Description of Changes Made to the Consolidated

Description of the Quality Assurance Program

Dated May 1983

Section i - Introduction

The revisions reflected here delete the particular revision numbers of the topical reports of the principal contractors since they are required to notify the NRC of changes to their Quality Assurance Programs.

Also reference to the reporting requirements of 10CFR50.55 was added.

Section 1 - Organization

This section reflects the current Marble Hill Nuclear Division structure. The position title descriptions have been revised as denoted herein. The same level of organizational independence and freedom from cost and schedule is still maintained within the Quality Assurance Department.

Section 2 - Quality Assurance Program

This section has been revised to reflect the current position titles and also to identify current regulatory commitments.

Also the section dealing with Project Training has been extensively revised to describe the enhanced training system. PSI is currently using Training and Development Guides which identify the type of training as well as the specifics of the training involved.

The tables which cross referenced the Project Management Procedures have been deleted. Project Management Procedures have been reidentified by number to correlate with the eighteen criteria.

In general, this section was revised to reflect commitments that have been fulfilled such as obtaining the Certificate of Authorization, concerns by the National and Indiana Boiler and Pressure Vessel Boards, etc. Commitments that were identified in the future tense are now reflected in the present tense.

The classification criteria attachment (CC-ME-01-MH) is no longer included as an attachment to this 17.1 Quality Assurance Description; it is included in the FSAR.

Section 3

This section has been corrected to state that audits of the design activities of the design contractors are conducted rather than surveillance of these activities.

Additionally, reference to procurement documents was changed to design documents for clarification in some paragraphs.

Section 4

Revisions to this section have occurred primarily to clarify the use of the term "procurement documents and procurement specifications", as well as to indicate that PSI may prepare procurement documents in addition to the principal contractors. The term "suppliers" was added to contractors to denote actual program practices.

Section 5

Table 1-2 reflecting all the Project Management Procedures issued, has been deleted, since these procedures are being revised, added, and cancelled on a frequent basis.

Section 6

This section reflects minor changes that were made to clarify some requirements. The term "Project Management Procedures" was changed to procedures, since other procedures implement program requirements. The description of the document register has been changed to a document indexing system and the description of the synonymous nomenclature for "superseded" has been added.

Section 7

The changes made to this section are as follows:

a. Project Purchasing is responsible for maintaining the ASCL and not the Quality Assurance Department.

b. Sargent & Lundy is not responsible for performing surveillance of subcontractors under their own program, as it is not within their scope of work.

c. Quality Assurance procedures was changed to Quality Assurance programs, since PSI does not review procedures from some of the principal contractors.

d. PSI does not always participate in surveillance trips with their subcontractors; therefore, the word "shall" was changed to "may" to reflect this option.

e. The requirement that PSI conducts frequent surveillance planning meetings has been deleted. PSI conducts surveillance based on scheduled construction activities and past problems and trends associated with particular contractors.

f. Quality verification records are now referred to as Quality Assurance records.

g. The requirements for surveillance and audits of suppliers and contractors has been revised for clarity and reflects actual program practices.

Section 8

This section reflects clarifications of PSI functions related to contractors/ suppliers identification process consistent with the Quality Assurance program.

Section 9

This section was revised to state that principal contractors are responsible for identifying special processes, and not PSI Quality Engineering.

Section 10

This section reflects the organizational changes within the Quality Assurance Department due to elimination of the Inspection Section. Also, the requirements for designating mandatory hold points and continuing work beyond these hold points were clarified.

Section 11

The entire section was revised due to the organizational changes that were made to the Test and Startup Section. PSI has maintained its level of commitments, and has identified the types of records to be maintained in the test program.

Section 12

This section was revised to reflect the current organizations that control measuring and test equipment. The paragraph on calibration standards was revised to reflect the correct tolerance limitations as required in ANSI N45.2-1971.

Section 13

This section was revised to delete the reference to procedures being included in the PSI Quality Assurance Manual. The Project Quality Assurance Manual does not contain procedures. Also, PSI establishes storage and maintenance requirements via the use of Storage and Maintenance Instructions. The principal contractors only have a limited scope in this area.

Section 14

This section was revised to clarify the responsibilities for maintaining the status of inspection, test, and operating activities; it also reflects prerequisite and preoperational testing to correspond with the organizational changes. Also the term procedures and instructions was changed to Quality Assurance Program in order to reflect actual commitments.

Section 15

The revisions in this section reflect organizational changes, clarifications as to what types of nonconformance documents are used and when (including the use of design change documents such as Field Change Requests and Engineering Change Notices), and deletion of commitments that have already been fulfilled (e.g., relocation of the staff to the construction site.)

Section 16

This section reflects organizational changes including the disbanding of the Quality Assurance Review Committee. The Executive Review Meeting accomplishes this function. Management audits continue to be a means of assuring Management awareness of problems.

Also reference to activities pertaining to the Confirming Order and restart has been deleted since the Confirming Order has been lifted. Also, the paragraph that described training for stop work authority has been deleted since training is adequately described in Section 1.2.

Reference to logs that control nonconformance documents has been deleted since PSI has adopted the use of a computerized status tracking system.

Section 17

This section reflects the organizational changes and restructuring of the records management system.

Quality verification records terminology has been changed to Quality Assurance records and Project Management Procedures was changed to Project procedures to reflect the use of other procedures.

Reference to storage of records at PSI General Headquarters has been deleted since all Quality Assurance records are stored at the Marble Hill Construction Site in a facility that meets ANSI N45.2.9 requirements.

Also, activities identified as future commitments in the last revision are now identified in the past and present tense to indicate accomplishment of the identified actions.

Section 18

This section was revised as follows:

a. Reference to the use of consultants and other PSI representatives was deleted and the words "and other designated representatives as appropriate" was inserted to parallel current program requirements.

b. "Procedures" was changed to "requirements" since the PSI Quality Assurance manuals do not contain procedures.

c. The commitment to Regulatory Guide 1.144, 9/80, requirements for performance of triennial audits is reflected in this section.

d. The audit control log is no longer used; a computer tracking system is used in its place.

QUALITY ASSURANCE PROGRAM DESCRIPTION
PUBLIC SERVICE COMPANY OF INDIANA, INC.
MARBLE HILL NUCLEAR GENERATING STATION, UNITS 1 AND 2
MAY, 1983

INTRODUCTION

This document provides a summary of the Quality Assurance Programs being employed in the design, procurement, construction, and construction phase testing of safety-related components, systems, and structures of the Marble Hill Nuclear Generating Station. It describes the interfaces between Public Service Company of Indiana, Inc. (PSI), Sargent & Lundy, and Westinghouse. Section 1 of this document describes the PSI Quality Assurance Program and supersedes all earlier PSI Program descriptions or portions thereof. WCAP-8370 describes the Quality Assurance Program of Westinghouse as Designer and Supplier of the Nuclear Steam Supply System. The Sargent & Lundy Quality Assurance Program Topical Report SL-TR-1A describes the Quality Assurance Program being implemented by Sargent & Lundy Engineers (S&L) as the architect-engineer. PSI will notify the Nuclear Regulatory Commission of changes to its Quality Assurance Program description in accordance with the requirements of 10 CFR 50.55.

1. Quality Assurance During the Design and Construction Phase

1.1 Organization

Public Service Company of Indiana, Inc. (PSI) retains and exercises overall responsibility for the Quality Assurance Program for the design, procurement and construction phases of the Marble Hill Nuclear Generating Station, Units 1 and 2.

The Senior Vice President-Nuclear Division has been assigned the responsibilities and authority within PSI for all activities including quality assurance associated with the design, procurement, construction and preoperational testing phases of the Station. The Senior Vice President-Nuclear Division has the overall responsibility for the Quality Assurance Program through the organizational structure set forth in Figure 1-1 and retains final approval authority of the Quality Assurance Program.

The PSI organizational structure shown in Figure 1-1 identifies the organizational elements which function under the cognizance of the Quality Assurance Program and indicates the functional lines of responsibility and authority from the PSI Board of Directors to each Nuclear Division organization implementing the Program. The Nuclear Division is located at the Station site.

PSI has delegated to the architect-engineer, Sargent & Lundy, and to the Nuclear Steam Supply System supplier, Westinghouse Electric Corporation, the work involved in establishing and executing large portions of the Quality Assurance Program associated with the design and procurement of safety-related structures, systems, and components listed in Chapter 3 of the SAR. Sargent & Lundy and Westinghouse and their suppliers and subcontractors who are responsible for safety-related functions are required to have Quality Assurance Programs consistent with the applicable requirements of 10 CFR 50, Appendix B, and with this Program.

1.1.1 Responsibilities for the Achievement of Quality Assurance Program Objectives

The functional responsibilities of those PSI organizations who are primarily responsible for the achievement of quality are as follows:

Vice President-Nuclear Services

The Vice President-Nuclear Services reports to the Senior Vice President-Nuclear Division and is delegated responsibility for Marble Hill Station design, procurement, construction, testing, and licensing.

Construction Manager

The Construction Manager reports to the Vice President-Nuclear Services and is responsible for the following activities:

a. Coordination of all project construction activities to assure contractor compliance with project commitments and establish project milestones.

b. Coordination of PSI contractural acceptance of structures and systems from the contractors.

c. Supervision of the Civil, Mechanical, Electrical, Composite, and Materials Project Contract Managers.

d. Supervision of the Safety and Fire Prevention Supervisor who monitors contractors' compliance with their established safety programs.

Project Contract Managers

The Project Contract Managers are the prime contact with contractors, report to the Construction Manager and are responsible for the following:

a. Assuring that contractor work is performed in conformance with drawing, specification, and contract requirements.

b. Coordinating Marble Hill construction and fabrication.

c. Receiving items and material.

d. Assuring the proper control and release of items requiring refabrication to the materials management contractor prior to release for installation.

e. Maintaining records and accountability of items and material stored by PSI.

f. Assuring implementation of handling, storage, preservation, protection and maintenance requirements for items and material.

g. Providing construction status and performance reports and assuring that construction-related communications and information flow properly.

h. Scheduling of construction activities.

Assistant Contract Managers

The Assistant Contract Managers report to the Project Contract Manager and are responsible for managing the field construction of the assigned contract and represent the Project Contract Manager for the specific contract.

Assistant Project Director

The Assistant Project Director reports to the Vice President-Nuclear Services and is responsible for directing the activities of the Project Engineering Manager and Project Purchasing Manager.

Project Purchasing Manager

The Project Purchasing Manager reports to the Assistant Project Director and interfaces with Project personnel relative to procurement activities and is responsible for the preparation and transmittal of procurement documents, approved change orders to suppliers and contractors, and maintenance of the Approved Supplier/Contractor List. The Project Purchasing Manager is the prime contact with suppliers for procurement related activities.

