-28-83				1536.00
REGULATORY GUIDES	R.G. 1.37, REV. 0, 3/73	16	X4AZ01-P1.11.0, REV. 13, 8-8-84, X4AQ01-12.1, REV. 16, 7-20-84	X4AZ01-P1.11.0, REV. 13, 8-8-84, X4AQ01-12.1, REV. 15, 12-5-83				1537.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
ANSI N45.2.1 (1973)		16	SEE REMARKS		NISCO PROCEDURE E.S.-67, REV. C, 5-31-84	NISCO PROCEDURE E.S.-67, REV. A, 9-22-82	SEE REF. NO 1537 FOR IMPLEMENTATIO N	1538.00
RG 1.44, REV. 0, 5/73		16	DC-1201-1.0, REV. 2, 3-9-84, DC-1204-1.0, REV. 2, 2-11-83, DC-1206-1.0, REV. 2, 4-28-83	DC-1201-1.0, REV. 2, 3-9-84, DC-1204-1.0, REV. 0, 3-13-78, DC-1206-1.0, REV. 1, 1-25-79				1541.00
RG 1.45, REV. 0, 5/73		16	DC-1220-1.0, REV. 1, 9-5-80 WESTINGHOUSE "REACTOR COOLANT PRESSURE BOUNDARY LEAK DETECTION SYSTEM-SYSTEM REQUIREMENTS" - SEE REMARKS	DC-1220-1.0. REV. 0, 5-27-77			PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	1542.00
BTP MEB 3-1, BTP ASB 3-1		16	DC-1018-1.0, REV. 2, 10-11-83	DC-1018-1.0, REV. 0, 12-13-77				1543.00
RG 1.48, REV. 0, 5/73		16	DC-1201-1.0, REV. 2, 3-9-84	DC-1201-1.0, REV. 0, 5-11-78				1544.00
RG 1.50, REV. 0, 5/73		16	DC-1201-1.0, REV. 2, 3-9-84, DC-1206-1.0, REV. 2, 4-28-83, X4AQ01-10.5, REV. 16, 7-20-84	DC-1201-1.0, REV. 2, 3-9-84, DC-1206-1.0, REV. 2, 4-28-83, X4AQ01-10.5, REV. 13, 11-8-82				1546.00
RG 1.53, REV. 0, 6/73		16	DC-1009-1.0, REV. 2, 6-3-83	DC-1009-1.0, REV. 0, 3-23-77				1551.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
RG 1.84, REV. 20, 11/82		16	DC-1017-1.0, REV. 3, 12-6-84, DC-1201-1.0, REV. 2, 3-9-84 WESTINGHOUSE LETTER - SEE REMARKS	DC-1017-2.4.1, REV. 0, 1-19-78, DC-1201-1.0, REV. 2, 3-9-84			PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	1565.00
RG 1.85, REV. 20, 11/82		16	DC-1017-1.0, REV. 3, 12-6-84, DC-1201-1.0, REV. 2, 3-9-84, DC-1206-1.0, REV. 2, 4-28-83 WESTINGHOUSE LETTER - SEE REMARKS	DC-1017-2.4.1, REV. 0, 1-19-78, DC-1201-1.0, REV. 1, 4-21-83, DC-1206-1.0, REV. 2, 4-28-83			PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	1569.00
REGULATORY GUIDES	R.G. 1.116, REV. 0, 6/76	16			SEE REMARKS	SEE REMARKS	SEE REF. NO. 1579 FOR IMPLEMENTATIO N	1578.00
ANSI N45.2.8-(1975)		16			NISCO QA MANUAL REV. D (8-10-84), VEGP QAM R7, 2-85, X4AZ06, DIV. N1, REV. 5, 11-21-84, DIV. N2, REV. 7, 12-17-84	NISCO QA MANUAL REV. A (10-4-82), VEGP QAM R10, 8-72, X4AZ06, DIV. N1, REV. 0, 12-16-82, DIV. N2, REV. 0, 11-15-82	REF. FSAR SECT. 1.9.116	1579.00
RG 1.139, REV. 0, 5/78		16	DC-1205-1.0, REV. 2, 3-17-83	DC-1205-1.0, REV. 0, 12-13-77				1611.00
ASME III, NB-3112 & NB 3113		16	DC-1017-3.1.1, REV. 3, 12-6-84	DC-1017-3.3.2, REV. 1, 1-24-83				1658.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
LOAD COMBINATIONS		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T1, REV. 0, 1-19-78				1660.00
ANSI N18.2-1973		16	DC-1201-2.0, REV. 2, 3-9-84	DC-1201-2.0, REV. 0, 5-11-78				1727.00
RG 1.4		16	DC-1206-3.1B, REV. 2, 4-28-83	DC-1206-3.1B, REV. 0, 1-6-78				1740.00
RG 1.29		16	PRM PART C, SECT. 13, REV. 3, 2-1-84, DC-1010-1.0, REV. 4, 6-29-83, DMCN-2, 12-20-84	DC-1010-1.0, REV. 0, 8-4-78				1754.00
ASME III, SUBSECTION NF		16	DC-1201-2.0, REV. 2, 3-9-84	DC-1201-2.0, REV. 0, 5-11-78				1785.00
PROPAGATION OF BREAK TO UNAFFECTED LOOPS PREVENTED		16	DC-1018-APP. D, REV. 2, 10-11-83	DC-1018-APP. D, REV. 2, 10-11-83				1841.00
PROPAGATION OF BREAK IN AFFECTED LOOP DOES NOT EXCEED 20% OF FLOW AREA OF RUPTURED LINE		16	DC-1018-APP. D, REV. 2, 10-11-83	DC-1018-APP. D, REV. 2, 10-11-83				1842.00
RG 1.31, REV. 3, 4/78		16	SEE REMARKS				SEE REF. NO. 256 FOR DESIGN IMPLEMENTATIO N	1855.00
ASME III SUBSECTION NF 1977 EDITION WITH WINTER 1977 ADDENDA	ARTICLE NF 1000	16	NOT APPLICABLE		NOT APPLICABLE		INTRODUCTION ONLY NO COMMITMENTS	1997.01

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
ASME III SUBSECTION NF 1977 EDITION WITH WINTER 1977 ADDENDA	ARTICLE NF 2000	16			NISCO PROCEDURE E.S.-56, REV. A, 6-4-84, E.S.-63, REV. A, 8-22-83	NISCO PROCEDURE E.S.-56, REV. A, 8-27-82, E.S.-63, REV. A, 8-22-83		1997.02
ASME III SUBSECTION NF 1977 EDITION WITH WINTER 1977 ADDENDA	ARTICLE NF 3000	16	SEE REMARKS				SEE REF. NO. 880 FOR IMPLEMENTATIO N	1997.03
ASME III SUBSECTION NF 1977 EDITION WITH WINTER 1977 ADDENDA	ARTICLE NF 4000	16			E.S.-8.7,REV.C,8-23-84,E.S.-100-5,REV.C,3-9-83,E.S.-300,REV.F,4-8-83,E.S.-4028-1,REV.E,7-7-83,E.S.-4028-3,REV.F,1-30-85,E.S.-4028-4,REV.F,1-30-85,E.S.-4028-5,REV.E,1-16-85,E.S.-4028-13,REV.D,8-27-84,WPS-10-1-20,REV.A,6-20-83,WPS-13-1-1,REV.A,6-20-83	E.S.-8.7,REV.A,3-20-84,E.S.-100-5,REV.C,3-9-83,E.S.-300,REV.A,8-26-82,E.S.-4028-1,REV.A,9-20-82,E.S.-4028-3,REV.A,9-27-82,E.S.-4028-4,REV.A,10-1-82,E.S.-4028-5,REV.A,10-5-82,E.S.4028-13,REV.A,5-25-83,E.S.-101-20,REV.A,6-20-83,WPS-13-1-1,REV.A,6-20-83		1997.04
ASME III SUBSECTION NF 1977 EDITION WITH WINTER 1977 ADDENDA	ARTICLE NF 5000	16			E.S.-8.7, REV. C, 8-23-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. E, 7-25-84, E.S.-100-4-1, REV. C, 2-1-85, E.S.-100-5, REV. C, 3-9-83, E.S.-116-1, REV. I, 11-3-83, E.S.-117, REV. D, 6-28-82, E.S.-118, REV. C, 4-25-83	E.S.-8.7, REV. A, 3-20-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. A, 8-15-82, E.S.-100-4-1, REV. A, 6-21-84, E.S.-100-5, REV. C, 3-9-83, E.S.-116, REV. H, 10-12-82, E.S.-117, REV. A, 6-18-82, E.S.-118, REV. A, 9-28-82		1997.05

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
RG 1.4, REV. 2, 6/74		16	WESTINGHOUSE CALCULATION - SEE REMARKS				PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	2021.00
COMPONENTS IN CONTACT WITH BORATED WATER ARE FABRICATED OF OR CLAD WITH AUSTENITIC STAINLESS STEEL OR EQUIV. CORROSION-RESISTANT MATERIAL.		16	DC-1205-4.0A, REV. 2, 3-17-83, DC-1206-4.0A, REV. 2, 4-28-83, DC-1204-4.0D, REV. 2, 2-11-83, DC-1208-3.3C, REV. 1, 3-9-83	DC-1205-3.3B, REV. 0, 12-13-77, DC-1206-4.0A, REV. 1, 1-25-79, DC-1204-3.3A, REV. 0, 3-13-78, DC-1208-3.3C, REV. 0, 5-9-78				2030.00
RG 1.7, REV. 2, 11/78		16	DC-1206-1.0, REV. 2, 4-28-83, DC-1501-1.0, REV. 5, 12-11-78, DC-1513-1.0, REV. 0, 6-3-83, DC-1516-1.0, REV. 1, 9-6-83	DC-1206-1.0, REV. 2, 4-28-83, DC-1501-1.0, REV. 5, 12-11-78, DC-1513-1.0, REV. 0, 6-3-83, DC-1516-1.0, REV. 0, 11-21-78				2041.00
RG 1.61, 10/73		16	DC-1005, REV. 1, 4-4-83, DC-1017-1.0, REV. 3, 12-6-84	DC-1005, REV. 0, 3-10-80, DC-1017-2.4.1, REV. 0, 1-19-78				2188.00
RG 1.32		16	DC-1206-3.1D & 3.1I, REV. 2, 4-28-83, DC-1620-3.10.13, REV. 2, 3-29-83, DC-1801-1.0, REV. 3, 7-19-83, DC-1821-1.0, REV. 5, 5-2-83	DC-1206-3.1D & 3.1L, REV. 0, 1-6-78, DC-1620-3.10.13 REV. 2, 3-29-83 DC-1801-1.0, REV. 0, 6-24-77, DC-1821-1.0, REV. 1, 4-19-74				2402.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
CSS AUTOMATICALLY PLACED IN OPERATION ON RECEIPT OF TWO OUT OF FOUR CONTAINMENT PRESSURE (HIGH-3) SIGNALS		16	DC-1206-3.1D, REV. 2, 4-28-83	DC-1206-3.1D, REV. 2, 4-28-83				2403.00
DESIGNED TO CATEGORY I AND QUALITY GROUP B REQUIREMENTS		16	DC-1206-7.0.1, REV. 2, 4-28-83	DC-1206-7.0.1, REV. 1, 1-25-79				2404.00
IEEE 279		16	DC-1620-2.0, REV. 2, 3-29-83	DC-1620-2.0, REV. D, 7-1-77				2406.00
SINGLE ACTIVE FAILURE PLUS LOSP (INJECTION) AND SINGLE ACTIVE OR PASSIVE FAILURE PLUS LOSP (RECIRCULATION)		16	DC 1206-3.1C, REV. 2, 4-28-83	DC-1206-3.1C, REV. 2, 4-28-83				2479.00
ASME III, CLASS 2		16	DC-1206-2.0B, REV. 2, 4-28-83	DC-1206-2.0B.1, REV. 1, 1-25-79				2480.00
ASME III, CLASS 3		16	DC-1206-2.0B, REV. 2, 4-28-83	DC-1206-2.0B.2, REV. 1, 1-25-79				2481.00
NEMA MG1		16	DC-1206-2.0B, REV. 2, 4-28-83	DC-1206-2.0B.3, REV. 1, 1-25-79				2483.00
MINIMUM pH OF 8.5		16	DC-1206-3.1H, REV. 2, 4-28-83	DC-1206-3.1J, REV. 0, 1-6-78				2485.00
AUSTENITIC S.S		16	DC-1206-4.0A, REV. 2, 4-28-83	DC-1206-4.0A, REV. 1, 1-25-79				2486.00
RG 1.1		16	DC-1206-3.1F, REV. 2, 4-28-83	DC-1206-3.1F, REV. 0, 1-6-78				2512.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
MAX. SPRAY PH OF 10.5		16	DC-1206-3.1H, REV. 2, 4-28-83	DC-1206-3.1H, REV. 1, 1-25-79				2514.00
RG 1.82		16	DC-1206-3.1N, REV. 2, 4-28-83	DC-1206-3.1I, REV. 0, 1-6-78				2515.00
REGULATORY GUIDES	R.G.-1.37, 3/73	16	SEE REMARKS		SEE REMARKS		SEE REF. NO. 1537 & 1538 FOR IMPLEMENTATIO N	3201.00
REGULATORY GUIDES	R.G.-1.37	16	SEE REMARKS				SEE REF. NO. 1537 FOR IMPLEMENTATIO N	3361.00
CVCS COMPONENTS, VALVES & PIPING WHICH SEE RADIOACTIVE SERVICE ARE DESIGNED TO LIMIT LEAKAGE TO ATMOSPHERE		16	DC-1208-3.1H, REV. 1, 3-9-83	DC-1208-3.1H, REV. 0, 5-9-78				3455.00
DIFFERENTIAL PRESSURE INDUCED BY 50% BLOCKAGE WITH DEBRIS		16	DC-1206-3.1N, REV. 2, 4-28-83	DC-1206-3.1N, REV. 1, 1-25-79			NRC QUESTION Q480.5 CORRESPONDENC E	4153.00
STARTING VOLTAGE AT LEAST 75% OF RATED VOLTAGE OF 4 KV (AND ABOVE) AND 460 VOLTS		16	DC-1804-3.3F, REV. 4, 9-14-83, DC-1805-3.3H, REV. 4, 9-23-83 WESTINGHOUSE EQUIPMENT SPEC. - SEE REMARKS	DC-18043.3F, REV. 3, 5-25-79, DC-18053.3H, REV. 3, 7-1-80			PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	4484.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
LOW PRESSURE PROCESS OR HOLDUP TANKS THAT CAN CONTAIN RADIOACTIVE MATERIAL ARE DESIGNED WITH FEATURES TO PRECLUDE VACUUM CONDITIONS		16	DC-1208-3.3E.2, REV. 1, 3-9-83, DC-1203-4.0, REV. 6, 11-2-83	DC-1208-3.3.E.2, REV. 0, 5-9-78, DC-1203-4.0, REV. 5, 4-15-83			I.E.B. CORRESPONDENCE C-80/08/05	4674.00
MAXIMUM PRESSURES (psi) AS FLOW APPROACHES ZERO (TABLE). (AFFECTED VALVES WILL BE MODIFIED)		16	DC-1208-1.0, REV. 1, 3-9-83, DC-1205-1.0, REV. 2, 3-17-83, DC-1204-1.0, REV. 2, 2-11-83, DC-1206-1.0, REV. 2, 4-28-83	DC-1208-1.0, REV. 0, 5-9-78, DC-1205-1.0, REV. 0, 12-13-77, DC-1204-1.0, REV. 0, 3-18-78, DC-1206-1.0, REV. 0, 1-6-78			I.E.B. CORRESPONDENCE C-81/11/20	4680.00
10CFR50, APP. B		16	SEE REMARKS				SEE REF. NO. 1537 FOR IMPLEMENTATION	4681.00
ASME III, SUBSECTION NF		16	X2AG05-PART I - 2.5.1, REV. 5, 4-1-82	X2AG05-PART I - 2.5.1, REV. 4, 6-29-81			PRESSURIZER BASE TO STEEL SUPPORT FRAME BOLTING	4695.00
2% AND 4% RESPECTIVELY		16	DC-1005-T2, REV. 1, 4-4-83	DC-1005-T2, REV. 0, 3-10-80				4732.00
ASME B & PV CODE, SECTION III. DIV. 1	SUBSECTION NCA, ALL ARTICLES	16			VEGP QAM, REV. 7, 2-85, NISCO QAM, REV. D, 8-10-84, X4AZ06, DIV. N1, REV. 5, 11-21-84, X4AZ06, DIV. N2, REV. 7, 12-17-84, GPC IDENT. & VERIFICATION MANUAL, REV. A, 4-30-84	VEGP QAM, REV. 0, 8-72, NISCO QAM, REV. A, 10-4-82, X4AZ06, DIV. N1, REV. 0, 12-16-82, X4AZ06, DIV. N2, REV. 0, 11-15-82, GPC IDENT. & VERIFICATION MANUAL, REV. 2, 1-15-82		4739.01

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 1000	16			NOT APPLICABLE		INTRODUCTION	4739.02
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 2000	16			E.S.-56, REV. D, 6-4-84, E.S.-6.3, REV. A, 8-22-83	E.S.-56, REV. A, 8-27-82, E.S.-63, REV. A, 8-22-83		4739.03
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 3000	16			NOT APPLICABLE		DESIGN	4739.04
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 4000	16			E.S.-87, REV. C, 8-23-84, E.S.-56, REV. D, 6-4-84, E.S.-63, REV. A, 8-22-83, E.S.-300, REV. F, 4-8-83, E.S.-GWP-BMI-1, REV. E, 1-15-85	E.S.-8.7, REV. A, 3-20-84, E.S.-56, REV. A, 8-27-82, E.S.-63, REV. A, 8-22-83, E.S.-300, REV. A, 8-26-82, E.S.-GWP-BMI-1, REV. A, 6-7-83		4739.05
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 5000	16			E.S.-8.7, REV. C, 8-23-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. E, 7-25-84, E.S.-100-4-1, REV. C, 6-21-84, E.S.-100-5, REV. C, 3-9-83, E.S.-116-1, REV. I, 11-3-83	E.S.-8.7, REV. A, 3-20-84, E.S.-100-1, REV. A, 8-23-82, E.S.-100-2, REV. A, 8-25-82, E.S.-100-4-1, REV. A, 6-21-84, E.S.-100-5, REV. C, 3-9-83, E.S.-116-1, REV. 11, 10-12-82		4739.06

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 6000	16			E.S.-4028-10, REV. E, 5-21-84	E.S.-4028-10, REV. A, 5-23-83		4739.07
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 7000	16			NOT APPLICABLE		OVERPRESSURE PROTECTION	4739.08
ASME B & PV CODE, SECTION III DIV. 1	SUBSECTION NB/NC/ND, ARTICLE 8000	16			NOT APPLICABLE		REFER TO SUBSECTION NCA	4739.09
RCS SEISMIC ANALYSIS-6 STATISTICALLY INDEPENDENT TIME - HISTORY INPUTS: 3 TRANSLATIONAL ACCELERATIONS 3 ROTATIONAL ACCELERATIONS		16	DC-1005-APP.B, REV. 1, 4-4-83	DC-1005-APP.B, REV. 1, 4-4-83				4755.00
LOADS COMBINED BY ALGEGRAIC SUM		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4757.00
DYNAMIC LOADS COMBINED USING SQUARE ROOT OF SUM OF SQUARES (SRSS)		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4759.00
NORMAL LOADS COMBINED ALGEBRAICALLY DYNAMIC LOADS COMBINED BY SRSS		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4760.00
LOCA & SSE LOADS COMBINED BY SRSS ON LOAD COMPONENT BASIS		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4761.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
SUSTAINED LOADS (WT. EFFECTS) ARE COMBINED WITH SRSS RESULTS BY ALGEBRAIC SUM		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4762.00
OTHER DYNAMIC LOADS COMBINED USING SRSS		16	DC-1017-T2, REV. 3, 12-6-84	DC-1017-T2, REV. 3, 12-6-84				4763.00
RG 1.75		16	DC-1809-3.1B, REV. 4, 1-21-82	DC-1809-3.1B, REV. 3, 2-6-78				4951.00
RG 1.75		16	DC-1809-3.1B, REV. 4, 1-21-82	DC-1809-3.1B, REV. 3, 2-6-78				4952.00
PRIMARY MEMBRANE IS < OR = 1.0 Sm, PRIMARY MEMBRANE PLUS BENDING IS < OR = 1.5 Sm		16	WESTINGHOUSE EQUIPMENT SPECIFICIATIONS - SEE REMARKS				PROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	4987.00
PRIMARY MEMBRANE IS < OR = 1.0 S, PRIMARY MEMBRANE PLUS BENDING IS < OR = 1.5 S		16	WESTINGHOUSE EQUIPMENT SPECIFICATIONS - SEE REMARKS				ROPRIETARY INFORMATION - IMPLEMENTATIO N VERIFIED AT WESTINGHOUSE	4991.00
RETURN LINE AUTOMATICALLY ISOLATED IN CASE OF A CRACK IN RCP THERMAL BARRIER		16	DC-1217-3.1, REV. 1, 03-09-83	DC-1217-3.1, REV. 1, 03-09-83				4996.00
ASME III & IX		16			SEE REMARKS		SEE REF. 223 FOR CONSTRUCTION IMPLEMENTATIO N	4997.00

IMPLEMENTATION

MODULE 16 - SORTED BY REFERENCE NUMBER

DOCUMENT/FEATURE	SECTION	MODULE	DESIGN LAST	DESIGN FIRST	CONST LAST	CONST FIRST	REMARKS	REF NO
NO BLOCK WELDING MAX 350 DEGREE INTERPASS TEMP EXERCISE WELD PROC. APPROVAL		16			E.S.-300, REV. F, 4-8-84, E.S.-GWP-BMI-1, REV. E, 1-14-85, NISCO QAM REV. D, 8-10-84	E.S.-300, REV. C, 8-26-82, E.S.-GWP-BMI-1, REV. A, 6-'-83, NISCO QAM REV. A, 10-4-82	INTERPASS TEMP IMPLEMENTED THROUGH INDIVIDUAL WELD PROCEDURES FOR AUSTENITIC S/S	4998.00

4.0 WORK ACTIVITIES

4.1 DESIGN

The Vogtle nuclear steam supply system (NSSS) is designed, analyzed, and manufactured/procured by Westinghouse. The primary safety related NSSS systems designed by Westinghouse are the reactor coolant system, the engineered safeguards features system, and the engineered safeguards features actuation system. Westinghouse provides to Bechtel balance-of-plant (BOP) design criteria as dictated by the NSSS design. Westinghouse also performs the stress analysis of the reactor coolant loop and ASME section III large bore piping and the fatigue analysis of ASME section III small bore piping. In addition, Westinghouse reviews the BOP design information and drawings for compliance with Westinghouse design criteria.

Bechtel performs detailed equipment and piping layouts for the NSSS systems, and is responsible for the design and analysis of hangers, supports, restraints, etc. for piping, conduit, and components of the NSSS as described in the preceding paragraph. Bechtel also provides information required by Westinghouse to design and supply the NSSS.

Division of responsibility for N stamping is defined in section 2.1. For those systems within the Westinghouse scope, Westinghouse responsibilities include:

- o Audits of those organizations responsible for supply of material and services associated with the installation and test of the subject systems;
- o Reviews of the design specifications governing the piping installation, testing (including hydro), and any deviations thereto;
- o Reviews of piping installation, nondestructive examination (NDE), and hydrotest procedures;
- o Witnessing of the hydrotesting of the subject systems and signing the N5 form signifying N-certificate holder approval.

4.1.1 INTERFACE CONTROL

The design interface between Bechtel and Westinghouse for the NSSS is controlled within Bechtel by the Project Reference Manual (PRM) and within Westinghouse by internal Westinghouse procedures. Through this interface, Westinghouse provides design documents for the NSSS. Westinghouse provides a master index identifying engineering related data transmitted by

Westinghouse. The index is updated with each new data transmittal and is used as a tracking tool for transmittals.

Westinghouse data supplied by correspondence is processed within Bechtel either as correspondence or as supplier data depending on the scope, content, or intended use by Bechtel. This data is processed by Bechtel Drawing and Data Control (DDC) and Project Administration as described in Appendix D.

Bechtel also provides drawings and documents to Westinghouse for verification or implementation of design. Each discipline is responsible for maintaining a drawing control log for the drawings to be transmitted to Westinghouse. Each discipline is also responsible for initiating document transmittal correspondence to Westinghouse. These documents are sent by project correspondence requesting review and concurrence with a specific aspect of the design (PRM part C, section 2).

4.1.1.1 Open Items List

An open items list is maintained to provide a means for assuring that actions required across the interface by either Bechtel or Westinghouse are tracked to completion. Each required interface action generated in correspondence, in vendor data which is statused as requiring revision, or in a meeting is assigned to the list and remains there until identifiable written evidence of completion is provided (PRM part C, section 2). All open items are reviewed at regular interface meetings where commitments are made to a completion schedule.

4.1.1.2 Interface Meetings

Interface meetings between Bechtel and Westinghouse to resolve technical, schedule, or scope items are scheduled at 6-week intervals and are normally held in the Westinghouse offices. Additional meetings are scheduled as required. Conference notes are issued in accordance with project procedures following the meeting, and assigned actions resulting from the meetings are tracked on the open items list.

4.1.2 TECHNICAL INTERFACE

The following sections summarize key areas of interface between Westinghouse and Bechtel.

4.1.2.1 Civil/Structural Discipline

Bechtel developed the preliminary containment design using general arrangement drawings which depict the overall containment layout, the locations of major equipment, and the

routings of major piping and raceways. Westinghouse reviewed and contributed to this design.

Westinghouse is responsible for the design and analysis of the reactor coolant loop piping and equipment and the design and analysis of the reactor coolant loop equipment supports. The loads on the containment structure resulting from the reactor coolant loop equipment supports are calculated by Westinghouse during these analyses. These loads are provided to Bechtel for the design of the interfacing structures. Changes to the loads as the result of Westinghouse reanalysis are also transmitted to Bechtel for evaluation. Bechtel used interdiscipline criteria (tornado missile barriers, radiation shielding, equipment separation, etc.) and Westinghouse provided loading criteria to develop the basic design of Vogtle structural systems.

4.1.2.2 Plant Design Discipline

The Plant Design Discipline is responsible for the design interface with Westinghouse for ASME Class 1 piping system analysis. Westinghouse designs and analyzes the Class 1 reactor coolant loop and pressurizer surge piping. Bechtel designs and Westinghouse analyzes the large-bore Class 1 piping. For the small bore Class 1 piping, Bechtel designs and performs the stress analyses and Westinghouse performs the fatigue analyses.

Figure 4.1-1 illustrates the design interface for large-bore Class 1 piping analyzed by Westinghouse. Figure 4.1-2 illustrates the control interface for small-bore Class 1 piping with stress analysis performed by Bechtel.

In addition to the pipe stress interface, drawings such as equipment outline drawings and special Westinghouse design requirements, such as provisions for inservice inspection access and clearances for Westinghouse supplied equipment, were transmitted to Bechtel for implementation in the plant layout process by Plant Design.

4.1.2.3 Mechanical Discipline

The Mechanical Discipline NSSS-BOP interfaces include:

- o Development of process and instrumentation diagrams for Westinghouse-designed systems;
- o Implementation of Westinghouse process requirements for Bechtel-designed systems which interface with the NSSS.

Westinghouse is responsible for the design of NSSS fluid systems. Westinghouse provides flow diagrams to Bechtel engineering for these systems and system standard design criteria documents such as piping layout criteria. Bechtel uses

these flow diagrams to develop process and instrumentation diagrams (P&IDs). From the P&IDs, Bechtel performs the same design functions as were discussed and reviewed in Module 4 for Bechtel-designed systems.

In the Westinghouse design process, a proof-of-design (POD) review is performed to confirm that Westinghouse design considerations and layout guidelines for these systems have been met. Bechtel provides piping layout and/or isometric drawings of the systems to Westinghouse for this review. These drawings contain the necessary information for the POD review (except for Westinghouse-supplied information on Westinghouse-supplied components). Westinghouse reviews these drawings for compliance with the Westinghouse design guidelines, and also uses these drawings to compile the piping take-offs needed for Westinghouse systems performance analyses. A POD review determines whether the Westinghouse-designed system as laid out by Bechtel will meet the basic functions required of that system, such as ECCS flowrates versus reactor coolant system (RCS) pressure and the residual heat removal (RHR) cooldown time of the RCS.

Westinghouse also identifies process requirements for Bechtel-designed systems which interface with Westinghouse-designed NSSS systems. For systems such as the nuclear service cooling water system and component cooling water system, Westinghouse transmits process requirements in balance-of-plant functional requirements documents. For steam side systems such as the auxiliary feedwater system, Westinghouse process requirements are transmitted in the Steam Systems Design Manual. These guidelines vary in detail. The general guidelines are included by Bechtel in the system design criteria. Specific detail requirements are incorporated into various Bechtel design documents such as calculations, control logic diagrams, and drawings.

4.1.2.4 Nuclear Discipline

Within Bechtel, the Nuclear Discipline has the overall responsibility for NSSS-BOP coordination.

Specific NSSS-BOP interfaces within the Nuclear Discipline include the following areas:

- LOCA and main steam line break subcompartment analysis;
- Emergency core cooling analyses requiring BOP interaction;
- Safety Analysis Report preparation;
- Radiation shielding;
- Hazards analyses.

Westinghouse performs the loss-of-coolant accident and main steam line break analyses which determine the postaccident temperature and pressure conditions inside the containment pressure boundary. Inputs consist of mass and energy release data from Westinghouse and containment physical dimensions, heat sink description, and containment cooling characteristics from Bechtel. The analytical results support the containment design criteria given by Design Criteria Document 2101, Containment Building.

Westinghouse provides mass and energy release data used by Bechtel for containment subcompartment pressurization analyses. The results of these analyses become input to the structural design.

Emergency core cooling analyses performed by Westinghouse determine performance specifications for the auxiliary feedwater system in the Bechtel scope. Westinghouse main steam and feedwater break analyses also require as input the characteristics of the BOP main steam and feedwater design.

Additionally, Westinghouse prepared information on the NSSS for the Preliminary and Final Safety Analysis Reports. Bechtel incorporated this information into the complete report. Westinghouse and Bechtel each reviewed applicable report sections for conformance to their scope of work.

Bechtel performs calculations to design or evaluate shield walls enclosing radioactive equipment and materials and to predict radiation levels in all parts of the plant under various operational or accident conditions. The basic radioactive source characteristics are provided by Westinghouse in the Radiation Analysis Manual.

As a result of the Westinghouse fatigue analyses, Westinghouse identifies the Class 1 pipe break locations. The break locations are used by Bechtel in performing hazard calculations.

4.1.2.5 Electrical Discipline and Control Systems Discipline

Westinghouse provides functional requirements for NSSS and interfacing systems in various functional requirement documents. Westinghouse also provides the following design documents.

- o Process flow diagrams showing process instrumentation;
- o Functional (logic) diagrams showing system requirements such as reactor trip, T/G trip, and initiation of engineered safety feature systems;

- o Instrumentation/control drawings such as installation drawings, rack arrangement drawings, rack interconnection drawings, and connection drawings;

- o Elementary wiring diagrams for electrical-powered equipment include equipment train assignments.

Bechtel implements the Westinghouse functional requirements through various design documents such as schematic diagrams, cabling block diagrams, control logic diagrams, and elementary diagrams. The requirements are also implemented in the plant physical drawings.

4.1.2.6 NSSS Equipment Qualification Interface

Westinghouse provides safety related NSSS equipment qualified to generic seismic and environmental levels which are typically conservative values obtained from Westinghouse experience on other projects. The various suppliers provide Westinghouse with calculations and/or test reports which are reviewed and approved by Westinghouse to support, on a generic basis, equipment qualification at defined levels. Bechtel is responsible for locating the NSSS equipment during completion of the plant design and thereby determines the Vogtle specific environmental and seismic requirements.

Bechtel designers use project design criteria and Westinghouse information documents that provide guidelines for locating equipment in acceptable environmental conditions in their locating of NSSS equipment.

Bechtel developed programs for verifying equipment qualification levels versus location required levels for safety-related equipment. The program for comparison of environmental qualifications is initiated with the preparation of a System Component Evaluation Work Sheet (SCEWS) for each NSSS safety-related component located in a harsh environment.

The operation of the evaluation is as follows:

- o Bechtel identifies which components are located in the harsh environment;

- o Westinghouse initiates a SCEWS for each component and enters the qualification information;

- o Bechtel enters location environment data and compares for acceptability.

Seismic verification programs for electrical and mechanical NSSS equipment are similar to those for the environmental qualification verification. Westinghouse is responsible for generic qualification of NSSS equipment and provides to Bechtel

installation details consistent with their generic qualification program. This information is used by Bechtel in the design of anchor bolts and supports to ensure that the qualified mounting is consistent with designed mounting. Deviations from Westinghouse requirements during design and installation are reviewed by Bechtel, and Westinghouse concurrence is obtained as necessary. Bechtel is then responsible for assuring that NSSS equipment is properly qualified and meets VEGP requirements.

When the qualification verification identifies an unacceptable condition, Bechtel investigates potential solutions such as relocation, provision of special protection, or additional analysis. If a Bechtel solution is not found, the case is assigned an open item number for coordination between Bechtel and Westinghouse. The open item is tracked on the Westinghouse open items list until resolution and closeout by documentation.

4.1.2.7 Installation Requirements

Installation requirements for Westinghouse-supplied equipment are identified in various design documents transmitted to Bechtel such as drawings, standards documents, or equipment specifications. These installation requirements identify the mounting installation used by Westinghouse in the seismic and environmental qualification of the equipment. Bechtel implements these requirements on drawings used for installation of the equipment.