Project Engineering Manager

The Project Engineering Manager is the prime contact with Sargent & Lundy and Westinghouse, reports to the Assistant Project Director and is assigned the following responsibilities:

a. Coordination of design activities.

b. Assuring that technical and quality reviews of design documents and their changes are accomplished by responsible PSI organizations.

c. Assuring control of design changes and design consistency with SAR commitments.

d. Assuring that safety-related items are properly identified by the Principal Contractors on design documents.

e. Assuring that currrent approved design configuration can be readily determined.

f. Coordinating and drafting responses to NRC regulatory bulletins and requests for information related to PSI.

g. Technical selection of suppliers and contractors found acceptable by Quality Assurance.

h. Preparation, coordination and review of Project Management Procedures.

i. Design activities required by PSI as Owner and "N" Certificate Holder.

Nuclear Safety and Licensing Manager

The Nuclear Safety and Licensing Manager reports to the Project Engineering Manager and is responsible for:

a. Coordinating licensing efforts including preparation and coordination of Safety Analysis Reports and amendments.

b. Acting as the primary contact with the Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation) for Project-related licensing matters.

c. Assuring that all licensing commitments relating to the Quality Assurance Program are made with the approval of the Executive Director-Nuclear Quality Assurance.

Project Startup Manager

The Project Startup Manager reports to the Vice President-Nuclear Services and is responsible for:

a. Managing, directing, and assuring that Phase I and II of the Test Program are conducted in accordance with the criteria established by the Startup and Test Program.

b. Developing and approving test procedures.

c. Managing prerequisite testing.

d. Performing preoperational tests.

e. Evaluating and approving all test results.

f. Managing maintenance of equipment as required.

g. Managing the activities associated with startup as may be delegated to a contractor or supplier.

Prerequisite Test Manager

The Prerequisite Test Manager reports to the Project Startup Manager and is responsible for:

a. Establishing and developing procedures for construction release to the Startup and Test Program.

b. Organizing the system construction completion function with effective contractor support.

c. Assuring the development of procedures for prerequisite testing and collection of test data.

d. Monitoring certification and training of Prerequisite Test personnel.

e. Supporting the Preoperational Test Program with physically complete, functionally tested equipment and components available for operation and preoperational testing.

Preoperational Test Manager

The Preoperational Test Manager reports to the Project Startup Manager and is responsible for:

a. Defining and developing the detail scope of the Preoperational Test Program (Phase II).

b. Managing the Preoperational Test Program.

c. Performing the initial evaluation of preoperational test results.

d. Providing completed Preoperational Test Procedures and results with recommendations for approval to the Joint Test Group.

The Joint Test Group is comprised of representatives from the following organizations:

Project Startup
Preoperational Test Management
Principal Contractor(s)
Station Production Management
Project Engineering Management

The Joint Test Group reviews and approves test procedures and test results.

Startup Maintenance Manager

The Startup Maintenance Manager reports to the Project Startup Manager and is responsible for:

a. Planning, scheduling and implementing the Preventative Maintenance Program through Phases I and II.

b. Planning, scheduling, and implementing the Corrective Maintenance Program through Phases I and II.

c. Coordinating the maintenance support personnel.

Startup Administrative Manager

The Startup Administrative Manager reports to the Project Startup Manger and is responsible for:

a. Assuring that all testing administrative functions are conducted in accordance with the criteria established by the Startup and Test Program.

b. Developing and maintaining administrative procedures to implement the Startup and Test Program testing and documentation.

c. Maintaining a computerized data base to status and track incomplete items, test procedure development and implementation, component and subsystem release and turnover status, and test documentation.

d. Managing the procurement, expediting, and tracking of materials support for the Startup Test Program.

e. Planning and directing release and turnover process and associated documentation. This also includes defining system and subsystem turnover boundaries.

Nuclear Division Administration Manager

The Nuclear Division Administration Manager reports to the Senior Vice President-Nuclear Division and is responsible for:

a. Directing the activities of the Administrative Services Manager and Records Management Manager.

b. Assuring the adequacy of the document control system and records management system.

c. Assuring the adequacy of the storage and retrieval of quality assurance records.

Administrative Services Manager

The Administrative Services Manager reports to the Nuclear Division Administration Manager and is responsible for:

a. Maintaining a site document control center to control and distribute controlled documents.

b. Supervising the Document Control Manager.

Document Control Manager

The Document Control Manager reports to the Administrative Services manager and is responsible for:

a. Control and distribution of controlled documents.

b. Supervision of Document Control personnel.

Records Management Manager

The Records Management Manager reports to the Nuclear Division Administration Manager and is responsible for:

a. Maintaining the quality assurance records file room to assure proper storage of quality assurance records.

b. Preparing and approving the quality assurance records file index and assuring the retrievability of quality assurance records.

Division Personnel Manager

The Division Personnel Manager reports to the Senior Vice President Nuclear Division and is responsible for directing the activities of the Division Training and Development Manager.

Division Training and Development Manager

The Division Training and Development Manager reports to the Division Personnel Manager and is responsible for establishing and administering the training program for Division personnel and for coordinating the certification of PSI inspection, test, and audit personnel.

Nuclear Regulation and Affairs Manager

The Nuclear Regulation and Affairs Manager reports to the Senior Vice President-Nuclear Division and is responsible for:

a. Assuring that any new or revised regulatory requirements are routed to affected PSI organizations for review, comment and determination of applicability.

b. Assuring the overall coordination and contact for NRC licensing activities above the NRC's Project Manager level.

c. Review of NRC correspondence including responses to NRC bulletins and requests for information, and coordination of responses from PSI organizations.

d. Emergency planning.

1.1.2 Responsibility for Quality Assurance Functions

The Executive Director-Nuclear Quality Assurance has been assigned overall authority and responsibility for the adequacy and verification of the effectiveness of the Quality Assurance Program. To assure the effective exercise of these authorities and responsibilities, the Executive Director-Nuclear Quality Assurance's position is at the same reporting level as those of the Nuclear Division Departments and Sections primarily responsible for the achievement of quality described in Subsection 1.1.1 which assures effective communication channels with those departments and sections. The primary responsibility for cost and schedule matters rest with the other department and section heads, ensuring that the Executive Director-Nuclear Quality Assurance is sufficiently independent from such matters. The Executive Director-Nuclear Quality Assurance's authority is also exercised through the review and approval of the Quality Assurance Program manual(s) and related procedure(s). The Executive Director-Nuclear Quality Assurance has not been assigned any responsibilities unrelated to quality assurance matters thereby assuring that the Quality Assurance Program is being effectively implemented.

The Executive Director-Nuclear Quality Assurance, Quality Assurance Department personnel, and other individuals and organizations performing quality assurance functions have been provided the organizational freedom and access to appropriate management levels to ensure authority to:

a. identify quality problems through reviews, inspections, surveillances and audits;

b. initiate, recommend or provide solutions through designated channels by means of documented results of the activities cited in "a" above and direct contact with other PSI personnel, suppliers and contractors; and

c. verify implementation of solutions and documenting them in appropriate reports or correspondence.

The verification of conformance to established requirements by performance of such activities as checking, surveying, testing, performing design verification, auditing and inspection is accomplished by individuals within the Quality Assurance Department or by individuals or groups trained and qualified in quality assurance requirements and practices who do not have direct responsibility for performing the work being verified.

The independence and freedom which assures the ability to exercise appropriate authority of individuals and groups performing quality assurance functions within suppliers and contractors, is required by incorporating the applicable requirements (including those related to organization) of 10 CFR 50, Appendix B in procurement documents. Conformance to these requirements is monitored and assessed by the Quality Assurance Department.

The Executive Director-Nuclear Quality Assurance has the responsibility and authority for the performance of the following activities:

a. Managing and directing the Quality Assurance Department as depicted by Figure 1-2.

b. The approval of the Program manuals, interpretation of quality assurance requirements and implementation of applicable portions of the Program.

c. Apprising the Senior Vice President-Nuclear Division and Vice President-Nuclear Services of the effectiveness of the Program by periodic reporting on quality activities, trends and problems.

d. Appropriately exercising authority to stop nonconforming work.

e. Coordinating regulatory and enforcement agencies activities such as audits, inspections or investigations with the affected site organization management.

f. Verifying conformance of activities affecting quality to the Program's requirements.

g. Appropriately exercising the authority vested in the Quality Assurance Department to cause the acceptance or rejection of work, materials and equipment based on conformance to engineering requirments or failure to meet procurement requirements.

h. Certification of Quality Assurance personnel.

i. Coordinating follow-up on NRC inspection activities to assure correct resolution and prompt closeout of inspection findings.

j. Assuring the adequacy, clarity and appropriateness of PSI Quality Assurance communications and commitments directed to regulatory and enforcement agencies, contractors and suppliers.

k. Contacting the NRC on quality assurance matters.

l. Maintaining a staff of sufficient size and qualifications to perform required quality assurance functions.

m. Determining documents which are to be generated, completed, and retained as quality assurance records.

Quality Engineering Manager

The Quality Engineering Manager reports to the Executive Director-Nuclear Quality Assurance, provides quality engineering direction, and is responsible for the following:

a. Directing the activities of Quality Engineering personnel.

b. Coordinating efforts to assure consistent application of PSI quality assurance requirements and commitments for contractors and suppliers.

c. Maintaining communication and coordination between Quality Engineering and other departments/sections/groups within PSI, contracors and suppliers.

d. Managing site construction surveillance, civil inspection and testing, material control surveillance and receipt inspection activities.

e. Evaluating identified potential adverse quality trends and recommending necessary corrective action to the Executive Director-Nuclear Quality Assurance.

Audit Manager

The Audit Manager reports to the Executive Director-Nuclear Quality Assurance and is responsible for:

a. Directing the activities of the Audit personnel.

1.1.3 Quality Assurance Staffing

The size of the Quality Assurance Department staffing at any particular time during the design, procurement and construction phase is established and maintained based on these selected factors:

a. Design and procurement activities;

b. Storage and maintenance inspection and surveillance activities;

c. Construction and test surveillance and inspection activities;

d. Surveillance and audit of supplier activities;

e. Surveillance and audit of PSI and contractor activities; and

f. Unscheduled or unplanned activities or events.

These activities may require periodic augumentation of the permanent staff with qualified temporary personnel.

Quality Assurance Department management is responsible for advance planning for staffing and training needs commensurate with their assigned functions and responsibilities, and for initiating action for staffing changes and training as necessary to assure adequate staffing and qualification to carry out quality assurance functions.

1.1.4 Delegation of Quality Assurance Authority

PSI requires each contracting organization performing activities affecting quality to have an adequate and implemented Quality Assurance Program complying with the applicable criteria of 10 CFR 50, Appendix B. Specific quality assurance requirements are incorporated into contract documents or purchase orders, and principal contractor Quality Assurance programs are reviewed and approved by PSI to assure compliance with contract requirements.

PSI has taken the position that each contracting organization performing work affecting quality on the Marble Hill Project shall be responsible for establishing, implementing, and monitoring its own Quality Assurance Program. Subsequent to acceptance of principal contractors' written plans, procedures, and instructions, PSI assures proper implementation and verifies the effectiveness of the Quality Assurance Programs through comprehensive audits and surveillance of facilities, activities and records. The principal contractors as used in this section are the architect-engineer and NSSS supplier.

The principal contractors participating in the design and construction of the Marble Hill Station who have been delegated Quality Assurance functions are:

b. Assuring communication and coordination between the Audit personnel and other departments/sections/groups within PSI, contractors and suppliers.

c. Managing the audit and source surveillance activities.

d. Evaluating identified potential adverse quality trends and recommending necessary corrective action to the Executive Director-Nuclear Quality Assurance.

Quality Administration Supervisor

The Quality Administration Supervisor reports to the Executive Director-Nuclear Quality Assurance and is responsible for:

a. Development, preparation and maintenance of the Quality Assurance Program Manuals and related SAR sections.

b. Reviewing PSI site procedures that implement the Program requirments to assure compatibility.

c. Reviewing and approving Quality Assurance Department section training plans and lesson plans.

d. Preparing quarterly trend reports.

Startup Quality Assurance Manager

The Startup Quality Assurance Manager reports to the Executive Director-Nuclear Quality Assurance and is responsible for:

a. Directing the activities of Startup Quality Assurance personnel.

b. Coordinating efforts to assure consistent application of PSI quality assurance requirements and commitments for startup activities.

c. Maintaining communication and coordination between Startup Quality Assurance and other departments/sections/groups within PSI, Contractors and Suppliers, as appropriate.

d. Managing Quality Assurance startup surveillance, inspection and test activities.

e. Evaluating identified potential adverse quality trends and recommending necessary corrective action to the Executive Director-Nuclear Quality Assurance.

a. Sargent & Lundy - architect-engineer.

b. Westinghouse Electric Corporation, designer and supplier of the nuclear steam supply system and nuclear fuel.

Sargent & Lundy provides architect-engineering services for the Marble Hill Station. These services include:

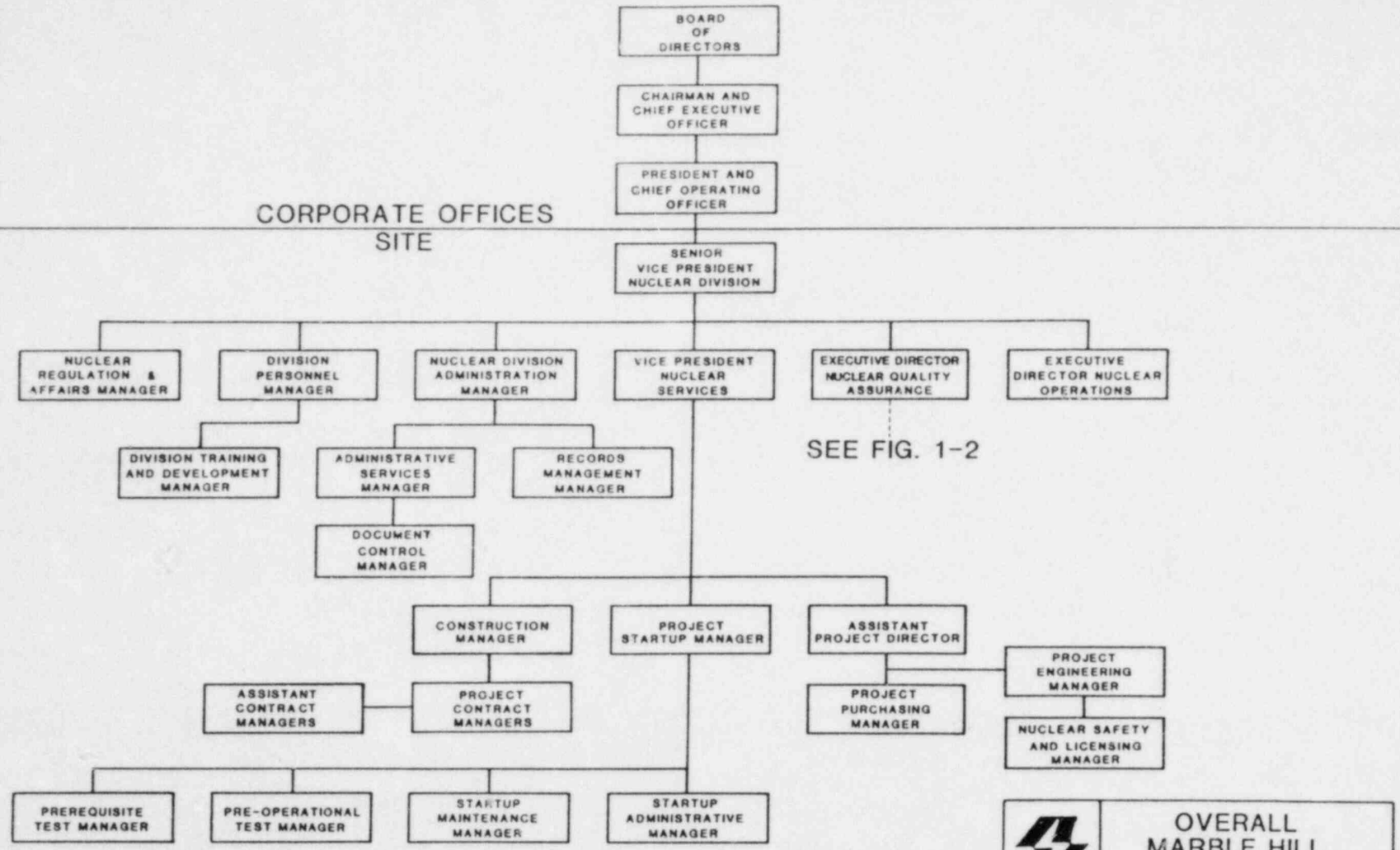
a. Overall design of the station, integrating the nuclear steam supply systems and turbine generators with the complete balance-of-plant items.

b. Responsibility for identification and coordination of design interfaces among the principal contractors.

c. Participation in Pre-Award and Post-Award activities as requested by PSI.

d. Review of selected supplier technical and quality control procedures as requested by PSI.

Westinghouse Electric Corporation provides the nuclear steam supply system and nuclear fuel, and is responsible for performing all design, procurement, fabrication, and quality assurance activities associated with their scope of supply.



PUBLIC SERVICE INDIANA

OVERALL MARBLE HILL PROJECT ORGANIZATION

FIGURE 1-1 | AS OF 5/83

1.2.3 Program Development and Implementation

PSI began the development and implementation of a Quality Assurance Program in March, 1974, when PSI established a corporate commitment to quality assurance. The following policy statement is formally issued with the PSI Project Quality Assurance Manual:

> The Public Service Company of Indiana policy is to ensure the highest feasible degree of functional integrity and reliability of those systems, equipment, and structures of its nuclear power generating stations that are essential to the prevention of nuclear incidents which could affect adversely the health and safety of the public and PSI employees or to the mitigation of the consequences of such incidents in the unlikely event they should occur.
>
> The Senior Vice President-Nuclear Division is assigned the authority and responsibility within PSI for all activities associated with the design, procurement, construction, startup, operation, maintenance, and quality assurance of the Marble Hill Project. To ensure that all of these activities are performed in a manner consistent with the policy set forth in this Manual, the Company has established a Quality Assuance Program to meet the requirements of 10 CFR 50, Appendix B. The Executive Director-Nuclear Quality Assurance has been delegated responsibility for the verification of implementation and maintenance of the Program as well as evaluating its effectiveness.
>
> All personnel performing duties affecting quality including PSI employees as well as those of its contractors, suppliers, and any other organization performing quality activities associated with the nuclear project are responsible for compliance with the directives established within the Quality Assurance Program. Each individual shall be familiar with the policies, requirements and procedures set forth in the Quality Assurance Program and shall implement those elements of the Program for which he is responsible.
>
> All personnel performing Quality Assurance functions are responsible for and have the authority and organizational freedom to identify quality problems; initiate, recommend or provide solutions; verify implementation of solutions, and limit or control further processing or installation of an item until proper dispositioning of the nonconformance or unsatisfactory condition has occurred.
>
> Any conflicts that cannot be resolved within the requirements of the Manual shall be brought to the attention of the Senior Vice President-Nuclear Division for final resolution. All resolutions shall meet the requirements of 10 CFR 50, Appendix B.

The policy statement is signed by the Company President and Chief Operating Officer. In addition to the formulation of quality assurance policy, PSI has established the following quality assurance objectives:

1.2 Quality Assurance Program (PSI)

1.2.1 Program Compliance

PSI requires that the design, procurement, construction, and installation of the station be carried out in accordance with 10 CFR 50, Appendix B. The Quality Assurance Program for the Marble Hill Project is described in two Quality Assurance Manuals. Each relates directly to the eighteen criteria established by 10 CFR 50, Appendix B, for Quality Assurance Programs for Nuclear Power Plants. One manual has been prepared in relation to Public Service Indiana's responsibilities as Owner of the Marble Hill facility. The other has been arranged directly to requirements of an N-Certificate Holder for piping systems of Section III, Division 1 of the ASME Boiler and Pr sure Vessel Code; both manuals are implemented through program implementing procedures wherever additional detail is required. Changes to either manual are coordinated to assure that basic requirements and methodology are functioning in parallel.