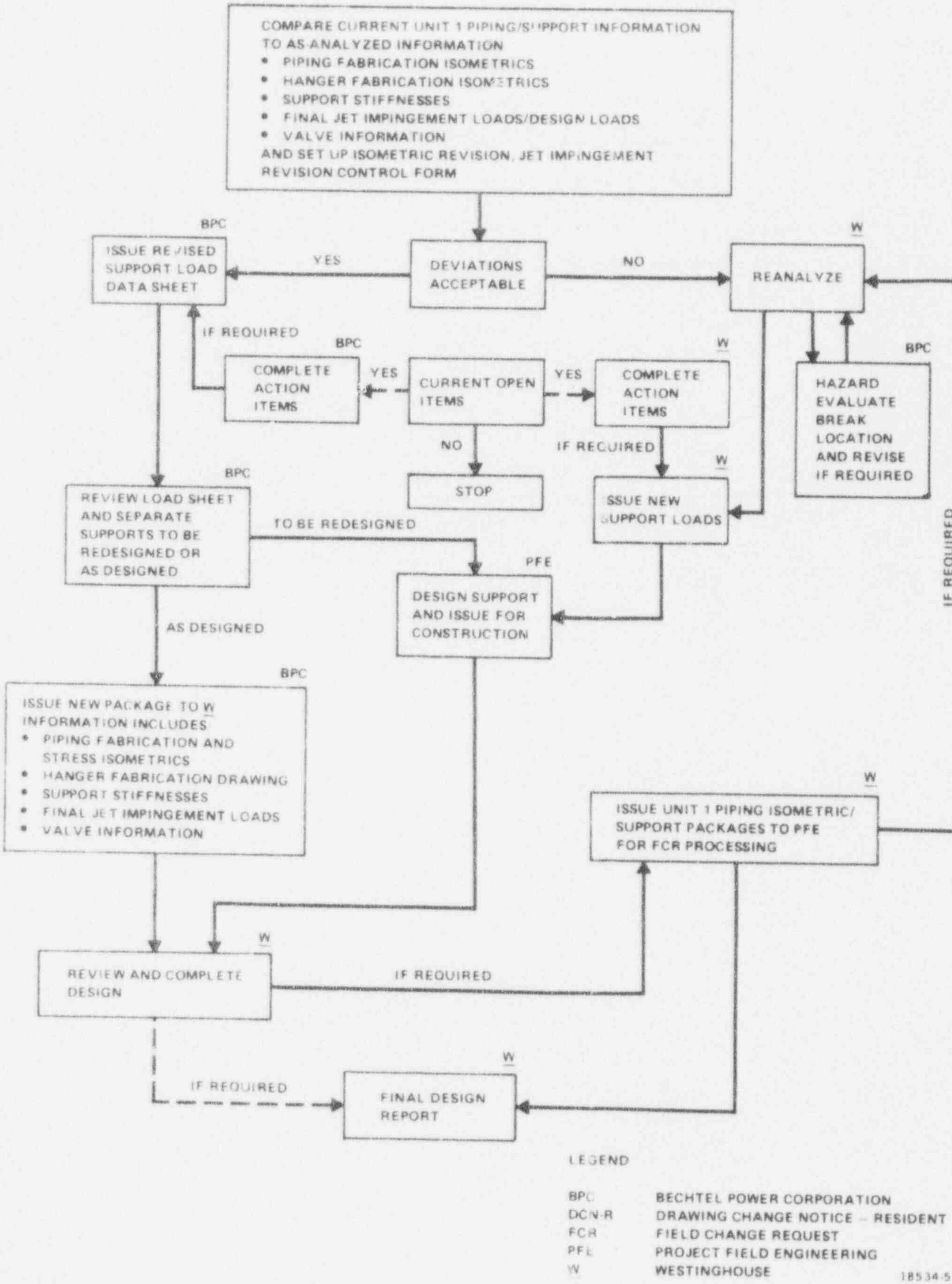
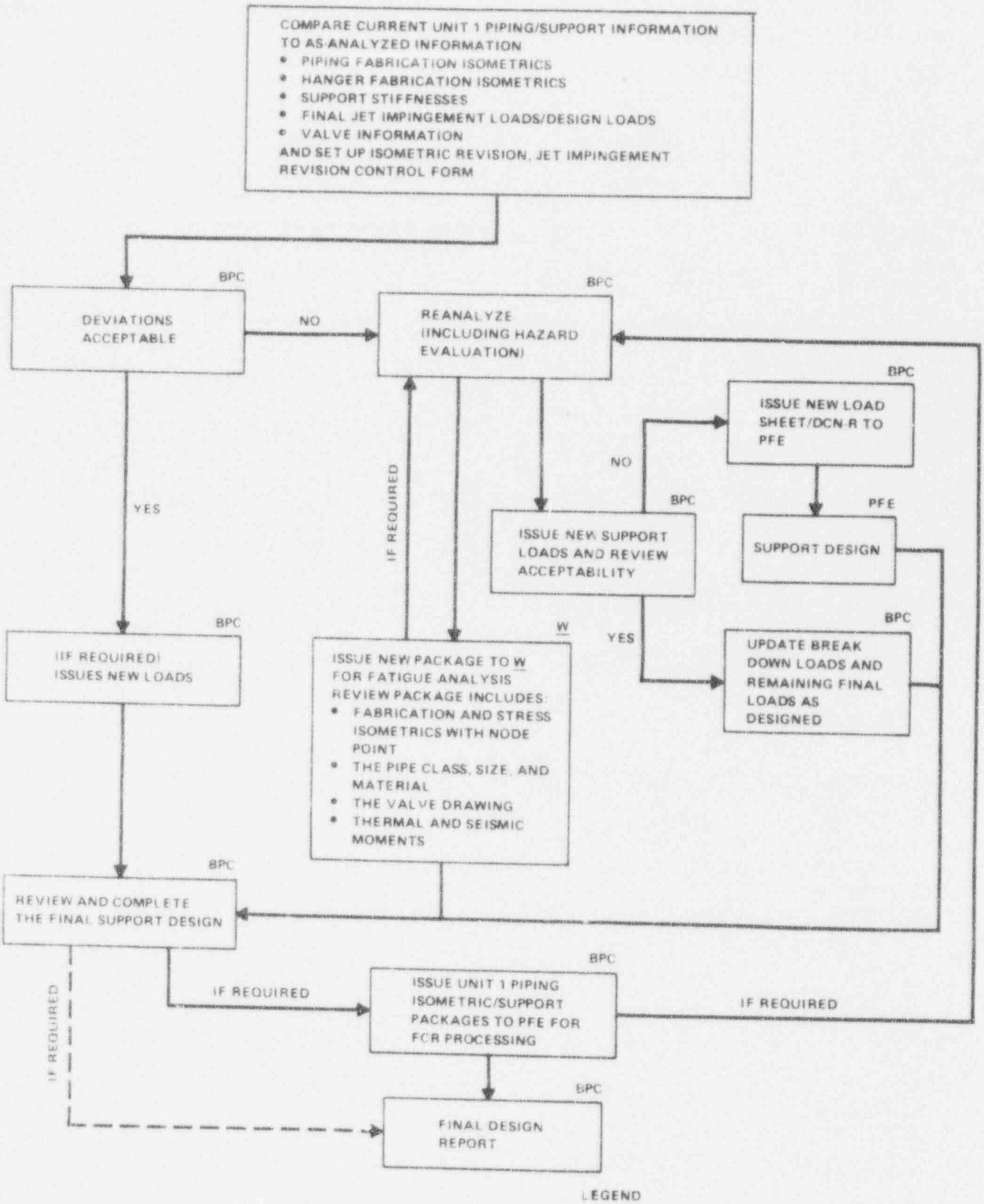


Figure 4.1-1 Design Control Interfaces (Westinghouse Scope Stress Analysis)



LEGEND

BCP	BECHTEL POWER CORPORATION
DCN-R	DRAWING CHANGE NOTICE -RESIDENT
FCR	FIELD CHANGE REQUEST
PFE	PROJECT FIELD ENGINEERING
W	WESTINGHOUSE

18534-5

Figure 4.1-2 Design Control Interfaces (BPC Scope Stress Analysis)

4.2 EQUIPMENT AND MATERIALS

Safety-related nuclear steam supply system (NSSS) equipment and materials within the Westinghouse scope of supply are procured by Westinghouse in accordance with the Westinghouse Quality Assurance Program. Technical and quality requirements, applicable to the procurement of NSSS components, are specified in Westinghouse procurement documents. The quality requirements include supplier quality assurance program requirements, requirements for access to the supplier's facility, and documentation and requirements for nonconformance control. Generally, technical and/or quality requirements are specified by reference to equipment specifications and/or other documents. Westinghouse procurement documents are developed based on input from requisitioners and are reviewed and approved by Westinghouse engineering and quality assurance. This includes review to assure that quality requirements are correctly specified, including adequate acceptance and rejection criteria; it also includes review to assure the procurement documents have been prepared, reviewed, and approved in accordance with quality assurance procedures.

The Westinghouse scope of supply is identified in Final Safety Analysis Report Table 3.2.2-1.

4.3 MATERIAL CONTROL

Georgia Power Company (GPC) purchases, receives, inspects, and stores equipment and material, including welding materials required for construction at Plant Vogtle. Details of the GPC program for these activities are discussed in Appendix E. The ASME Boiler and Pressure Vessel Code, section III, division 1 requires that receipt inspection and control of ASME Code items and material be performed by the NA installer, Nuclear Installation Services Company (NISCO). NISCO responsibility is limited to components and activities that are within the Westinghouse Electric Company scope of supply and are discussed in this module. Figure 4.3-1 shows material flow with references to the information contained within this text.

4.3.1 REQUISITIONING

All equipment and material, including restricted consumables, are initially received and inspected at the jobsite by GPC as explained in Appendix E. After satisfactory completion of receipt inspection, the material is placed in storage locations maintained by GPC. NISCO obtains the equipment and material needed for construction from GPC using the Piping Materials Requisition as required by procedure ES-63.

4.3.2 RECEIPT INSPECTION

Equipment and material requisitioned from GPC is receipt inspected by NISCO in accordance with NISCO procedure ES-63. A Receiving Inspection Report (RIR) (Attachment A, procedure ES-63) is used to document receiving inspection activities. The RIR is initiated by the lead engineer or designee who inspects the equipment/material for damage and correct quantities. The RIR is then forwarded to the field QA/QC manager or designee for quality control inspection of the items. The NISCO QC inspector physically checks the items for damage, dimensions, identification, and other markings.

4.3.3 DOCUMENT REVIEW/ACCEPTANCE

Concurrent with QC receiving inspection of equipment and material, the field QA/QC manager or designee reviews documentation to assure that material certifications, test reports, and Code Data reports are available and acceptable. The review also ensures that required documentation is attached to the RIR. All documentation is checked for traceability to the equipment and materials received and is available to the authorized nuclear inspector for review.

After successful completion of receiving inspection and documentation review activities, the equipment or material is released for installation.

4.3.4 MATERIAL TRACEABILITY

Component/material traceability to supporting documentation is maintained through installation by the following activities:

- o When components or materials are issued, the RIR number is entered on the applicable process control sheet to establish traceability of the component or material to the location of use.

- o Material is identified with code numbers and/or heat numbers, and verified by QC/QA prior to cutting the material into more than one piece.

- o Components and subassemblies are assigned a unique serial number by NISCO. The serial number corresponds to the drawing of the component/subassembly. The serial numbers are identified on each component/subassembly, verified by QC/QA, and documented on the applicable RIR or process control sheet.

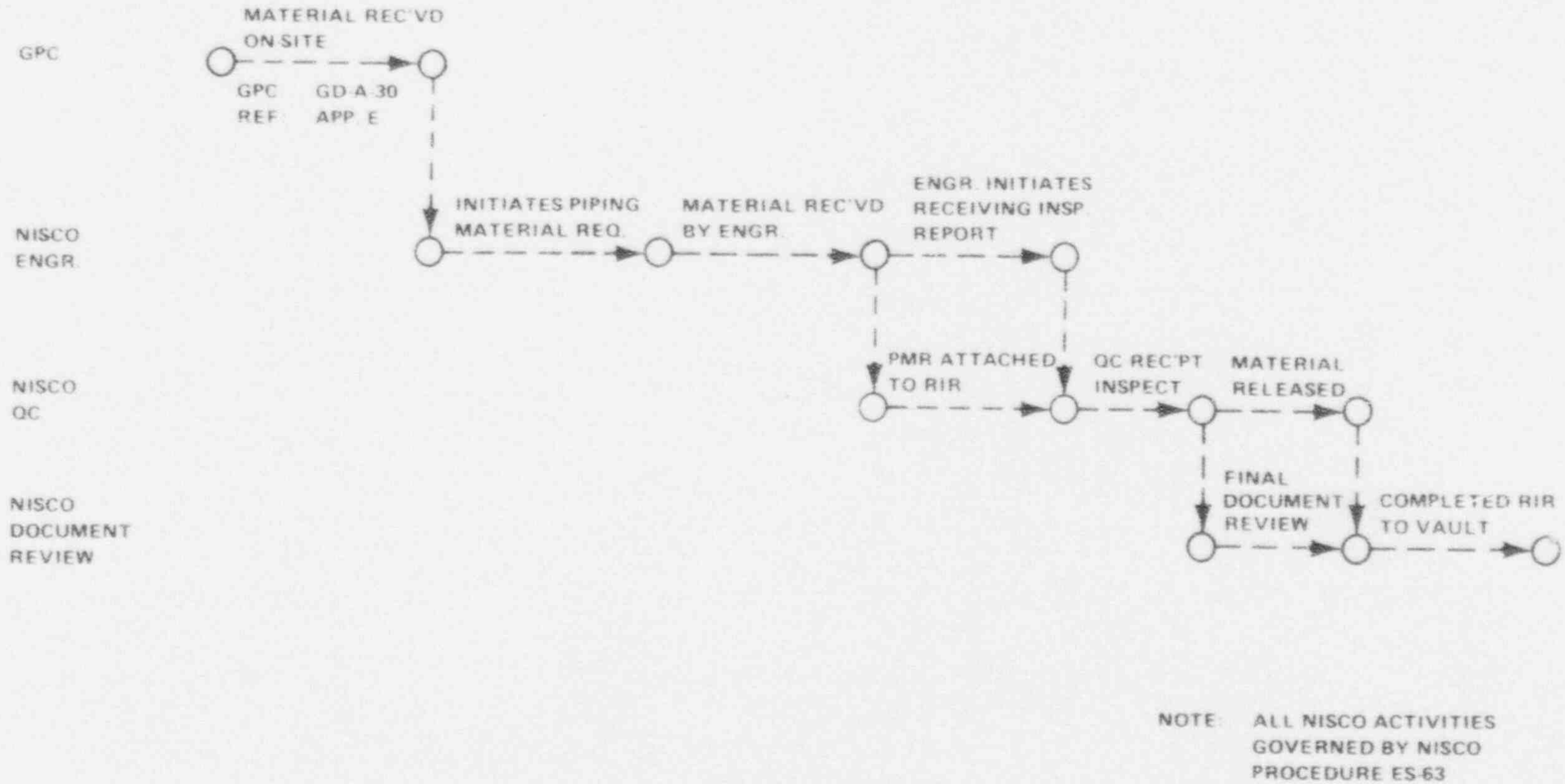


Figure 4.3-1 NISCO Material Control

4.4 FABRICATION, INSTALLATION, INSPECTION, AND TESTING

4.4.1 INTRODUCTION

Section 4.4 describes those activities which are both pertinent and specific to the fabrication, welding, and erection of the nuclear steam supply system (NSSS) supports, and the setting, assembly, and construction testing of NSSS equipment, which are within the scope of responsibilities of Nuclear Installation Services Company (NISCO). Standard construction fabrication, installation, inspection, and testing activities relative to ASME piping, pipe supports, safety-related equipment, and associated welding activities within the Pullman Power Products (PPP) scope of responsibilities are described in Module 4 and Module 11.

Flowcharts in this section depict the general progression of key work activities, as well as key quality verification points. Each flowchart is supplemented, as necessary, with a brief narrative which provides a more detailed description of critical activities which are specific to the particular item being addressed.

4.4.1.1 Program Requirements

NISCO is the prime contractor for the installation of the NSSS and has an ASME approved Quality Assurance Manual (QAM) which complies with the ASME Boiler and Pressure Vessel (B&PV) Code section III, division 1, and 10 CFR 50, Appendix B. ASME B&PV Code section III, division 1, work is performed in accordance with the 1977 edition through the winter 1977 addenda under ASME Certificates of Authorization numbers 2159-7 for NA installation and 2160-7 for NPT fabrication. Bechtel Power Corporation (BPC) construction specification X4AZ06 is the governing specification used for NSSS installation activities performed by NISCO.

Drawings, NISCO procedures or engineering specifications, and process control sheets (PCSs) are prepared, approved, and issued for work activities in accordance with sections 2 (engineering), 3 (document control), 6 (process control), and 11 (control of construction processes) of the NISCO QAM.

Drawings are provided to NISCO for installation activities by Georgia Power Company (GPC) Document Control. NISCO engineering and QA/QC review and approve drawings prior to distribution for installation.

NISCO procedures used for installation, fabrication, examination, inspection, purchasing, quality control, or quality assurance are assigned an engineering specification (ES) number. The ESs contain quantitative or qualitative criteria for determining that activities are satisfactorily

accomplished. The NISCO ESs are initiated by NISCO engineering, approved by NISCO QA/QC, and statused by BPC and Westinghouse.

The principal document used by NISCO to fabricate and install nuclear items is the Process Control Sheet (PCS) which defines specific work operations and the sequence of operations; identifies ASME B&PV Code examinations and tests; and provides for NISCO engineering, quality control, Authorized Nuclear Inspector (ANI), and customer signoff hold points. When completed, the PCS documents the process of fabrication, examination and testing, and installation. The PCS also lists the applicable drawings and NISCO engineering specifications required for a particular work activity. Figure 4.4-1 depicts the process flow of the preparation, approval, and issuance of installation documents by NISCO.

4.4.1.2 Welding/NDE

The welding activities performed at Plant Vogtle by NISCO are in accordance with ASME B&PV Code section III, 1977 edition through winter 1977 addenda. As an NA installer contracted by GPC, NISCO performs ASME B&PV Code section III welding of subsection NF supports, pipe socket welds, and seal welds to the reactor head penetration. The welding procedures being used by NISCO at Plant Vogtle have been prepared and qualified in accordance with ASME B&PV Code sections III and IX and construction specification X4AZ06.

Nondestructive examinations performed by NISCO are in accordance with ASME B&PV Code sections III and V. Procedures being used have been reviewed by Project Engineering and Westinghouse to ensure compliance with construction specification X4AZ06 and Westinghouse requirements. Consumable materials used during the examination are of the type specified in construction specification X4AZ01, division P-9.

Welding and nondestructive examination (NDE) performed by NISCO on the NSSS is depicted on Figure 4.4-2 which presents major construction activities such as:

- Transfer of material markings;
- Cutting;
- Cleaning;
- Controls of welding materials;
- Fit-up;
- Welding;
- Finish weld surface;

- NDE;
- Interfacing with other contractors;
- Engineering QC and QA activities;
- Documentation.

Only the major work activities and principal procedures are depicted, and additional activities may be required in the referenced procedures.

Craftsmen perform the physical work activities under the technical direction of the craft superintendent and field engineers. The primary documents used by the craftsmen are the design drawings and the PCSs which specify work activities, sequence, procedural references, and inspection hold points. Craftsmen notify the QC inspector when a hold point is reached, at which time the inspections are performed by the inspector in accordance with and documented on the PCS.

Once the quality control inspections are completed, the inspector notifies the ANI of any corresponding hold point.

4.4.1.3 Rigging and Handling

Material and items designated for permanent plant installation at VEGP, and which require rigging and hoisting for transporting and/or installation are classified into one of three categories. Category A items require special equipment and Project Engineering approved procedures. Category B items do not require special equipment but do require approved procedures. Category C items require neither special equipment nor specially designated handling procedures. The particular category in which an item belongs is determined by Project Engineering and is implemented through GPC procedure GD-T-11.

The NSSS components for which NISCO has direct responsibility for rigging, hoisting, transporting, and setting include Category B lifts of the reactor coolant pump casings, internals, motor, and motor support stand. All other NSSS components (e.g., reactor pressure vessel, steam generators, etc.) were classified as Category A lifts and performed by others (i.e., Ingalls and Lampson) under GPC and Westinghouse direction.

4.4.1.4 Storage

4.4.1.4.1 Equipment Storage

The responsibility for NSSS equipment storage rests with GPC and is controlled through the Equipment Maintenance Storage List

(EMSL) program which is governed by GPC procedure GD-T-09, Inspection and Maintenance of Items in Storage. Procedure GD-T-09 provides for the establishment of storage and maintenance requirements for permanent plant equipment and materials at the Vogtle jobsite which conform to the parameters of ANSI N45.2.2 (1972), as supplemented by specific vendor requirements, nature of the item, and value of the item in relation to plant operations and safeguards. This is known as the EMSL program.

After receipt of an item of equipment in accordance with GPC procedure GD-A-30, Receipt, Receipt Inspection, Storage and Handling, the mechanical discipline engineer receives a copy of the mechanical QC inspector's Receipt Inspection Report. Using the criteria of procedure GD-T-09, he determines whether the item(s) should be entered into the EMSL program. For those items of equipment to be entered into the program, he initiates a Maintenance Report Card and Rolodex (exhibit 01 to procedure GD-T-09) and a Maintenance Report-Mechanical (exhibit 05 to procedure GD-T-09) which identify warehouse location, vendor requirements, vendor maintenance file number or identifier, and the inspection interval.

The maintenance inspection requirements on the Mechanical Maintenance Report include:

- o Protective covers/seals;
- o Desiccant/humidity;
- o Area/equipment cleanliness;
- o Compliance with Level ____ (B,C,D, etc.);
- o Environmental/physical damage;
- o Preservatives/coatings;
- o Rotation performed;
- o Lubrication checked;
- o Lubrication changed;
- o Bearings shaft seals inspection;
- o Heaters energized;
- o Other maintenance (specify).

The mechanical discipline engineer checks the applicable inspection requirements and enters any additional information necessary to clarify the inspection attributes for the equipment being evaluated.

The Maintenance Report Card and Rolodex is then transmitted to the mechanical QC inspection department for filing and notification to commence maintenance inspection activities in accordance with GPC procedure QC-T-11, Mechanical Surveillance Program. Each maintenance inspection is to be performed within an allotted interval of the actual due date as specified in procedure GD-T-09.

When an item of equipment is to be issued to the field from the GPC warehouse, the mechanical engineer signs the withdrawing contractor's requisition in the "approved by" block prior to issue, and notifies the inspector of the new storage location and any changes in the inspection attributes by making the necessary modifications on the Maintenance Report Card within the time allowed by procedure GD-T-09. He also changes the EMSL file accordingly.

The rigging, handling, and transporting of equipment after issue from the GPC warehouse to the new location is performed by the requisitioning contractor in accordance with his own approved procedure. The GPC mechanical QC inspector monitors and documents these activities in accordance with GPC procedure GD-T-11, Rigging, Hoisting, and Transporting Permanent Plant Equipment. See section 4.4.1.3 of this module for handling and rigging details.

Temporary access control barriers may be employed at the discretion of the mechanical engineer based upon the nature and importance of the item. Acceptable alternatives to temporary access control barriers are to limit access with lockable doors if feasible (with maintenance and inspection personnel retaining the keys) or to hold installation until construction is nearly complete. Additional measures are also used, such as fully wrapping the equipment when sand blasting, painting, or other activities are occurring in the vicinity of the equipment. Maintenance of access control is the responsibility of GPC and all contractors on all shifts.

In controlled areas where work must be performed, the particular contractor may obtain the keys and authorization from the GPC equipment engineer and may unlock and work in the controlled area as required, abiding by the storage and maintenance criteria for both the area and the included equipment.

During internal access of equipment, the authorized activity personnel must post a Work in Progress sign, reenergize heaters, and loosely recover equipment (if the work is not to be continued on consecutive shifts), and clean and properly recover/close equipment upon work completion.

Deficiencies found during equipment maintenance inspections and their resulting corrective actions are reported and controlled as required by GPC procedure GD-T-01, Nonconformance Control.

For a more detailed discussion of nonconforming item controls, refer to Appendix H.

4.4.1.4.2 Material Storage

NISCO's practice of requisitioning only the necessary amount of material at the time of installation precludes the necessity of NISCO maintaining material storage areas, except for storage of weld filler material.

NISCO stores and maintains control of weld filler material in accordance with NISCO procedure ES-56, Welding Filler Material Control. ES-56 conforms to the requirements of ANSI N45.2.2, ASME B&PV Code section II, part C, and section III, subsections NB and NF.

4.4.2 NSSS COMPONENTS AND SUPPORTS

4.4.2.1 Reactor Pressure Vessel Supports Installation and Setting

The installation of the reactor pressure vessel (RPV) supports and setting of the RPV are depicted in Figure 4.4-3. The rigging, lifting, and transporting of the RPV was performed as a combined effort of Ingalls and Lampson (the rigging contractors) under the direction of Westinghouse and GPC. The concrete foundation pads for the RPV supports were placed by the concrete contractor, Walsh Construction Company, whose activities are discussed in Module 1.

During the setting of the RPV, the actual lifting and lowering of the RPV is performed by the rigging contractors in support of NISCO's installation, setting, and inspection activities.

4.4.2.1.1 Reactor Pressure Vessel Head Assembly

NISCO performs assembly of the head penetration appurtenances to the head at their onsite fabrication shop. The RPV head and components are received by NISCO and, after preliminary measurements are taken, assembly commences.

As the pressure boundary work is completed on a penetration (e.g., attachment of the control rod drive mechanism (CRDM) and completion of welding), the penetration and appurtenance are hydrotested. Upon completion of pressure boundary work and hydrotesting of penetrations, assembly continues with installation of coil stacks, rod position indicator coils, and dummy baffle cans.

The NISCO activities which are relative to the assembly and testing of the RPV head are depicted in Figures 4.4-4 through 4.4-7. It should be noted that, even though the ANI is not specifically depicted, he is deeply involved in review and prior notification of activities and has the option of witnessing any activities he chooses by establishing hold points on the applicable process sheets.

4.4.2.1.2 Fit-up and Assembly of Reactor Pressure Vessel Internals

The reactor internals support and orient the reactor core fuel assemblies, maintain alignment between fuel assemblies and CRDMs, absorb and transmit control rod dynamic loads to the reactor vessel flange, direct reactor coolant flow around and over the fuel elements, support the incore instrumentation, and provide gamma and neutron shielding. The reactor internals consist of the lower internals assembly and the upper internals assembly.

The lower internals assembly consists of the core barrel, lower core plate, core support, baffle assembly, secondary core support assembly, and the core support columns. The lower internals assembly is shipped assembled, with the secondary core support assembly attached, and is 33 ft high, 14 ft in diameter, and weighs 130 tons.

The upper internals assembly consists of the upper core plate, support columns, and the upper support. The upper internals assembly is 11 ft high, 14 ft in diameter across the upper support flange, and weighs 66 tons.

Prior to NISCO receiving the RPV internals from GPC, it was necessary for NISCO to install the roto-lock inserts in the flange of the internals assemblies, to install the upper internals storage stand (UISS) with extensions, to install the lower internals storage stand (LISS), and to assemble the reactor vessel internals lifting rig.

The UISS and LISS are located in the refueling canal and are used to support the upper internals assembly and lower internals assembly, respectively, when these assemblies are removed from the shipping skid during construction or when they are removed from the reactor vessel. The internals are lifted from the shipping skid using the containment polar crane which is connected to the reactor vessel internals lifting rig through a load cell linkage assembly. The reactor vessel internals lifting rig is attached to either of the internal assemblies through roto-lock studs which engage mating female inserts located in the flange of the internals assemblies.

The reactor vessel and head were constructed to the 1971 through summer of 1972 addenda of the ASME B&PV Code, section III,

division 1 which contained no requirements for Code class CS internals and core supports. Internals and core supports are designed and installed to meet the technical requirements of the 1977 through winter of 1977 addenda of the ASME B&PV Code, section III, division 1 without the CS symbol stamp. The RPV internals are assembled and installed in accordance with NISCO procedure ES-4027-17 and its references. The general process flow of the major assembling and installation activities is depicted on Figure 4.4-8.

4.4.2.1.3 Bottom-Mounted Instrumentation

The NISCO scope of work for bottom-mounted instrumentation includes the following activities:

- o Installation of the seal table;
- o Installation of guide tubing from the reactor vessel to the seal table;
- o Installation of guide tubing supports.

Currently all the guide tubes are installed with the exception of the final weld to the seal table. The seal table installation is not complete and work is in progress on the guide tube supports.

4.4.2.1.3.1 Guide Tubes. The guide tubing consists of 58 separate tubes that connect the vessel instrumentation penetration nozzles, which protrude through the bottom of the vessel, to the seal table. The preformed guide tubes are supplied by Westinghouse in match-marked sections that are joined during assembly by socket weld fittings. The guide tubes are seal welded to the seal table. The seal table is a stainless steel plate approximately 22 in. x 30 in. which is welded to a steel support frame. NISCO procedure number ES-4028-VOGTLE-12 is used for the installation of the guide tubes.

4.4.2.1.3.2 Guide Tube Support. The guide tube supports consist of six separate supports, furnished by Westinghouse and installed by NISCO using procedure ES-4028-VOGTLE-13. The procedure details the installation process for each support and provides details for the installation of the seal table and seal table support.

4.4.2.2 Reactor Coolant Pump Setting, Assembly, and Alignment

The reactor coolant pumps, internals, motor support stands, and motors are rigged, lifted, transported, and set by NISCO with GPC personnel monitoring the activity. GPC supplies the cranes, lifting rigs, crane operators, and transport vehicles. NISCO performs the rigging, and directs the lift and transportation.

Upon achievement of the proper pump support completion status, NISCO sets the pump casing on the supports and installs the tie rods. The pump casing is then released for connection of main loop piping by the piping contractor. Upon completion of the piping contractor's activities, NISCO resumes assembly operations. Figure 4.4-9 through 4.4-11 depicts the key activities in this process.

The pump casings, internals, motor support stands, and motors have been installed on all four reactor coolant pumps. The installation of controlled leakage seals and coupling flanges, and the performance of final coupling alignment had not been completed at the time of assessment.

4.4.2.3 Pressurizer Installation and Setting

The pressurizer is an ASME B&PV Code section III, Class 1 vertical, cylindrical vessel with hemispherical top and bottom heads. The vessel is approximately 53 ft in height and 8 ft in diameter and is one of the major components in the nuclear steam supply system. The pressurizer is connected to the hot leg of one of the coolant loops by a surge line. Electrical heaters are installed through the bottom head and the spray nozzle; relief and safety valve connections are located in the top head.

The pressurizer was designed and fabricated by the Nuclear Components Division of Westinghouse (Pensacola, Florida) in accordance with ASME B&PV Code section III 1971 edition through summer 1972 addenda.

Upon its completion in 1981, with the exception of hydrostatic testing, Westinghouse supplied the pressurizer to GPC at plant Vogtle as an NPT stamped component. After hydrotesting of the vessel during system tests, the proper Code Data Report will be prepared and the N-symbol nameplate will be attached.

The pressurizer and its associated supports are installed by NISCO, an NA certificate holder, in accordance with ASME B&PV Code section III, 1977 edition through winter 1977 addenda. Using procedure ES-4028-5, NISCO accomplishes the process of assembling and installing the pressurizer lateral supports and the final setting of the pressurizer to its supporting steel. The installation activities performed by NISCO are depicted on

Figure 4.4-12 which presents major construction activities such as:

- o Rigging and handling;
- o Assembling and installing lateral supports;
- o Final setting of the pressurizer;
- o Interfacing with other contractors;
- o Engineering quality control and quality assurance activities;
- o Documentation.

The major work activities and their principal procedures are depicted; however, additional activities may be required by referenced procedures.

4.4.2.4 Steam Generator Installation and Setting

The four steam generators are ASME B&PV Code section III, Class 1 vertical shell and U-tube evaporators with integral moisture-separating equipment. The evaporators are approximately 68 ft in height and 15 ft in diameter and are major components in the nuclear steam supply system. The steam generators are connected to the coolant loops by the inlet and outlet tube side nozzles located in the hemispherical bottom head.

The steam generators were designed and fabricated by the Nuclear Components Division of Westinghouse (Pensacola, Florida) in accordance with ASME B&PV Code section III, 1971 edition through summer 1972 addenda.

Upon its completion, in 1981, with the exception of the hydrostatic testing, Westinghouse supplied the steam generators to GPC at Plant Vogtle as an NPT stamped component. After hydrotesting of the vessel during system tests, the proper Code Data Report will be prepared and the N-symbol nameplate will be attached.

The steam generators and their associated supports are installed by NISCO, in accordance with ASME B&PV Code section III, 1977 edition through winter 1977 addenda. Using procedure ES-4028-3, NISCO accomplishes the process of assembling and installing the steam generator vertical column assemblies and upper and lower lateral supports, as well as the final setting of the steam generators.

The installation activities performed by NISCO are depicted on Figure 4.4-13 which presents major construction activities such as:

- o Rigging and handling;
- o Assembling and installing supports;
- o Final setting of the steam generators;
- o Interfacing with other contractors;
- o Engineering, quality control, and quality assurance activities;
- o Documentation.

The major work activities and their principal procedures are depicted; however, additional activities may be required by referenced procedures.