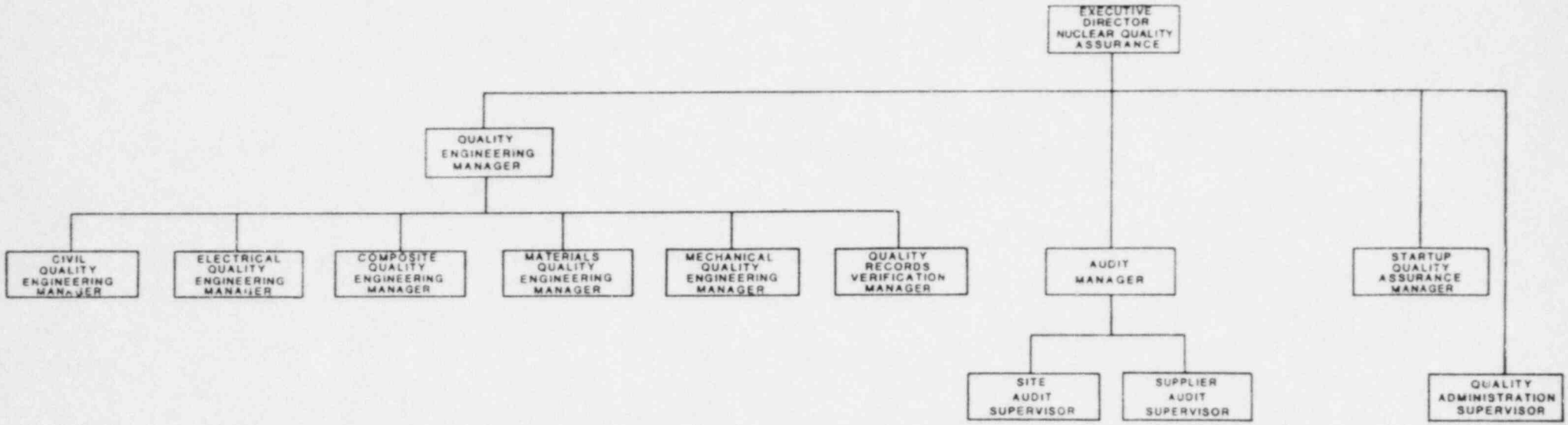
Design of Marble Hill Units 1 and 2 replicates to the maximum extent possible, the design of Commonwealth Edison Company Byron Station design. The replication concept does not affect the PSI quality assurance policy to control those activities needed to provide assurance that quality objectives are achieved during design and procurement.

PSI requires that its principal contractors comply with 10 CFR 50, Appendix B and other published guidelines from the Nuclear Regulatory Commission as they apply to activities affecting quality. The PSI Quality Assurance organization is responsible for verifying compliance with these requirements.

For PSI replicate items, the Quality Assurance Plans and Procedures utilized for the Byron Station by the base plant owner, Sargent & Lundy, and Westinghouse in formulating and verifying the design, design bases, and specifications of the base plant items are considered adequate to meet the Quality Assurance requirements for replicated structures, systems and components.

1.2.2 Program Applicability

The CC-ME-01-MH, "Classification Criteria of Structures Systems and Components" identifies the safety-related structures, systems, and components to be governed by the PSI Quality Assurance Program. Through reviews performed by Project Engineering and Quality Assurance, PSI assures that such items are properly classified as to Safety, ASME Code, Seismic Category ad Electrical Classification. CC-ME-01-MH includes references to Reg. Guides 1.26 and 1.29. It is a controlled document requiring approval of the PSI Vice President-Nuclear Services, the PSI Project Engineering Manager, and the PSI Executive Director-Nuclear Quality Assurance. This listing is subject to revision. Changes require equivalent aprovals to the original.



PUBLIC SERVICE INDIANA

QUALITY ASSURANCE DEPARTMENT

FIGURE 1-2 | AS OF 5/83

PSI Quality Assurance Objectives

PSI has established the following goals and objectives related to Quality Assurance:

a. PSI will establish and implement an effective Quality Assurance Program.

b. PSI shall assure the established Quality Assurance Program complies with regulatory commitments.

c. The scope of the Quality Assurance Program shall include all applicable activities which may affect the quality of nuclear safety-related materials, items, or services.

Further, the Company's objective is to comply with the applicable quality control criteria, guides, codes, and standards. Specifically, PSI intends to achieve this goal through compliance with the following as interpreted and understood by PSI:

Quality Assurance Program Commitments as Regulatory Guides and Endorsed Codes and Standards

NRC Regulations and Policies:

Appendix B to 10 CFR Part 50, 'Quality Assurance Criteria for Nuclear Plants'.

'NRC Policy and Procedures for Replication of Custom Plant Designs' - July, 1974.

Industry Standards and Associated Regulatory Guides:

REGULATORY GUIDE		ENDORSED STANDARD
1.28	"Quality Assurance Program Requirements (Design and Construction)" (Rev 0, 6/7/72)	ANSI N45.2-1971
1.30	"Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment" (8/11/72)	ANSI N45.2.4-1972
1.37	"Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants" (3/16/73)	ANSI N45.2.1-1973
1.38	"Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants" (Rev 2, 5/77)	ANSI N45.2.2-1972

	REGULATORY GUIDE		ENDORSED STANDARD
	1.39	"Housekeeping Requirements for Water-Cooled Nuclear Power Plants" (Rev 2, 9/77)	ANSI N45.2.3-1973
	1.54	"Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants" (6/73)	ANSI N101.4-1972
	1.58	"Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel (9/80)	ANSI N45.2.6-1978
1	1.64	"Quality Assurance Requirements for the Design of Nuclear Power Plants, "(6/76)	ANSI N45.2.11-1974
2	1.74	"Quality Assurance Terms and Definitions" (2/74)	ANSI N45.2.10-1973
3	1.88	"Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records" (Rev 2, 10/76)	ANSI N45.2.9-1974
	1.94	"Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants" (4/76)	ANSI N45.2.5-1974
	1.116	"Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems" (6/76)	ANSI N45.2.8-1975
	1.123	"Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants" (7/77)	ANSI N45.2.13-1976
	1.144	"Guidance on Quality Assurance Requirements During Design and Procurement for Auditing of Quality Assurance Programs for Nuclear Power Plants" (9/80)	ANSI N45.2.12-1977
	1.146	"Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants" (8/80)	ANSI N45.2 23-1978

1 Exception is taken to Regulatory Guide 1.64 6/76, regulatory position C2 in that the designer's immediate Supervisor may perform design verification in exceptional cases when the Supervisor is the only qualified engineer available. When the designer's immediate Supervisor performs the design verification, justification is individually documented and approved in advance by the Supervisor's management.

2 Exception is taken to Regulatory Guide 1.74 2/74 in that definitions of terms may be altered from the specific text of ANSI N45.2.10 to more closely fit the requirements of the Quality Assurance Program. For situations where ANSI N45.2.10 terms and definitions conflict with Code terms and definitions as defined in NCA-9000 of the Winter 1981 Addenda, Section III, PSI may use the best of the two terms and definitions to meet the requirements of the program.

3 Exception to ANSI N45.2.9-1974 is taken in the design of the quality records storage facility at the Marble Hill Nuclear Generating Station. The alternatives are the use of wind loading for a 50-year occurrence design wind as described in Section 3.3.1 of the Marble Hill PSAR and a two (2) hour fire rating meeting NFPA No. 232.

CODE COMMITMENT

ASME Boiler and Pressure Vessel Code, Section III, Division 1.

ASME Section XI - Division 1 - Rules for Inservice Inspection of Nuclear Power Plant Components.

The PSI quality assurance policy and objectives were promulgated in written form and utilized as the basis for development of Project Quality Assurance Manual and implementing Procedures as well as performance of initial quality-related activities. The corporate quality assurance policy prefaces each copy of the Project Quality Assurance Manual originally issued October 7, 1974, and revised July 16, 1982. The Project Quality Assurance Manual has been distributed to appropriate levels of management and all organizations concerned with quality-related activities for the Marble Hill Project. Activities affecting quality initiated prior to the submission of the PSAR include:

a. selections of architect-engineer, NSSS supplier, and fuel manufacturer (initial core and first reload);

b. development of the PSAR;

c. establishment of design basis criteria; and

d. meterological, geotechnical, and geological site surveys.

Prior to October 7, 1974, these activities were surveyed for compliance with 10 CFR 50, Appendix B, and Gray Book requirements. After October 7, 1974, all quality-related activities were controlled utilizing the provisions of the Quality Assurance Program Manual. Prior to the issuance of the Quality Assurance Program Manual, the quality of the activities performed was verified to be in conformance with the requirements of 10 CFR 50, Appendix B and the Gray Book by review and audit. This included:

a. reviewing the audits, surveillance, and quality assurance program of contractors conducting quality-related activities.

b. reviewing prospective principal contractors' quality assurance program descriptions for adequacy and compliance with pertinent regulations, standards and guidelines.

c. auditing of ongoing quality-related activities based on draft quality assurance procedures and experience with assistance provided by a consultant.

The PSI Quality Assurance Program Manual content was initially defined utilizing the projected PSI scope of involvement in project quality-affecting activities. All drafts of the Quality Assurance Program Manual and procedures were reviewed by PSI corporate managers, project personnel, and quality assurance personnel to assure consistency with PSI policies and objectives.

The Project Quality Assurance Manual was reviewed and approved by the Senior Vice President-Nuclear Division prior to issuance. The distribution of the Project Quality Assurance Manual is controlled by assigning unique copy numbers to each manual and requiring written acknowledgement of receipt by receiving organizations. Changes to manuals require the prior approval of the Executive Director-Nuclear Quality Assurance, the Vice President-Nuclear Services and the Senior Vice President-Nuclear Divison. Changes to Project Management Procedures require approval by the Executive Director-Nuclear Quality Assurance and the Vice President-Nuclear Services. If the requested Quality Program change requires a SAR amendment, the Quality Assurance Department is responsible for drafting the proposed amendment. Project Management Procedures will describe the review, approval and distribution controls for SAR amendments.

PSI requires that all principal contractors have an implemented quality assurance program that satisfies the requirements of 10 CFR 50, Appendix B. PSI annually evaluates the quality assurance program of its principal contractors and contractors providing items or services purchased by PSI. PSI requires that its principal contractors and contractors review and approve the quality assurance programs of their subcontractors and pass on applicable quality assurance requirements to subtiers.

1.2.4 Program Documentation

The PSI Quality Assurance Program is described by the PSI Project Quality Assurance Manual and the ASME Quality Assurance Manual and is implemented by PSI program implementing procedures. The Project Quality Assurance Manual details the PSI organizational structure as it relates to quality assurance; identifies the functions, duties, and responsibilities of key departments and individuals; describes interrelationshios and interfaces among internal and external organizations; delineates Program requirements; and outlines methods of implementation.

Program implementing procedures provide detailed direction for implementation of the Program requirements and methods addressed by the Project Quality Assurance Manual and the ASME Quality Assurance Manual.

1.2.4.1 Description of PSI ASME Code Program

The PSI Project Quality Assurance Manual has been developed to address PSI's responsibilities as an Owner as defined by the ASME Code, and to address non-ASME Code activities for safety-related construction.

The PSI ASME Quality Assurance Program has been developed to assure that PSI responsibilities as an N-Certificate Holder for piping systems comply with ASME Code requirements and to ensure achievement of the highest feasible degree of functional integrity of piping systems. The program was approved and issued on January 2, 1980 and became effective for implementation on February 8, 1980. A Certificate of Authorization has been issued by the ASME.

a. General Responsibilities of PSI as Owner

1. The Project Quality Assurance manual defines PSI's responsibility as an Owner under the applicable rules of NCA 3200 of the ASME Code.

2. PSI has obtained an Owner's Certificate of Authorization as required by the ASME Code.

3. PSI will certify and file the Owner's Data Report as required by NCA 3270 of the ASME Code.

4. PSI or its designee will assure that overpressure protection requirements are designated for each component or system.

5. PSI has obtained a written agreement with an Authorized Inspection Agency.

6. Preparation of Design Specifications is performed by PSI or its Design Subcontractor. The Design Specifications are reviewed by the PSI Project Engineering Manager to assure that ASME Code requirements are met. The Design Specifications are certified by PSI or its designee in accordance with ASME Code requirements.

7. Review and release of Design Specifications is performed by PSI Project Engineering and Quality Assurance to assure inclusion of ASME Code requirements.

8. Review of component manufacturers' Quality Assurance Programs and ASME Code authorizations is performed by PSI Quality Assurance.

9. Periodic surveillance at the component manufacturers' facilities is performed by PSI Quality Assurance to determine compliance with their approved ASME Quality Assurance Program.

10. PSI Project Engineering reviews technical changes to the Design Specifications to assure compliance with ASME Code.

11. PSI Project Engineering or its qualified Design Subcontractor reviews and certifies the review of Component Design Reports.

12. Physical receipt inspection and review of documentation is performed by PSI Quality Assurance upon delivery of the component to the project site.

b. General Responsibilities of PSI as an N-Certificate Holder

1. The Executive Director-Nuclear Quality Assurance under authority from the Senior Vice President-Nuclear Division has been delegated responsibility and authority for implementation and maintenance of the ASME Quality Assurance Program as well as evaluating its effectiveness.

2. The PSI Project Engineering Manager is responsible for design activities associated with the Marble Hill Project.

3. Sargent & Lundy Engineers have been retained by PSI as the Design Subcontractor for all ASME Code piping systems except for reactor coolant piping systems for the Marble Hill Project.

4. Westinghouse has been selected by PSI as the Design Subcontractor for reactor coolant piping systems.

5. The Design Subcontractors are responsible for:

   i. Reviewing the requirements of the Certified Design Specifications.

   ii. Performing stress analysis calculations.

   iii. Preparing drawings and specifications.

   iv. Preparing Design Reports or Load Capacity Data Sheets as applicable.

v. Certification of the Design Report or Load Capacity Data Sheet, when required by the Code.

vi. Reconciliation of changes to specifications and drawings with the Design Report.

vii. Assuring that applicable requirements of the Certified Design Specification and of the Code are correctly translated into specifications and drawings.

c. PSI's Technical Responsibility for Design Efforts (N-Certificate Holder)

1. The Project Engineering Manager reviews the Owner's Certified Design Specifications.

2. The Project Engineering Manager subcontracts design work to the Design Subcontractors in accordance with the ASME Quality Assurance Program. The Design Subcontractors prepare and certify the Design Reports.

3. The Project Engineering Manager reviews the Design Reports to assure that they conform to applicable Code requirements and the Owner's Certified Design Specifications.

4. The Design Subcontractors provide PSI with engineering and construction drawings for piping systems. The drawings are reviewed by PSI Project Engineering.

5. Engineering and technical documents are controlled in accordance with the document control provisions of approved Quality Assurance Programs.

1.2.5 Quality Assurance Training

1.2.5.1 Project Training

An integral part of the PSI Quality Assurance Program is its provision for the training and indoctrination of project personnel and quality assurance personnel in the techniques of quality assurance. The training program is established under the administrative supervision of the Division Personnel Manager. Implementation of the training program is the responsibility of the Division Training and Development Manager.

The training program applies to all PSI personnel who perform project-related activities affecting quality. Participation in the program is mandatory. The selection of participants and the degree of required participation is determined by the responsible Section Manager. The training program is conducted through the use of such techniques:

a. lectures,

b. seminars,

c. demonstrations,

d. industry committee participation,

e. workshops, and

f. field trips.

PSI has developed a comprehensive training program. This program is intended to supplement the technical expertise of project personnel in specific areas, to provide familiarization in project procedures, and to indoctrinate project personnel in site rules. The program also provides documentation of training.

1.2.5.2 Indoctrination and Training Program

The Quality Assurance Program requires indoctrination and training to assure that personnel performing quality-related activities are instructed as to the purpose, scope and implementation of the Quality Assurance Manuals, procedures, and the reporting requirements of 10 CFR Part 21. Training includes instruction on principles and techniques of the activity being performed. The training program is divided into two levels, general quality assurance indoctrination and job specific training (initial and on-going). Training, qualification and certification necessary for those activities requiring qualification and certification is accomplished prior to performing the activity.

The Quality Assurance Department is responsible for approving the adequacy of the lesson plans used for general quality assurance indoctrination. The Nuclear Division Training and Development Manager is responsible for conducting the quality assurance indoctrination for all new PSI and PSI consultant personnel.

The Division Training and Development Manager is responsible for ensuring that each PSI Section develops a Section Training Plan for required job specific training and for the development and maintenance of Training and Development Guides used to specify the initial required job specific training for each of the job titles identified in Section Training Plans. The guides identify required reading, classroom training, on-the-job training, required testing or examination (or a combination of any of these) for personnel newly entering each job title.

Training requirements may be individualized to the person involved, taking into consideration past experience and previous training. The guides are approved by the responsible Section Managers, the Division Training and Development Manager and by the Quality Assurance Department for applicable Quality Assurance Department guides.

Ongoing training is conducted in a timely manner when applicable procedures, program manuals, regulations, codes or standards requirements are added or revised in order to assure that personnel maintain the ability to adequately perform their assigned duties and responsibilities. When informed by responsible Section Managers, the Division Training and Development Manager ensures the accomplishment of ongoing training through the assignment of required reading and by performing group discussion or classroom training whenever applicable procedures or program requirements are added or revised. When classroom training is utilized, a training lesson plan is developed. The training of personnel is structured to provide the necessary background in quality assurance and instructions regarding performance of activities affecting quality. Personnel conducting training are knowledgeable of the subjects being presented. In the case of job specific training being conducted for the purpose of certifying personnel to perform an activity, the individual performing the training shall be certified on at least the level or position to which personnel attending the training will be certified.

PSI's contractors and suppliers are responsible for developing and implementing training and qualification programs for their personnel in accordance with PSI procurement document requirements. The Division Training and Development Manager is responsible for coordinating PSI participation in contractor training.

1.2.5.3 Records

Records will be maintained identifying each employees' participation in the indoctrination program.

1.2.5.4 Other

In addition to the above, PSI is developing posters and other materials that will be prominently displayed on the jobsite as a reminder of PSI's concern and commitment to quality and its policy of no recrimination for reporting.

1.2.5.5 Personnel Qualification

To ensure that the PSI Executive Director-Nuclear Quality Assurance is able to perform his duties adequately, a set of minimum qualification requirements has been designated as follows:

Executive Director-Nuclear Quality Assurance

The Executive Director-Nuclear Quality Assurance shall have a broad background and working knowledge of power plant construction, operation and maintenance. In addition, the Executive Director-Nuclear Quality Assurance shall have the ability to establish internal and external channels of communication to successfully achieve company goals and objectives. Educational requirements include, as a minimum, a baccalaureate degree in engineerng or science plus a minimum of five years experience in a responsible position in engineering or quality assurance, or high school diploma plus a minimum of fifteen years in engineering or technical activities, at least five of which must be in quality assurance or quality control. Two years of the experience should be associated with nuclear facilities.

1.2.6 Control of Activities

The PSI Quality Assurance Program requires that all quality-related activities be conducted using approved procedures. These procedures specify the necessary conditions, appropriate equipment, suitable environment, and necessary prerequisites for conducting activities.

PSI requires that its principal contractors exercise the same type of controls over all of their quality-related activities.

PSI Quality Assurance responsibilities under the Quality Assurance Program include the following:

a. reviewing safety-related design base criteria documents;

b. reviewing non-replicate design output documents; changes to replicate design documents and replicate documents relating to significant licensing issues, complex interfaces, new regulatory requirements and product experience;

c. preparing quality assurance specifications for contractors and suppliers;

d. evaluating non-replicate procurement specifications, and changes from replication in replicate specifications;

e. conducting pre-award evaluations of prospective contractors/suppliers, as appropriate;

f. reviewing proposals from prospective contractors/suppliers;

g. reviewing and approving contractor/supplier quality assurance programs against the requirements of 10 CFR 50, Appendix B, as appropriate;

h. conducting surveillance of construction activities;

i. conducting system and structure quality assurance record review;

j. conducting surveillance of preoperational and startup testing activities;

k. performing internal PSI audits and external audits of principal contractors, selected subcontractors and suppliers;

l. approve corrective action and selected nonconformance dispositions;

m. monitoring and performing trend analysis;

n. controlling and maintaining the Project and ASME Quality Assurance Manual.

Resolution of differences of opinion between Quality Assurance personnel and other department or organization personnel is accomplished through discussion and mutual agreement between participants, culminating at the Senior Vice President-Nuclear Division. PSI will provide notification to the NRC in accordance with the requirements of 10 CFR 50.55 of changes to the Quality Assurance Program Description.

1.2.7 Management Review

The Senior Vice President-Nuclear Division is responsible for reviewing and evaluating the status and effectiveness of the PSI Quality Assurance Program. An annual independent audit shall be performed at the direction of the Senior Vice President-Nuclear Division which assesses the scope, implementation, and effectiveness of the Quality Assurance Program to assure that the program is meaningful, effectively complies with applicable codes, standards and regulatory guides and effectively implements all elements of the Quality Assurance Program as stated in the PQAM. Reports containing the results of the audit shall be reviewed and appropriate action taken as directed by the Senior Vice President-Nuclear Division.

Quality Assurance Programs of principal contractors are also evaluated and monitored. Prospective principal contractors were qualified by evaluation of historical quality data and/or conduct of quality assurance surveys (audits) by PSI personnel. Subsequent to contract award, PSI initiates planned and periodic audits of principal contractors' facilities, records, and activities to assure implementation of, and compliance with, documented plans and procedures. All of the review, evaluation, and auditing activities are prescribed by PSI program implementing procedures.

1.3 Design Control (PSI)

1.3.1 Regulatory Requirements and Standards

PSI has delegated primary responsibility for development of design base criteria (including regulatory requirements, design bases, and quality standards) to Sargent & Lundy (S&L) and Westinghouse. Design of Marble Hill Units 1 and 2 replicate to the maximum extent practicable, the design of Commonwealth Edison Company Byron Station. The replication concept does not affect the PSI Quality Assurance policy to control those activities necessary to assure that quality objectives are achieved during design and procurement. PSI project and quality assurance organizations review and approve classification of structures, systems, and components assigned by S&L and Westinghouse. Approval of classification of Westinghouse supplied equipment shall be made against ANSI N18.2-1973. Subsequent to approval of structure, system, and component classifications, PSI reviews and approves non-replicate design base criteria and any necessary changes to replicate design base criteria developed by S&L and Westinghouse for safety-related items.