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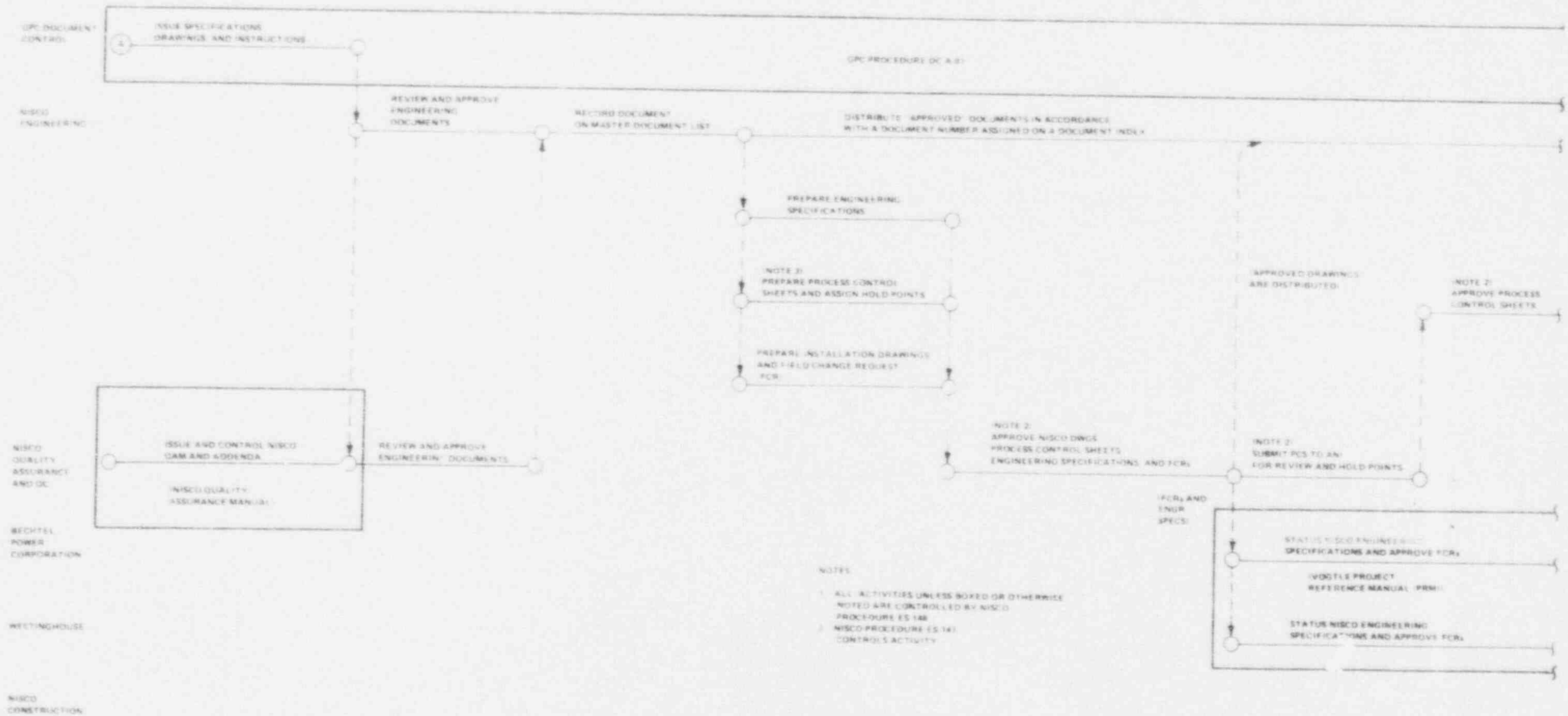


Figure 4.4-1 Preparation and Control of Installation Documents (Sheet 1 of 2)

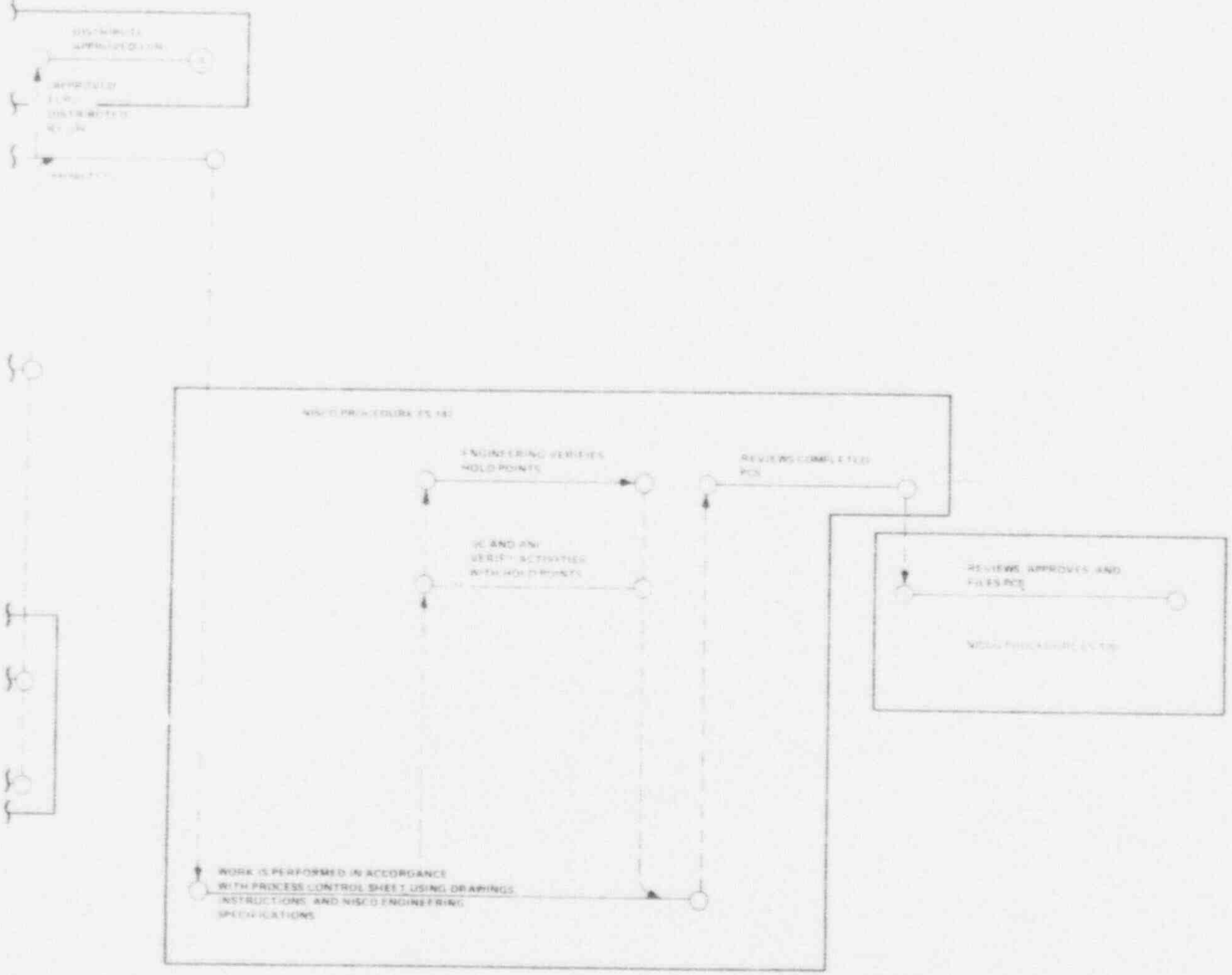


Figure 4.4-1 Preparation and Control of Installation Documents (Sheet 2 of 2)

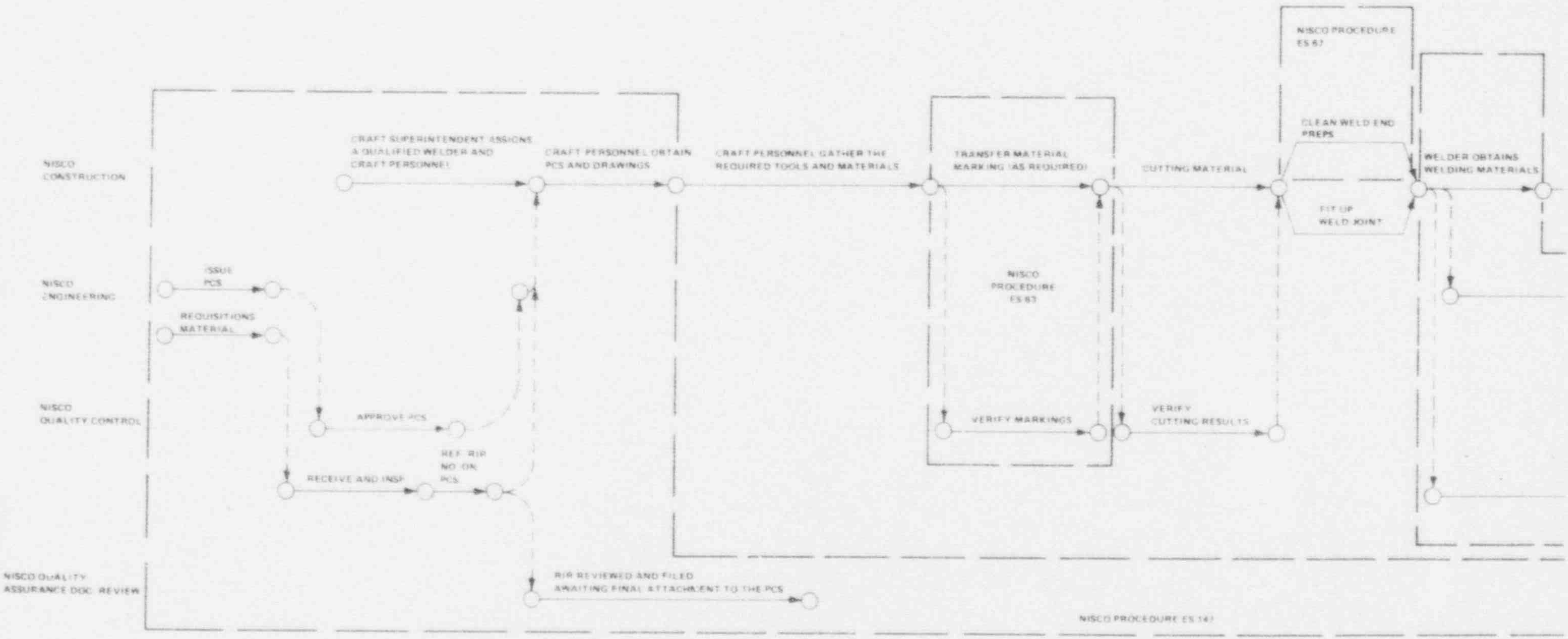


Figure 4.4-2 Welding and NDE (Sheet 1 of 2)

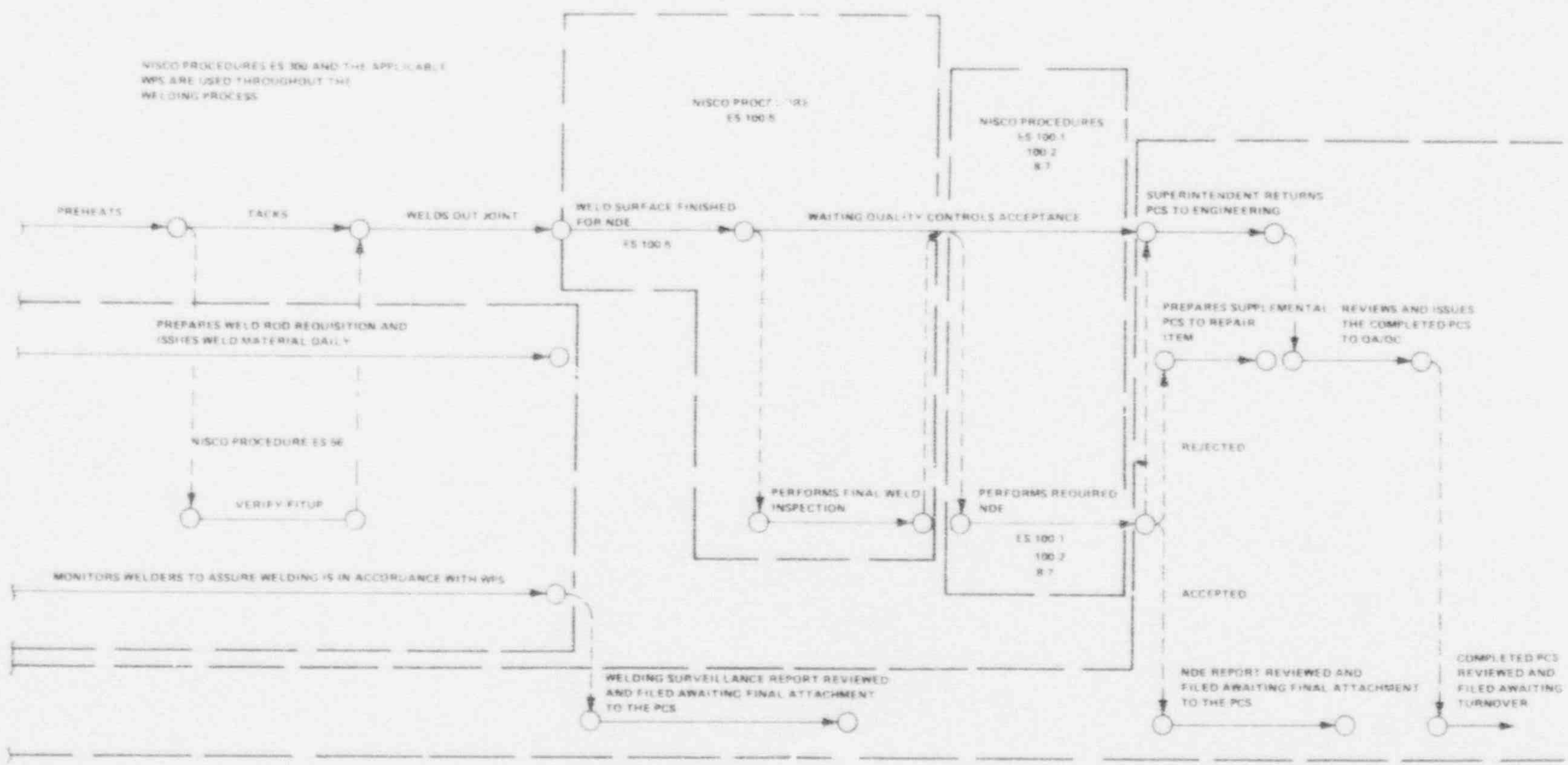


Figure 4.4-2 Welding and NDE (Sheet 2 of 2)

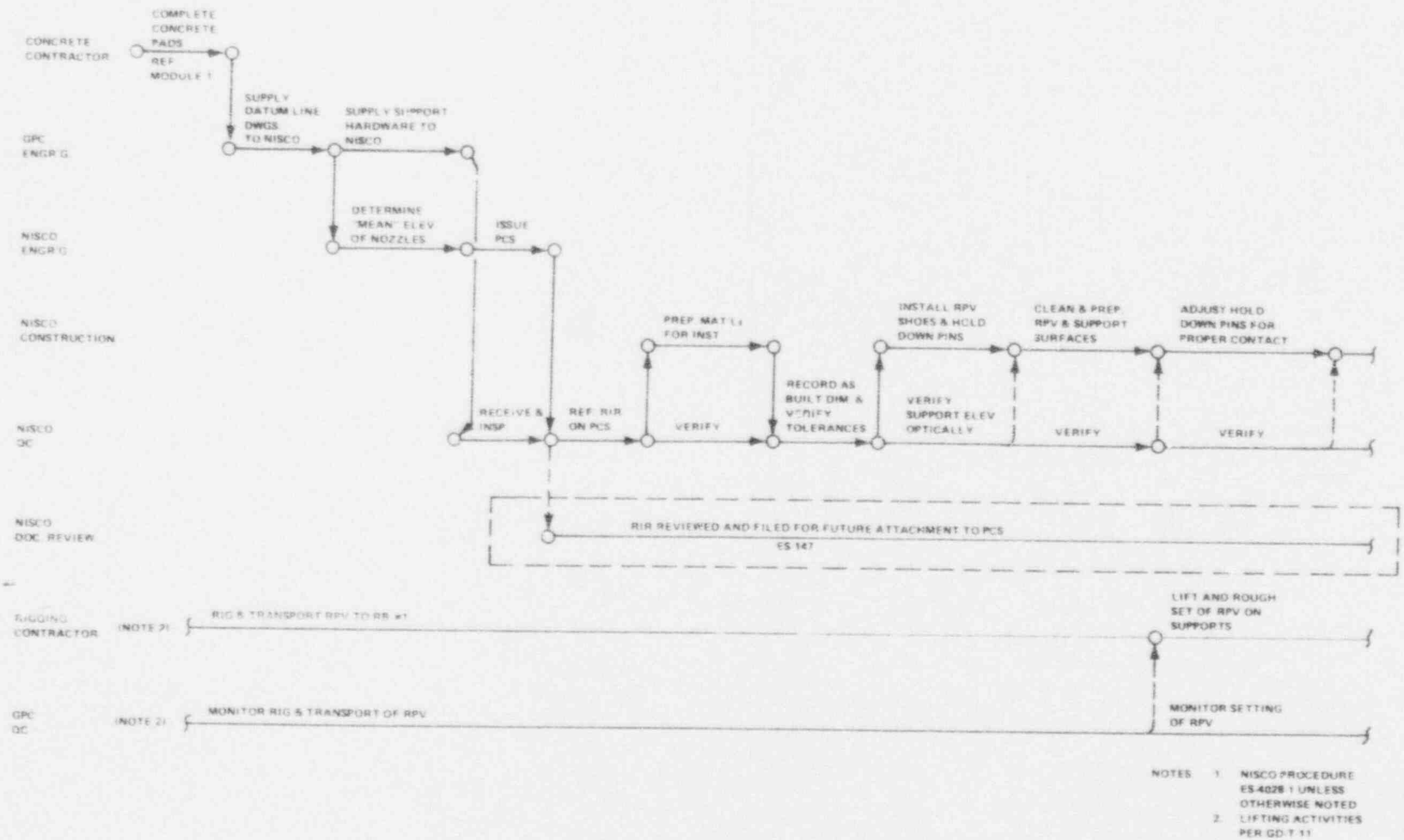


Figure 4.4-3 Reactor Pressure Vessel Supports and Setting (Sheet 1 of 2)

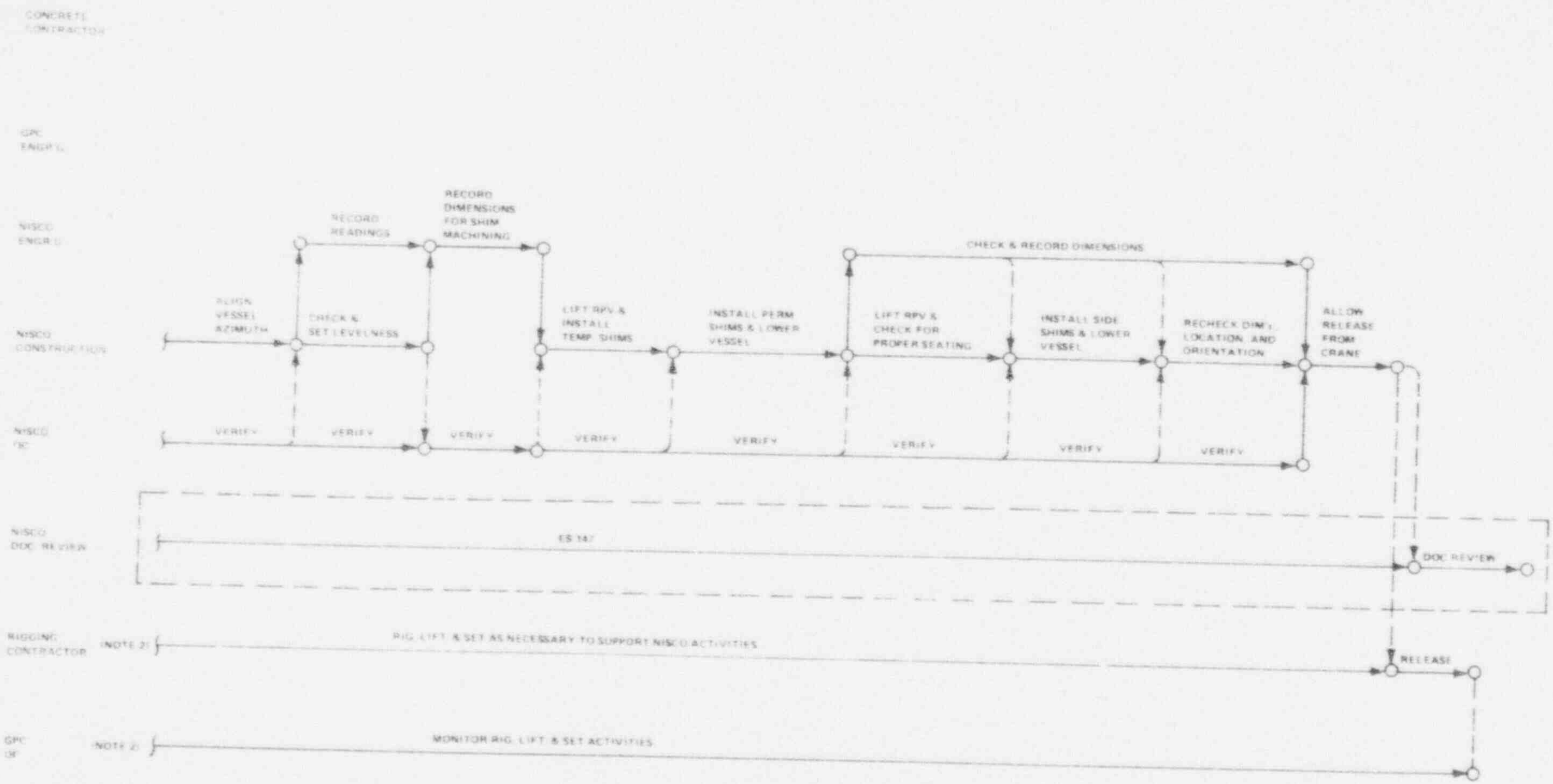


Figure 4.4-3 Reactor Pressure Vessel Supports and Setting (Sheet 2 of 2)

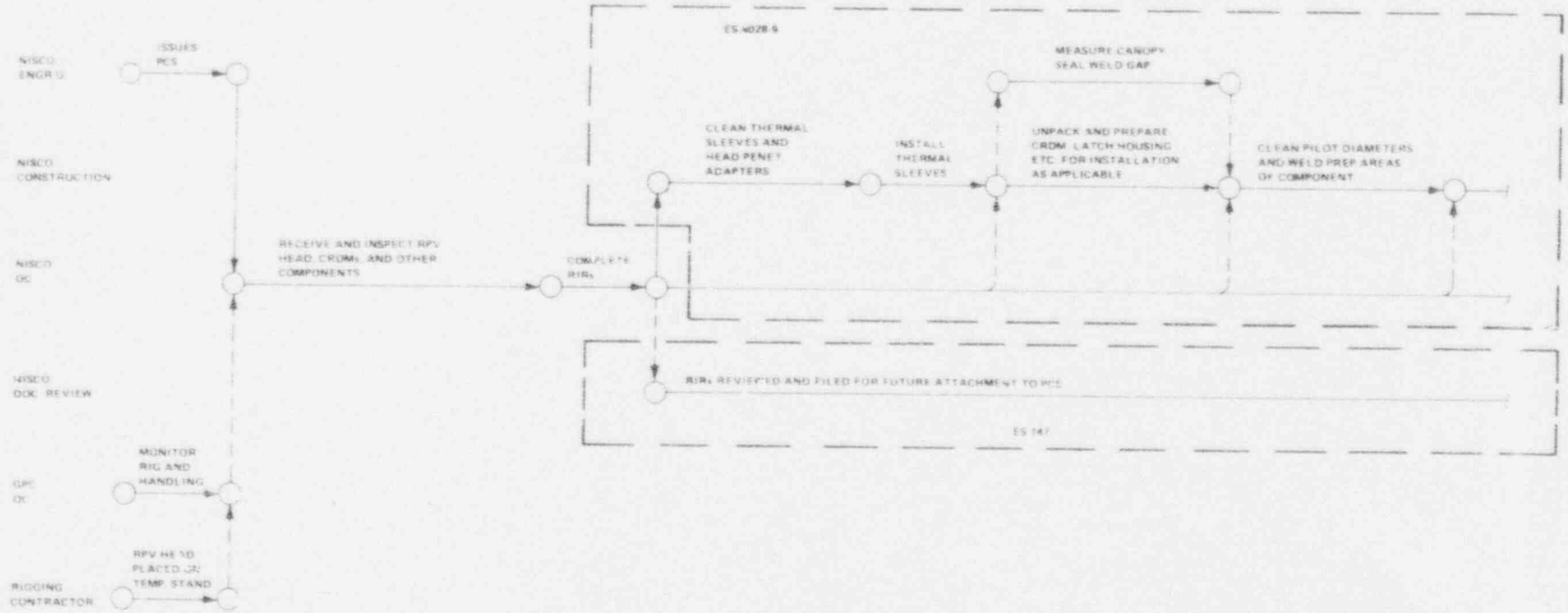


Figure 4.4-4 Assembly of RPV Head: CRDM, Thermal Sleeve Guide, Capped Latch Housing, and Head Adapter Plug Installation (Sheet 1 of 2)

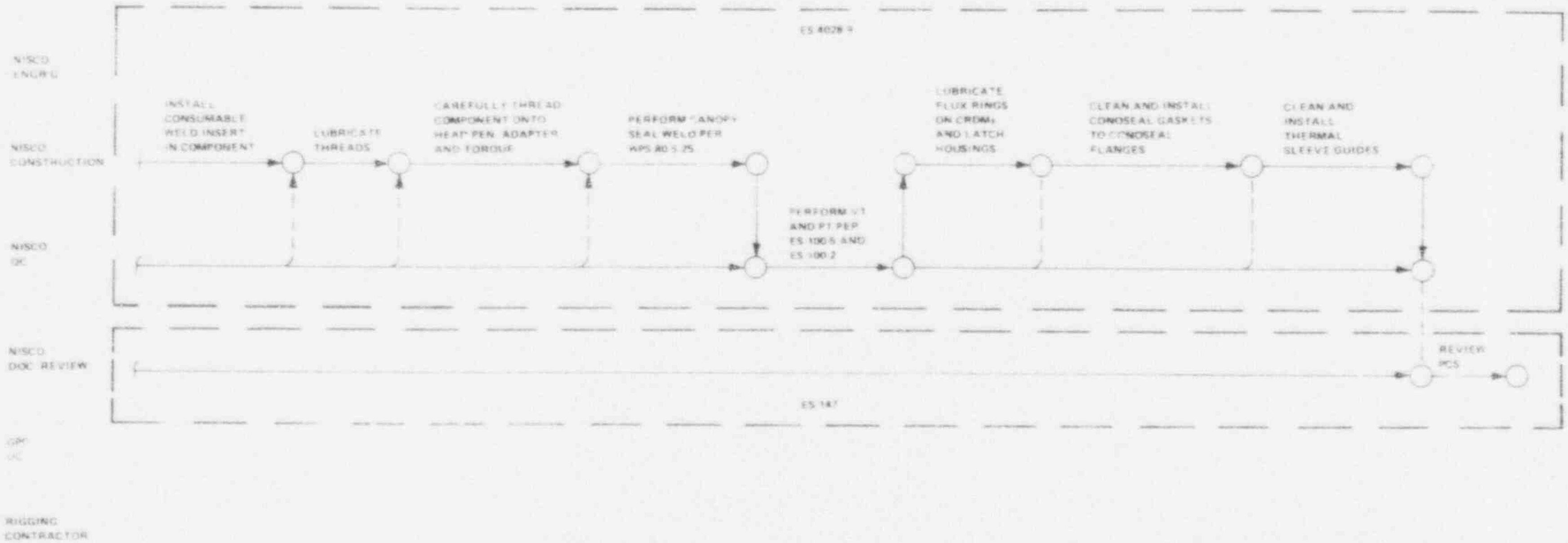


Figure 4.4-4 Assembly of RPV Head: CRDM, Thermal Sleeve Guide, Capped Latch Housing, and Head Adapter Plug Installation (Sheet 2 of 2)

Figure 4.4-5 Assembly of RPV Head: RVLIS Piping System Installation

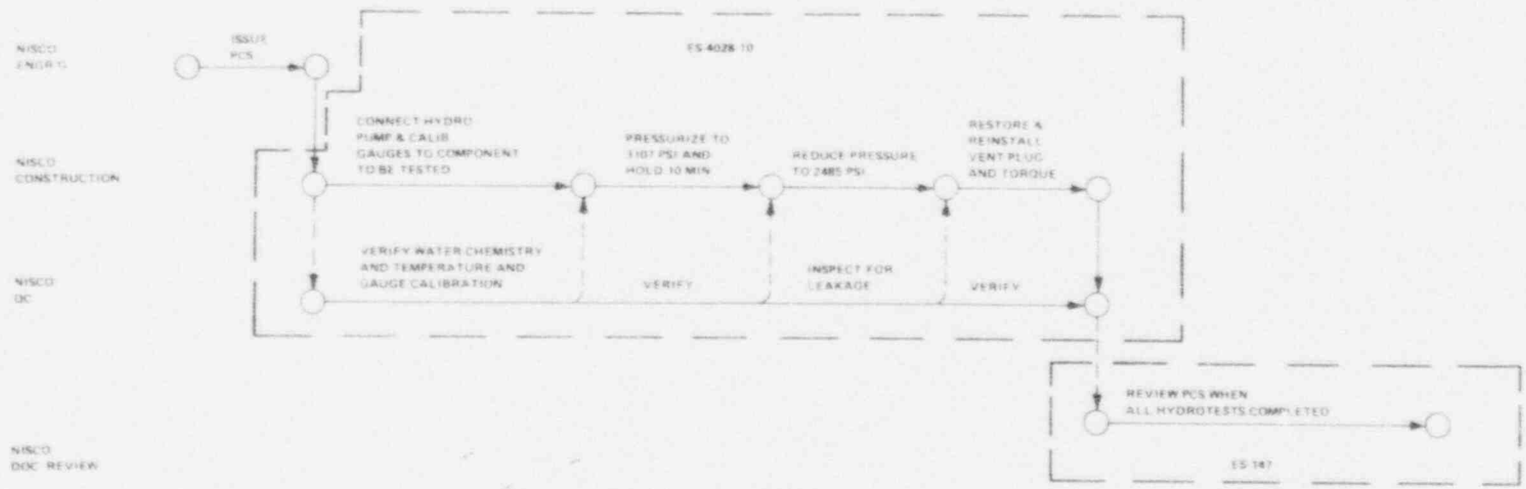


Figure 4.4-6 Assembly of RPV Head Package: Hydrostatic Testing of CRDMs, Capped Latch Housing, Head Adapter Plugs, Instrument Port Columns, and RVLIS Piping

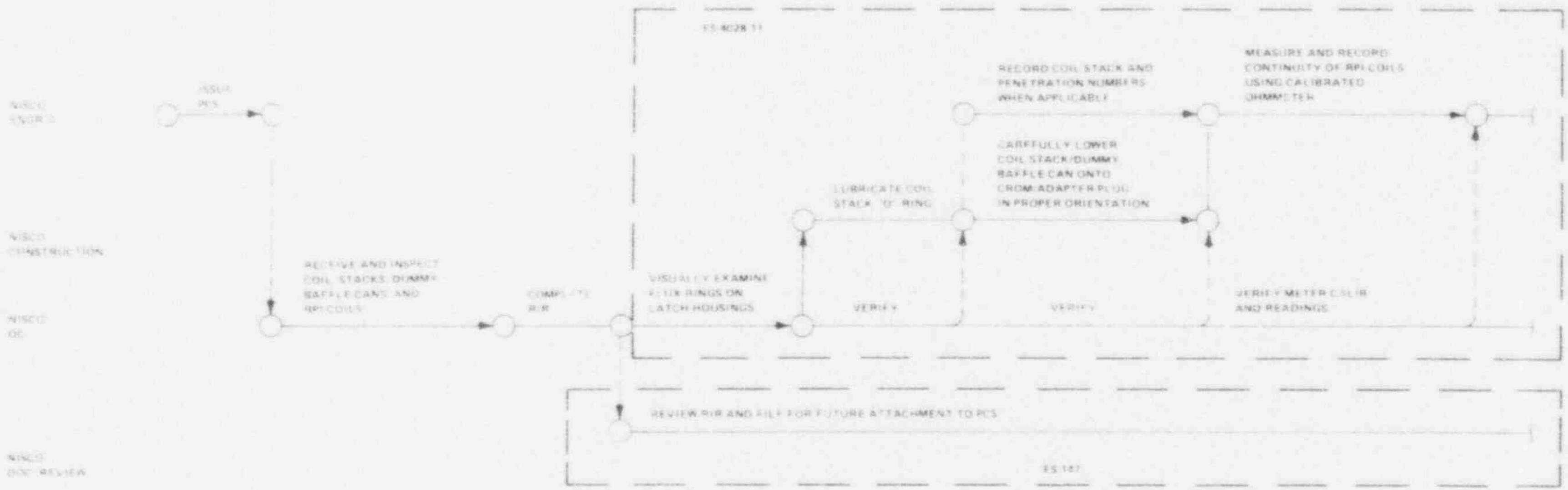


Figure 4.4-7 Assembly of RPV Head: CRDM Coil Stack, Dummy Baffle Can, and RPI Coil Assembly (Sheet 1 of 2)

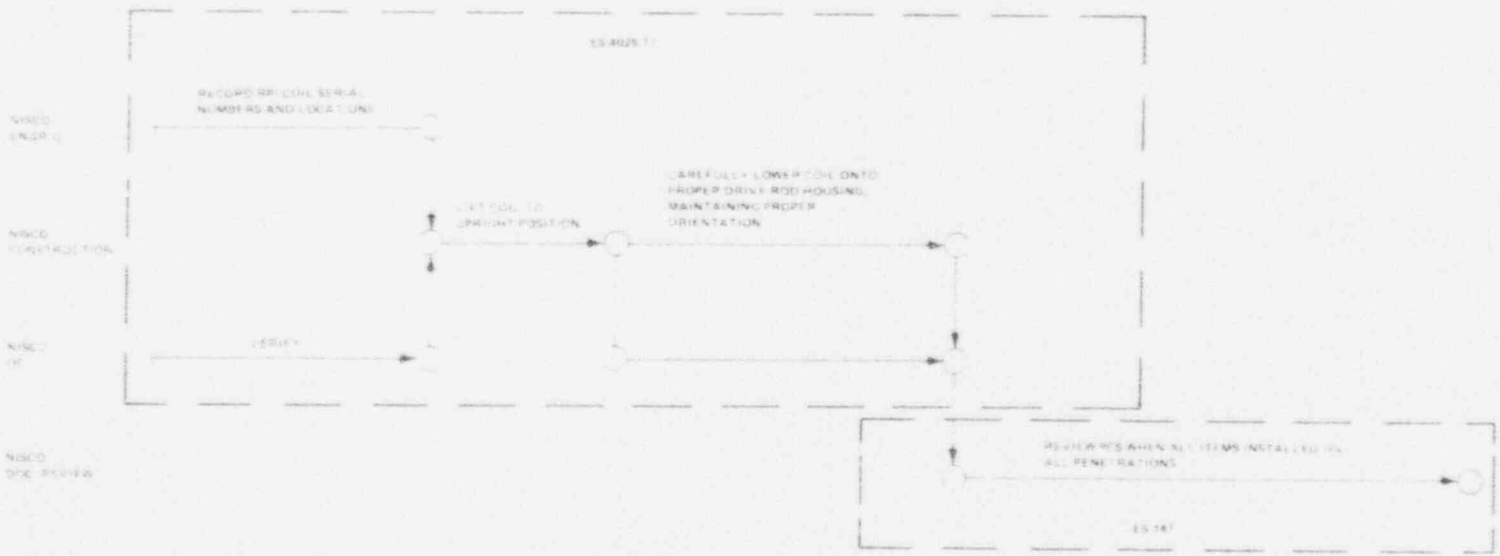


Figure 4.4-7 Assembly of RPV Head: CRDM Coil Stack, Dummy Baffle Can, and RPI Coil Assembly (Sheet 2 of 2)

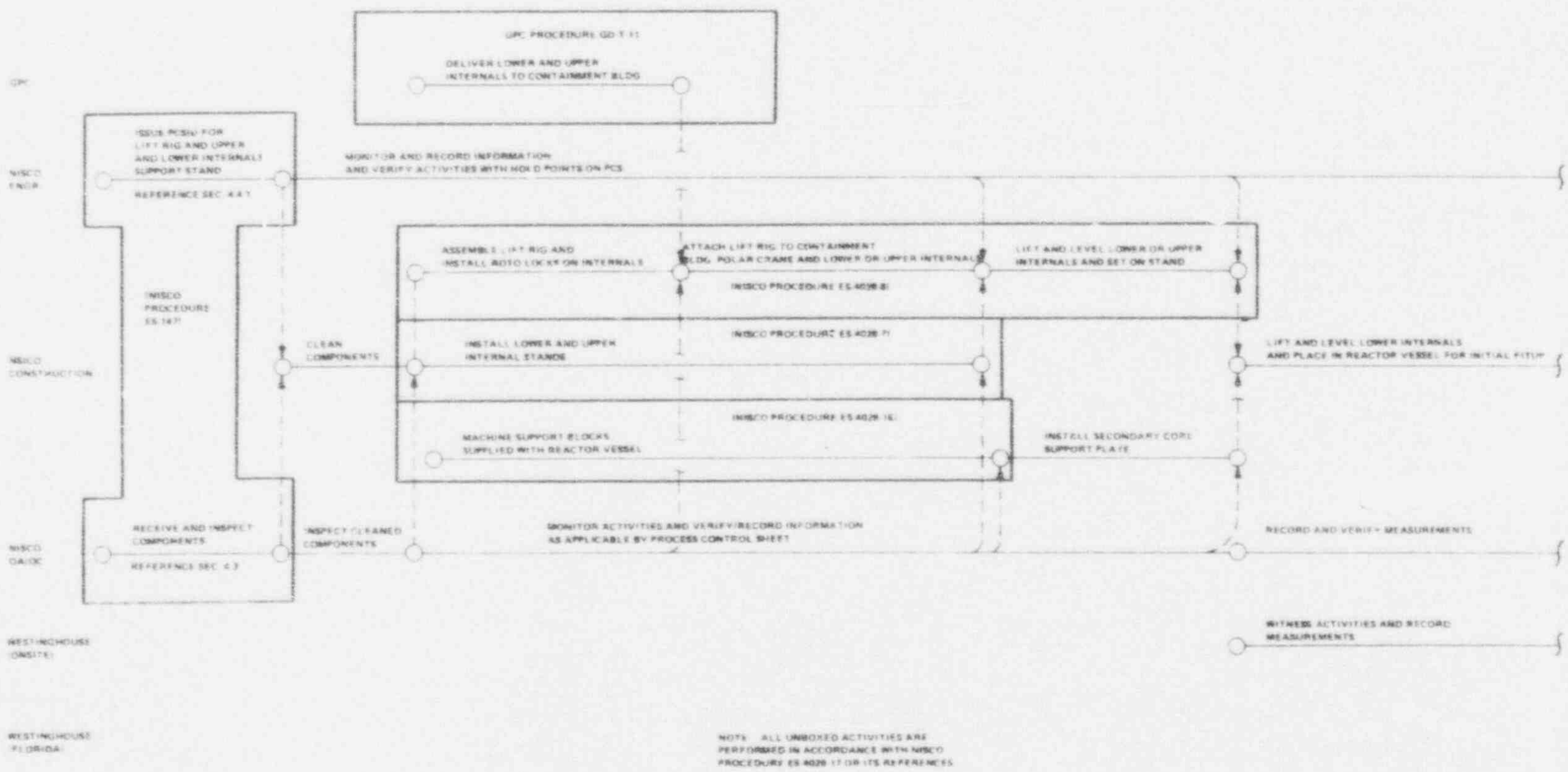


Figure 4.4-8 Reactor Vessel Internals Assembly (Sheet 1 of 2)