The design process, that of translating applicable design base criteria into specifications, drawings, procedures, and instructions, is the prime responsibility of S&L and Westinghouse. Design of Marble Hill Units 1 and 2 is based upon duplicating to the maximum extent practicable, the Byron Station design. Replicate designs may be modified because of unique site related features, economic considerations, licensing requirements, and reliability improvements. The S&L and Westinghouse design control program for Marble Hill is devised to handle both replicate and non-replicate design documents. The PSI internal design review system is devised to handle both replicate and non-replicate design specifications and drawings. PSI shall review design procedures and instructions of these organizations and ensure that provisions are incorporated for correct performance of design activities, including specifying appropriate quality standards in design documents and identifying, documenting, and controlling deviations from such standards and subsequent corrective actions. While most design verification is completed prior to procurement, certain analyses such as piping stress reports require verification after installation. This verification will be completed prior to fuel load. Documentation will be such that unverified portions are appropriately identified and controlled. PSI shall verify proper implementation of approved procedures and instructions through audit of principal contractor design activities, and records as well as through review of resulting design output documents.

1.3.2 Application Review

Review and selection for suitability of application of materials, parts, equipment, and processes that are essential to safety-related systems, structures and components shall be conducted by principal contractors. The measures PSI will employ to assure the adequacy of such application reviews are by review of principal contractor's programs to assure conformance to commitments and adequacy of methods, and periodic audit of principal contractor's activities, facilities, and records to verify implementation of procedures and instructions.

Since design reviews were performed during the Byron Station design, it will not be required that they be performed again except in the case where the design is not duplicated. Selection of materials, parts, equipment, and processes must include the use of valid industry standards and specifications, material and prototype hardware testing programs, and design reviews.

1.3.3 Design Control

Application of replicate and non-replicate design control measures to such aspects of design as reactor physics; seismic, stress, thermal, hydraulic radiation, and accident analysis; materials compatibility; and accessibility for maintenance, inservice inspection, and repair shall be formulated and presented as written procedures and instructions by cognizant design contractors. The design contractors shall also delineate acceptance criteria for inspections and tests of structures, systems, and components under their design responsibilities. PSI ensures the adequacy of design control measures and acceptance criteria utilizing the basic methods outlined in Subsection 1.3.2.

Design changes, modifications or new design features of the replicate design shall have design reviews and controls equivalent to the original design. Design documents are controlled to assure distinction of replicate from non-replicate identification. In addition, PSI shall review procurement specifications and safety-related selected design output documents based on complexity, licensing issues, experience with similar designs, and new regulating requirements, and perform comprehensive design reviews of selected system interrelationships to further develop confidence in the effectiveness of design control methods. No change is authorized for construction until the design change is approved to assure that designs are kept current with as-built configurations. PSI Project Management Procedures require that approved drawings and specifications be updated to incorporate approved changes after a fixed number of changes or a designated time period, whichever is sooner.

1.3.4 Design Verification and Checking

Provisions for verifying or checking design adequacy under the most adverse conditions, including the identification of positions or organizations responsible, shall be established by the cognizant design contractors. During review of safety-related suppliers/contractors' written procedures and instructions, PSI will assure that measures such as design reviews, use of alternative calculational methods, or qualification testing are prescribed and that the verifying or checking process is performed by authorized individuals or goups other than those who performed the original design or the designer's immediate supervisor. The Quality Assurance Program requires that computer codes used for design verification and analysis shall be documented and qualified by testing or other calculational means and approved for a particular use prior to use. Audits of contractors' activities, facilities, and records and review of selected safety-related design documents by PSI ensure compliance with written procedures for design verification of non-replicate designs and proper inclusion of replicate requirements in design documents.

1.3.5 Design Interface Control

S&L is responsible for verifying replicate and non-replicate features and identifying the external design interfaces on the Marble Hill Project. Each individual design organization is responsible for controlling interfaces between internal groups and positions.

External design interface control measures include review, approval, release and distribution of design documents and changes thereto. Design documents shall also be controlled to prevent inadvertent use of superseded design information. These control measures are prescribed by S&L procedures and instructions, reviewed and approved by PSI, and verified through audit.

1.3.6 Design Change Control

Design changes and field changes for the Marble Hill Project shall be reviewed, approved, released, and distributed by the design organization responsible for the original design. The cognizant design organization shall utilize written procedures and instructions acceptable to PSI for controlling design changes and field changes. The PSI Marble Hill Project organization will utilize written procedures for screening, handling, and controlling field change requests. PSI Project Engineering Section will exercise final approval for change requests, design changes, and field changes which affect FSAR commitments or design criteria.

The design change process shall be monitored through audit of design organizations and construction management groups by PSI quality assurance personnel. Audits also ensure that design documents and reviews, records, and changes thereto are collected, stored, and maintained in a systematic and controlled manner in accordance with written procedures.

1.4 Procurement Document Control (PSI)

1.4.1 Procurement Document Control

Non-replicate procurement documents prepared by S&L for the Marble Hill Project shall be reviewed by PSI Project Engineering and Quality Assurance personnel prior to issuance.

Changes to replicate procurement documents shall be given the same review and control as non-replicate procurement documents, including quality assurance review and approval. Methods and responsibilities for the PSI review are prescribed by a PSI Project Management Procedure governing the procurement document review process. A technical review of safety-related procurement documents by the PSI Project Engineering Section shall assure that they contain or reference the following technical requirements as applicable.

a. regulatory requirements;

b. components and equipment identification and requirements;

c. drawings;

d. specifications;

e. codes and industrial standards;

f. test and inspection requirements; and

g. special process instructions for such activities as welding, heat treating, nondestructive examination, and cleaning.

A review of safety-related procurement documents by the PSI Quality Assurance Department shall assure that the documents contain the following:

a. identification of the applicable 10 CFR 50, Appendix B, requirements which must be complied with and described in the supplier's quality assurance program.

b. identification of the documentation (e.g., drawings, specifications, procedures, inspection and as-built drawings, inspection and test records, personnel and procedure qualifications, and material, chemical, and physical test results) to be prepared, maintained, and submitted, as applicable, to the purchaser for review and approval;

c. identification of those records which shall be retained, controlled, maintained, or delivered to the purchaser prior to use or installation of the hardware;

d. requirements for the purchaser's right of access to supplier's facilities and applicable records for source inspection, surveillance or audit; and

e. provision for supplier reporting and disposition of nonconformances from procurement requirements.

Procurement documents developed for PSI by Sargent & Lundy for replicate designs may be accepted after review and issuance of a certificate of conformance to replicate criteria by Sargent & Lundy. PSI reviews of procurement documents shall be documented as specified in PSI program implementing procedures and retained as quality assurance records.

1.4.2 Procurement Document Control Responsibilities

Westinghouse has been delegated control responsibility for preparation, review, approval, and issuance of procurement documents and changes or revisions thereto associated with the NSSS. Sargent & Lundy or PSI may prepare and review procurement documents and changes or revisions thereto associated with the Balance of Plant. PSI will approve and issue procurement documents to bidders. PSI requires S&L and Westinghouse to submit to PSI written quality assurance programs governing these activities. PSI reviews and accepts the programs in accordance with written PSI review procedures. The PSI review ensures that the following aspects are included:

a. Procurement document control responsibilities are clearly delineated.

b. Action seq ences for preparation, review, approval, and issuance of procurement documents are specified.

c. Internal reviews of procurement documents are conducted by qualified personnel.

d. Internal reviews of procurement documents determine that quality requirements are correctly stated, inspectable, and controllable; there are adequate acceptance and rejection criteria; and the document has been prepared in accordance with Quality Assurance Program requirements.

e. Changes or revisions to procurement documents are subject to the same review and approval requirements as the original documents.

The PSI audit program of principal contractors shall be utilized to confirm and verify implementation of procedures or instructions accepted by PSI.

1.4.3 Supplier Requirements

The quality assurance requirements prepared and issued by PSI to suppliers/contractors includes requirements to pass on applicable quality assurance requirements to subtier contractors or suppliers. Therefore, it is incumbent upon suppliers/contractors to prepare procurement documents for suppliers which require an established and implemented supplier quality assurance program for purchased materials, equipment, and services to an extent consistent with their importance to safety. PSI confirms through audits or review that procurement documents include Quality Assurance Program requirements for suppliers.

PSI shall evaluate the quality assurance program of its contractors/ suppliers prior to award of contracts or issuance of purchase orders. PSI shall also require that its principal contractors, contractors and suppliers evaluate the quality assurance programs of their subcontractors and suppliers to assure these subcontractors/suppliers meet the PSI quality assurance requirements prior to award of contracts or purchase orders.

The measures employed by PSI for control of procurement documents as described above are independent of whether the purchase of items, materials, or services is for original equipment or spare or replacement items. Therefore, controls for spares or replacements are equivalent to those used for original equipment.

1.5 Instructions, Procedures, and Drawings (PSI)

1.5.1 Documentation and Implementation

PSI activities include project management, design control, procurement control, construction management, preoperational and startup testing, and quality assurance. Responsibility for functional activities affecting quality such as design and engineering, procurement, manufacturing, fabrication, construction, erection, installation, testing, and inspection have been delegated to principal contractors and subtier contractors. PSI requires each contracting organization to develop and implement written instructions, procedures, or drawings for performance of all quality-related activities, including quality assurance or quality control audits of internal and external functions. Clear delineation of the sequence of actions to be accomplished in the preparation, review and control of instructions, procedures, and drawings is provided by PSI program implementing procedures and is required of all PSI contractors.

PSI shall verify the existence and satisfactory implementation of required instructions, procedures, and drawings through its audit and surveillance programs (internal and external).

1.5.2 Acceptance Criteria

For activities where specific qualitative or quantitative standards exist, itemized acceptance criteria shall be included in the instructions, procedures, or drawings governing the activity. Inclusion of appropriate acceptance criteria shall be assured during review and approval of specifications, procedures, or drawings. Reviewers and approval authorities are designated in applicable PSI program implementing procedures.

1.6 Document Control (PSI)

1.6.1 Control Procedures

PSI has established procedures to ensure that PSI-originated documents such as drawings, procedures, and specifications, including changes thereto, are reviewed for adequacy and approved for release by authorized personnel. These procedures also prescribe methods for distribution and receipt acknowledgement of documents requiring updating at the location where the prescribed activity is performed. PSI procedures identify the individual or groups responsible for review, approval and distribution of these documents.

PSI procedures establish requirements for documemt control which include the following:

a. Controlled documents, and changes thereto, are reviewed prior to release to assure that the quality requirements are sufficiently, clearly, and accurately stated and authorized.

b. Individuals or groups responsible for reviewing, approving, and issuing documents and revisions thereto are identified.

c. Changes are reviewed and approved by the same organization(s) who performed the original review and approval unless other qualified organization(s) are designated in writing.

d. Approved changes to instructions, procedures, drawings, and other appropriate documents are promptly issued.

e. A document indexing system containing listings of current revisions and changes to instructions, procedures, specifications, drawings, and procurement documents is utilized to assure that obsolete or superseded documents are not used. Superseded documents which are retained for reference purposes are marked or identified as "Superseded", "Historical", "Void", or "Uncontrolled."

f. Documents are distributed promptly to ensure availability prior to commencement of work for which they are needed.

g. Document copies which are microfilmed and retained for reference purposes shall have their use controlled by project procedures which require controls similar to "e" above, or verification of proper revision against the indexing system and the list of effective pages, if applicable, prior to use in activities affecting quality.

1.6.2 Review and Approval

Documents which are safety-related, and changes thereto, shall be reviewed and approved by the same organizations who performed the original review and approval unless other qualified organizations are designated in writing to perform these functions. Types of documents which are controlled include:

a. Design documents, such as Design Contractor-Prepared Drawings, Field Change Requests, and Engineering Change Notices.

b. Procurement Specifications.

c. Manufacturing documents, such as Technical Manuals.

d. Installation-Construction documents, such as Contractor Procedures.

e. Quality Assurance Manuals and Project Management Procedures.

f. Startup Manual

g. FSAR and related Design Criteria Documents.

PSI requires that principal contractors, contractors, and suppliers establish programs for document control which comply with 10 CFR 50, Appendix B, and PSI requirements. PSI shall review and accept these programs and subsequently confirm proper implementation and verify their effectiveness through audit or surveillance of facilities, activities, and records.

1.7 Control of Purchased Material, Equipment, and Services (PSI)

1.7.1 Conformance Assurance

PSI assures that material, equipment, and services procured by or for PSI conform to procurement document requirements. Measures employed by PSI include evaluation and selection of suppliers; surveillance of suppliers' facilities; inspection of procured items at the source of supply or upon receipt; and examination, acceptance, and retention at the plant site of documentary evidence of conformance to procurement requirements. PSI delegates responsibility for implementation of some of these measures to principal contractors or consultants but controls these organizations through review, audit, or surveillance.

PSI has conducted evaluations of the S&L and Westinghouse organizations to assess their capability to provide acceptable quality services and products. The evaluations were accomplished utilizing PSI management, engineering, and quality assurance personnel. S&L and Westinghouse were judged acceptable based upon the following:

a. capability to comply with the elements of 10 CFR 50, Appendix B.

b. historical evidence of providing quality items and services; and

c. facilities, personnel, and quality assurance programs capable of meeting design, manufacturing, and quality requirements (based upon surveys by PSI)

Prior to bid award, Quality Assurance participates in evaluation of the bid, assures there are no unresolved exceptions to quality requirements and that the supplier/contractor has been evaluated for adequacy of its Quality Assurance Program and for Quality Assurance capability. The Project Purchasing Section maintains an approved supplier/contractor list.

PSI Quality Assurance has overall responsibility for the establishment and direction of the surveillance program of its contractors. PSI may delegate responsibility for performance of surveillance at its contracors facilities to its architect-engineer or other qualified agents. PSI Quality Assurance may select personnel to participate in the surveillance program from other departments or organizations within PSI based on the experience, background, and qualification of these personnel. Surveillance of PSI contractors, whether conducted by PSI or its agents, shall be performed by qualified personnel and conducted in accordance with written procedures to verify compliance with quality requirements.

Westinghouse and other contractors are responsible for performing surveillance at the subcontractors facilities in accordance with written Quality Assurance Programs to verify compliance with quality requirements. PSI shall review and accept written Quality Assurance Programs of the principal contractors. PSI may select surveillance and tests for which PSI may accompany the principal contractor or contractors

during their surveillance of suppliers. PSI also requires the principal contractor and contractors to notify PSI prior to performance of these selected surveillance points if required. During review and acceptance of surveillance procedures, PSI shall ensure that the procedures provide for:

a. instructions that specify the characteristics or processes to be witnessed, inspected, or verified, and accepted; the method of surveillance and the extent of documentation required; and those responsible for implementing these instructions (including qualification requirements for surveillance personnel); and

b. audits and surveillance which assures that the supplier complies with all quality requirements. Surveillance should be performed on those items where verification of procurement requirements cannot be verified upon receipt.

Where required, S&L, Westinghouse, and/or designated agents shall provide source inspectors to ensure quality compliance at suppliers' facilities. PSI Quality Engineering determines the extent to which purchased items will be verified by PSI at sources. Source surveillance and receipt inspection is conducted by PSI Quality Assurance in accordance with approved plans and checklists. Receipt inspections at the construction site shall be performed by PSI Quality Assurance for material procured by Westinghouse or PSI (owner-furnished material) and by the construction contractor for material which is contractor-procured. Inspections shall be performed in accordance with written procedures, reviewed and accepted by PSI, which include the following provisions:

a. Material, equipment, or components are properly identified and correspond with associated documentation.

b. Specific inspection instruction and acceptance criteria are delineated.

c. Inspections are performed and materials, equipment, components, and acceptance records are judged acceptable prior to installation or use.

d. Inspection records or quality release forms (certificates) of conformance attesting to the acceptance of materials, equipment, and components are completed and made available at the power plant site prior to installation or use.

e. Items accepted or released are identified as to their inspection status prior to forwarding them to a controlled storage area or releasing them for installation or further work.

f. Nonconforming items are segregated, controlled, and clearly identified until proper disposition is made.

In addition to inspection records or quality release forms completed by the source or receipt inspector, suppliers of items affecting the quality of the nuclear plant shall be required to furnish the following records:

a. Quality release forms that specifically identify (e.g., by purchase order number, specifications and revisions, component or equipment identification) the purchased material or equipment and the specific procurement requirements (codes, standards, specifications, and revisions) not met by the items; and

b. Quality release forms that identify any procurement requirements which have not been met together with a description of those deviations with approved disposition of "use-as-is" or "repair".

These quality release forms shall be reviewed during receipt inspection by PSI Quality Assurance. PSI shall assure that the quality release review is performed by a qualified individual.

1.7.2 Audits and Surveillance

PSI shall verify adherence to procedures and instructions for control of purchased material, equipment and services through audits of principal contractors and selected suppliers and contractors as described in Subsection 1.18 of this document.

PSI Quality Assurance performs surveillance of construction contractors. This surveillance effort includes the following:

a. assignment of personnel and performance of surveillance

b. formalized written reporting of surveillance activities and results based on data and commments recorded during surveillance.

c. retention of surveillance reports as quality assurance records, and

d. assuring deviations are identified and that corrective action is implemented.

1.8 Identification and Control of Materials, Parts, and Components

PSI requires that principal contractors and contractors identify and control materials, parts, and components in accordance with 10 CFR 50, Appendix B, and applicable codes and standards, and that these requirements be passed on to subtier contractors or suppliers as appropriate. PSI will maintain cognizance of the identification process by reviewing and accepting contractors' and suppliers' written procedures or instructions governing this activity. The review shall assure that the following elements are incorporated into procedures and instructions:

a. Procedures and instructions govern identification and control of materials, parts, and components including partially fabricated subassemblies.

b. Identification requirements are determined during initial planning stages.

c. Mechanisms for traceability of identification of materials and parts to the appropriate documentation (drawings, specificatons, purchase orders, manufacturing and test documents, deviation reports, and physical and chemical mill test reports) are delineated.

d. Locations and methods of identification are selected so as not to affect the function or quality of the item.

e. Effective measures for verification of correct identification are prescribed including documentation of verification prior to release for fabication, assembling, shipping, or installation.

f. Consumable materials which impact safety, such as weld filler, metals, grout, preservatives, coating materials, and certain lubricants are identified, stored and controlled to protect quality.

PSI will verify adherence to procedures and instructions for identification and control of materials, parts and components through audits of principal contractors, contractors, subcontractors and suppliers of safety-related items as described in Subsection 1.18 of this document.

PSI shall verify adherence to procedures and instructions by construction contractors for identification and control of materials, parts and components through surveillance as described in Subsection 1.7 of this document.

1.9 Control of Special Processes (PSI)

There are certain processes the quality of which cannot be verified by direct inspection of the product. Such processes have been classified "special processes". PSI requires that the principal contractors and contractors provide controls to assure qualification of procedures and personnel required to perform special processes, including welding, heat treating, electrochemical machining, coating, cleaning and flushing, and nondestructive examination, and that these requirements be passed on to applicable subtier contractors or suppliers. Principal contractors and contractors are responsible for identifying those processes requiring special controls and the methods for qualifying or certifying equipment, procedures or personnel necessary for their performance.

PSI requires that contractors and suppliers establish measures for the control of special processes, which include the following:

a. Adequate performance and control of special processes such as welding, heat treating, and nondestructive testing.

b. Procedures, equipment, and personnel connected with special processes are qualified in accordance with codes, standards, and specifications, or when necessry, supplementary procedures.

c. Accomplishment of special processes performed by qualified personnel are documented by written process sheets, shop procedures, checklists, travelers, or equivalent, to provide for recording evidence of verification and, if applicable, inspection and process results.

d. An active file is maintained and kept current on qualification records of all special process procedures, equipment, and personnel performing special processes.

PSI will verify adherence to procedures and instructions for control of special processes through audits of principal contractors, contractors and suppliers of safety-related items as described in Subsection 1.18 of this document.

PSI will verify adherence to procedures and instructions by construction contractors for control of special processes through surveillance as described in Subsection 1.7 of this document.