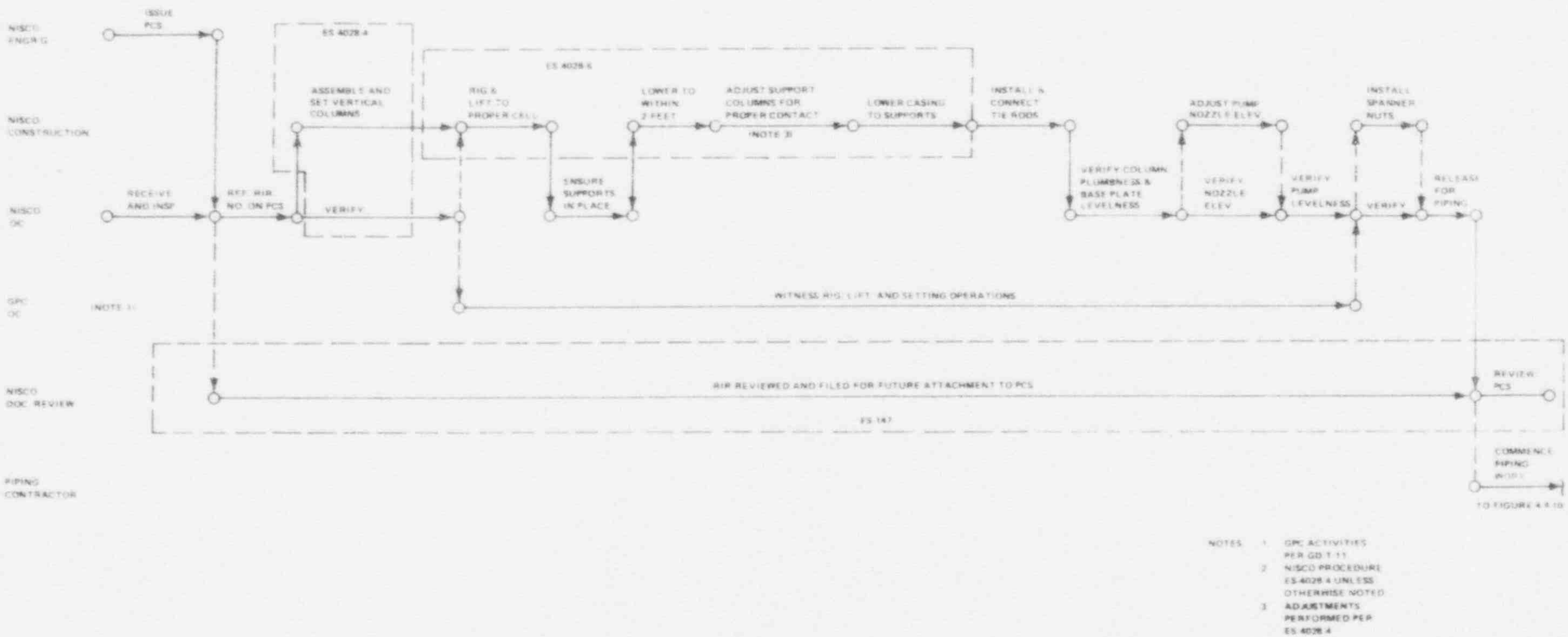
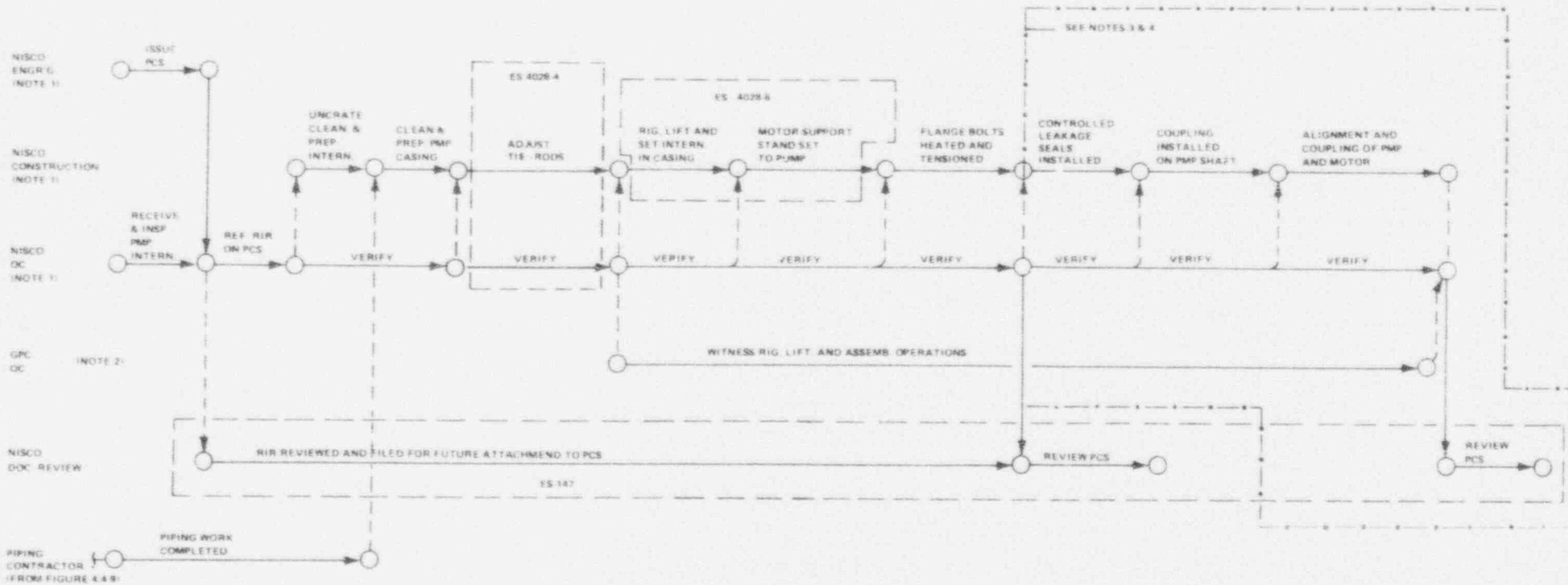


Figure 4.4-9 Reactor Coolant Pump Setting



NOTE
1. NISCO PROCEDURE ES 4028.21 UNLESS OTHERWISE NOTED
2. GPC ACTIVITES PER ED-T-11
3. ACTIVITIES INSIDE THIS BOX WILL BE PERFORMED AFTER MOTOR INSTALLATION
4. ACTIVITIES INSIDE THIS BOX ARE FOR FUTURE SCHEDULES AND PCS DEVELOPMENT

Figure 4.4-10 Reactor Coolant Pump Assembly

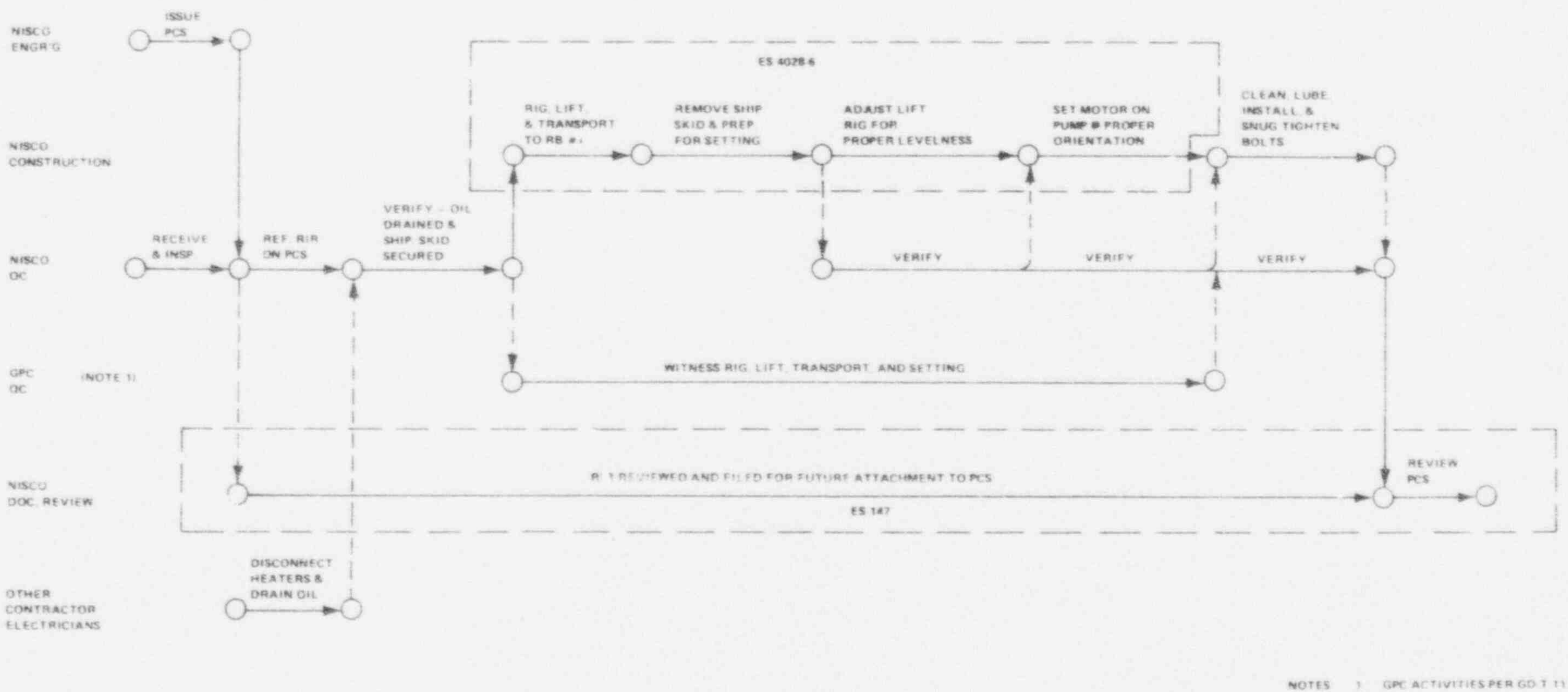


Figure -11 Reactor Coolant Pump Motor Setting

Figure 4.4-12 Installation/Setting of the Pressurizer and Supports (Sheet 1 of 2)

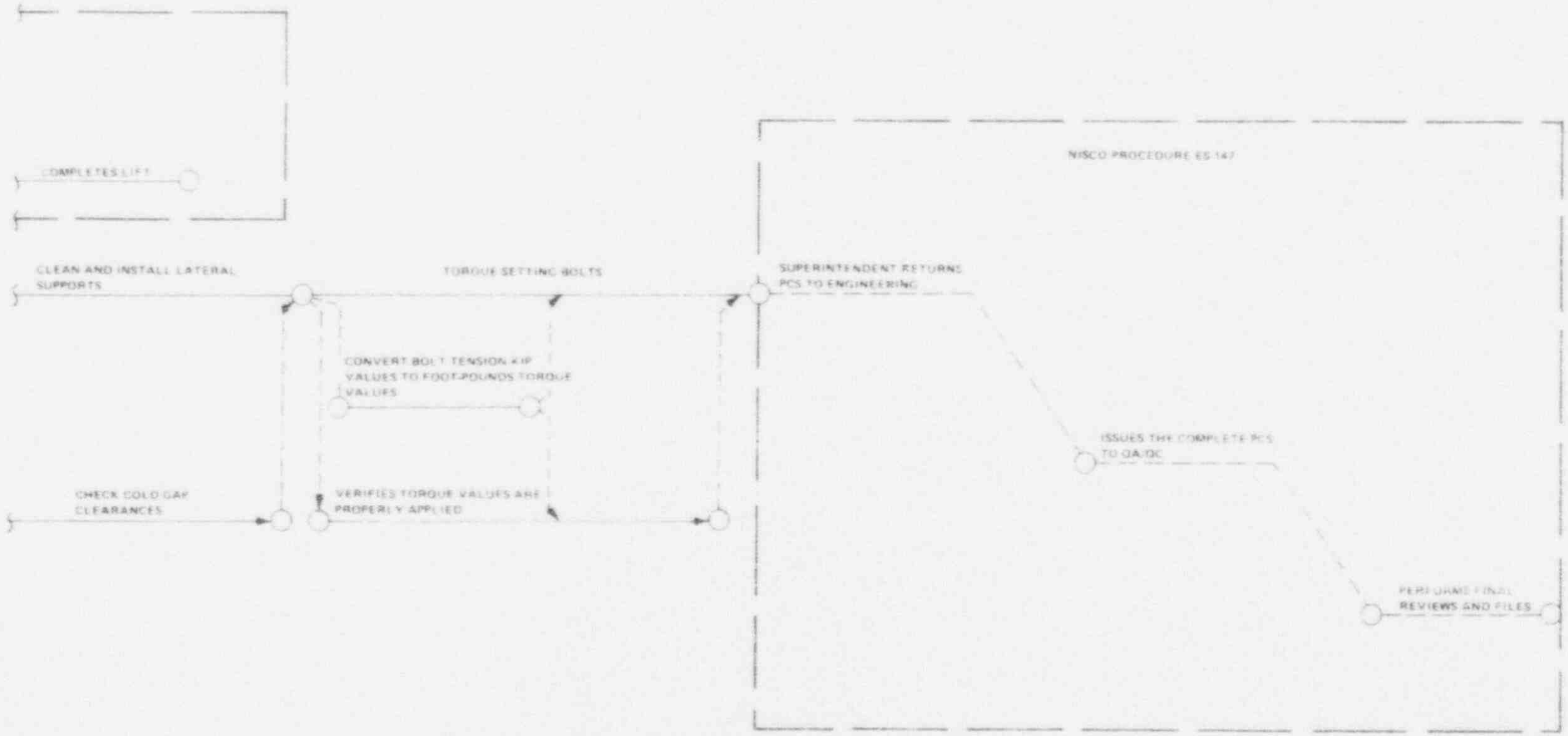
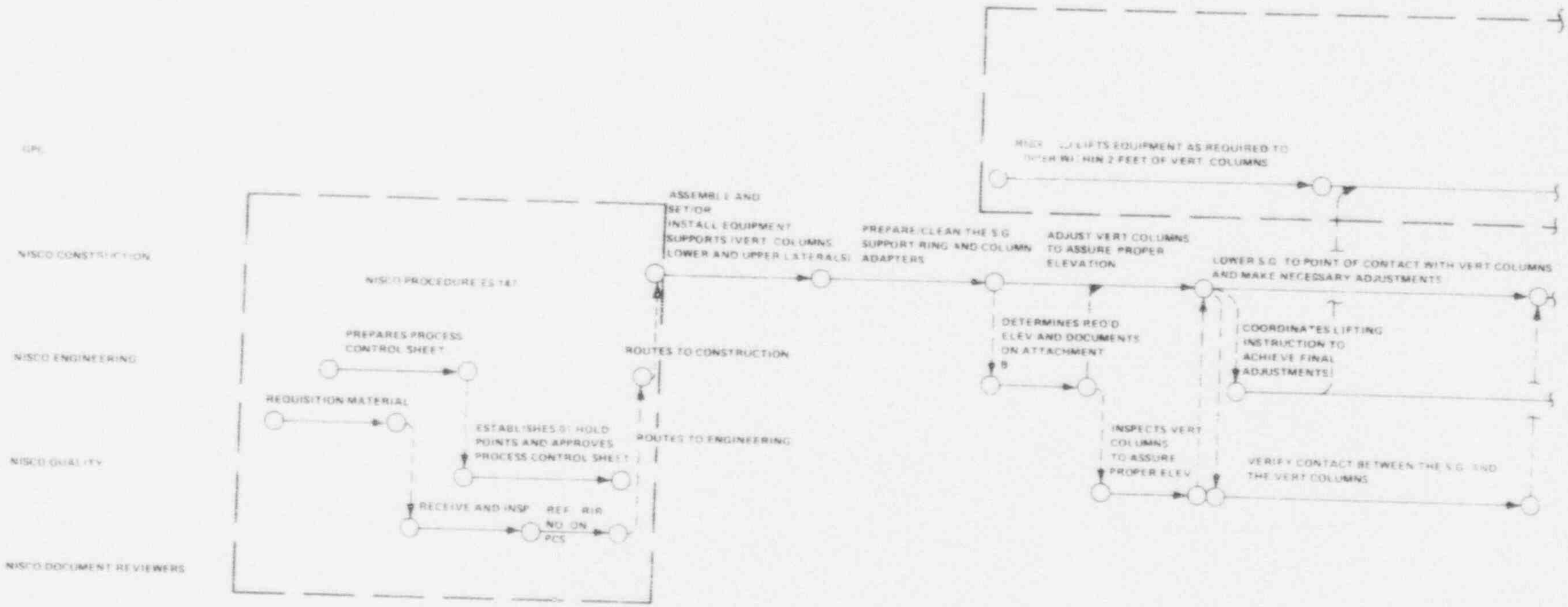
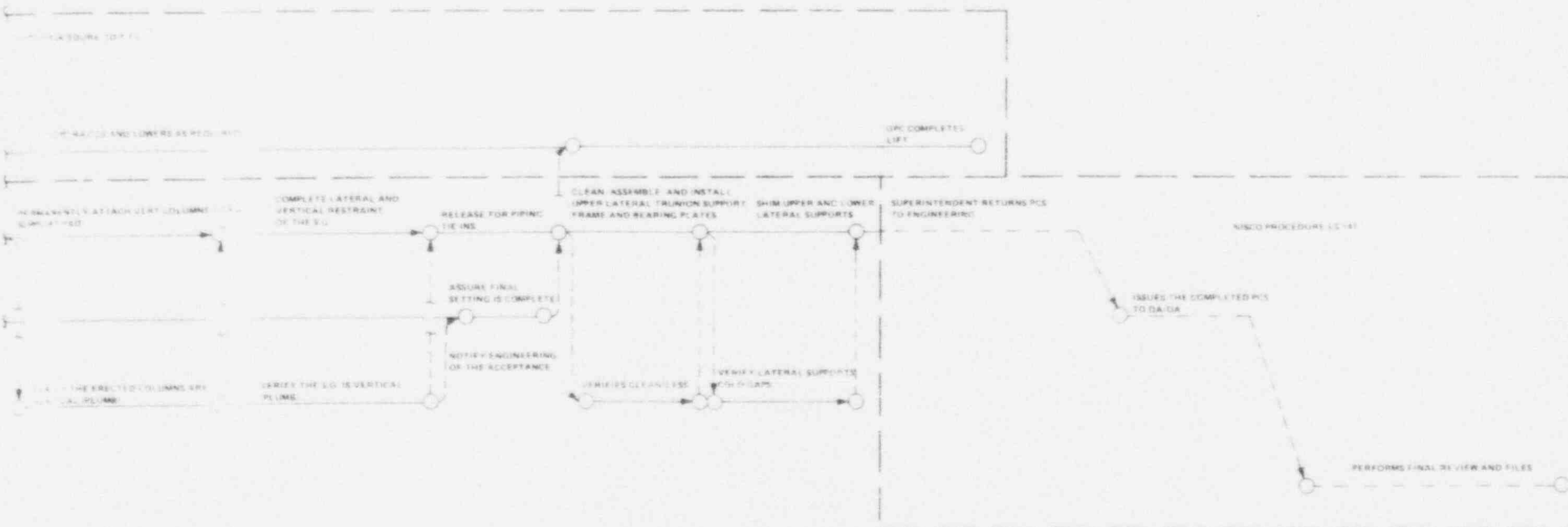


Figure 4.4-12 Installation/Setting of the Pressurizer and Supports (Sheet 2 of 2)



SETTING PROCEDURE IS NISCO ES-4028-3 UNLESS NOTED

Figure 4.4-13 Installation/Setting of the Steam Generator and Supports (Sheet 1 of 2)



SETTING PROCEDURE IS NISCO ES-4028-3 UNLESS NOTED

Figure 4.4-13 Installation/Setting of the Steam Generator and Supports (Sheet 2 of 2)

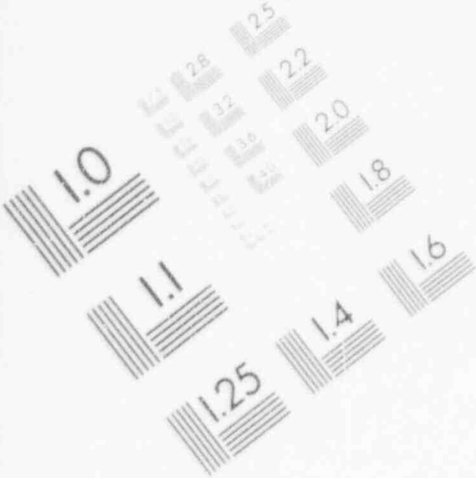
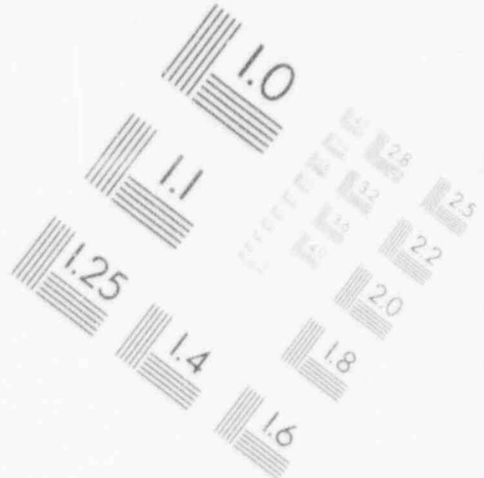
4.5 TURNOVER TO GPC

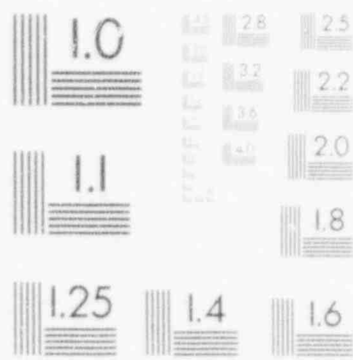
Upon completion of Nuclear Installation Services Company (NISCO) field work on an item, the NISCO field QA/QC manager ensures that the applicable process control sheets and the supplemental quality documentaton and records are collected, reviewed, and compiled into a package in accordance with NISCO procedure ES-126. Documentation for work activities which do not require an ASME data report and certification by the authorized nuclear inspector (ANI) or code stamping, is then transmitted to Georgia (GPC), where receipt is acknowledged by signature on the NISCO transmittal.

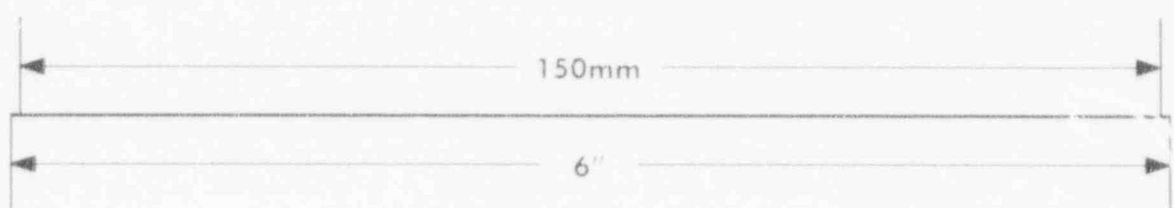
Documentation providing objective evidence of work activities on ASME components by NISCO is retained by NISCO for compilation of the ASME data reports and subsequent reviews by the applicable signatories (e.g., ANI, Westinghouse). Upon completion of the data report and application of the NA symbol stamp, the quality documents and data report are transmitted to GPC.

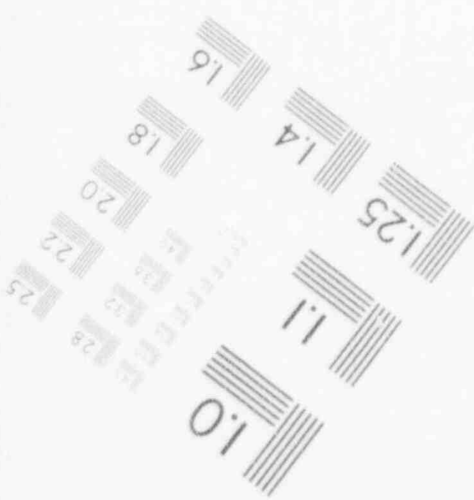
2

IMAGE EVALUATION TEST TARGET (MT-3)





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

2

IMAGE EVALUATION TEST TARGET (MT-3)

150mm

6"

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WEBSTER, NEW YORK 14580
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5.0 AUDITS

This module section contains a discussion of the Quality Assurance (QA) audit process, Nuclear Regulatory Commission (NRC) inspections, and special evaluations addressing pipe stress analysis and pipe supports. Throughout the Plant Vogtle construction program, onsite audits have been performed by Georgia Power Company (GPC) QA. In addition to regularly scheduled and periodic inspections and investigations, the NRC has conducted a Systematic Assessment of Licensee Performance evaluation and a special investigation performed by the Regional Construction Assessment Team. Plant Vogtle was the first of 22 utility sites that initially participated in onsite investigations and evaluations performed by the Institute of Nuclear Power Operation (INPO). An off-shoot of the pilot INPO program and the subsequent follow up onsite investigation was the formation of the GPC Self-Initiated Evaluation program.

The content of this section is divided into four subsections:

Section	Title
5.1	Project Organization Audits
5.2	NRC Inspections
5.3	Past Construction and Design Problems
5.4	Supplemental Audits

The Readiness Review discipline teams used the results of the various audits, evaluations, programs, inspections, and records of past problems as an aid in developing a meaningful and representative assessment program.

5.1 PROJECT ORGANIZATION AUDITS

5.1.1 AUDITS OF DESIGN ACTIVITIES

5.1.1.1 Georgia Power Company Audits

This section addresses the Georgia Power Company (GPC) audit findings applicable to Module 16. The Readiness Review Team has identified eight GPC quality assurance (QA) audits addressing subjects within the scope of Module 16. These audits resulted in the identification of six findings. As part of the Readiness Review program, the findings were reviewed and categorized by subject in the audit matrixes.

The QA evaluation of the audit findings included a determination of impact on safety-related work, if any, corrective measures, and assessment of the proposed actions to minimize the potential for recurrence. Significant audit findings which addressed nuclear steam supply system (NSSS) design interface control is discussed below in more detail.

- AFR 468

  Six Westinghouse drawings, which had been superseded were found issued for use, and seven Westinghouse letters were not entered in the records management system (RMS). The project supplier document register was reviewed against the Westinghouse Master Index to assure that voided and superseded Westinghouse documents have been removed from the jobsite active file. Drawing transmittal letters had been erroneously interpreted as not required in the RMS. All post transmittal letters were entered in the RMS as corrective action. The Project Reference Manual was revised for processing of voided/superseded Westinghouse documents and project personnel were trained in the revised procedure.

- AFR 533

  A review of installation procedures in use by the contractor, Nuclear Installation Services Company (NISCO), found several instances of conflicts or inconsistencies with the Bechtel Power Corporation (BPC) installation specification and also conflicts with basic Westinghouse guidelines or requirements. Westinghouse - Bechtel - NISCO coordination led to resolution and changes in NISCO procedures.

o AFR 573

Page 1 of 2 was missing from erection contractor's welding procedure specification. Bechtel had failed to deliver the page at the time of transmittal and omission was not detected by NISCO review. Procedures for reviewing documents for adequacy were reexamined and individuals involved were reinstructed in their use.

5.1.1.2 Southern Company Services Audits

Southern Company Services (SCS) audits BPC to ensure adequate implementation of the interface relationship between BPC and Westinghouse as N-certificate holder of record for the NSSS. Two findings within the scope of Module 16 were identified. In both, SCS questioned the Westinghouse position that BPC design documents do not require Westinghouse review. The Project Reference Manual was revised to clarify the BPC/Westinghouse relationships concerning design documents.

5.1.1.3 Other Design Audits

In addition to the audits of Bechtel, both Bechtel and GPC have performed audits of Westinghouse design activities. From July 1983 through June 1985, Bechtel, in conjunction with GPC and/or SCS, performed 12 audits of Westinghouse compliance with the Westinghouse QA program. No significant findings were identified as a result of those audits.

The results of the Bechtel/GPC audits of Westinghouse complied with the frequency review of Westinghouse by the Nuclear Regulatory Commission and other customers, lead the Readiness Review Team to conclude that the Westinghouse design program has adequately adhered to the Westinghouse QA program.

5.1.2 AUDITS OF CONSTRUCTION ACTIVITIES

GPC conducts regularly scheduled and planned audits of construction activities to verify compliance with project commitments and suitable response to procedural and design requirements. Audit findings and recommended corrective measures are reported to the management of the audited organization. The audit results are also reported to GPC management and the GPC QA organization tracks the acceptability and timeliness of response. The QA organization issues monthly reports to management summarizing audit results and response status.

This section addresses the GPC audit findings applicable to Module 16. The Readiness Review Team has identified 30 GPC QA audits addressing subjects within the scope of Module 16. The subject categories of each finding are presented in the audit matrix at the end of this section. The 30 audits resulted in the identification of 22 findings and observations related to construction activities during the period from March 1979 through May 1985. As part of the Readiness Review program, the findings were reviewed and categorized by subject in the audit matrixes. The results are summarized in the table below:

Subject Area	Frequency[a]	Finding[b]
Materials	15	6
Training and qualification	2	0
Fabrication	11	5
Inspection	9	3
Testing	4	0
Measuring and test equipment	4	1
Document control	7	3
QA records	8	4
TOTALS	60	22

The QA evaluation of the audit findings included a determination of impact on safety-related work, if any, corrective measures, and assessment of the proposed actions to minimize the potential for recurrence. As of May 31, 1985, four of the findings remained "open":

Audit No.	Finding No.	Date	Description
GD07-83/64	468	7/14/83	Control of Westinghouse documents
MD07-84/44	652	6/14/84	NISCO procedures not responsive to Westinghouse requirements
GD08-85/11	759	3/22/85	Improper NISCO welding procedures
MD09-85/10	765	02/28/85	Contractor responsible for cleaning of external surfaces of fluid systems does not have an approved QA manual

Resolution of these items is in progress.

---

a. The Frequency column includes findings, observations, and other references to the subject areas within audit reports.
b. The Findings column includes findings, observations, and deficiencies and reflects multiple listings of the same finding if more than one category is affected.

Audit findings which addressed the subject categories of materials, QA records, and fabrication are discussed below in more detail.

5.1.2.1 Materials

Two of the findings required Westinghouse participation in developing a response or corrective measures. Both were isolated instances and were not indicative of programmatic problems.

- 052-OBS

  Clarification was required to establish when GPC assumed responsibility for surveillance of storage conditions of NSSS equipment.

- AFR 493

  The Westinghouse-furnished covers for the RPV lower internals did not allow for a complete seal as required by Westinghouse documents. The covers were evaluated by Westinghouse and found to be acceptable.

The remaining findings involved improper preparation and disposition of Discrepancy Reports on NSSS bolting and improper storage and inspection of RPV internals.

All findings were satisfactorily closed.

5.1.2.2 Fabrication

Three of the findings in the fabrication category were summarized in section 5.1.2 above and are still open. AFR-409 involved NISCO's performance of work without the correct process control sheet, and AFR-533 addressed a NISCO welding procedure which was not fully responsive to Westinghouse requirements.

5.1.2.3 QA Record

Of the four findings in this category, one (AFR 409) involved activities performed on the steam generator without a process control sheet to document the work. The others were examples of incomplete or inaccurate entries or documents.

DESIGN AUDITS

SORTED BY INITIATING ORGANIZATION AND AUDIT NUMBER

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

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
MOD	- Module addressing finding
DESIGN CRIT	- Design Criteria, FSAR
CALCULATIONS	- Calculations, Failure Modes and Effects Analyses (FMEAs), engineering studies
DRAWINGS	- (Self-explanatory)
SPEC	- Design pecifications, 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
WEST. SCOPE	- NSSS and activities specific to Module 16

DESIGN AUDITS

MODULE 16

EDIT NO	INIT ORGAN	AUDIT NUMBER	DATE	MOD	DESIGN CRIT	CALCUL ATIONS	DRAW- INGS	SPEC	SUPPLR DATA	DEVIAT. REPORTS	TRAIN PRGM	DESIGN REVIEW	DESIGN DOC CNT	DESIGN CHANGES	MISC	WEST. SCOPE
883	BPC-QA		06-01-78	16												X
884	BPC-QA		02-01-79	16												X
885	BPC-QA		12-01-79	16												X
888	BPC-QA	EG-8	07-26-84	16												X
890	BPC-QA	VH-111-13	06-16-85	16											X	X
886	BPC-QA	VH-111-9	11-24-81	16, 21B											X	X
889	BPC-QA	VH-111-9	08-02-84	16											X	X
77	BPC-QA	VH-III-9	09-30-80	21B ,16											X	X
79	BPC-QA	VH-III-9	07-01-82	16, 21B											X	X
80	BPC-QA	VH-III-9	07-19-83	16, 21B											X	X
188	GPC-QA	GD07-83/64	07-22-83	21B ,16									468			
469	GPC-QA	MD07-82/112	09-08-82	16				X								
219	GPC-QA	MD07-83/109	12-12-83	16				533	533							
220	GPC-QA	MD07-83/18	04-14-83	16				408								
472	GPC-QA	MD07-83/73	08-3-83	16				X								
221	GPC-QA	MD07-84/11	02-27-84	16, 21G ,21F									573			

DESIGN AUDITS

MODULE 16

EDIT NO	INIT ORGAN	AUDIT NUMBER	DATE	MOD	DESIGN CRIT	CALCUL ATIONS	DRAW-INGS	SPEC	SUPPLR DATA	DEVIAT. REPORTS	TRAIN PRGM	DESIGN REVIEW	DESIGN DOC CNT	DESIGN CHANGES	MISC	WEST. SCOPE
218	GPC-QA	MD07-84/44	07-09-84	16				684	652,655							
580	GPC-QA	SP01-85/30	04-29-85	16,21F,21G						X						
714	NRC-INS	82-24	11-03-82	18										X		
270	SCS-QA	N/A	11-12-84	21B,21J,16				84-17,84 19	X			84-15				

CONSTRUCTION AUDITS

EDIT NO.	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	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

MODULE - Readiness Review module number

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 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
327	GPC-QA	GD07-83/64	07-14-83	16							468		
332	GPC-QA	GD07-84/27	04-10-84	16							613		
380	GPC-QA	GD08-85/11	03-22-85	16			759						
451	GPC-QA	MD03-82/85	08-03-82	16	320								
495	GPC-QA	MD05-81/31	05-19-81	16	X			X					
517	GPC-QA	MD06-82/101	11-29-82	16	X	X				X			
520	GPC-QA	MD06-83/23	04-27-83	16	X			X			X		
526	GPC-QA	MD06-84/76	11-07-84	16	X		X		X		X	X	
530	GPC-QA	MD07-82/142	12-21-82	16	052-OBS, 379			379					
532	GPC-QA	MD07-82/66	06-15-82	16	302								
534	GPC-QA	MD07-83/109	12-12-83	16			533		X	X			
536	GPC-QA	MD07-83/18	04-14-83	16			409					409	
537	GPC-QA	MD07-83/43	06-30-83	16								441	
539	GPC-QA	MD07-83/76	08-24-83	16	493								
1422	GPC-QA	MD07-84/11	02-06-84	16		X			X	574		574	
544	GPC-QA	MD07-84/44	07-09-84	16			652				653	652	
578	GPC-QA	MD09-85/10	02-28-85	16			765						
579	GPC-QA	MD10-82/134	01-26-83	16	X								
582	GPC-QA	MD10-82/38	03-31-82	16	X		X	X					

CONSTRUCTION AUDITS

MODULE 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
583	GPC-QA	MD10-83/45	06-03-83	16	X		X	X			X	X	
584	GPC-QA	MD10-84/01	02-13-84	16			X						
633	GPC-QA	MD13-79/07	04-11-84	16			X			X		X	
635	GPC-QA	MD13-80/19	05-13-80	16				X			X		
638	GPC-QA	MD13-80/44	12-10-80	16	X							X	
640	GPC-QA	MD13-81/06	02-13-81	16					X				
1431	GPC-QA	MD13-84/51	07-10-84	16	X			667					
678	GPC-QA	MD14-84/65	09-25-84	16			X	X					
773	GPC-QA	WH01-82/47	04-15-82	16	291			291					
784	HART-N-626	01	07-05-84	16	X	X	X	X			1.0-DEF, 2.0-DEF	2.0-DEF	ANSI-N-626.0 AUDIT
785	HART-N-626	02	03-04-85	16							X	X	ANSI-N-626.0 AUDIT
787	NISCO	4027-A1	01-05-83	16							X	X	SUPPLIER AUDIT
788	NISCO	4027-A10	01-24-84	16	X						X	X	SUPPLIER AUDIT
789	NISCO	4027-A11	01-10-84	16	X			X					SUPPLIER AUDIT
790	NISCO	4027-A12	03-06-84	16			X				X	X	SUPPLIER AUDIT
791	NISCO	4027-A13	04-24-84	16	1.0, 2.0, 11.0, 19.0			16.0-OBS			7.0, 20.0-OBS , 23.0-OBS	3.0, 13.0, 22.0, 6.0	

CONSTRUCTION AUDITS

MODULE 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC-ATION	INSPECT-ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
792	NISCO	4027-A14	08-16-84	16	X		X	X				X	
793	NISCO	4027-A15	06-06-84	16							11-OBS	X	
794	NISCO	4027-A16	07-10-84	16						X	X		
795	NISCO	4027-A17	11-08-84	16			8.A	12.0			1.0-OBS, 7.0, 8.A, 8.B, 8.C	2.0-OBS, 3.0-OBS, 3.B, 7.0, 8.A, 11.0	
797	NISCO	4027-A19	02-18-85	16	X	10-1,10-2	X	35.0			X	4.0	
798	NISCO	4027-A2	02-16-83	16	X			X					SOURCE INSPECTION
799	NISCO	4027-A3	04-22-83	16	2.0						7.0-OBS	7.0-OBS	
801	NISCO	4027-A4	04-26-83	16		X	X	X			10.B-OBS	X	SUPPLIER SURVEY
802	NISCO	4027-A5	06-28-83	16	X								
803	NISCO	4027-A6	07-28-83	16							X		
804	NISCO	4027-A7	10-06-83	16						X		X	
805	NISCO	4027-A8	12-12-83	16			X	X			X	3.0-OBS	
806	NISCO	4027-A9	12-14-83	16			X						
807	NISCO	4027-CAR-01	05-31-84	16	X	X						X	RESPONSE TO N-626 AUDIT
809	NISCO	4027-SI-1	11-02-82	16				X					SURVEY OF MACHINING SUB-CONTRACTOR

CONSTRUCTION AUDITS

MODULE 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
811	NISCO	4027-SI-3	02-09-84	16			X	X					SUPPLIER AUDIT
812	NISCO	4027-SI-4	06-28-84	16			X	X					SUPPLIER AUDIT
813	NISCO	4027-SI-5	07-26-84	16			X	X					SUPPLIER AUDIT
814	NISCO	4027-SI-6	09-05-84	16			X	X					SUPPLIER AUDIT
838	NRC-INS	77-03	07-06-77	16	77-03-N1							X	77-03-N1
905	NRC-INS	79-14	09-11-79	16	X							X	
921	NRC-INS	80-01	02-21-80	16				X					
941	NRC-INS	80-10	07-03-80	16	80-10-03			X	X				
960	NRC-INS	80-15	10-28-80	16	80-15-02								
983	NRC-INS	81-07	07-27-81	16	81-07-01, 81-07-02								
996	NRC-INS	81-11	12-02-81	16	X								
1001	NRC-INS	81-13	12-28-81	16				X					
1009	NRC-INS	82-02	02-02-82	16	X								
1015	NRC-INS	82-04	02-23-82	16			X	X	82-04-01				
1019	NRC-INS	82-05	03-31-82	16			X						
1025	NRC-INS	82-06	04-12-82	16	82-06-02		X	X				X	

CONSTRUCTION AUDITS

MODULE 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC-ATION	INSPECT-ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
1035	NRC-INS	82-10	06-21-82	16	82-10-04		X					X	
1080	NRC-INS	82-19	09-15-82	16			X						
1088	NRC-INS	82-22	09-29-82	16			X	X					
1095	NRC-INS	82-24	11-03-82	16			X						
1114	NRC-INS	82-29	01-11-83	16	X		X						
1116	NRC-INS	83-01	02-23-83	16			X						
1121	NRC-INS	83-02	02-18-83	16	X								
1135	NRC-INS	83-06	03-14-83	16	X		X						
1138	NRC-INS	83-07	03-23-83	16	X		X						
1140	NRC-INS	83-08	05-10-83	16	X		X						
1143	NRC-INS	83-09	05-19-83	16			X					X	
1144	NRC-INS	83-10	06-24-83	16			X	X					
1160	NRC-INS	83-13	10-14-83	16	83-13-06							83-13-0 4	
1173	NRC-INS	83-18	11-07-83	16					83-18-0 1				
1185	NRC-INS	83-22	12-08-83	16					X				
1198	NRC-INS	84-03	03-12-84	16		X	X	84-03-01					
1223	NRC-INS	84-08	05-16-84	16			84-08-0 1						
1278	NRC-INS	84-23	09-19-84	16	84-23-02								

CONSTRUCTION AUDITS

MODULE 16

EDIT NO	INITIATING ORGANIZATION	AUDIT NUMBER	DATE	MODULE	MATERIAL	TRAIN/ QUAL	FABRIC- ATION	INSPECT- ION	TESTING	MEASURE &TEST EQ	DOCUMENT CONTROL	QA RECORDS	REMARKS
1287	NRC-INS	84-25	09-28-84	16			X						
1308	NRC-INS	84-30	11-30-84	16	X								
1338	NRC-INS	84-37	01-07-85	16	X								
1343	NRC-INS	85-01	02-04-85	16	X								
1379	NRC-INS	85-09	04-18-85	16	85-09-01			85-09-01					
1392	WEST	PA-83-1079	01-20-83	16	X			X			03-OBS, 02-OBS	01-OBS	
1393	WEST	PA-84-1170	08-22-84	16	X	X		X			X	X	PA-84-1170 FINDING 01 CLOSED
1394	WEST	PA-85-476	02-26-85	16	01,02,05 -OBS		05-OBS	01			03-OBS	02, 01-OBS, 02-OBS, 04-OBS	
1395	WEST	PI&DA-82-168	01-21-82	16	X			X			01,02	X	
1396	WEST	PI&DA-84-071	01-27-84	16	01,01-OB S			01			01	01-OBS, 01	

5.2 NUCLEAR REGULATORY COMMISSION INSPECTIONS

5.2.1 NRC INSPECTIONS - DESIGN

The nuclear steam supply system (NSSS) design has been addressed in 12 Nuclear Regulatory Commission (NRC) inspections. During these inspections no violations related to the NSSS were identified. The design audit matrix identifies the specific NRC inspections with the subject areas evaluated identified by an X.

5.2.2 NRC INSPECTIONS - CONSTRUCTION

NSSS equipment, materials, or construction activities have been addressed in 35 NRC inspections during the period from July 1977 through April 1985. During these inspections, the NRC identified 6 violations, of which only the most recent, 85-09-01, addressed inadvertent contact of the stainless steel cladding of the reactor pressure vessel by a carbon steel personnel basket, remains open. For further information on the open item see NRC Inspection Report 85-09. The NRC Inspection Reports addressing the construction activities included in the scope of Module 16 were reviewed and categorized into one or more of eight subject areas as shown below:

Subject Areas	Frequency of Inspection	Number of Violations[a]
Materials	21	4
Training and Qualification	1	0
Fabrication	17	0
Inspection	9	1
Testing	4	1
Measuring and Test Equipment	0	0
Document Control	0	0
QA Records	6	0
	58	6

The audit matrix at the end of this section identifies the specific subject categories assigned to each of the violations, unresolved items, inspector followup items, and licensee-identified deficiencies. For convenience, each of the violations has been circled for ready identification (subject areas which were evaluated but did not result in violations, unresolved items or inspector follow up items are identified by an X). The violations were not repetitive in nature, indicating that the few procedural violations identified were isolated

a. Violation 85-09-01 has been listed in two subject areas resulting in a total of six.

occurrences. Violation 83-18-01, though identified at the VEGP construction site, addresses improper or incomplete actions by the reactor pressure vessel manufacturer.

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5.3 PAST CONSTRUCTION AND DESIGN PROBLEMS

5.3.1 DESIGN

No significant design problems were uncovered during the course of Georgia Power Company (GPC) and Bechtel Power Corporation (BPC) reviews and the Institute of Nuclear Power Operation (INPO) pilot evaluation program. However, six significant design problems were identified during evaluations by Westinghouse. In all cases the Nuclear Regulatory Commission (NRC) was notified of a reportable, or potentially reportable, deficiency.

5.3.1.1 Gate Valve Closure Problems

On October 29, 1980, Westinghouse advised GPC that during preoperational testing on another domestic plant, problems were encountered on 3 in. gate valves supplied by Westinghouse Electro Mechanical Division. The valves did not accomplish full stroke during testing. As a result of this problem, GPC requested BPC and Westinghouse to determine applicability and evaluate the effect of similar 3 in. valves on Vogtle.

As a result of the evaluation, it was determined that four of the subject valves were to be used in safety-related piping systems. It was concluded that failure of the valves to close constituted a reportable deficiency and a reportable safety hazard. To resolve the valve problem, the valve actuators were modified to ensure closing. The corrective action was reported to the NRC on April 21, 1981.

5.3.1.2 Gate Valve Closure Problems

During the evaluation of the 3-in. gate valves, Westinghouse determined that a similar problem existed for certain 4-in. gate valves. It was determined that failure of the 4-in. valves to close also constituted a reportable deficiency and corrective action to modify the valve actuators was reported to the NRC on July 2, 1981.

5.3.1.3 Sheared Pinion Keys in Valve Motor Operators

On August 4, 1982, Westinghouse reported to the NRC and GPC that sheared pinion keys had been discovered in six Limitorque Model SB-0-25 valve motor operators. A subsequent evaluation by BPC revealed that this particular Limitorque model would not be used at VEGP; however, Westinghouse found that several other Limitorque models (JB-0-SB-00, SMB-0, and SMB-00) used keys made from the same material, Series 1113 resulfurized carbon steel.

Since GPC discovered there are approximately 50 valves with the above model Limitorque motor operators at VEGP, they reported to the NRC that both a significant deficiency and a substantial safety hazard exist.

To eliminate potential failure, Westinghouse and Bechtel will furnish replacement pinion keys of certified AISI 1018 material which VEGP is to install during future maintenance cycles for valves with the applicable model numbers. Georgia Power Company reported this corrective action to the NRC on June 1, 1983.

5.3.1.4 Charging Pumps

Modifications, implemented as a result of I&E Bulletin 79 06A, resulted in a condition in which the charging pumps could operate at shutoff pressure for an extended period in the event of secondary side high energy line break or spurious safety injection signal. Westinghouse identified this problem to GPC on May 8, 1980. This event could lead to degradation of the charging pumps and result in the pumps' inability to deliver required design flow. Corrective action to provide an auxiliary miniflow path for each charging pump was reported to the NRC on August 10, 1982.

5.3.1.5 Unqualified Limitorque Valve Operator

Westinghouse was informed by another domestic power plant that motors on four Limitorque operators for valves in the charging pump auxiliary miniflow lines were not qualified to appropriate IEEE standards. Westinghouse advised GPC on October 5, 1984 that this problem also applied to valves supplied to VEGP. Since the motors were not qualified, the valves could not be assumed to operate as required, and this condition could cause damage to the charging pumps. It was determined that this condition represented a reportable deficiency, and corrective action to replace the operators with qualified operators was reported to the NRC on December 19, 1984.

5.3.1.6 Westinghouse Gate Valve Position Indication

On December 23, 1982, Westinghouse advised GPC of a potential safety concern involving valve position indication for certain Westinghouse manufactured gate valves. The valves had been wired in a manner such that the position indicator would indicate a valve was fully closed prior to the valve disc fully isolating flow. If the valve were to stall or bind after the premature closure indication, the plant operator would have an inaccurate indication of the valve position, and the potential would exist for the unit to be in an unanalyzed condition.

It was concluded that this condition represented a reportable concern and corrective action to rewire the valves to provide accurate position indication was reported to the NRC on November 9, 1983.

5.3.2 CONSTRUCTION

There have been no significant past construction problems identified.

5.4 SUPPLEMENTAL AUDITS

The ASME Boiler and Pressure Vessel Code, section III, subsection NA/NCA addresses the need for quality assurance programs and imposes certain audit activities on specific organizations. This section addresses those audits applicable to this module.

The ASME surveys N-type certificate holders triennially for continuation of authorization to extend their ASME certificate for work performed at the VEGP construction site. Data from these surveys are confidential and unavailable for inclusion in this module.

5.4.1 AUTHORIZED NUCLEAR INSPECTION AGENCY AUDITS

ANSI N-626 requires biannual audits of certificate holders. The two audits of Nuclear Installation Services Company (NISCO) activities identified procedures problems related to Authorized Nuclear Inspector acceptance of quality assurance manual revisions and review of Discrepancy Reports. No programmatic problems were noted. The Authorized Nuclear Inspection Agency at VEGP is the Hartford Steam Boiler Inspection and Insurance Company.

5.4.2 WESTINGHOUSE AUDITS

Westinghouse is the responsible N certificate holder for the nuclear steam supply system (NSSS) primary loop piping and portions of other NSSS systems. As the responsible N certificate holder, Westinghouse has the responsibility for auditing GPC activities as the material supplier for contractors performing work within the Westinghouse scope of contract responsibilities.

Westinghouse has conducted four new audits and one followup audit during the period from January 1982 through May 1985 in which they identified five findings and nine observations. The Readiness Review Team has categorized these findings and observations into one or more of nine subject categories as summarized in the table below.

Subject Area	Frequency(a)	Findings(b)
Design	NA	NA
Materials	8	5
Training and qualification	1	0
Fabrication	NA	NA
Inspection	5	2
Testing	NA	NA
Measuring and test equipment	NA	NA

Subject Area	Frequency[a]	Findings[b]
Document control	7	6
QA records	9	7
TOTALS	30	20

The findings were related to approval of the GPC Identification and Verification Manual, verification that suppliers of welding materials were acceptable to Westinghouse and appeared on the Westinghouse list of qualified suppliers, and the use and control of purchasing documents. The observations addressed numerous subjects and included recommendations and comments concerning GPC activities and QA program requirements but no programmatic problems were identified.

All findings have been satisfactorily closed.

5.4.3 NISCO INTERNAL AUDITS

The NISCO internal audits were frequent, effective, and identified numerous procedural and QA program deviations. The timeliness of the audits and the rapid remedial and corrective actions assured that none of the findings resulted in significant problems.

As in previous sections, the findings and observations have been listed on matrixes and categorized into specific subject areas as tabulated below.

Subject Area	Frequency[a]	Findings[b]
Design (not applicable)	0	0
Materials	9	5
Training and qualification	4	2
Fabrication	5	1
Inspection	6	4
Testing	0	0
Measuring and test equipment	2	0
Document control	15	10
QA records	17	13
TOTALS	58	35

a. The Frequency column includes findings, observations, and other references to the subject areas within the audit reports.

b. The Findings column includes findings, observations, and deficiencies, and reflects multiple listings of the same item if more than one category is affected.

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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 that the results of these work processes conform to project procedures and design requirements.

This section is divided into two parts. Section 6.1 describes activities related to design program verification, and section 6.2 addresses construction program verification.

Resulting findings have been classified into levels of importance to plant safety. The following levels are used:

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

Tables 6.1-2 and 6.2-1 provide a listing of the identified findings along with their assigned level of importance.

6.1 DESIGN PROGRAM VERIFICATION

The following sections describe the design program verification and resulting findings and corrective actions. This design verification was performed by the Readiness Review design verification team. The five members of the team had a cumulative experience of 85 years in power plant design engineering. Approximately 750 manhours were expended performing the verification.

The design verification concentrates on the design interface (i.e., the flow of design information) between Westinghouse, the nuclear steam supply system (NSSS) vendor, and Bechtel Power Corporation (BPC). The results of the review provide a basis on which to determine whether interface activities have been properly controlled.

Section 6.1.1 summarizes the verification results.
Section 6.1.2 describes the design verification scope and plan.
Section 6.1.3 describes the verification and results.
Section 6.1.4 discusses the design verification findings and responses. Section 6.1.5 discusses the significance of the findings.

6.1.1 SUMMARY

The scope of this module involved 11 key NSSS areas. The key areas and the verification sample reviewed are presented in Table 6.1-1.

The design verification resulted in four findings. Three of the findings were procedural in nature and did not adversely affect hardware. The fourth finding identified hardware deficiencies. The affected hardware will be reinstalled to correct requirements. The finding which impacted hardware was considered Level 1. The remaining three findings had no effect on the technical adequacy, design, or hardware of the NSSS; nor do they indicate a deficiency in the overall NSSS interface between Bechtel and Westinghouse.

The Level 1 finding identified a deficiency in a single discipline in which vendor mounting details for instruments were not incorporated into instrument installation drawings. The project proposed corrective actions to the finding, if properly implemented, should ensure that the deficiency will not recur.

6.1.2 VERIFICATION SCOPE AND PLAN

The Module 16 design program verification concentrated on the design interface between BPC/GPC and Westinghouse, the NSSS supplier. As noted in section 4.1, the Vogtle NSSS is designed by Westinghouse under the Westinghouse quality assurance

program. Westinghouse design work is organized using a functional group concept which is an organization divided into specific work activities, and in which a given type of work is done by a single group for all projects. Therefore, the same policies, procedures, and often the same people are involved in a given design area for all plants. The Westinghouse quality assurance plan has been accepted by the Nuclear Regulatory Commission (NRC) for generic application to all safety-related work conducted in conjunction with the design of commercial nuclear power plant projects. Repeated reviews by the NRC Quality Assurance Branch and the Region IV Vendor Compliance Branch have developed extensive documentation of the adequacy of the Westinghouse quality assurance program. In addition, numerous audits by Westinghouse customers over many years, including the 1982 Southern Company Services (SCS) Vogtle audit on design control, have established the acceptability of the Westinghouse quality assurance program. Because of this evidence of adequacy of the internal design process at Westinghouse, the verification scope concentrated on a review of the NSSS design interface.

Key areas were selected for review to ascertain whether the NSSS interface has been appropriately implemented and controlled. These areas are:

- o Piping stress analyses;
- o Reactor coolant loop equipment supports;
- o Westinghouse proof of design review;
- o Accident analyses;
- o Instrument and control interface;
- o NSSS and balance of plant (BOP) process requirements;
- o Electrical interface;
- o NSSS equipment qualification and nozzle loads;
- o Radiation shielding source data;
- o Equipment installation requirements;
- o Field change documents.

To maintain continuity between modules, the samples for verification were primarily taken from the residual heat removal (RHR), auxiliary feedwater (AFW), and nuclear service cooling water (NSCW) systems which were also the primary sample systems in Module 4. Additional NSSS systems such as the safety injection system (SIS) and components such as reactor coolant

loop equipment were also included to ensure that representative samples were selected for each of the areas

In addition to the review of the design interfaces, implementation of Final Safety Analysis Report (FSAR) commitments was reviewed for those commitments associated with the NSSS which are unique to Vogtle (i.e., not associated with the Westinghouse NSSS generic design). The commitments reviewed are related to Westinghouse scope of supply and/or design. Additionally, samples of commitments which represent Westinghouse design requirements on BPC design were reviewed to ascertain the implementation of interface of commitments. (These commitments will also be verified in appropriate BPC design modules, such as Module 4, for equipment and piping requirements.)

The verification program also includes a review of previous audit findings, industry problem reports, and past project problem reports. The design interface was also reviewed specifically for the RHR/component cooling water (CCW)/NSCW system to verify Westinghouse/BPC design consistency.

6.1.2.1 Review Method

The design verification was performed in two phases. In phase I, licensing commitments which are unique to VEGP (i.e., not Westinghouse NSSS generic design) were reviewed to ascertain their implementation in project design documents. In Phase II, design documents were reviewed to ascertain whether required design interface data has been properly transmitted, received, and implemented.

6.1.2.1.1 Phase I

Implementation of licensing commitments was evaluated through review of the licensing commitment documents (e.g., FSAR) and various implementing documents (e.g., design criteria). The commitments reviewed were those commitments related to the Westinghouse scope of supply which are considered unique to VEGP. Those commitments which are typical for Westinghouse plants similar to VEGP are considered generic and were not specifically reviewed for implementation, since the Westinghouse NSSS design is performed by functional groups using the same procedures and practices for each NSSS. The generic commitments are an integral part of the Westinghouse NSSS design.

In addition to the above commitments, a sample of commitments which represent Westinghouse process requirements on BPC designed systems was also reviewed for implementation in BPC design documents to ascertain whether commitments/requirements have been appropriately communicated and implemented.

6.1.2.1.2 Phase II

In Phase II of the verification, the design interface between Westinghouse and BPC/GPC was reviewed. Eleven key areas were selected for review to encompass the major NSSS interface activities. These areas include each Bechtel discipline which is involved in interface activities and the areas address the flow of information in both directions through the interface (i.e., Bechtel to Westinghouse and Westinghouse to Bechtel).

Samples of design interface items were selected for review in each of the key areas. These samples included data provided to Westinghouse by BPC and data provided to BPC by Westinghouse. The samples were primarily selected from the sample systems (AFW, RHR, and NSCW). The review was directed as much as possible toward changes in design which would result in interface activities. To accomplish this, the review also included samples of systems (e.g., SIS) and components (e.g., reactor coolant loop equipment) for which design changes have occurred that required additional design interface activities. Additional bases for the samples selected are discussed in the section 6.1.3.

Past audit findings, problem reports, etc. were also reviewed. For this review, several examples were selected to ascertain whether project coordination and action had taken place. In particular, samples of Westinghouse related 10 CFR 50.55(e) reports were reviewed for proper completion.

6.1.3 VERIFICATION REVIEW

The Westinghouse/BPC/GPC interface activities were examined for proper and effective exchange of information between organizations. The areas considered were transmission of information required by other parties, receipt and correct internal distribution of the information, implementation of information, and feedback, when needed.

The interface review was accomplished using a plan developed to systematically guide team members through their review. Adjustments were made to the plan when the verification team found that the selected items were inappropriate or when more significant items were identified. The original worksheets for the plan are shown in Figures 6.1-1 and 6.1-2. The worksheets were modified and appropriate documents identified for review after discussions with personnel from the organization initiating the information.

The following sections discuss the review and results of the selected interface areas listed in section 6.1.2.

6.1.3.1 Pipe Stress Analyses

The Bechtel/Westinghouse interface in the pipe stress analysis area was reviewed for proper control and effective exchange of data required by each organization and for feedback of information. The review of the interface in this area concentrated on design changes which required interface activity. The following areas were selected for review to encompass most of the interface activities in this area:

- o Large and small bore ASME III piping fatigue analysis;
- o Seismic spectra;
- o Support loads/location;
- o Jet impingement loads.

Design changes in the sample systems (RHR, AFW, etc.) were selected for review and additional samples were included to ensure a review in each of the above areas.

For piping fatigue analysis interface activities, changes to the RHR/SIS injection lines to Reactor Coolant (RC) Loops 1 and 4, to the RC Loop lines 1201-036-12 and 1201-119-3, to SIS line 1204 02-12, and RC Loop 1 resistance temperature detector (RTD) manifold piping were selected for review. The current routing, including changes shown on three isometric drawings and the current stress analysis input for the RHR/SIS injection lines, was observed to be appropriately included in the Westinghouse fatigue analyses.

Reviewed were routing changes which were made following the completion of the current Westinghouse fatigue analyses to large bore ASME III, Class 1 lines 1201-036-12, 1201-119-3, and 1204-021-12 shown on 12 field change requests (FCRs) and their associated design change notices (DCNs). The appropriate Westinghouse fatigue analyses were reviewed and found not to include these changes. However, it was determined that Westinghouse will review and finalize fatigue analyses prior to turnover. As a rule, the fatigue analyses are updated during the interim only if the routing changes are significant. In the case of the above 12 FCRs, the routing changes were minor and did not require interim Westinghouse fatigue analyses.

Also reviewed was the Westinghouse fatigue analysis for small bore ASME III, Class 1 RC Loop 1 RTD manifold piping. The current Bechtel input data and the addition of a tee in the piping were appropriately incorporated in the fatigue analysis. The Westinghouse analysis produced unacceptable results. The transmittal informing Bechtel of this and of possible solutions was reviewed. The reviewer determined that Bechtel had redesigned the line, using a Westinghouse recommended solution and is now performing the stress analysis of the line.

The seismic spectra being used by Westinghouse was reviewed. This seismic spectra was observed to be the same as the current Bechtel seismic spectra given in Bechtel design criteria.

Changes to loads on four supports and a change of support location were identified in discussions with a Westinghouse engineer. A letter informing Bechtel that these changes occurred was identified by Westinghouse. The letter could not be located in the Bechtel files. However, it was determined that periodic reviews were made of correspondence files, and these reviews coupled with design interface meetings would have ensured that this letter would be located.

Jet impingement loads on the pressurizer surge line were selected for review. The Bechtel transmittal of the complete set of jet impingement loads (from all high energy line breaks) and another transmittal of pipe insulation data were reviewed. The transmittal of the results of the Westinghouse jet impingement evaluation was reviewed. The pressurizer surge line was appropriately addressed in each transmittal.

The interface in the pipe stress analysis area was observed to be properly controlled and data effectively exchanged. There were no findings in this area.

6.1.3.2 Primary Equipment Support Loads

The review of the interface in the area of primary equipment support loads on the containment structure concentrated on changes in the loads for the steam generator supports and reactor coolant pump supports. In September 1982, Westinghouse revised the support loads from those of December 1976, which were initially transmitted to Bechtel for the steam generator supports and the reactor coolant pump supports. The Bechtel calculation for the steam generator support loads and the calculation for the reactor coolant pump support loads were reviewed. Both calculations clearly summarized the evaluation of the respective equipment support loads up to and including the September 1982 loads. In April 1985, Westinghouse again revised the support loads for this equipment. These new loads were recently transmitted to Bechtel. The reviewer, while in the Bechtel offices, was shown that the new loads were being prepared to be routed in the civil discipline for evaluation.

The interface in the area of primary equipment support loads on the containment structure was observed to be documented and controlled. There were no findings in this area.

6.1.3.3 Westinghouse Proof-of-Design Review

Verification of the Westinghouse proof-of-design interface review was to be initially a review of the drawings and

revisions used by Westinghouse in performing the proof-of-design review against the present drawing and revision level for the safety injection and residual heat removal systems. Bechtel and Westinghouse engineers identified and the reviewer confirmed that the Westinghouse letter transmitting results of the proof-of-design review requested that as-built revisions of the drawings used in the review be provided to Westinghouse. This request had been assigned an action item number and was being tracked on the project open items list. Therefore, a mechanism was found in place to ensure Westinghouse review of changes to drawings used in the proof-of-design review; thus, the originally planned review was not pursued. Since an as-built review is being tracked to completion, the interface activities in this area were found acceptable. There were no findings in this area.

6.1.3.4 Accident Analysis

The review of interface in accident analysis covered three specific areas: containment subcompartment analyses, containment pressure/temperature analyses, and emergency core cooling system (ECCS) analyses including revision to Bechtel input data and auxiliary feedwater flow requirements.

In accident analysis, the primary area in which Bechtel utilizes data provided by Westinghouse is containment subcompartment analyses. A single calculation, steam generator compartment pressure/temperature, was selected for review as representative of the limited number of containment subcompartments. The calculation was observed to be based on current Westinghouse mass and energy release data.

Westinghouse performs several types of accident analyses which require information from Bechtel. The containment pressure/temperature and ECCS calculations were selected for review since changes to the heat sink data, a portion of the Bechtel-provided information, had occurred.

The ECCS calculation was also selected for review since not only was information required from Bechtel to perform the calculations, the calculation also defined the auxiliary feedwater system flow at various conditions which were required to be implemented by Bechtel.

The current Bechtel data package transmittal for use in the containment pressure/temperature calculation was reviewed. The latest Westinghouse containment pressure/temperature calculation was observed to be based on the current Bechtel data-package. A Bechtel transmittal of revised containment heat sink data, which supercedes a portion of the current data-package, was reviewed. The Westinghouse response to the revised heat sink transmittal was reviewed. Westinghouse evaluation of the revised heat sink

data determined that there was an overall increase of heat sink and Westinghouse reanalysis was not required.

The current Bechtel data package transmittal for use in the ECCS calculation was reviewed. The latest Westinghouse ECCS calculation was observed to be based on the current Bechtel data package. Correspondence regarding iterations of the layout of the Bechtel-provided AFW system were reviewed. The layout iterations were to obtain the required AFW system flow at various conditions. The final of the six Bechtel and Westinghouse letters reviewed verified that for the appropriate conditions, the AFW system flow would be that required by the Westinghouse calculation.

Both Bechtel and Westinghouse have controlled and documented the use of input data provided by the other for use in the analyses for which each is responsible. There were no findings in this area.

6.1.3.5 Instrumentation and Control Interface

The interface in the instrument and control area was reviewed for incorporation of functional requirements specified by Westinghouse for Bechtel designed systems, and for the input signals to be provided by Bechtel to the Westinghouse solid state protection system (SSPS), which is a part of the engineered safeguards features actuation system. The selected sample is summarized in Table 6.1-1.

The Westinghouse functional requirements were reviewed for those which would be implemented by Bechtel in the instrumentation and controls area, those which had changed or were added during the life of the project, and those which were associated with the sample systems. Three specific functional requirements for Bechtel-designed systems were selected for review. The AFW turbine pump start on blackout and steam generator blowdown and sample line isolation requirements of these were selected since they were added during a Westinghouse revision to a functional requirements document. Seven Bechtel control logic diagrams were reviewed. The logic for each required function was observed to be shown appropriately on control diagrams.

The reviewer was able to identify just two instrumentation and controls input signals required to be supplied by Bechtel to the Westinghouse SSPS. The main steam (MS) stop valve position and turbine trip system pressure signals were selected for review. The Bechtel Solid State Protection Cabling Block Diagram was reviewed for these input signals. The four required channels of the MS stop valve position input signal and the three required channels of the turbine trip system pressure input signal were observed to be shown appropriately on the block diagram. The input signals were appropriately supplied by Bechtel.

The review in the instrumentation and controls area showed that the requirements specified by Westinghouse were incorporated appropriately into the Bechtel design. There were no findings in this area.

6.1.3.6 NSSS and BOP Process Requirements

The interface in the area of Westinghouse process requirements was reviewed in two areas. The area of Westinghouse-designed fluid systems was reviewed for changes to the flow diagrams initiated by Westinghouse to ensure that the changes were reflected accurately in Bechtel drawings. The area of process requirements for BPC-designed systems was reviewed for implementation of Westinghouse process requirements from a Balance of Plant Functional Requirements document and the Steam Systems Design Manual. Table 6.1-1 summarizes the selected sample.

Seven changes to the Westinghouse flow diagrams for four safety-related systems were selected for review. The Westinghouse letters transmitting these changes were reviewed. Seven Bechtel process and instrumentation diagrams (P&IDs) were reviewed for implementation of the selected flow diagram changes. The P&IDs in each instance accurately incorporated the flow diagram changes. As evidence of an active, effective, and controlled interface in this area, two additional activities were observed. First, documentation was reviewed of a January 1984 meeting between Bechtel and Westinghouse engineers to discuss and resolve Bechtel comments on Westinghouse flow diagrams. Second, Bechtel and Westinghouse engineers working in this area were informally meeting at the Bechtel offices at the time of the review. They discussed the work in this area and provided clarification for the reviewer on specific questions.

Samples of Westinghouse process requirements for Bechtel-designed systems which interface with the NSSS were selected based on a review of the Westinghouse Balance of Plant Functional Requirements documents and the Steam Systems Design Manual. Eight requirements for the sample NSCW, CCW, and AFW systems were selected for review. Except for NSCW heat exchanger redundancy, two separate flow paths, and AFW single failure criterion, the design requirements were selected for review because they had potential for being overlooked during the design process.

Six process requirements for Bechtel-designed NSCW and CCW systems were selected for review from a Westinghouse Balance of Plant Functional Requirements document. Requirements for NSCW heat exchanger redundancy and two separate flow paths were observed to be accurately implemented in the Bechtel NSCW System Design Criteria. The limit on CCW heat exchanger maximum outlet temperature was documented by a Bechtel calculation. NSCW and CCW heat loads from the NSSS were reviewed in two separate

Bechtel calculations. These heat loads were the same as the current heat loads from Westinghouse vendor documents. The requirement for automatic start of the standby NSCW train was observed to be properly implemented in a Bechtel control logic diagram. The pressure requirement for the CCW piping to the reactor coolant pump thermal barrier was observed to be correctly implemented in the Line Designation List.

The two process requirements for the Bechtel-designed auxiliary AFW system were selected from the Westinghouse Steam Systems Design Manual. The requirement for steam from two steam generators to the AFW turbine pump was observed to be properly implemented on a P&ID and on piping isometric drawings. The AFW system single failure criterion requirement was accurately implemented in the Bechtel AFW System Design Criteria.

The review of Westinghouse process requirements showed that the process requirements specified by Westinghouse were incorporated into the Bechtel design and that changes made by Westinghouse to the flow diagrams for Westinghouse-designed systems have been controlled through the interface and are being implemented by Bechtel. There were no findings in this area.

6.1.3.7 Electrical Interface

The interface in the electrical area was reviewed in three areas: engineered safeguards features actuation system (ESFAS) valve and pump train assignments, Westinghouse electrical requirements for Bechtel-designed systems, and input signals to be provided by Bechtel to the Westinghouse SSPS which is a part of the ESFAS. The selected sample is summarized in Table 6.1-1.

Six pairs of valves, safety injection pump suction and discharge isolation, residual heat removal pump suction and discharge isolation, boron injection tank outlet isolation and sump suction line isolation, and safety injection and residual heat removal pumps were reviewed for consistent train assignments between Bechtel and Westinghouse. This area was selected for review in part because of the team's awareness that problems had been experienced in the area on other projects. Westinghouse train assignments were identified in the Westinghouse Electrical Requirements document. Sixteen Bechtel elementary diagrams, one for each component, were reviewed for the Bechtel train assignments. The train assignments reviewed were consistent between Bechtel and Westinghouse design documents.

The Westinghouse Steam Systems Design Manual was reviewed to identify electrical power requirements for the Bechtel-designed systems. Two electric power requirements for the sample AFW system were selected for review: AFW motor-driven pumps powered from separate power sources and the AFW turbine-driven pump flow path independence from diesel AC power. The Bechtel elementary wiring diagram for each AFW motor-driven pump and for each of

three pairs of valves in the associated flow paths were reviewed. The motor-driven AFW pump and associated valves in each flow path were observed to be powered by a separate power source (train) from that of the pump and valves of the other flow path. The requirement for separate power sources for each AFW motor driven pump flow path therefore is met.

The AFW turbine-driven pump flow path independence from diesel AC power was reviewed by identifying AFW turbine-driven pump flow path valves, pump turbine steam supply valve power sources, the source of AFW turbine-driven pump lube oil pump power, and independence of the lube oil cooling source. The power source for four AFW turbine-driven pump discharge line valves and one suction line valve is shown on the elementary wiring diagram for each valve as an independent DC power source (train). The power source for two valves in the steam supply line to the pump turbine is shown on the elementary wiring diagram for each valve as an independent DC power source (train). The power supply for two vendor supplied, steam supply line valves was traced through the vendor drawing to a Bechtel one-line diagram which showed it as an independent DC power source. The AFW pump vendor manual showed that the lube oil pump is integrally attached to the AFW pump shaft and is not dependent on diesel AC power. The AFW pump lube oil cooling system is internally cooled as shown on the vendor drawing and reflected on two AFW P&IDs, and is also independent of diesel AC power. Thus, the turbine-driven AFW pump system was observed to meet the requirement of independence from diesel AC power.

The engineered safeguards features (ESF) pump motor loads shown on the Bechtel diesel generator loading table drawing were reviewed against the Westinghouse-specified motor horsepowers and were consistent.

The reviewer identified two electrical input signals required to be supplied by Bechtel to the Westinghouse SSPS. The reactor coolant pump under frequency and reactor trip breaker open signals were selected for review. The reactor trip breaker open signal was initially required by the Westinghouse functional diagrams and subsequently was deleted by a revision representing a change in design. Four Bechtel elementary diagrams were reviewed. The reactor coolant pump under frequency signal was shown as a separate channel on each of the four drawings. This signal had been implemented appropriately. The same drawings were reviewed for inclusion of the reactor trip breaker open signal channels which had been deleted by Westinghouse. The signal was not on any of the reviewed elementary wiring diagrams which was consistent with the Westinghouse drawing. The input signals were supplied by Bechtel.

The train assignments of equipment and valves and the ESF pump motor horsepowers used in the Bechtel diesel generator loading table were consistent between Bechtel and Westinghouse design documents. The Westinghouse-specified electrical power

requirements on Bechtel-designed systems were observed to be implemented. The input signals provided by Bechtel to the SSPS reviewed were observed to be implemented. The interface in the electrical area was found to be effective and adequately controlled. There were no findings in this area.

6.1.3.8 NSSS Equipment Qualification

Nuclear steam supply system equipment qualification was reviewed in three areas: seismic qualification of equipment, environmental qualification of equipment, and nozzle loadings on equipment from the attached piping. The samples selected for review were electrical and mechanical equipment (including various types of each) and valves. For both the seismic and environmental qualification areas, the electrical equipment sample included the SSPS cabinets and four instrumentation transmitters from three different manufacturers. The valve samples were a modulating valve in the centrifugal charging pump portion of the chemical and volume control system (CVCS) with its associated electronic control module, and the safety injection pump discharge isolation valve with its associated motor operator and limit switch. For mechanical equipment, safety injection pumps were reviewed in the environmental qualification and nozzle loadings areas. The RHR heat exchanger and steam generator main steam nozzle loadings were selected for review. The sample was selected to review the seismic qualification, environmental qualification, and nozzle loadings for the same equipment reviewed in other areas to the same extent possible. The samples for each area are summarized in Table 6.1-1.

6.1.3.8.1 Seismic Qualification

The review in the seismic qualification area was intended to verify the seismic qualification for safety-related NSSS equipment to Vogtle-specific seismic requirements.

Bechtel was observed to have on file the current revision of Westinghouse documentation related to seismic qualification for each piece of equipment of the sample selected for review in the seismic qualification area.

The review of seismic qualification of the selected sample of electrical equipment could not be performed since the program for comparison of seismic qualification levels to Vogtle-specific seismic levels for electrical NSSS equipment was still under development at the time of the review. Based on this, it was observed that there was a lack of specific definition of such a program in the Bechtel Project Reference Manual. Finding 16-15 was issued as a result of this observation.

The two sample valves were reviewed for seismic qualification. The Bechtel stress calculation was reviewed for the line in which the modulating CVCS valve is located. This stress calculation defines the Vogtle-specific seismic acceleration levels for the modulating valves and references the Bechtel Stress Analysis Criteria-Design Criteria document on a standard format sheet. Although the Design Criteria states a valve acceleration limit as a pipe support design goal, there was no direct comparison of the resulting specific calculated acceleration to the modulating valve qualification. The electronic control module for this valve is mounted separately and would be treated as electrical equipment.

The safety injection pump isolation valve seismic qualification acceleration levels were reviewed in the Westinghouse equipment specification for the valve. The acceleration levels of the installed valve were reviewed in the stress calculation for the line in which the valve was located. The calculation was observed to contain a preprinted sheet referring to compliance "...with the criteria established by Westinghouse," but there was no direct comparison of the qualification to calculated Vogtle-specific seismic acceleration levels. The reviewers observed that the Bechtel-calculated acceleration levels were within the qualification levels of the Westinghouse equipment specification. Finding 16-12 was issued dealing with the lack of direct comparison of qualification to calculated Vogtle-specific acceleration levels for the two valves reviewed.

The stage of work progress in the seismic qualification area did not permit a sufficient review to draw conclusions regarding this area. Review of the valve seismic area indicated weaknesses in documentation which did not affect the technical adequacy of the work.

6.1.3.8.2 Environmental Qualification

The review in the environmental qualification area was to verify the environmental qualification for safety-related NSSS equipment to Vogtle-specific environmental conditions.

Bechtel had on file the Westinghouse documentation, in its current revision, for each piece of equipment of the sample selected for review in the environmental qualification area. The comparison of environmental qualification conditions with location specific environment was in progress at the time of the review. A systematic program was being followed in which a System Component Evaluation Work (SCEW) sheet was prepared for NSSS safety-related electrical components and electrical parts of mechanical components and valves which operate in a harsh environment.

Completed SCEW sheets were reviewed for the modulating CVCS valve and associated control module, the safety injection pump discharge isolation valve motor, the four instrument transmitters, and the safety injection pump motor. These SCEW sheets properly compared the component environmental qualification conditions with the location specific environment for each item, indicating the component was qualified. No SCEW sheet was observed for the safety injection pump discharge isolation valve limit switch. Bechtel project personnel showed the reviewer that the limit switch was scheduled on a list of work to be completed.

A systematic program was also being followed for safety related mechanical equipment located in a harsh environment. The Mechanical Equipment Qualification (MEQ) list identifies the qualification of soft part components (gasket, seal, etc.) that could degrade. The safety injection pump and the safety injection pump discharge valve itself were observed on the MEQ list. The documentation of the soft parts lifetime qualification for the valve was observed to be satisfactory during the review. The safety injection pump will be evaluated, because it is included in the MEQ, when Bechtel receives the qualification data.

The Bechtel equipment and instrumentation qualification list (EIQL) makes a comparison of safety related equipment, environmental qualification conditions and the component location specific environment for both harsh and nonharsh environments. The environmental comparison for the SSPS cabinet was observed in the EIQL to be satisfactory.

Completed SCEW sheets were located for all sample equipment except one valve limit switch which was shown by project personnel to be on the list of work to do. The SSPS cabinets are not located in a harsh environment and do not require a SCEW sheet. The environment for the SSPS, as defined in Design Criteria Documents 100F, Environmental, is compared to the Westinghouse qualification in a Bechtel internal tracking program, EIQL. The safety injection pump had been identified by the project for later verification of soft parts (any parts of the pump whose function can degrade as a result of environmental exposure qualification).

Although work was still in progress in this area, a complete program exists to provide a comparison of environmental qualification conditions with location specific environmental requirements for applicable equipment. There were no findings in this area.

6.1.3.8.3 Nozzle Loadings

Equipment nozzle loadings from attached piping were reviewed for three different types of Westinghouse supplied components.

Selected for review were the main steam nozzle for Steam Generator Number 1, the inlet nozzle for RHR heat exchanger A, and the suction and discharge nozzles for both safety injection pumps. For the steam generator and RHR heat exchanger, the allowable nozzle loading specified by Westinghouse in each component's equipment specification was met by the nozzle loading from the attached piping calculated in the Bechtel stress calculation for lines 1301-001-26 and 1205-005-8 respectively. The Bechtel-calculated loadings on the four safety injection pump nozzles exceeded those of the Westinghouse safety injection pump equipment specification. The Bechtel letter requesting approval of the safety injection pump calculated nozzle loads and Westinghouse's subsequent letter of approval were reviewed.

The interface activities in the area of nozzle loadings are controlled and data is effectively exchanged. There were no findings in this area.

6.1.3.9 Radiation Shielding Source Data

The review in the area of radiation shielding source data concentrated on the use of current Westinghouse data in the Bechtel calculations. Three Bechtel radiation shielding calculations were selected for review: volume control tank (VCT) valve gallery, Auxiliary Building Level D (RHR pump shield wall), and Auxiliary Building Level D post accident shielding calculations. The current and past revisions of the Westinghouse Radiation Analysis Manual were reviewed to identify areas where data had been revised. The VCT valve gallery and Auxiliary Building Level D (RHR pump shield wall) calculations were selected for review since Westinghouse data which had been revised should be used as input to the calculations. The Auxiliary Building Level D postaccident shielding calculation was selected to review a calculation for other than normal operating mode shielding.

The Bechtel VCT valve gallery calculation was observed to use appropriately the data from the November 1978 issue of the Westinghouse Radiation Analysis Manual.

The purpose of the Bechtel Auxiliary Building Level D (RHR pump shield wall) calculation review was to adjust the previous calculation to account for changes that occurred in the November 1978 issue of the Westinghouse Radiation Analysis Manual since the previous issue. The Westinghouse data was observed to be appropriately utilized in this calculation.

The Bechtel Auxiliary Building Level D postaccident shielding calculation was observed to be based on the Bechtel source spectrum for a TMI shielding calculation which was observed to be based, in turn, on the Bechtel source terms for the TMI Shielding Calculation. During a review of the source terms for

the TMI Shielding Calculation, the appropriate use of data from the November 1978 Westinghouse Radiation Analysis Manual was observed.

During the review of the Westinghouse Radiation Analysis Manual, it was observed that the current manual was issued in March 1983. The changes made in the March 1983 issue were observed to be typographical and had been previously identified to Westinghouse by Bechtel. Bechtel calculations were not affected by the typographical changes in the March 1983 issue of the Westinghouse Radiation Analysis Manual in Bechtel calculations and, therefore, no changes to Bechtel calculations were required.

The review of Bechtel shielding calculations showed that the current Westinghouse radiation source data had been appropriately used. There were no findings in this area.

6.1.3.10 Equipment Installation Requirements

The interface in the area of equipment installation requirements was reviewed in the electrical area and the control systems area. Based on the team's experience, installation of mechanical equipment was judged an area which typically receives much attention on a project and usually has more easily identifiable requirements. The team considered the installation of electrical or control equipment to be an area in which installation requirements were more likely to be misinterpreted.

The installation requirements for nuclear instrument system (NIS) cable were selected for review. Westinghouse provides the installation requirements in the NIS Cable and Connectors Installation Control and Electrical Systems (C&ES) Standard document. The Bechtel Raceway Systems Construction Specification references the C&ES Standard document and reiterates specific details from the C&ES Standard document. The Bechtel raceway drawings which contain NIS cable were observed to call out specifically the Raceway Systems Construction Specification for NIS cable installation details.

Process control instrumentation installation was also selected for review. The sample for review was selected to include various types of Class 1E transmitters (e.g. pressure, level) from different manufacturers (e.g. Barton, Tobar) and to include installations inside and outside of containment. The containment pressure, accumulator level, steam generator wide range level, refueling water storage tank (RWST) level, pressurizer pressure and steam generator pressure transmitters were selected for review.

A Westinghouse drawing showing the containment pressure transmitter, a sealed transmitter system, was reviewed for

installation details. The Bechtel installation drawing for this transmitter was reviewed and observed to reflect accurately the installation details of the Westinghouse drawing.

The Bechtel instrument installation drawings for the accumulator level and pressurizer pressure transmitters were not prepared at the time of this review and could not be reviewed.

The three Westinghouse transmitter drawings, one each for the steam generator wide range level, RWST level, and steam generator pressure transmitters were reviewed to identify installation details. The Bechtel instrument installation drawing for the steam generator pressure transmitter was also reviewed. The torque requirements for the transmitter bracket mounting bolts, shown on the Westinghouse drawing, were not included on the Bechtel drawing. The Bechtel instrument installation drawing showing installation details for both steam generator level-wide range and RWST level transmitters were reviewed. The transmitter bracket mounting bolts shown on the Bechtel drawing were 1/4 in. bolts, not the 5/16 in. bolts shown on the Westinghouse drawing. Based on the discrepancies between Westinghouse transmitter installation details and the two Bechtel instrumentation installations drawings, Finding 16-13 was issued.

In the areas reviewed, except for the transmitter mounting which resulted in a finding, the Westinghouse installation requirements were reflected in Bechtel design documents.

6.1.3.11 Field Change Documents

The field change documents reviewed were deviation reports (DRs), field change requests (FCRs), and field change notices (FCNs)/field equipment change orders (FECOs).

6.1.3.11.1 Deviation Reports

In the review of 1000 DRs in Module 4, only nine were identified as being for Westinghouse equipment. Four of those nine were reviewed as part of Module 4 and were revealed to have been processed with proper Westinghouse interface. Because of the small number of DRs found in Module 4 that were related to Westinghouse equipment, only three more were reviewed for this module. The three DRs reviewed were on the No. 1 steam generator supports, the four safety injection accumulator tanks, and the No. 1 regenerative heat exchanger. All three had been reviewed by Westinghouse, and that review was documented on the DR. The interface activities for DRs were found to be controlled properly.

6.1.3.11.2 Field Change Requests

Field change requests reviewed as a part of the Module 4 verification indicated that FCRs were being processed by Bechtel in accordance with approved procedures. Based on this, FCRs were not explicitly reviewed in this module. FCRs were, however, a part of the review of the pipe stress analysis interface area as discussed in section 6.1.3.1.

6.1.3.11.3 Field Change Notices/Field Equipment Change Orders

Westinghouse issued FCNs were reviewed to determine whether they were being issued to construction and being incorporated into Bechtel FECOs for construction implementation. The FCNs reviewed were selected from four 10 CFR 50.55(e) reported issues in order to determine whether coordination of related commitments had taken place. The four issues cover Westinghouse 3 inch gate valve closure, Westinghouse 4 inch gate valve closure, Limitorque pinion key shear, and Limitorque valve operator qualification.

For the four issues, Westinghouse identified four corresponding FCNs issued for Unit 1. The four FCNs were processed properly, having been received and issued through BPC Drawing and Document Control. Four FECOs for the respective four FCNs were reviewed and proper issue for construction was verified.

Although they had been issued for construction, it was not apparent from the FCNs or FECOs that the respective modifications were a result of a material nonconformance/ deficiency. The reviewer also could not identify a specific tracking method to ensure the implementation of commitments related to 10 CFR 50.55(e) issues. This resulted in Finding 16-11.

6.1.4 DESIGN PROGRAM VERIFICATION FINDINGS

During the performance of the verification activities described in sections 6.1.2 and 6.1.3, questions were raised which required clarification and resolution, or there were findings of deviations from commitments or procedures which required project evaluation, disposition, and corrective action. Each question or issue identified during verification was documented using the Readiness Review finding procedure. A Finding Report form was completed and processed. During the verification process for this module, four findings were identified. Table 6.1-2 provides a summary of those findings.

A detailed description of these findings and the basis for conclusions regarding them are as follows:

o Finding 16-11 (Level II)

Finding: In reviewing commitments related to 10 CFR 50.55(e) reports to the NRC for file M-30, Sheared Pinon Keys in Limitorque Motor Operators, and file M-47, Westinghouse Gate Valve Position Indication, the following conditions were identified:

1. Documented evidence could not be located to verify that either 10 CFR 50.55(e) commitment had been completed.

2. It could not be determined whether these reportable deficiencies had been documented on Deviation Reports, or other nonconformance documentation.

3. It does not appear that there is a program in place to track completion of commitments to the NRC regarding 10 CFR 50.55(e) reports.

Project Response: The following items address the respective items in the finding.

1. A review was conducted of two 10 CFR 50.55(e) reports identified in the finding with the following results:

   M30 - Sheared Pinion Keys in Limitorque Motor Operators

   It was determined that field equipment change orders (FECOs) were issued to replace the pinion keys in 12 Westinghouse-supplied valves identified in the report. However, there were no change documents issued for the 50 BOP valves identified in the report.

   Omission of the BOP valves was an inadvertent oversight. The 10 CFR 50.55(e) report was issued because of a material deficiency identified in Limitorque models SB-0-25 and SMB-4 operators. It was determined that these two models were not used on Vogtle. However, while evaluating the pinion key material concern for reportability, SCS licensing noted that Limitorque motor operator models SB-0, SB-00, SMB-0, and SMB-00 all used the same pinion key material as the SB-0-25 operators which had failed. Tests had shown that this material was adequate for use in these operators, but audits conducted by Westinghouse and Bechtel found weaknesses in Limitorque's material control programs such that a weaker resulfurized carbon steel material could have been inadvertently installed in any of these operators, as had happened in the cases

of failure involving the SB-0-25 operator models. It was determined that it would be more effective to consider the concern reportable pursuant to 10 CFR 50.55(e) and replace the pinion keys in all BOP SB-0, SB-00, SMB-0, and SMB-00 Limitorque operators than to conduct material analyses on all the pinion keys. However, the decision to replace the pinion keys in the other Limitorque operator was not relayed from licensing to engineering, and engineering did not recognize the commitment to replace the pinion keys when they received the 10 CFR 50.55(e) report.

M47 - Westinghouse Gate Valve Position Indication

Wiring modifications to provide positive indication of valve closure were committed to the NRC 10 CFR 50.55(e) report X7BG03-M47, GN-280, dated November 9, 1983. Required corrective actions to meet this commitment were implemented and tracked through CCP 810159E.

In addition to the two items above, reviews were also conducted of several other evaluations involving commitments to the NRC;

M15 and M17 - 3-in. and 4-in. Gate Valve Closure Problem

M44 - Brown Boveri Reactor Coolant Pump Switchgear

M72 - GE AKR-30 and AKR-50 Circuit Breakers

I&E Bulletin 83-06 - Nonconforming Materials Supplied by Tube-Line Corporation

In all cases the corrective actions were being tracked by appropriate change documentation. Therefore, the discrepancy regarding the sheared pinion keys is considered an isolated case.

2. The program for 10 CFR 21 and 10 CFR 50.55(e) reports does not require that associated material deficiencies be documented on Deviation Reports, Operations Deficiency Reports, or other nonconformance documentation. These documents are used by construction and operations personnel respectively to identify nonconformances discovered in the field or in documentation. Reportable deficiencies identified at the engineering/design level would not normally be documented on DRs/ODRs. Bechtel's Deficiency Evaluation Report (DER) is used to identify and track these deficiencies. Reportable deficiencies resulting from 10 CFR 21

reports from vendors and subvendors are also identified on DERs or other engineering or licensing documents while they are being evaluated. The resulting corrective actions are documented on FECOs or Change Control Packages (CCPs) until completed. FECOs and CCPs are tracked to ensure they are completed and signed off when required.

Wording in Revision 12 of construction procedure GD-T-01 inadvertently indicated a broader scope for DR usage than was intended. A revision is currently being processed to more specifically define the use of DRs within the Vogtle Project's nonconformance control program. This revision will be issued by November 15, 1985.

3. The project had previously recognized the need to track corrective action to items reported to the NRC and, as a result, had established the Project Compliance Coordinator position. The Project Compliance Coordinator is responsible for immediate followup and assignment of individuals for accomplishing corrective actions. Since the establishment of the Project Compliance Coordinator position, the primary emphasis has been to track the most recent items reported to the NRC. Readiness Review Finding 16-11 has pointed out the need for additional tracking, especially for the older reportable items. By November 26, 1985, the following actions will be completed:

   a. Review all Vogtle Project 10 CFR 50.55(e) reports for corrective action commitments.

   b. Obtain objective evidence of completed corrective actions.

   c. Update existing tracking logs as required.

   In addition to the above, GPC QA has developed a computer tracking system for all commitments made to the NRC relative to 10 CFR 50.55(e)/10 CFR 21 reports and responses to NRC inspection reports and I&E Bulletins. This system will be used by QA in the long-term followup of corrective action commitments and will also be available to the Project Compliance Coordinator and others as a cross-checking device.

Readiness Review Conclusion: Implementation of corrective action to review all past reports to the NRC, coupled with the commitment tracking and followup, should ensure that no additional commitments are overlooked. The FECO and CCP do provide a means of

tracking resulting design changes through construction completion.

- Finding 16-12 (Level III)

  Finding: Inadequate reference in the dynamic stress calculations to allowable valve acceleration levels prevents a valid comparison of calculated versus allowable accelerations for Westinghouse-provided valves. Two sample valves in two calculations were reviewed to confirm that appropriate Westinghouse allowables were used. Although Design Criteria Document 1017 is referenced by a preprinted form contained in the calculation packages, DC-1017, revision 3, dated December 6, 1984, does not explicitly contain the current allowables for one of the two sample valves. Appropriate specifications or qualification reports are not referenced. Both calculations conclude that the effective accelerations calculated are acceptable without reference to an appropriate acceptance criteria source.

  Project Response:

  1. 1K3-1208-485-01: The allowable valve accelerations for HV-190A given by specification X6AA06-512 are not currently shown in DC-1017 (revision 3). DC-1017 was revised to incorporate specification X6AA06-512.

  2. 1K3-1204-028-03: Until June 1982, Bechtel stress calculations used a format that did not give a numerical comparison (of valve accelerations). In June 1982, a stress group instruction memo changed the format of the valve acceleration qualification sheet. This format provides the numerical comparison and source reference. The calculation for 1K3-1204-028-03 was originally done in 1980 and revised in 1981. This calculation was subsequently transferred to the jobsite in 1983 and the engineering group supervisor (EGS) signature added in 1984. Since a technical revision was not done after 1981, the new format for valve acceleration qualification was not included. A technical revision will be done by V-SAMU for the as-built reconciliation and will include an actual/allowable comparison.

  Extent: Bechtel Home Office Engineering (BHOE) conducted a review and ensured all other valves requiring seismic qualification are listed in DC-1017.

Impact on Hardware:

There was no adverse effect on hardware because calculated g values are below allowable values.

Root Cause of Finding:

1. DC-1017 did not incorporate allowable valve accelerations for all safety-related NSSS and BHOE valves. This was an oversite by BHOE and is considered an isolated case, based on the above review.

2. Stress calculations performed prior to June 1982 used an old format which did not give numerical comparisons or source reference.

Action Taken to Prevent Recurrence:

1. Specification No. X6AA06-512 was incorporated in revision 4 of DC-1017 signed off August 9, 1985. A review of the FSAR by BHOE concluded that no other allowable valve accelerations were missing from DC-1017.

2. Stress group instruction memo No. 11 was issued in June 1982, requiring updated format for all new calculations and calculations to be revised after June 1982. During routine as-built reconciliation, acceleration comparisons (actual/allowable) will be included in calculations that do not already include this comparison.

Readiness Review Conclusion: The new format for Bechtel stress calculations will ensure comparison of valve seismic accelerations for seismic qualification when the as-built reconciliation is completed. Based on the review conducted by BHOE, accelerations for all valves requiring seismic qualification are included in DC-1017. The response is acceptable.

o Finding 16-13 (Level I)

The installation bolting details, bolt size, and torque values for Westinghouse-supplied seismically and environmentally qualified electronic dp transmitters and pressure transmitters are not the same on the Bechtel drawings as those on the Westinghouse drawings. For the selected sample of three specific transmitters reviewed, two Bechtel seismic mounting detail drawings apply. Installation bolting details on neither Bechtel drawing were in agreement with those of the corresponding Westinghouse drawing.

Project Response: Instruments 1FT-922 and PT-501 are shown on installation isometrics 1X5DY00922-A and 1X5DY00501-A respectively. The Instrument Installation Drawing referenced in these isometrics is CX5DPM030. We concur that the problems listed in the finding are applicable to installation drawing CX5DPM030.

Extent: A review was conducted of the CX5DPMXXX drawings which are provided to mount Westinghouse and other vendor's safety-related instruments (project class 61J or 11J). This review was performed comparing the mounting requirements given in the vendor documents and the requirements as shown in Instrument Installation Drawing. Of the 21 drawings which are used to mount 61J and 11J instruments, 7 were found to include all vendor mounting requirements. The remaining 14 drawings showed one of the inconsistencies as noted in the three categories below:

A. Vendor recommended torque value was not shown on the drawing.

B. Incorrect bolt size called out on the drawing.

C. Combination of both A and B.

Impact on Hardware: According to information provided by Pullman Power Products, as of July 1, 1985 there are 66 class 61J and 11J instruments installed and tested of which 64 are affected by the results of this finding. Using the categories of inconsistencies given above, the breakdown consists of A=47, B=8, and C=9.

Root Cause of Finding: In the initial issue of the Instrument Installation Drawings, certain vendor requirements for instrument installation were inadvertently omitted from review and therefore were not incorporated. This omission has been determined to be due to an oversight by the designer and checker.

This finding is unique to Control Systems' mounting drawings since these drawings are designed as stand-alone documents, not requiring the vendor print for installation. Other disciplines rely on the vendor print, and do not duplicate the vendor's information.

Action Taken to Prevent Recurrence: Instrument Installation Drawings will reference the vendor documents which contain vendor requirements for equipment mounting. The checker will check these references against the completed Instrument Installation Drawing to assure that all requirements pertinent to installation are incorporated into the drawing. These

actions will be contained in a Desk Instruction to be issued by November 22, 1985.

In addition, training will be conducted with designers and checkers to ensure that all installation requirements pertinent to vendor's equipment qualification are recognized and the source documents are identified.

Future Commitments: The 14 Instrument Installation Drawings identified have been revised to incorporate the vendor's qualification requirements. In addition, reference to applicable vendor prints and instruction manuals for 61J and 11J instruments has been added to the 21 Instrument Installation Drawings used for installing these instruments. The affected instruments will be reinstalled and tested in accordance with the requirements of the revised installation drawings.

Readiness Review Conclusion: The reinstallation of affected instrumentation and revision of affected drawings will resolve the problem identified. The design verification team concurs that the problem was isolated in the Control Systems discipline. The response is acceptable.

- Finding 16-15 (Level II)

Finding: VEGP Project Reference Manual, Part C, Section 37, Equipment Qualification, does not adequately outline the verification process for seismic qualification of NSSS equipment. The text does not address the activity entitled, Compare Requirements with Results, as shown in the block diagram, Attachment H. Seismic formats are not included, and a verification procedure is not defined. The role of Westinghouse, BPC, or others is not discussed. Based on the above lack of information, it could not be established that a complete program exists for verification of NSSS equipment seismic qualification.

Project Response: Westinghouse is responsible for generic qualification of NSSS equipment and provides to Bechtel the installation details consistent with their generic qualification program. This information is used by Bechtel in the design of anchor bolts and supports to ensure that the mounting design with which the equipment is qualified is consistent with mounting details on installation drawings. Deviations from Westinghouse requirements during design and installation are reviewed by BPC; Westinghouse concurrence is obtained as necessary. Bechtel and Westinghouse jointly prepare the NRC form Seismic and Dynamic Qualification Summary and Status of Safety Related Equipment for all NSSS

safety-related electrical and mechanical equipment (including pumps and valves). This list identifies necessary references which contain information regarding qualified and applicable seismic levels to enable BPC to make comparisons between qualified and actual location seismic levels. This form is submitted to NRC for review prior to their seismic audit. Code A in the qualification status column indicates that the equipment has been properly qualified for VEGP requirements.

The Bechtel Equipment Qualification (EQ) Group (with support from the Westinghouse Seismic Group) is responsible for ensuring that NSSS equipment is properly qualified and meets VEGP requirements. Completion of the above effort is documented in the VEGP EQ Data Packages (EQDPs). These EQDPs are reviewed, checked, and signed off by the VEGP task force which consists of the Bechtel EQ Group, SCS licensing, GPC nuclear operations, and the Westinghouse seismic consultant. These EQDPs are controlled project documents and will be turned over to Georgia Power Company for use during plant operation.

Root Cause of Finding: Personnel involved in the above process are familiar with the requirement and did not feel that a detailed description of the above description was necessary.

Future Commitments: PRM Section C37 will be revised to include the above details and will be issued by December 2, 1985.

Readiness Review Conclusion: Inclusion of the equipment seismic qualification program details in the PRM will satisfactorily resolve the finding. The response is acceptable.

6.1.5 FINDINGS SIGNIFICANCE

The four design verification findings are summarized in Table 6.1-2. Each finding is classified into a level of importance to plant safety as defined in the introduction of section 6.0.

One of the findings was Level 1. The Level I finding related to lack of inclusion of vendor mounting details on Bechtel drawings used by construction to install qualified transmitters. The Bechtel project response to this finding, when completed, should resolve concerns addressed by this finding.

Only one category, seismic, was established where two of the findings bore a relationship. The definition in the Bechtel PRM of the details of the Bechtel equipment seismic qualification

program should resolve any cumulative concern for this category.

Collectively the findings do not affect the adequacy of the NSSS interface between Bechtel and Westinghouse or associated design activities.

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TABLE 6.1-1 (SHEET 1 OF 4)

REVIEW SAMPLE SUMMARY

Pipe Stress Analysis

- o Reactor coolant loop RTD manifold bypass line
- o RHR recirculation/safety injection, hot leg injection line
- o Pressurizer surge line

Primary Equipment Support Loads

- o Steam generator supports
- o Reactor coolant pump supports

Accident Analysis

- o Steam generator compartment pressure/temperature
- o Containment pressure/temperature
- o Auxiliary feedwater flow requirement
- o Emergency core cooling

Instrumentation and Control

- o Function requirements
  1) Hi-Hi steam generator level close feedwater isolation valves
  2) Blackout signal start turbine driven auxiliary feedwater (AFW) pump
  3) Actuation signal for AFW motor driven start also closes blowdown and sample lines for all steam generators
- o Solid state protection system input signals
  1) Main steam stop valve position
  2) Turbine emergency hydraulic fluid pressure

NSSS and BOP Process Requirements

- o Flow diagram changes

  1) Reactor coolant system
  2) Safety injection system
  3) Containment spray system
  4) Chemical and volume control system

- o Process requirements

  1) Redundant nuclear service cooling water (NSCW) heat exchangers
  2) Two separate NSCW flow paths
  3) Automatic start of component cooling water (CCW) backup pump on running pump stop
  4) CCW piping to reactor coolant pump thermal barrier designed for 2485 psi
  5) Maximum CCW heat exchanger discharge temperature limited to 120° F
  6) NSCW and CCW heat loads
  7) Auxiliary feedwater (AFW) turbine driven pump supplied steam from two steam generators
  8) AFW system designed for single active failure

Electrical

- o Train assignments

  1) Valves 8801 A & B
  2) Valves 8802 A & B
  3) Valves 8809 A & B
  4) Valves 8811 A & B
  5) Valves 8812 A & B
  6) Valves 8923 A & B
  7) Safety injection pumps 1 & 2
  8) Residual heat removal pumps 1 & 2

- o Power requirements

  1) Motor driven auxiliary feedwater (AFW) pumps power from separate power sources which meet separation requirements
  2) Turbine driven AFW independent of both motor driven AFW pump power sources

- o Solid state protection system input signals

  1) Reactor coolant pump under frequency
  2) Reactor trip breaker open (deletion)

<u>NSSS Equipment Qualification</u>

- o Seismic and Environmental Qualification

  1) Modulating valve located in the centrifugal pump portion of the CVCS;
     - Electronic control module, mounted separately

  2) Safety injection pump discharge isolation valve
     - Limitorque operator
     - Limit switch

  3) Solid state protection system cabinet

  4) Flow transmitter (mfg. by Tobar) located outside containment

  5) Flow transmitter (mfg. by Veritrak) located inside containment

  6) Pressure transmitter (Barton) located outside containment

  7) Pressure transmitter (Veritrak) located inside containment

- o Nozzle loading

  1) Residual heat removal heat exchanger
  2) Safety injection pump*
  3) Steam generator (main steam)

<u>Shielding Source Data</u>

- o Volume control tank valve gallery

- o Auxiliary building level 0 - RHR pumps

- o Source terms for TMI shielding

*Environmental qualification also.

TABLE 6.1-1 (SHEET 4 OF 4)

Installation Requirements

- o Nuclear instrumentation system cable
- o Instrumentation - transmitters
  1) Containment pressure (sealed)
  2) Accumulator level
  3) Steam generator level
  4) Refueling water storage tank level
  5) Pressurizer pressure
  6) Steam generator pressure

Deviation Reports

- o 03528 No. 1 Steam Generator supports
- o 07067 Safety injection accumulator tanks (4)
- o 06759 No. 1 Regenerative Heat Exchanger

Field Change Notices (FCNs)/Field Equipment Change Orders (FECOs)

10 CFR 50.55(e) Issue	FCN Number	FECO Number
M15 & M17 Gate valve closure	GAEM 10527	N-0022-OBF
M15 & M17 Gate valve closure	GAEM 10549	N-0045-OBF
M30 Limitorque pinion keys	GAEM 10562	N-0058-OBF
M69 Limitorque operator qualification	GAEM 10574	N-0071-OBF

TABLE 6.1-2

READINESS REVIEW FINDING SUMMARY

Finding Number	Finding	Level	Resolution/ Project Response	Conclusion/ Assessment
16-11	Lack of documentation that commitments related to 10 CFR 50.55(e) reports have been completed or are being tracked.	II	Tracking program being instituted. Past and present reports to NRC to be reviewed and corrective actions tracked	Response Acceptable
16-12	Lack of documentation for comparisons made of valve acceleration levels.	III	Documentation will be included per existing (1982) calculation format during "as-built" reconciliation.	Response Acceptable
16-13	Inaccurate qualified process transmitter seismic mounting bolt details.	I	Drawings are revised and affected transmitters will reinstalled. Training of designers will be done to incorporate vendor qualification details on Instrument Installation Drawings.	Response Acceptable
16-15	Lack of defined complete program to verify NSSS equipment seismic qualification.	II	Existing program to be included as part of the PRM.	Response Acceptable

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
1.0	NRC Commitments for NSSS	VEGP-FSAR	For checklist items 1.1 and 1.2: Select a minimum of ten (10) commitments identified on attachment A and verify that the commitment is adequate and complete in the implementing document.	
1.1	Procedures, instructions, specifications	ANSI N45.2.11 Section 2		
1.2	Design Criteria	ANSI N45.2.11 Section 3		

Figure 6.1-1 Design Readiness Review Checklist (Sheet 1 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
2.0	Interface control	ANSI N45.2.11 Section 5	For checklist items 2.1 thru 2.4 verify that procedures and documentation exist to affectively provide for interface control for item a, b, c, and d.	
2.1	External Bechtel/Westinghouse (B-W) (W-B) Georgia PWR/Westinghouse (GPC-W) (W-GPC) a) Identification of interface b) Responsibilites c) Lines of communication d) Documentation - control of flow of design information			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 2 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
2.2	Internal (Bechtel) a) b) c) d)			
2.3	Internal (Westinghouse) a) b) c) d)			
2.4	Internal (Georgia Power)			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 3 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.0	Interface verification	ANSI N45.2.11 Section 5	For checklist item 3.1 thru 3.12 Select a minimum of four (4) documents each and review for flow, identification and use of design information per procedure requirements	
3.1	Stress Analysis			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 4 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.2	Equipment Support Loads			
3.3	Proof of Design			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 5 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.4	System Process Requirement			
3.5	Accident Analysis			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 6 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.6	I & C Interface			
3.7	Electrical Interface			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 7 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.8	Seismic Qualification			
3.9	Environmental Qualification			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 8 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.10	Shield Source Data			
3.11	W Installation Requirements			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 9 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
3.12	Field Change Documents			

Figure 6.1-1 Design Readiness Review Checklist (Sheet 10 of 11)

ITEM	ELEMENT CHARACTERISTIC	REFERENCE	METHOD OF VERICATION	AUDIT RESULT
4.0	Significant problems, reportable events, applicable QA audits, NRC inspections and industry problems	R. E. Conway to NRC dated 10/3/85 Attachment Readiness Review Program	Review significant problems, reportable events, QA audits, NRC inspections, industry problems for impact on review of Module 16 and perform a follow-up review where necessary.	

Figure 6.1-1 Design Readiness Review Checklist (Sheet 11 of 11)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
A-1	Changes to RCL RTD Bypass Manifold Piping	B-W B-W	Letter Letter		RTD Manifold Stress Analysis		
A-2	Jet Impingment Loads on Pressurizer Surge-line	B-W	Calculation		Pressurizer Surge Line Stress Analysis		BW -
A-3/4	RHR Recirc. and SIS Hot Leg Injection	B-W	Letter (Loop 1)		Stress Calc Refs.		
	Stress Analysis Input	B-W	Letter (Loop 4)		Stress Calc Refs.		
A-5	Large Bore Routing Change Line ____ Line ____ Line ____	B-W					BW
A-6	Transmittal of Seismic Spectra Changes	B-W B-W	Seismic Spectra Revision ____	____ ____	Seimic Spectra Book Stress Calc.	____ ____	BW
A-7	Support Load Changes VI-1204- Support 025-H001 Support 025-H002 Support 025-H012 Support 047-H003	 W-B W-B W-B W-B	Support Stress Calc	____ ____ ____ ____			
A-8	Support Location Change VI-1204-051-H028	W-B	ISO	____			
A-9	Pipe Break Locations RHR/SI Loop 3 ____ ____	W-B	Calc,-Jet Impingment	____ ____ ____	Letter		

Figure 6.1-2 Design Verification Work Sheet (Sheet 1 of 16)

EQUIPMENT SUPPORT LOADS

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
B-1	Stream Generator (S/G) Support Loads	W-B	Structural Calculation	______	Support Analysis	______	
	Seismic Anchor Motion	W-B		______		______	
B-2	Change to S/G Support Loads	W-B	Structural Calculation	______ Rev ______	Support Analysis	______	
B-3	Reactor Coolant Pump Support Loads	W-B	Structural Calculation	______	Support Analysis	______	
	Seismic Anchor Motion			______		______	
B-4	RCP Support Loads Changes	W-B	Structural Calculation	______ Rev ______	Support Analysis	______	

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Figure 6.1-2 Design Verification Work Sheet (Sheet 2 of 16)

PROOF OF DESIGN

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
C-1	Compare list of drawings used in the RHRS Proof of Design calc. with latest revision.	B-W			Proof of Design Calculation	______	
C-2	Compare list of drawings used in the SIS Proof of Design calc. with the latest revision.	B-W			Proof of Design Calculation	______	

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Figure 6.1-2 Design Verification Work Sheet (Sheet 3 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
D-1	Mass and Energy Releases for Containment Sub-compartment Analysis	W-B W-B	Calculation Calculation	__________ __________	Letter Letter		
D-2	Containment P/T and ECCS Backpressure Calculation Input data	B-W			Calculation Calculation	__________ __________	
D-3	New heat sink data in containment disposition?	B-W	Calculation		Calculation	__________	BW-
D-4	AFW flow requirements	W-B B-W					

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Figure 6.1-2 Design Verification Work Sheet (Sheet 4 of 16)

Item No.	Interface Item	B-W W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
E-1	High-high steam generator water level in two of four (2/4) level channels in any of the four steam generators (P-14) should trip the main turbine and all main feedwater pumps, close the main and bypass feedwater control valves for all steam generators and close all feedwater isolation valves in series with the main and bypass feedwater control valves (see Section 8.17.1.3 for further calarification).	W-B	Logic Diagram		Functional Requirements		
E-2	A black-out signal should start the turbine driven auxiliary feed pump.	W-B	Logic Diagram		Functional Requirements		
E-3	Any automated motor driven auxiliary feed pump actuation signal should close the blow-down isolation and sample line valves for all steam generators.	W-B	Logic Diagram		Functional Requirements		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 5 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
E-4	Input to SSPS						
	Main steam stop valve position	W-B	Drawing ________ or Logic Diagram	________	Logic Diagram	________ ________	
	Turbine emergency trip system hydraulic fluid pressure signals	W-B	Drawing ________ or Logic Diagram	________	Logic Diagram	________ ________	

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Figure 6.1-2 Design Verification Work Sheet (Sheet 6 of 16)

Item No.	Interface Item	B-W W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
F-1	Since the (NSCW) heat exchangers are part of engineered safeguards, sufficient redundancy is required to meet single failure criterion.	W-B	Design Criteria	DC-	Functional Requirements		
F-2	Redundency requirements placed on the (NSCW) system design by the single failure criterion, require that two separate flow paths be provided for all engineered safeguards systems components.	W-B	Design Criteria	DC-	Functional Requirements		
F-3	If during normal operation of the plant the (NSCW) CCS pump becomes inoperative, instrumentation and controls automatically start the backup pump.	W-B	Design Criteria	DC	Functional Requirements		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 7 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
F-4	(NSCW) component cooling system piping must be designed to withstand pressures [2485 psig] resulting after isolation with (RCP) thermal barrier in leakage.	W-B	Design Criteria	DC	Functional Requirements		
F-5	The maximum permissible (NSCW) CCS heat exchanger discharge temperature during cooldown is specified as 120°F.	W-B	Design Criteria or Calc. ______________	DC	Functional Requirements		
F-6	NSCW heat loads and flows	W-B	Design Criteria	DC	Functional Requirements Tables		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 8 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
F-7	For steam turbine driver (AFW pump), steam must always be available from at least two steam generators during plant operation, to preclude a loss of all steam supplies due to any single incident.	W-B	Design Criteria	DC	Steam Systems Design Manual		
F-8	The (AFW) system must be designed to sustain a single active failure in the short term (less than 24 hours) without loss of flow capability below the minimum required.	W-B	Design Criteria	DC	Steam Systems Design Manual		
F-9	Minimum required AFW flow. Minimum AFW flow provided by one motor driven AFW pump.	W-B	See Accident Analysis Page				

Figure 6.1-2 Design Verification Work Sheet (Sheet 9 of 16)

WESTINGHOUSE PROCESS REQUIREMENTS
FLOW DIAGRAM CHANGES

Item No.	Interface Item	B-W W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
F-10	Flow Diagram Changes	W-B					
	WDCN-		P&ID		W Flow Diagram		
	RCS-2-9		____________				
	RCS-6-9		____________				
	RCS-9-9		____________				
	SI-5-9		____________				
	CSS-2-9		____________				
	CVCS-7-8		____________				
	CVCS-1-9		____________				

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Figure 6.1-2 Design Verification Work Sheet (Sheet 10 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
G-1	Equipment Train Assignments	W-B					
	Valves 8801A		Train	A	Train		
	8801B		Train	B	Train		
G-2	Valves 8802A		Train	A	Train		
	8802B		Train	B	Train		
G-3	Valves 8809A		Train	A	Train		
	Valves 8809B		Train	B	Train		
G-4	Valves 8811A		Train	A	Train		
	8811B		Train	B	Train		
G-5	Valves 8812A		Train	A	Train		
	8812B		Train	B	Train		
G-6	Valves 8923A		Train	A	Train		
	8923B		Train	B	Train		
G-7	SI Pump 1 Tag ______		Train	A	Train		
	SI Pump 2 Tag ______		Train	B	Train		
G-8	RHR Pump 1 Tag ______		Train	A	Train		
	RHR Pump 2 Tag ______		Train	B	Train		
G-9	Each auxiliary feedwater motor driven pump should be supplied from a separate power source and the power supply should be separated throughout to meet requirements of IEEE-279	W-B	Design Criteria	DC	Steam Systems Design Manual		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 11 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
G-10	To provide a completely separate system (turbine driven AFW pump) the independence of the turbine driven pump and its associated system from diesel AC power is essential.	W-B			Steam System Design Manual		
	a. Motor Operated Valves to provide water to S/G		a. Design Criteria DC	______			
	b. Motor Operated Valves in steam supply		b. Design Criteria DC	______			
	c. Lube oil pumps		c. Design Criteria DC	______			
	d. Lube oil cooling supplied by an external system. (Use of the turbine to cool lube oil driven pump meets this).		d. Design Criteria DC or Procurement Spec.	______ / ______			
G-11	Reactor Coolant Pump Supply underfrequency signal to SSPS	W-B	Drawing ______ or Logic Diagram	______	Logic Diagram	______	
G-12	Reactor trip breaker open signal to SSPS - deletion	W-B	Drawing ______ or Logic Diagram	______	Logic Diagram	______	

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Figure 6.1-2 Design Verification Work Sheet (Sheet 12 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	Number	Westinghouse Document Title	Number	Comments
H-1	Valve HCV-190-A	W-B	Seismic Qualification Review Team Form (SQRT)	________			
	Electronic Control Module HY-190-A	W-B	SQRT	________			
H-2	Valve 8802A Motor Operator	W-B	SQRT	________			
	Limit Switch for 8802A	W-B	SQRT	________			
	Valve 8802A	W-B	SQRT	________			
H-3	Valve ________ Exceed "g" or end loads	B-W	BW-				
	________	B-W	BW-				
H-4	SSPS Cabinet	W-B	SQRT ________				
H-5	FT918 (Tobar) (OC)	W-B	SQRT ________				
	FT 444 (Veritrak) (IC)	W-B	SQRT ________				
	PT 418 (Barton) (OC)	W-B	SQRT ________				
	PT455 (Veritrak) (IC)	W-B	SQRT ________				
H-6	RHR heat exchanger Nozzle loads	B-W	BW-		Calculation		
H-7	SI Pump Nozzle loads	B-W	BW-		Calculation		
H-8	Steam Generator Main Steam Nozzle Loads	B-W	BW-		Calculation		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 13 of 16)

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
I-1	Valve HCV190	W-B	Sub-Component	______			
	Electronic Control Module HY-190	W-B	Evaluations Worksheet (SCEW) SCEW	______			
I-2	Valve 8802 A Motor Operator	W-B	SCEW	______			
	Limit Switch for 8802A	W-B	SCEW	______			
	Valve 8802 A	W-B	SCEW	______			
I-3	SSPS	W-B	SCEW	______			
I-4	FT 918	W-B	SCEW	______			
	FT 444	W-B	SCEW	______			
	PP 418	W-B	SCEW	______			
	PT 455	W-B	SCEW	______			
I-5	RHR Heat Exchanger Tag ______	W-B	SCEW	______			
I-6	SI Pump Tag ______	W-B	SCEW	______			

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Figure 6.1-2 Design Verification Work Sheet (Sheet 14 of 16)

SHIELD SOURCE DATA

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
J-1	Volume Control Tank Sources						
	Radiation Analysis Design Manual Rev. 2 to Rev. 3 (Attached)	W-B	Shield Sizing Calculation for Room RA48 or 80	____________	Radiation Analysis Design Manual		
J-2	RHR Pump Room wall at passageway	W-B	Shielding Calc.		Radiation Analyses Design Manual		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 15 of 16)

INSTALLATION REQUIREMENTS

Item No.	Interface Item	B-W / W-B	BPC Document Title	BPC Document Number	Westinghouse Document Title	Westinghouse Document Number	Comments
K-1	NIS Cable and Connectors	W-B	Installation Specification		C&ES Standard		
K-2	Instrumentation Installation	W-B	Installation Specification		Drawing		

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Figure 6.1-2 Design Verification Work Sheet (Sheet 16 of 16)

6.2 CONSTRUCTION PROGRAM VERIFICATION

Program assessment of the construction section of this module was performed to provide an evaluation of the nuclear steam supply system (NSSS) installation and related construction activities performed by Nuclear Installation Services Company (NISCO).

The Readiness Review Construction Team for Module 16 consisted of five team members who have a combined total nuclear construction experience of 48 manyears. Program assessment represents approximately 675 total manhours expended by the construction team.

6.2.1 SUMMARY EVALUATION

Program assessment activities resulted in five findings. The findings were reviewed by the construction team to assess their impact on the project and to classify each finding with respect to the following categories in addition to levels of importance:

- o Category A, Hardware;
- o Category B, Paperwork;
- o Category C, Programmatic.

The findings, their level of importance, and their category are given in Table 6.2-1.

The construction team did not discover any hardware-related findings during verification activities. The hardware surveyed demonstrated the acceptable installation of the NSSS. Four findings were classified as Category B, paperwork concerns. These findings involved minor deficiencies in documents, procedures, or markings, and further review demonstrated that no hardware was affected. NISCO currently maintains approximately 1400 documents and procedures. The construction team reviewed a portion of approximately 800 of these during assessment activities, and only the 4 minor deficiencies were identified. The construction team concluded that the documentation adequately reflects the acceptability of the hardware covered by Module 16.

The remaining finding was classified as a Category C, programmatic concern. The finding resulted from a deviation between the NISCO procedure and the Bechtel specification for the sequencing for the reactor internals assembly. The finding concerned deviations in the internals assembly sequence and the performance of leveling the upper internals assembly flange during intermediate preinstallation assembly activities. Westinghouse has verified that the sequence of the assembly activities in question is not critical. The upper internals assembly flange levelness has been checked and verified by NISCO

as required by the specification. These intermediate activities had no hardware impact and are not significant to final internals assembly or installation.

The construction assessment activities indicate that an acceptable program has been applied for fabrication and installation activities associated with the NSSS even though findings were identified. The construction team concluded that the established program and NISCO construction performance resulted in an acceptable system.

6.2.2 PROGRAM ASSESSMENT PLAN

The assessment plan was developed to provide an appraisal of the NSSS installation performed by NISCO. Development of the plan consisted of the selection of items and activities for evaluation, determination of the current status of these items and activities, and formulating the method (e.g., surveys, paperwork reviews, etc.) for assessing each item and activity.

6.2.2.1 Assessment Item Selection

The assessment areas selected are divided into two parts, hardware/components and program/procedures. These areas provide a representative outline of the NSSS hardware and certain programmatic activities that support field installation. The basis for the selection was comprised of several factors. First, only items or activities within the NISCO scope of responsibility were considered. Second, historical information such as audit reports, Nuclear Regulatory Commission (NRC) inspection reports, Institute of Nuclear Power Operations (INPO) evaluations, and NRC Construction Appraisal Team reports from VEGP and other similar nuclear facilities were reviewed to identify generic or significant problem areas that would warrant assessment. Finally, items or activities that have been, or will be, assessed in other Readiness Review modules were identified to preclude the duplication of assessment activities. Examples of these areas are piping installation, covered in Module 4; pipe supports and pipe whip restraints, covered in Module 11; measuring and test equipment, covered in Appendix G; and instrumentation and controls, covered in Module 20.

Using the basis described above, the following items and activities were selected for assessment:

- Hardware/components
  - Reactor coolant pump No. 4 motor setting,
  - Reactor coolant pump No. 4 support columns and tie rods,
  - Steam generator No. 1,

- Pressurizer,
- Reactor pressure vessel (RPV),
- RPV head assembly,
- RPV internals,
- Bottom-mounted instrumentation;

o Program/Procedures

- Material control,
- Nondestructive examination,
- Document/records control,
- Personnel certifications,
- Nonconformance handling.

6.2.2.2 <u>Hardware/Components</u>

The selected hardware/components were assessed by a combination of witnessing in-process activities, walkdown and visual examination, and review of documentation. The assessment method details and the results of the hardware/component assessment are as follows:

6.2.2.2.1 Reactor Coolant Pump No. 4 Motor Setting

The setting of the motor on reactor coolant pump No. 4 was assessed by the construction team to evaluate the following activities associated with the setting of the motor:

o Rigging;

o Lifting;

o Maintenance activities;

o Documentation of activities.

The assessment ascertained that the activities were performed in compliance with specification and procedure requirements. The assessment also ascertained that required inspections, including maintenance inspections, were performed and appropriately documented. The checklist shown in Figure 6.2-1 details the specific attributes checked during assessment activities.

6.2.2.2.2 Reactor Coolant Pump No. 4 Support Columns and Tie Rods

The vertical supports and tie rod brackets of the reactor coolant pump No. 4 were assessed to ascertain whether they were installed in compliance with specification ASME Boiler and Pressure Vessel (B&PV) Code requirements.

The assessment items consisted of 3 vertical columns, column bases, and connections and the 3 tie rod brackets and locking bars, and 34 of the 54 connecting fillet welds.

The assessment activities were performed using a checklist developed by the construction team (Figure 6.2-2). The checklist details the specific attributes, items, and documents checked during assessment.

The assessment activities included a hardware survey of the supports to evaluate the following attributes:

- Material identity;
- Location and orientation;
- Clearances;
- Locking devices and spacers;
- Visual weld examination.

The assessment also included a review of installation documents to assure adherence to NISCO procedures for installation document control processes. Examples of the attributes assessed are as follows:

- Availability and legibility;
- Appropriate entries and signatures;
- Implementation of selected specification requirements.

The construction team concluded that the installation and inspections of the vertical columns and tie rods were in compliance with specification and ASME B&PV Code requirements.

6.2.2.2.3 Steam Generator No. 1

The loop 1 steam generator and the four steam generator vertical supports were assessed to ascertain compliance with procedure, specification, and ASME B&PV Code requirements. The assessment was accomplished through paperwork reviews and hardware surveys to assure that installation activities, including required inspections are properly documented and adequate.

The hardware surveys assessed the following attributes:

- Steam generator orientation;
- Material/component identification;

- Vertical support orientation and clearance;
- Vertical support pin connections.

The paperwork reviews consisted primarily of a review of NISCO Process Control Sheets (PSCs). The reviews were performed to ascertain the following attributes:

- Availability and legibility;
- Appropriate entries and signatures;
- Implementation of selected specification requirements.

The assessment activities were performed using checklists developed by the construction team (Figures 6.2-2 and 6.2-3). The checklists detail the specific attributes, items, and documents checked during assessment.

The results of the assessment showed that the documentation was adequate to ascertain the acceptability of the installation of the steam generator. The hardware survey found the steam generator and vertical supports to be properly installed and identified.

6.2.2.2.4 Pressurizer

The assessment of the pressurizer was to ascertain whether the installation and setting was in compliance with procedure, specification, and ASME B&PV Code requirements. Additionally, the assessment evaluated the implementation of the quality control (QC) and quality assurance (QA) programs associated with the pressurizer.

The construction team assessment focused on four general areas:

- Field assessment;
- Installation documentation;
- Procurement documentation;
- General documentation.

The assessment was governed by the use of a checklist prepared by the construction team (Figure 6.2-4).

The paperwork reviews revealed that the installation and setting of the pressurizer complies with construction specification X4AZ06. Observations of the NISCO QA/QC program showed there was sufficient involvement to assure that the installation requirements were satisfied. The field examination revealed that the basic orientation of the pressurizer is correct in

relationship to the reactor coolant loops and that it conforms to ASME B&PV Code requirements. The construction team identified one deviation concerning the stamping of the ASME nameplate. The deviation was documented on Readiness Review Finding 16-8 and is described as follows:

- Readiness Review Finding 16-8 (Level II)

  Description: Pressurizer ASME nameplate does not indicate the Code class.

  Project Response: Investigation of the finding shows that the NPT Code plate in question will be removed prior to N stamping. Westinghouse Quality Release 24405, revision 1, shows that the stress report will be completed prior to the primary hydrotest, and the Westinghouse Authorized Nuclear Inspector (ANI) will authorize application of the permanent nameplate with the correct stamp and Code class after completion of the primary hydrotest and stress report.

  Readiness Review Conclusion: Readiness Review concurs with the project response. The pressurizer Code class was verified as acceptable by review of the N-2 code data report.

6.2.2.2.5 Reactor Pressure Vessel

The RPV was assessed to ascertain whether the setting of the RPV and the installation of the RPV supports were in compliance with specification and procedure requirements. Since installation has already been completed, the assessment was done by reviewing the documentation associated with these activities. The checklist shown in Figure 6.2-5, developed for this review, outlines the specific attributes assessed by the construction team.

The construction team found all documentation to be administratively and technically accurate and reflected the acceptable installation of the RPV and supports.

6.2.2.2.6 RPV Head Assembly

The Unit 1 RPV head assembly was assessed through reviews of paperwork because the head assembly was not accessible for visual inspection. The paperwork reviews involved a review of the PCSs for the assembly of the RPV head, and were documented on Figure 6.2-5. The PCSs were reviewed for the following attributes:

- Legibility and completeness of entries;

- o Supporting documents, if applicable, attached or referenced;
- o Specification requirements properly reflected.

In addition, the documentation associated with seven head penetrations was reviewed for additional attributes. The seven penetrations selected are listed on Table 6.2-2. The additional attributes assessed are:

- o Material traceability;
- o Welder qualification;
- o Inspector certification;
- o Hydrotesting activities;
- o Performance of nondestructive examination (NDE).

The construction team visually examined 16 CRDM-to-RPV head penetration seal welds on the Unit 2 RPV head assembly to supplement the Unit 1 RPV head assembly paperwork reviews. The examination was performed using acceptance criteria established by NISCO procedure ES-100-5, which are the same criteria used for welding activities on the Unit 1 head assembly. The 16 welds examined by the construction team are listed in Table 6.2-2.

The results of the assessment found that the PCSs were complete and legible and demonstrated that the head assembly complies with specification and ASME B&PV Code requirements. Additionally, the visual examination of the welding revealed the welds to be adequate and free from surface defects.

6.2.2.2.7 RPV Internals

The RPV internals were assessed to ascertain whether the internals were assembled in accordance with specification requirements. The assessment was performed by review of installation documentation because the internals assembly was nearing completion and no assembly or installation activities were in progress. The documents reviewed were selected from the documents required to ascertain the implementation of 35 out of the approximately 70 specification requirements for assembly. These documents included NISCO procedures, installation drawings, and PCSs.

A checklist that details the specific attributes checked was prepared and used for the review of the documentation (Figure 6.2-6).

As a result of the assessment, the construction team initiated Readiness Review Finding 16-6. This finding related to three instances where specification requirements were not adequately reflected on PCSs.

Readiness Review Finding 16-6, identified during assessment activities, is described below:

- Readiness Review Finding 16-6 (Level II)

  Description: Of 50 technical specification requirements reviewed by the construction team, 2 were found to not be completely implemented by NISCO procedures and/or PCSs.

  Project Response: The two specification requirements in question involve the internals assembly sequence and the upper internals assembly flange levelness requirements while in the stand. These assembly activities have no hardware impact and do not affect final internals assembly and installation. This finding is not significant because the required assembly activities were completed even though the sequence was changed. Additionally, the upper internals assembly flange levelness had not been completed at the time of Readiness Review assessment. This requirement has been checked and found to be within tolerance. It should be noted that this requirement is applicable when the internals are in the storage stand and does not affect the final installation. A Deviation Report was initiated to document these deviations and was dispositioned Use-As-Is.

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

6.2.2.2.8 Bottom-Mounted Instrumentation

The bottom-mounted instrumentation (BMI) was assessed to ascertain whether the installation of the guide tubes and guide tube supports is in compliance with design requirements. In addition, the assessment ascertained the implementation of a portion of the NISCO QA/QC program.

The installation of the guide tubes and guide tube supports is currently in process. The construction team assessed completed portions of 6 of 58 guide tubes and 3 of 6 guide tube supports for the following attributes:

- Freedom from damage;

- Installation per drawings;

- o Material acceptability and traceability;

- o Acceptable welding-visual examination.

To supplement the survey of the BMI hardware, the construction team reviewed the applicable installation documentation for the following attributes:

- o Availability;

- o Legibility;

- o Supplemental records attached or referenced;

- o Appropriate entries.

The hardware surveys and paperwork reviews were performed using checklists that detail the specific attributes checked by the construction team (Figures 6.2-7 and 6.2-8).

The construction team found no deficiencies during assessment activities. Visual examination revealed that the welds checked were in compliance with approved criteria. All material checked was the required type, traceable, and all the documentation was retrievable, legible, and appropriately completed.

6.2.2.3 Program/Procedures

The assessment of program/procedures was performed in conjunction with hardware and component surveys. The assessment consisted primarily of paperwork review activities but included visual examinations and interviews with construction personnel. The specific method of assessment used and the results for each area are as follows:

6.2.2.3.1 Material Control

Material control was assessed to ascertain whether the material and components used by NISCO, including welding filler materials, were properly received and inspected, and that the documentation for the material was reviewed and accepted. The assessment also checked that welding materials were being controlled and issued in accordance with requirements. NISCO has currently issued 162 Receiving Inspection Reports (RIRs) for material and components and 26 RIRs for weld filler materials. The construction team reviewed five of the material/components RIRs and five weld filler material RIRs for the following attributes:

- o Identification of the material (type, size, tag no., heat no.);

o Appropriate signatures for inspections;

o CMTRs, if required, in conformance with specifications;

o Evidence of acceptance or rejection.

The assessment activities were performed using a checklist that details the specific attributes checked by the construction team (Figure 6.2-9). The construction team found no deficiencies during the assessment. Documentation was readily retrievable, legible, and properly completed.

NISCO currently maintains two storage/issue areas for weld filler material and employs nine welders. The construction team surveyed one weld filler material storage area using the checklist illustrated in Figure 6.2-10.

The construction team found the weld filler material to be stored within the required housekeeping and environmental requirements. Access controls were observed and the holding oven was properly maintained and calibrated.

Three welders who had been issued welding filler materials were also surveyed by the construction team using the checklist shown on Figure 6.2-11. The assessment found that the material was issued in appropriate containers and was clearly identified, and a copy of the Welding Material Requisition was kept with the issued material.

6.2.2.3.2 Nondestructive Examination

Nondestructive examination was assessed to ascertain whether NDE activities were properly implemented in accordance with project procedures. The assessment focused on the three NDE methods used by NISCO; magnetic particle (MT), liquid penetrant (PT) and radiographic (RT). The assessment consisted of the review of completed inspection reports. Because of its frequent use, the assessment of the PT method was supplemented by witnessing the performance of PT examinations. Table 6.2-3 lists the specific items checked during assessment activities. The inspection reports were reviewed for attributes such as the following:

o Test part identification;

o Consumable materials;

o Governing code;

o Technique data;

o Examiner's qualification;

- Examination results;
- Legibility;
- Completeness.

All assessment activities were performed using checklists prepared by the construction team (Figures 6.2-12 through 6.2-15). The checklists detail the specific attributes checked.

Eleven MT inspection reports of the 18 completed were reviewed by the construction team. The assessment determined that the documentation was adequate to ascertain the acceptability of the inspections, but one procedural deficiency was identified on Readiness Review Finding 16-9.

Thirty-one PT examination reports of the 299 completed were reviewed during the assessment. The reports were determined to be adequate and complete. In addition to reviewing documents, the construction team witnessed the performance of two liquid penetrant examinations. The construction team found that both examinations were performed and documented in accordance with procedures and that the technique used was acceptable.

Radiographs were assessed by reviewing the radiographs and associated inspection reports for 35 ASME B&PV Code section III, subsection NF support welds. The review was performed by a GPC individual who was qualified and certified to the requirements of ASNT-TC-1A, Level III. The 35 welds reviewed included original and repair welds. As a result of the review, six comments were identified and addressed on Readiness Review Finding 16-10.

Readiness Review Finding 16-9 and 16-10, identified during assessment activities are described below:

- Readiness Review Finding 16-9

  Description: The MT reports reviewed during assessment do not reference the governing code for acceptance criteria.

  Project Response: All of the 18 MT inspections performed were in accordance with ASME B&PV Code section III. NISCO has corrected the MT inspection reports to reflect the governing code.

  The PCS controls the work activities, including NDE, and indicates the governing code. The QA/QC engineer visually inspects the item and performs the NDE in accordance with the PCS; therefore, the inspectors were cognizant of the governing code and the examinations were conducted and interpreted in compliance with the appropriate acceptance criteria.

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

- Readiness Review Finding 16-10

Description: NISCO radiographic reports and film do not fully comply with ASME B&PV Code sections III and V. Deficient conditions exist relating to:

1. The identification of specific revisions of NISCO procedures used for interpretation.

2. Incomplete sketches and inadequate identification of rejectable indications.

3. Lack of location markers or maps.

4. Differing dates on film and reports.

5. Not addressing linear indications.

Project Response: Items 1 through 4 of Finding 16-10 involved minor documentation discrepancies with the radiographic reports or the implementation of procedure requirements for completing radiographic reports. None of the discrepancies affected or questioned the quality of the weld. The radiographic reports were corrected as applicable. The radiographic examination report form and the radiographic shooting sketch form have been revised to include acceptance procedure revision numbers and locating dimensions of rejectable indications. NISCO has also conducted additional training with NDE personnel on code and procedure requirements.

Item 5 of finding 16-10 involved five films of a similar joint configuration that displayed linear indications not noted on the radiographic reports. The linear indications were not addressed because they have been interpreted to be slag pushed up under the clip angle and out of the weld area, which is common with this joint configuration.

ASME B&PV Code film was re-reviewed to ensure that linear indications have been addressed. This review has been completed, and the ASME B&PV Code film is in full compliance with Code requirements.

Readiness Review Conclusion: Readiness Review concurs with this response.

6.2.2.3.3 Document/Records Control

The assessment of document/records control was performed in conjunction with paperwork reviews of NISCO PSCs. The assessment ascertained the following:

- o Drawing numbers listed on the PCS were correct for the time of installation/inspection;
- o Drawing revisions were documented on the PCSs;
- o PCSs reflect appropriate information and entries;
- o PCSs were available and retrievable.

The construction team reviewed approximately 12 PCSs during assessment activities. All the requested PCSs were available and retrievable. The construction team did identify one deficiency:

- o Readiness Review Finding 16-7 (Level III)

  Description: One PCS out of 29 reviewed referenced drawing numbers but did not list their revision level as required by NISCO procedure ES-147.

  Project Response: The lack of drawing revisions on the PCS had no effect on the quality of the hardware. Procedure ES-146, Document Control, assures that only the latest revisions of client/ engineer and NISCO-originated documents are available for use. In addition, the PCS is prepared using current design and installation criteria and is approved by NISCO QA/QC and the client/engineer. These program controls eliminate the possibility of accepting incorrectly installed hardware because of a lack of documented procedure revisions.

  The revision numbers of the drawings identified in the finding have been entered on the PCS. NISCO has reviewed an additional 25 PCSs and noted that the correct revisions had been entered. The personnel responsible for entering the drawing revisions on the PCSs have been reinstructed in procedure requirements.

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

6.2.2.3.4 Personnel Certification

Personnel certifications of NISCO QC inspectors and NDE technicians were assessed to ascertain whether inspection activities were performed by qualified personnel. The

construction team reviewed individual certification packages for evidence that the personnel were certified to the proper level using the method applicable at the time of performance of the activity.

The construction team reviewed five certification packages of NISCO personnel. This sample is representative of nine certified QC inspectors and NDE technicians employed by NISCO since the beginning of inspection activities. The construction team found that for all cases the inspection personnel were appropriately certified.

6.2.2.3.5 Nonconformance Handling

An assessment of NISCO nonconformances or DRs was performed to ascertain whether resolutions of DRs were in compliance with NISCO procedure ES-142. The assessment involved 27 DRs that were reviewed by the construction team for the following attributes:

- o Appropriate disposition approval signatures;
- o Proper closure and completion.

The 27 DRs reviewed were representative of the 135 DRs that have been initiated by NISCO. The construction team found all DRs to be legible and appropriately dispositioned and completed.

6.2.3 COMMITMENT IMPLEMENTATION

Section 3.4 contains the commitment matrix for the commitments identified by the FSAR that are applicable to Module 16. After identification of the commitments, Readiness Review reviewed each commitment to identify the project document that currently implements that commitment. Additionally, the review was performed to identify the project document that initially implemented the commitment; i.e., the project document in effect when the work activity began.

The commitment implementation matrix identified 11 construction commitments. Each commitment was appropriately traced to implementing procedures from initial implementation to current status.

Table 6.2-1 CONSTRUCTION FINDINGS

Level of Importance[a]	RRF Number	Category[b]	Description
II	16-6	C	1. Assembly sequence for RPV internals not in accordance with specification. 2. Flange leveling requirements not implemented.
III	16-7	B	Process control sheet does not list revision for referenced drawings.
II	16-8	B	Pressurizer code nameplate does not indicate code class.
III	16-9	B	NDE reports do not indicate the governing code.
II	16-10	B	Radiographic flim does not fully comply with ASME Code requirements.

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 - Hardware concern
B - Paperwork concern
C - Program concern

Table 6.2-2
RPV HEAD ASSEMBLY ASSESSMENT ITEMS

1. Unit 1 RPV head penetrations assessed by software review.

Penetration No.	Attachment
1	CRDM - 03
6	CRDM - 31
41	CRDM - 11
50	CRDM - 36
56	CRDM - 39
63	CLH - 02
12	RVLIS adapter

2. Unit 2 RPV head penetrations seal welded to CRDM housings assessed by visual examination.

Penetration No.	Penetration No.
50	60
30	53
54	36
61	59
73	35
49	56
41	42
72	66

Table 6.2-3
NONDESTRUCTIVE EXAMINATION ASSESSMENT SAMPLE

PT Reports Reviewed

PT- 1	PT-22	PT- 72	PT-205
PT- 2	PT-29	PT- 76	PT-214
PT- 7	PT-51	PT- 79	PT-230
PT- 8	PT-54	PT-133	PT-251
PT-11	PT-61	PT-144	PT-260
PT-12	PT-67	PT-150	PT-267
PT-17	PT-69	PT-158	
PT-19	PT-70	PT-189	

PT Examination witnessed

PT-295

MT Reports Reviewed

MT-3	MT-6	MT- 9	MT-15
MT-4	MT-7	MT-13	MT-16
MT-5	MT-8	MT-14	

RT Reports Reviewed (Weld numbers)

BMIA-60	BMIA-117	BMIA-139	BMIA-233
BMIA-6021	BMIA-117R1	BMIA-140	BMIA-233R1
MAIA-61	BMIA-118	BMIA-143	BMIA-23322
BMIA-61R1	BMIA-119R1	BMIA-147	BMIA-233R3
BMIA-68	BMIA-122	BMIA-148	BMIA-247
BMIA-72	BMIA-126	BMIA-225	BMIA-247R1
BMIA-108	BMIA-129	BMIA-225R1	BMIA-250
BMIA-108R1	BMIA-13321	BMIA-228	BMIA-250R1
BMIA-110	BMIA-136R1	BMIA-228R1	

EQUIPMENT IN-PROCESS
INSTALLATION ASSESSMENT CHECKLIST
REACTOR COOLANT PUMP MOTOR

1. Equipment: I.D./Tag No. ____________

   Description ____________

   Serial No. ____________

2. Receiving inspection report referenced on installation process control sheet. ________

3. Installation process control sheet attributes 2A through 2H completed and signed by QC as applicable (preping, rigging, transporting). ________

4. Motor seating flange cleaned and deburred. ________

5. Motor leveled to $\pm$.125 inch across seating flange diameter. ________

6. Motor lowered into proper cell in manner to preclude damage to motor and other permanent plant equipment. ________

7. Motor set on pump in proper orientation, mounting bolts cleaned, lubed and installed snug tight. ________

8. Process sheet and installation activities completed in sequence and applicable hold points signed by Q.C. ________

9. EMS requirements imposed with proper time after receipt on site. ________

10. Remarks: ____________________________________

____

____

____

RR Team Member ____________________ Date ________

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Figure 6.2-1 Equipment In-Process Installation Assessment Checklist for the Reactor Coolant Pump Motor

NSSS SUPPORT CHECKLIST

Support Identification ______________________________

Drawings Utilized Referenced On Process Control Sheet ...	Dwg. No.	Rev.	Date

1. General Assessment
   - o Configuration and Orientation ____________
   - o Material Identification ____________
   - o Clearances ____________
   - o Freedom from obvious damage ____________
2. Bolted and Pinned Connections
   - o Spacers installed (when required) ____________
   - o Locking devices ____________
   - o Proper thread engagement ____________
   - o Proper torquing documented verification ____________
3. Field Welded Connections are acceptable with respect to:
   - o Size ____________
   - o Contour and Shape ____________
   - o Freedom from cracks ____________
   - o Overlap ____________
   - o Slag ____________
   - o Spatter ____________
   - o Porosity ____________
   - o Arc Strikes ____________
   - o Undercut ____________

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Figure 6.2-2 NSSS Support Checklist (Sheet 1 of 2)

4. Process Control Sheets

- o Appropriate entries/signatures ______
- o Hold points signed by qualified individuals ______
- o Procedure and drawing revisions correct for time of installation. ______
- o Welders were qualified ______

5. Procurement Documentation

- o Weld filler material acceptable ______

  Type ______ HT. No. ______ Size ______
  Type ______ HT. No. ______ Size ______

- o Documentation required by the PO/Spec is available ______
  - Code data reports complete

6. Deviation Reports are properly prepared, have the appropriate dispostion approval signatures, and properly closed (when applicable) ______

   DR No. ______
   ______
   ______
   ______
   ______

Team Member ______ Date ______

Figure 6.2-2 NSSS Support Checklist (Sheet 2 of 2)

MODULE 16 - CONSTRUCTION ASSESSMENT CHECKLIST -
NSSS MECHANICAL EQUIPMENT

STEAM GENERATOR

SPIN Number ______________

ASME Code Class ______________

ASME S/N ______________

Tag Number ______________

Field Assessment

1. Check for equipment identification. ____

2. Equipment layout is correct in relationship to reactor loops. ____

Installation Documentation

3. Check the setting process control sheet for:

   o Appropriate entries/signatures ____

   o Hold points signed ____

4. Check procedure revisions listed on the process control sheet are correct for the time of installation/inspection. ____

5. Check to assure the specification commitments listed below have been adequately addressed and inspected by NISCO during the installation/setting process.

   o Inspect and clean steam generator prior to rough placement in preparation for final setting. ____

   o Check the steam generator alignment so that the generator in the vertical position is within the tolerance of ± 0 degrees 30 minutes (1/2°) vertically. The steam shall be set to the predetermined optimum elevation to within ± 1/32 inch. ____

Figure 6.2-3 Construction Assessment Checklist for the Steam Generator (Sheet 1 of 2)

Procurement Documentation

6. Quality Assurance documentation required by the P.O./Spec is available. ____

7. Code data report forms available and complete.

   o Report references correct serial number and code class. ____

   o Certificate of shop inspection complete. complete. ____

General Documentation

8. Deviation reports are properly prepared, have the appropriate disposition approval signatures, and properly closed (when applicable).

   DR No. ____________________ ____

   DR No. ____________________ ____

   DR No. ____________________ ____

9. Drawing revisions referenced on the process control sheet are correct for the time of installation/inspection.

   o ____________________ ____

   o ____________________ ____

   o ____________________ ____

   o ____________________ ____

10. EMSL requirements imposed within proper time after receipt on site. ____

Team Member ______________________________ Date: __________

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Figure 6.2-3 Construction Assessment Checklist for the Steam Generator (Sheet 2 of 2)

MODULE 16 - CONSTRUCTION ASSESSMENT CHECKLIST -
NSSS MECHANICAL EQUIPMENT

PRESSURIZER

SPIN Number ____________

ASME Code Class ____________

ASME S/N ____________

Tag Number ____________

Field Assessment

1. Check for equipment identification. ____

2. Equipment layout is correct in relationship to reactor loops. ____

Installation Documentation

3. Check the setting process control sheet for:

   o Appropriate entries/signatures ____

   o Hold points signed ____

4. Check procedure revisions listed on the process control sheet are correct for the time of installation/inspection. ____

5. Check to assure the specification commitments listed below have been adequately addressed and inspected by NISCO during the installation/setting process.

   o Inspect and clean pressurizer vessel prior to rough placement in preparation for final setting. ____

   o Lower the pressurizer vessel to approximately one foot above the foundation. Examine the vessel orientation and matching with bolt holes. The vessel support ring should be installed at this time. ____

Figure 6.2-4 Construction Assessment Checklist for the Pressurizer (Sheet 1 of 2)

5. (cont'd)

- o Lower the pressurizer to the foundation and install the hold down bolts. Verify that the vertical position is within ± degrees 30 minutes (1/2°) of vertical. The pressurizer shall be set to the predetermined optimum elevation to within ± 1/4 inch. ____
- o Install the upper lateral supports around the pressurizer lugs making sure that the slots which fit around the pressurizer lugs are shimmed to the required cold gap clearance. ____
- o Torque the hold down bolt to provide a bolt tension of 186 min, 206 max, KIPS. ____

Procurement Documentation

6. Quality Assurance documentation required by the P.O./Spec is available. ____

7. Code data report forms available and complete.

- o Report references correct serial number and code class. ____
- o Certificate of shop inspection complete. ____

General Documentation

8. Deviation reports are properly prepared, have the appropriate disposition approval signatures, and properly closed (when applicable).

DR No. ____________________ ____

DR No. ____________________ ____

DR No. ____________________ ____

9. Drawing revisions referenced on the process control sheet are correct for the time of installation/inspection.

- o ____________________ Rev ________ ____
- o ____________________ Rev ________ ____
- o ____________________ Rev ________ ____
- o ____________________ Rev ________ ____

Team Member ______________________________ Date: __________

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Figure 6.2-4 Construction Assessment Checklist for the Pressurizer (Sheet 2 of 2)

PROCESS CONTROL SHEET

ASSESSMENT CHECKLIST

1. Process Control Sheet No. ________________

   Item: Description ________________

   Serial No. ________________

   ASME Class ________________

2. Process Control Sheet Hold Points:

   Completed ____________

   Signed by Certified Personnel ____________

3. Applicable DRs: Referenced ____________

   Reviewed ____________

   DR Nos: ____________________ __________

   ____________________ __________

4. Entries legible and any changes were made properly ________

5. Specification requirements are properly reflected and implemented ____________

6. Process Control Sheet is administratively and technically accurate ____________

7. Supporting documents are attached or referenced as applicable (check for 6 CRDMs/CCHs) ____________

8. Welders/welding operators qualified (check for welds performed on 6 penetrations) ____________

9. Remarks: ____

RR Team Member ______________________________ Date ____________

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Figure 6.2-5 Process Control Sheet Assessment Checklist

Reactor Internals Assembly and Installation Checklist

Process Control Sheets Reviewed ____________________

____

____

____

____

Drawings Utilized Referenced on Process Control Sheet ...	Dwg. No.	Rev.	Date
	______	___	______
	______	___	______
	______	___	______
	______	___	______
	______	___	______
	______	___	______

1. Process control sheet

   o Appropriate entries/signatures ______

   o Hold points signed by qualified individuals ______

   o Procedure and drawing revisions correct for time of installation ______

2. Procurement documentation

   o Documentation required by the P.O./spec is available ______

3. Deviation reports are properly prepared, have the appropriate disposition approval signatures, and properly closed (when applicable). ______

   DR No. ____________________

   ____

   ____

   ____

4. The following specification requirements have been adequately addressed by the installation documents.

Figure 6.2-6 Reactor Internals Assembly and Installation Checklist (Sheet 1 of 5)

4. (cont'd) Requirement — Implementation Location

- o Prior to initiating assembly, all accessible reactor internals parts and welds shall bevisually examined for defects. The full length of all major girth welds shall be examined.
- o Clean all components thoroughly before and after assembly in accordance with Westinghouse Process Specification PS 597760. Maintain clean room conditions during assembly of internals.
- o Activities requiring quality assurance check, verification, or witnessing by Westinghouse personnel must be identified and coordinated with appropriate parties prior to initiating work.
- o Before lifting components, lock tab welds on the internals lifting rig shall be checked. Roto-Lock inserts which are used for attaching the lift rig to the internals shall be checked to insure they are installed as match-marked pairs in identical locations in the core barrel and the upper internals support plate. Correct orientation of studs on the lifting rig shall be verified. Insert-to-flange lines must be aligned.
- o Machine the RV radial support blocks in accordance with the Westinghouse lower radial support clevis machining details.
- o Inspect for proper perpendicularity of support blocks, tapped holes, and flatness of pads on the lower radial support clevises.
- o Lift lower internals assembly clear of storage stand. The assembly must be level within 0.18 inches total. Record the weight on the load sensors when the assembly is freely suspended.
- o Measure and record the friction load weight reduction as the lower radial support key engages the clevis members on the vessel.

Figure 6.2-6 Reactor Internals Assembly and Installation Checklist (Sheet 2 of 5)

4. (cont'd)

Implementation Location

- A radial clearance of approximately 0.080 inches should exist at matching nozzle interfaces. At each nozzle, at four equally spaced locations, measure and record the clearance gap between the barrel and vessel. Also measure and record the minimum gap at each nozzle.
- Take measurements and machine the lower radial support clevis. Requirements are shown on Westinghouse gauging and assembly documents for the lower radial support clevis insert. This is a second machining operation.
- Machine the lower support clevis inserts in accordance with the Westinghouse requirements.
- Torque bolts on the head and vessel alignment pins in accordance with Westinghouse requirements.
- Install the hold-down spring on the upper core barrel flange. Take and record necessary measurements in accordance with Westinghouse instructions.
- Inspect the lower radial support clevis inserts prior to and after welding lock bars and dowel pins. Verify that the lower radial support clevis inserts are are seated in the RV and that no gaps exist on side and top. If gaps exist, stop work and notify Westinghouse.
- Measure and record the clearance, top and bottom, at each of the lower radial support keys.
- A minimum clear space of 48 inches below the upper internals assembly for access to fuel assembly guide pins, for checking thermocouple insertion and, for inspection of the guide tube profile.
- A minimum clear space of 120 inches above the upper internals assembly for thermocoupleinsertion.

Figure 6.2-6 Reactor Internals Assembly and Installation Checklist (Sheet 3 of 5)

4. (cont'd)

Implementation Location

- Place in the assembly stand. Do not remove the protective covering until ready to set the upper internals assembly into the core barrel (in the RV). ________ ________ ________ ________ ____
- Level upper internals assembly flange to within .0005 inches per foot. ________ ________ ________ ____
- The upper surface of the core barrel must be level to within 0.18 inches. Record flange the weight indicated on the load sensor. ________ ________ ________ ________ ____
- Apply Neolube to the upper core plate aligning pins and the upper core plate inserts. Allow to dry. ________ ________ ________ ____
- Inspect and verify pin-to-pin spacing of the fuel pins located around the periphery of the upper core plate. ________ ________ ________ ____
- Check and record clearance for the fuel assembly all around the baffle at the upper and lower core plate. Use the Westinghouse gauges for fuel assembly guide pin and baffle checking. ________ ________ ________ ________ ____
- Verify proper spacing of fuel assembly guide pins on the upper and lower core plates. Use the Westinghouse gauges for fuel assembly guide pin and baffle checking. ________ ________ ________ ________ ____
- Measure and record the radial clearance between the upper support flange and the inside-diameter of the vessel above the support ledge. ________ ________ ________ ________ ____
- Measure and record the radial clearance between the core barrel flange and the inside-diameter of the RV above the support ledge. ________ ________ ________ ____
- Measure and record the gaps between the upper core plate inserts and the upper core plate guide pins. Compare results to those recorded on as-built drawings. Submit results to Westinghouse for review. ________ ________ ________ ________ ____

Figure 6.2-6 Reactor Internals Assembly and Installation Checklist (Sheet 4 of 5)

4. (cont'd)

Implementation Location

- Measure and record the gaps between the upper support flange and the head and vessel alignment pins. Compare results to those recorded on as-built drawings. Submit results to Westinghouse for review. ________ ____
- Measure and record the gaps between the upper core plate and core barrel band adjacent to the 0°, 180°, 90°, and 270° axes as well as positions 45° removed from the axes. Submit result to Westinghouse for review. ________ ____
- Resolve all Westinghouse review comments. ________ ____
- Verify that the core barrel flange is level within .010 inches total. ________ ____
- Verify that all mating surfaces are fully seated and clamped. Weld the locking devices. ________ ____
- Verify, by hand, that there is no looseness of locking collars on the instrument guide columns beneath the lower core plate. Install the locking dowels. ________ ____
- Verify final torquing of the locking dowels of bottom mounted instrumentation and that there is a free path for flux thimbles. ________ ____
- Verify that the flow nozzles have been installed as required. ________ ____

Team Member ______________________ Date: ________

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Figure 6.2-6 Reactor Internals Assembly and Installation Checklist (Sheet 5 of 5)

MODULE 16
CONSTRUCTION TEAM CHECKLIST - BMI GUIDE TUBES

Guide Tube Number ______________________

Drawing Number ______________________

1. Guide tube is free from surface damage . . . . ___

2. Tubing is installed per drawing . . . . ___

3. Socket welds - visual examination are acceptable for the following attributes:

   Undercut . . . . ___

   Suface defects . . . . ___

   Weld contour . . . . ___

   Weld size . . . . ___

Note: Acceptance criteria per NISCO Procedure ES-100-5, visual inspection of welds.

Team Member ______________________________ Date: __________

page 1 of 2
(front)

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Figure 6.2-7 Construction Team Checklist for BMI Guide Tubes (Sheet 1 of 2)

MODULE 16

CONSTRUCTION TEAM CHECKLIST - BMI GUIDE TUBES

1. All hold points, QA and ANI are appropriately signed. . . . . ____

2. PT reports for socket weld root passes and final welds are attached to the process control sheet. . . . . ____

3. For three different QA hold points, the procedure revision listed on the process control sheet is correct for the time of inspection. . . . . ____

Procedure/Rev.	Date of Inspection	
____________	____________	. . . . ____
____________	____________	. . . . ____
____________	____________	. . . . ____

4. For two different QA hold points, the inspectors were certified at the time of inspection

Inspector	Date of inspection	
____________	____________	. . . . ____
____________	____________	. . . . ____

Team Member ____________________ Date: __________

0056p/15

Figure 6.2-7 Construction Team Checklist for BMI Guide Tubes (Sheet 2 of 2)

MODULE 16
CONSTRUCTION TEAM CHECKLIST - BMI GUIDE TUBE SUPPORTS

1. For (2) pieces of material - the identification, type, and size is as required by the drawings

   Dwg No_______________ Item No_____ Heat No_______ . . . . ____

   Dwg No_______________ Item No_____ Heat No_______ . . . . ____

2. For the above (2) pieces of material - the CMTR's are in compliance with code requirements. . . . . ____

3. For (5) pieces of material - the material identity is evident and if required, transferred prior to cutting.

   Dwg No ____________________ Item No __________ . . . . ____

   Dwg No ____________________ Item No __________ . . . ____

   Dwg No ____________________ Item No __________ . . . ____

   Dwg No ____________________ Item No __________ . . . ____

   Dwg No ____________________ Item No __________ . . . ____

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Figure 6.2-8 Construction Team Checklist for BMI Guide Tube Supports (Sheet 1 of 2)

MODULE 16

CONSTRUCTION TEAM CHECKLIST - BMI GUIDE TUBE SUPPORTS

4. For (5) welds - visual examination is acceptable for the following attributes:

Undercut . . . . ___

Surface damage . . . . ___

Contour. ___

Size . . . . ___

Note: Marked-up drawings (s) illustrating the welds assessed is attached. Acceptance criteria per NISCO procedure E.S.-100-5, visual inspection of welds.

Team Member ______________________________ Date: __________

Figure 6.2-8 Construction Team Checklist for BMI Guide Tube Supports (Sheet 2 of 2)

MODULE 16

CONSTRUCTION TEAM CHECKLIST - RECEIVING INSPECTION REPORTS

NISCO RIR NUMBER ____________________

1. The RIR identifies the material/component . . . . ___

   Identity/Tag Numbers ____________________

   Heat/Lot/Serial Numbers ____________________

   Size/Type ____________________

2. The material certifications, data reports and piping materials requisitions, as applicable, are available and/or attached. . . . . ___

3. The Col C, CMTRs and data reports, as applicable, are acceptable for the following attributes:

   Legibility . . . . ___

   Certification by signature of the supplier or authorized respresentative . . . . ___

   Compliance with the requirements of the code and specifications. . . . . ___

   Traceability to the item received . . . . ___

4. The RIR shows appropriate sugnatures by QA/QC for all inspections performed . . . . ___

5. The RIR shows acceptance or rejection of the . . . . ___

Team Member ______________________________ Date: __________

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Figure 6.2-9 Construction Team Checklist for Receiving Inspection Reports

MODULE 16
CONSTRUCTION TEAM CHECKLIST - WELDING MATERIAL STORAGE

Storage Location ______________________ Date Surveyed ___________

1. Access controls are in place . . . . ____
2. Housekeeping and temperature are within requirements . . ____
3. Identification of filler material is evident . . . . . . ____
4. Low hydrogen electrodes stored per requirement . . . . . ____
5. Holding oven temperature and calibration is appropriate. ____
6. Holding oven contents segregated by electrode type and size . . . . ____

Team Member ________________________________ Date: __________

0056p/19

Figure 6.2-10 Construction Team Checklist for Welding Material Storage

MODULE 16
CONSTRUCTION TEAM CHECKLIST - WELD MATERIAL CONTROL

DATE OF SURVEY ____________

WELDER ____________

WELD NUMBER ____________

1. Weld material container has a properly completed weld material requisition . . . . ___
2. Moisture sensitive electrodes are issued/stored in heated containers . . . . ___
3. Portable rod ovens are holding minimum temperature . . . . ___
4. Weld material containers have only one type or classification of weld filler material . . . . ___
5. The completed WMR shows evidence of return of stubs/ unused weld material . . . . ___
6. The completed WMR has been placed in the appropriate process control sheet file . . . . ___

Team Member ____________ Date: ____________

0056p/20

Figure 6.2-11 Construction Team Checklist for Weld Material Control

MODULE 16 - CONSTRUCTION

FIELD ASSESSMENT CHECKLIST - LIQUID PENETRANT

REPORT NO: ____________________________

1. Compare the practical application of the P.T. examination performed by the NISCO inspector with the NISCO P. T. procedure requirements to insure the following parameters are met:

   - o Examiner Qualification Level ____
   - o Consumable Materials ____
   - o Temperature Range ____
   - o Cleanilness of Surface to be Examined ____
   - o Penetrant (Applying and Removal) ____
   - o Developer (Applying and Removal) ____
   - o Evaluation of Indications ____
   - o Hold/Dry Times ____

2. Review the liquid penetrant inspection report to insure the following parameters are met:

   - o Legibility ____
   - o Appropriate Entries/Signatures ____
   - o Administrative Completeness ____

______________________________ ______________
READINESS REVIEW TEAM MEMBER DATE

0056p/21

Figure 6.2-12 Field Assessments Checklist for Liquid Penetrant

MODULE 16 - CONSTRUCTION

SOFTWARE REVIEW CHECKLIST - LIQUID PENETRANT

REPORT NO: ______________________

1. Compare the liquid penetrant inspection report information with the NDE procedure to insure the following parameters are met:

   o Test Part Identification ____

   o NDE Procedure No./Rev. ________/________ ____

   o Dwg. No., Material, Material Thickness ____

   o Consumable Materials ____

   o Examination Date ____

   o [illegible] and Qualification Level of the [illegible]er and Acceptor ____

   o Examination Results ____

   o Project Number ____

2. Assess the completed liquid penetrant inspection report to ascertain whether the following attributes are proper:

   o Legibility ____

   o Appropriate Entries ____

   o Administrative Completeness ____

______________________ READINESS REVIEW TEAM MEMBER

______________________ DATE

0056p/22

Figure 6.2-13 Software Review Checklist for Liquid Penetrant

MODULE 16 - CONSTRUCTION

SOFTWARE REVIEW CHECKLIST - MAGNETIC PARTICLE

REPORT NUMBER: ______________________________

1. compare the magnetic particle inspection report information with the NDE procedure to insure the following parameters are met:

   - NDE Procedure No./Rev. ____________/__________ ____
   - Test Part Identification ____
   - Consumable Materials ____
   - Examination Date ____
   - Project Number ____
   - Governing Code ____
   - Pertinent Technique Data/Type of (Magnetization, Current Density, Prod. Spacing, Coil Configuration etc.) ____
   - Dwg. No., Material, Material Thickness ____
   - Name [illegible] Qualification Level of the Examiner and [illegible]ceptor ____
   - Examination Results ____

2. Assess the completed magnetic particles inspection report to ascertain whether the following attributes are proper:

   - Legibility ____
   - Appropriate Entries ____
   - Administrative Completeness ____

______________________________   ______________
READINESS REVIEW TEAM MEMBER   DATE

0056p/23

Figure 6.2-14 Software Review Checklist for Magnetic Particle

Module 16 - Construction

Software Review Checklist - Radiography

REPORT NUMBER ____________

Weld/Support Number ________ ________ SS ___ CS ___

Drawing Number ________ ________

1. Compare reader sheet information with NDE procedure to insure the following parameters are met:

   - o NDE procedure No./Rev ________/____ ___
   - o Cassettes and lead screens used are acceptable ___
   - o Penetrameter size, type, location, and shimming ___
   - o Source size ___
   - o Material thickness ___
   - o Source to film distance ___
   - o Weld identification identified on the radiography film agree with radiographic examination report ___
   - o Level II or III interpreter qualifications are current ___
   - o ANI film review acceptable ___

2. Review radiographs for the following attributes:

   - o Proper storage ___
   - o Proper film type ___
   - o Film ID markers are correct, properly located, and legible ___
   - o Film density acceptable ___
   - o Film artifacts ___
   - o Interpretation agrees with reader sheet ___

Readiness Review Team Member	Level	Date

0056p/24

Figure 6.2-15 Software Review Checklist for Radiography

7.0 INDEPENDENT DESIGN REVIEW

The Readiness Review process includes an independent review of design documents, such as system design criteria, calculations, specifications, and drawings, to ascertain whether proper design requirements were considered and that design documents correctly implement licensing commitments. This review is being conducted by Stone and Webster Engineering Corporation and includes a team of technical and professional experts to assess the technical adequacy of the design of the work covered by this and other modules. This independent design review (IDR) ensures that technically the design meets commitments, and that the mechanical equipment, piping, and components within the scope of this module are in fact adequate. The results of the independent design review will be provided as a separate report.

The IDR is conducted in two parts. One is an integrated evaluation of selected systems across all disciplines; the second is an evaluation of the structural aspects [reinforced concrete (Module 1), structural steel (Module 8), foundation materials and backfill (Module 13A), etc.] of the project design. The integrated IDR (including nuclear steam supply system) will be issued as a separate report, whereas the structural reviews will be issued with the appropriate structural module.

8.0 PROGRAM ASSESSMENT/CONCLUSION

8.1 SUMMARY OF OPEN CORRECTIVE ACTIONS

8.1.1 SECTION 6.1

- Finding 16-11

  Action: Revise construction procedure GD-T-01 to clarify the scope of Deviation Reports (DR).

  Responsible Organization: Construction

  Completion Date: November 15, 1985

  Action: Review all past CFR 50.55(e) reports to determine status of corrective actions and add open actions to the commitment tracking log.

  Responsible Organization: Construction

  Completion Date: November 26, 1985

- Finding 16-12

  Action: Include actual versus allowable acceleration comparison in stress calculations during routine as-built reconciliation.

  Responsible Organization: Bechtel Engineering

  Completion Date: Completion of As-Built reconciliation

- Finding 16-13

  Action: Issue desk instruction and provide training to institute a program that vendor drawings be reviewed and cross referenced on instrument installation drawings to assure that vendor requirements are included in the installation drawings.

  Responsible Organization: Bechtel PFE

  Completion Date: November 22, 1985

- o Finding 16-15

  Action: Revise Project Reference Manual, Part C, Section 37, to include details of the program for verification of Westinghouse equipment seismic qualifications.

  Responsible Organization: Bechtel Engineering

  Completion Date: December 2, 1985

8.1.2 SECTION 6.2

There were no open actions remaining from Section 6.2.

0073p/324-5

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. One was so identified, but was subsequently determined to be nonreportable by the project.

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 appendix and the Readiness Review Team conclusions are judged to be acceptable.

George C. Bell
Readiness Review Team
Quality Assurance Representative

John H. Draggs
Readiness Review Team
Quality Assurance Representative

MODULE 16

TECHNICAL CONSULTANTS CERTIFICATION

On the basis of review of the Module 16 report on NSSS interface and NSSS construction, the project organization and selected documents, 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 and the corrective action described in Section 6, the commitments of the VEGP FSAR are being implemented and the NSSS interfaces and construction comply with FSAR commitments.

Russell P. Bone

Russell P. Bone

Nuclear Steam Supply System - Module 16

Readiness Review Board Acceptance

The Readiness Review Board has been apprised of the scope and content of Module 16, Nuclear Steam Supply System.

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 judgment of the members, the Readiness Review Board is of the opinion that the corrective actions are acceptable, and that the nuclear steam supply system at Plant Vogtle is sound and complies with commitments set forth in the FSAR and acceptable practices.

APPROVED: [signature] DATE: Nov 20, 1985

Doug Dutton
Chairman, Readiness Review Board
Vogtle Electric Generating Plant

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: November 19, 1985

Re: Plant Vogtle - Units 1 & 2
Readiness Review Module 16
File: X7BD102
Log: SS-5403

From: O. Batum

To: W. C. Ramsey

Engineering has reviewed Module 16, Nuclear Steam Supply System, for general accuracy and completeness. To the best of our knowledge and belief, the module is a complete and accurate representation of the Nuclear Steam Supply System, and the engineering process and commitments related thereto.

Ozen Batum

Ozen Batum
General Manager, Project
Engineering - Vogtle

xc: Project File

Georgia Power Company
Project Management
Route 2, Box 299A
Waynesboro, Georgia 30830
Telephone 404 724-8114
404 554-9961

Vogtle Project

DATE: August 21, 1985

RE: Plant Vogtle - Units 1 & 2
Readiness Review Module 16

FROM: M. H. Googe

TO: W. C. Ramsey

Nuclear Construction has reviewed Module 16 excluding the referenced appendices. To the best of our knowledge and belief, the module is a complete and accurate representation of the Nuclear Steam Supply System Installation Program and commitments related thereto.

M. H. Googe
Project Construction Manager II
Vogtle Nuclear Construction Department

0204B

8.6 RESUMES

The following resumes, arranged in alphabetical order, present a brief professional history of those people instrumental to the development of Module 16.

ROBERT D. ANDREWS, Piping Engineer, Design Team Member

Mr. Andrews has been with Bechtel for over 18 years, fulfilling various assignments associated with the design of mechanical systems in mills, smelters, and refineries before being assigned to supervise the verification of piping systems and penetration seals in Unit 2 of the Diablo Canyon nuclear power plant. He also supervised the layout of piping and equipment for facilities being added to the plant.

Before he joined Bechtel, Mr. Andrews spent 16 years working on the design of steel mill equipment.

Education:

University of California
B.S., Mechanical Engineering

P.E., State of California

GEORGE C. BELL, Quality Assurance Engineer, Quality Assurance Representative

Mr. Bell has over 12 years of experience in the nuclear power plant industry, 8 of them in Quality Assurance. Most recently he was assigned to the Limerick Nuclear Generating Station as project quality assurance engineer. His principal responsibilities included: coordinating the preparation of and establishing the Quality Assurance Program within the Project including the Operational Quality Assurance Program for Bechtel work inside the operation boundaries of Unit 1; directing quality activities on the project and reviewing project schedules for quality-related activities to ensure timely and effective implementation of the Project Quality Assurance Program; and supervision and providing work assignments to Project Quality Assurance personnel (site and home office) and preparing reports on the effectiveness of Quality Assurance Program implementation. Previous assignments have been the W. H. Zimmer Nuclear Station, Susquehanna Steam Electric Station, and Davis-Besse Nuclear Power Project.

Education:

Villanova University
B.E., Electrical Engineering

M.B.A., Wilkes College of Pennsylvania

P.E., State of Pennsylvania

RUSSELL P. BONE, Supervisor Advisory Operations Division, Technical Expert

Mr. Bone joined Stone & Webster Engineering Corporation in April 1971, and is presently serving as Supervisor of the Operations Design Review Group in the Advisory Operations Division. Mr. Bone has over 14 years experience in the engineering, design, start-up testing, and operation of power plants. He is a Mechanical Engineer with additional education in nuclear engineering and experience in the operation and design of nuclear and fossil power plants.

Prior to joining Stone & Webster, he served as Chief of Quality Assurance for the U.S. Army Nuclear Power Program, where he qualified as Officer in Charge of an Army Nuclear Power Plant.

Education:

Worcester Polytechnic Institute
B.S., Mechanical Engineering

RAINER M. GRIMM, Engineering Contract Administrator, Design Team Member

Mr. Grimm has over 20 years experience in the nuclear power industry in Europe, Asia, and the United States. He has served in various capacities on the Rancho Seco and San Onofre projects. Most recently, Mr. Grimm served as administrator for the nuclear steam supply system and turbine generator contracts for power units in South Korea.

Education:

University of Munich
Diploma, Chemical Engineering

KENNETH J. HAY, Senior Engineer, Design Team Member

Mr. Hay has been assigned to five nuclear power plant projects spanning a period of 14 years. Principally engaged in pipe stress and support analysis, he has also served as ASME Codes Engineer and was responsible engineer for several material procurement contracts.

Education:

Kingston College of Technology
University of London, England
Higher National Certificate - Mechanical Engineering

JAMES R. HUME, Project Manager, Design Team Member

Prior to joining Readiness Review, Mr. Hume spent 6 years in project management positions on the Maanshan (Taiwan) and Korea Units 7 and 8 projects. Previously he served as design project engineer on San Onofre and two European generating plants. Before joining Bechtel, Mr. Hume was responsible for directing conceptional design efforts on several large reactor projects for Atonica International and also supervised a systems analysis unit that performed design, analysis, and optimization of reactor systems.

Education:

Georgia Institute of Technology
B.S., Industrial Engineering

University of New Mexico
M.S., Mechanical-Nuclear Engineering

LEO P. HYDRICK, JR., Instrumentation Quality Control Engineer, Construction Team Member

Mr. Hydrick has 7 years of nuclear experience in quality control engineering with Bechtel Power Corporation. His responsibilities have included supervision of inspection activities required to complete construction of Diablo Canyon Nuclear Units 1 and 2; performing software review activities associated with quality assurance records completion for Limerick Nuclear Units 1 and 2; developing the quality control program and procedures required for the completion of construction at Zimmer Nuclear Unit 1; and the supervision of inspection activities associated with the construction of Susquehanna Steam Electric Station Nuclear Units 1 and 2.

Education:

Pennsylvania State University
Nuclear Engineering Technology

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, Oconce, 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

LESTER J. MIKULECKY, JR., Construction Engineer, Construction Team Member

Mr. Mikulecky has 5 years of nuclear power plant experience and is currently employed with Georgia Power Company. His experience includes writing installation procedures for a quality assurance ASME manual, and serving as a technical specialist for pipe supports, and a system engineer for reactor coolant and utility water system. Prior to joining Georgia Power Company he was employed with Daniel International Corporation as a certified quality inspector II. His responsibilities included visually inspecting safety and non-safety related welds; monitoring qualification of welders; performing component support installation inspections for compliance to applicable drawings, specifications, codes, and procedure requirements; and assisting in the preparation of procedures and reports.

Education:

Iowa State University
B.S., Construction Engineering

ROBERT W. McMANUS, Assistant Project Construction Manager, Construction Discipline Manager

Mr. McManus has been with Georgia Power Company for over 11 years, 5 of them on direct assignment at the Vogtle Electric Generating Plant. He was most recently responsible for the quality acceptance of Civil, Electrical, and Mechanical portions of VEGP. Responsibilities other than management of personnel included reviewing Field Change Notices to design drawings for acceptance, contact with Engineering Quality Assurance on acceptability of the site quality program, construction contact for the Nuclear Regulatory Commission for their quality audits, and performing departmental audits of site construction activities for design compliance.

Education:

Southern Technical Institute
B.S., Civil Engineering Technology

CHALMER R. MYER, Engineering Group Supervisor, Design Team Leader

Mr. Myer has been involved in the design and analysis of piping, pipe supports, and mechanical equipment on various nuclear generating plant projects for the past 12 years. In his most recent assignment, he supervised the finalization of mechanical equipment systems design and the resolution of construction and startup problems.

Education:

New Mexico State University
B.S., Mechanical Engineering

P.E., State of California

WILLIAM C. RAMSEY, JR., Readiness Review Program Manager

Mr. Ramsey is employed by Southern Company Services as manager-nuclear projects, nuclear safety and fuel. He is currently relieved of those position responsibilities and assigned management responsibilities for the Vogtle Readiness Review Program.

He has approximately 13 years of nuclear experience that encompasses design engineering, engineering management, scheduling, budgeting, procedures administration, testing, startup, engineering evaluations and audits, and licensing management.

He directed a number of engineering evaluations and audits including the Design Control Review, INPO Pilot Response, and INPO Self-Initiated Evaluation on the Vogtle Project.

He has been active in a number of industry groups and AIF and EPRI subcommittees and working groups.

Education:

University of Alabama
B.S., Mechanical Engineering

ROBERT C. SOMMERFELD, Supervising Construction Engineer, Construction Team Member

Mr. Sommerfeld has over 20 years of experience in the nuclear power industry. His responsibilities have included design assistance; material selection and performance; corrosion control; preparation of technical specifications; review and approval of vendor and contractor special process procedures and quality programs; preparation of project QA manuals; interface with regulatory agencies; participation in code writing body

activities; and control of welding operations, forging, heat treatment, and QA/QC activities related to manufacture of pipe, pipe fittings, extruded headers, vessels, and piping subassemblies.

Education:

University of Wisconsin
B.S., Mechanical Engineering

CHARLES M. SUMMERS, SR., Administrative Quality Control Engineer, Construction Team Member

Mr. Summers has been associated with the nuclear power industry for 7 years in administrative and mechanical quality control. He has been assigned to various nuclear projects including WPPS Units 1, 2, and 4, Zimmer, Limerick, and Hope Creek. His duties have ranged from inspection of mechanical equipment and piping to QA/QC documents/records control and departmental management of a large construction management QC surveillance group which included various discipline activities and construction management task forces.

Education:

Chattanooga State Technical Community College
Civil Engineering Technology

ZOLLY G. TUCKER, III, Quality Control Engineer, Construction Team Member

Mr. Tucker has over 5 years of nuclear power plant experience with Bechtel Power Corporation. His responsibilities include supervising, training, and evaluating Level I and Level II inspectors; and performing all types of in-process and postinstallation inspection and testing on piping, instrumentation, welding, and hangers. He is also throughly familiar with the construction turnover, startup, and maintenance phases of a nuclear power facility.

Education:

Southeastern University
2 years Pre-Engineer Training

CARL W. VERNON, Principal Engineer, Design Team Member

Mr. Vernon's 16-year career has included responsibilities in various disciplines in both construction and operation of nuclear power plants. He has most recently been the Westinghouse project engineer during the reverification and

startup of the Diablo Canyon power plant. He has been involved in startup and operating procedures, ALARA consultation, plant layout, fluid systems design, NSSS interfaces with balance-of-plant equipment, and analysis of postaccident hydrogen generation. For 5 years, he was assigned to the engineering staff of the U.S. Navy Division of Naval Reactors.

Education:

Ohio State University
B.E.E., Electrical Engineering

WILLIAM M. WRIGHT, Mechanical Project Engineer, Design Discipline Manager

Mr. Wright has over 12 years of nuclear power plant experience in mechanical design. He was most recently responsible for managing a group of engineers and pipe designers involved in BOP system design and pipe/pipe support design activities for the Vogtle Electric Generating Plant. He was also involved in several design control evaluations conducted on the Vogtle project which involved technical audit/INPO type reviews of Bechtel, Georgia Power, and Westinghouse organizations. Mr. Wright was also an engineering group leader for BOP system design activities on Plant Vogtle; a design engineer for developing in-service inspection plans (per ASME XI) on the Farley Nuclear Power Plant; and a design engineer on the Barton Nuclear Power Plant where he developed P&IDs, system calculations, and hazards analyses for NSSS and safety-related systems and participated in writing the Barton PSAR.

Education:

University of Alabama
B.S., Mechanical Engineering
M.S., Mechanical Engineering

P.E., State of Alabama