1.10 Inspection (PSI)

1.10.1 Inspection Program

Inspection programs shall be established and implemented by or for contractors or suppliers performing activities affecting the quality of safety-related products or materials. Inspection methods and responsibilities shall be prescribed by written procedures and instructions within each organization performing these activites. All such procedures and instructions will be reviewed and approved by PSI or a designated principal contractor. The reviews ensure that the following provisions are included:

a. Inspection personnel are identified and appropriately qualified in accordance with applicable codes, standards, and company training programs and are independent of the individual or groups performing the activity being inspected. Except for nondestructive examiners who are required to be qualified to SNT-TC-1A-1975, inspection and test personnel are required to be trained, qualified and certified to ANSI N45.2.6-1978.

b. Indirect control by monitoring processing methods, equipment, and personnel is used if direct inspection of processed material or products is impossible or disadvantageous.

c. Both inspection and process monitoring are used when control is inadequate without both.

d. Inspection procedures and instructions are made available with necessary drawings and specifications for use prior to performing inspections. Procedures, instructions, and checklists contain the following:

   1. identification of characteristics to be inspected,

   2. identification of the individuals or groups responsible for performing the inspection operation,

   3. acceptance and rejection criteria,

   4. a description of the method of inspection,

   5. verification of completion and certification of inspection,

   6. a record of the results of the inspection operations,

   7. specification of inspection methods to achieve the required accuracy

e. Inspectors' qualifications and certifications are kept current.

f. Replaced or reworked items are inspected in accordance with appropriate inspection requirements.

g. Modified or repaired items are inspected by methods which are equivalent to the original inspection method.

Receipt inspection of owner-furnished materials will be conducted by PSI Quality Assurance personnel.

PSI shall verify adherence to procedures and instructions for inspection through audits of principal contractors, contractors and selected subcontractors and suppliers as described in Subsection 1.18 of this document.

PSI shall verify adherence to procedures and instructions by construction contractors for inspection through surveillance as described in Subsection 1.7 of this document.

PSI Quality Assurance personnel will monitor quality-related activities of the PSI organizations and contractors at the Marble Hill site. Schedules of construction, erection, and installation activities shall be provided to PSI in advance of performance of these activities. PSI specifies Mandatory Hold Points at significant points in the process and requires documentation by PSI or its designated representatives. The activity shall not proceed past the Mandatory Hold Points without the written approval of the Quality Assurance Department.

Inspection staffing is planned in relation to short and long range schedules that identify manpower needs. In addition, Quality Assurance participates in regular project meetings that address specific schedule and work assignments. Work will not be allowed to proceed that is not adequately staffed by qualified inspectors from the contractors and PSI.

Westinghouse is the designated PSI representative for surveillance of NSSS manufacturing and fabrication subcontractors and is responsible for developing systems whereby mandatory inspection hold points are specified. These systems will be reviewed and approved by PSI as well as the resulting hold point/inspection schedule. PSI maintains the option to accompany Westinghouse personnel during witnessing or inspection at predetermined hold or notification points.

1.11 Test Control

1.11.1 Test Program

The PSI Quality Assurance Program includes requirements for manufacture, installation, prerequisite and preoperational testing. The Program includes requirements for test procedures or instructions to contain criteria for determining the required accuracy of test equipment, criteria for determining what tasks are required and for determining how and when testing activities are performed. Test results are documented, evaluated, and their acceptability determined by responsible individuals or groups.

Test procedures and instructions provide for the following:

a. The requirements and acceptance limits contained in applicable design and procurement documents.

b. Instructions for performing the test.

c. Test prerequisites such as calibrated instrumentation, adequate test equipment and instrumentation including their accuracy requirements, completeness of items to be tested, suitable and controlled environmental conditions, and provisions for data collection and storage.

d. Mandatory Hold Points for witness by PSI, contractor, or Authorized Nuclear Inspector (as required).

e. Acceptance and rejection criteria.

f. Methods of documenting or recording test data and results.

g. Provisions for assuring test prerequisites have been met.

Test records contain the following where applicable:

a. A description of the type of observation.

b. The data and results of the test.

c. Information related to conditions adverse to quality.

d. Inspector or data recorder identification.

e. Evidence as to be the acceptability of the results.

f. Action taken to resolve any discrepancies noted.

PSI requires contractors and suppliers performing fabrication and construction testing to develop procedures conforming with these requirements. After completion of required tests by contractors and suppliers and prior to fuel loading, prerequisite or construction verification tests and preoperational tests are performed by the PSI Startup organization under the supervision of the PSI Project Startup Manager. The Startup and Test Program within the scope of this Quality Assurance Program is described in Chapter 14 of the SAR including the establishment of responsibilities and functions of the Joint Test Group.

The Project Startup Manager is responsible for the planning, coordination, supervision, and execution of the Startup and Test Program. The Quality Assurance Department is responsible for review of test procedures or instructions, establishing mandatory hold points and verification activities as appropriate and for assuring the acceptability of test results.

PSI Quality Assurance verifies PSI, contractor and supplier compliance with test requirements and adherence to procedures and instructions during testing as described in Subsections 1.7 and 1.18.

1.12 Control of Measuring and Test Equipment

The PSI Quality Assurance specification requires that contracting organizations performing quality-related activities requiring use of measuring and test equipment establish measures to assure that tools, gauges, instruments, and other measuring and testing devices are of the proper type, range and accuracy for their application. To assure accuracy, the measuring devices are properly controlled, calibrated, and adjusted at specified periods or prior to use. PSI or its designated agent shall review the Quality Assurance Programs or procedures of applicable contractors to verify inclusion of the following provisions:

a. description of the calibration technique, calibration frequency, and maintenance and control of all measuring and test instruments, tools, gauges, fixtures, reference standards, transfer standards, and nondestructive test equipment which is to be used in the measurement, inspection, and monitoring of safety-related components, systems, and structures;

b. provisions for unique identification of measuring and test equipment and for correlation between calibration test data and the equipment to which it applies;

c. provisions for determination of calibration frequency requirements for equipment based on the required accuracy, purpose, degree of usage, stability characteristics, and other conditions affecting the measurements;

d. requirements for use of calibrating standards which have known relationships to nationally recognized standards, or if no national standards exist, the basis for calibration is accurately documented. The error of the calibration standard must be less than the error of production measuring and test equipment.

e. provisions for recording and maintaining records indicating the complete status of all items under the calibration system; and

f. provisions for conducting investigations to determine the validity of previous inspections performed when measuring and test equipment is found to be out of calibration.

PSI requires that calibration standards used to calibrate M&TE have an uncertainty error of no more than 1/4 (25%) of the tolerance of the equipment being calibrated unless limited by the practical limits of the "state-of-the-art". Calibrating standards are required to have greater accuracy than standards being calibrated unless limited by the practical limits of the "state-of-the-art".

The following organizations are responsible for control and calibration of PSI M&TE.

a. PSI Quality Assurance - M&TE used for civil inspection and test and receipt inspection.

b. PSI Startup - M&TE used for PSI prerequisite and preoperational testing.

PSI shall verify adherence to procedures and instructions for control of measuring and test equipment through audits of principal contractors and selected contractors and suppliers as described in Subsection 1.18 of this document.

PSI shall verify adherence to procedures and instructions by construction contractors for control of measuring and test equipment through surveillance as described in Subsection 1.7 of this document.

1.13 Handling, Storage, and Shipping

The PSI Project Quality Assurance Manual governs the handling and storage of owner-furnished materials at the construction site. Instructions are developed by the PSI Marble Hill Project organization to supplement special procedures and requirements issued by the suppliers and principal contractors.

These instructions will be reviewed by PSI Quality Assurance to assure that the following provisions are included;

a. Procedures and instructions accurately reflect and comply with design and specification requirements.

b. Special handling, preservation, storage, cleaning, packaging, and shipping requirements are delineated.

c. Activities are accomplished by appropriately trained and experienced individuals.

d. Special protective environments such as inert gas atmosphere, specific moisture content levels, and temperature levels are specified when necessary for particular products.

PSI has delegated the handling, storage, shipping, cleaning, and preservation of material and equipment to contractors and suppliers where not performed by PSI. Organizations performing handling or shipping activities shall develop work and inspection instructions or procedures for accomplishing these activities. Instructions or procedures so developed by contractor and suppliers are reviewed and accepted by PSI or its designated agent.

PSI shall verify adherence to procedures and instructions for handling, storage and shipping through audits of principal contractors, contractors and selected subcontractors and suppliers as described in Subsection 1.18 of this document.

PSI shall verify adherence to procedures and instructions by construction contractors for handling, storage and shipping through surveiilance as described in Subsection 1.7 of this document.

1.14 Inspection, Test, and Operating Status

The PSI Quality Assurance Program requires measures that provide for the status of inspections and tests performed on structures, systems, or components by use of stamps, tags, labels, routing cards, or other suitable means. These measures provide for the identification of items which have satisfactorily passed required inspections and tests, and provisions to preclude inadvertant bypassing of such inspections and tests.

PSI requires that principal contractors and contractors establish measures which include the following:

a. that measures be established and documented to identify the inspection, test, and operating status of structures, systems, and components throughout manufacturing and installation;

b. that measures be established to control the use of inspection and welding stamps and status indicators including the authority for application and removal of tags, marking, labels, and stamps;

c. that the bypassing of required inspections, tests, and other critical operations be controlled through documented measures under the cognizance of the Quality Assurance organization; and

d. that the status of nonconforming, inoperative, or malfunctioning structures, systems, or components is clearly identified to prevent inadvertent use.

The written Quality Assurance Progams developed by principal contactors or contractors to fulfill the control requirements will be reviewed and approved by PSI.

PSI is responsible for identifying and controlling the test and operating status of systems and components under prerequisite and preoperational testing. PSI has established procedures for tagging systems under test to indicate custody and operating status. Tags shall be utilized to prevent incorrect or inadvertent operation of equipment under test and to prevent damage to equipment or danger to personnel. Application and removal of tags shall be strictly controlled through utilization of tag control logs, designation of individuals authorized to apply or remove tags, and use of signatures to indicate responsibility for actions.

PSI shall verify adherence to procedures and instructions for control of inspection, test and operating status through audits and surveillance of contractors selected subcontractors, and suppliers as described in Subsection 1.7 and 1.18 of this document.

1.15 Nonconforming Materials, Parts, or Components

During the design/procurement/construction phase of the Marble Hill Project, nonconformances in materials, parts, or components may be discovered through review, inspection or testing during manufacture or fabrication, or through functional testing. The PSI Quality Assurance Program provides for control of nonconforming items discovered by PSI. The following provisions are necessary for acceptance of principal contractor and contractor quality assurance programs by PSI:

a. Control of the identification, documentation, segregation, review, disposition, and notification of affected organization of nonconformance of materials, parts, components, or services.

b. Documentation identifies the nonconforming items; describes the nonconformance, the disposition of the nonconformance, and the inspection used to uncover the nonconformance; and include signature approval of the disposition.

c. Identification of the responsible individual for determining and approving the disposition of nonconforming items.

d. Acceptability of rework/repair of items is verified by reinspecting the item as originally inspected or by a method which is at least equal to the original inspection method and that rework and repair inspection procedures are documented.

e. Nonconformances concerning departures from design specifications, and drawing requirements which are dispositioned "use-as-is" and "repair" are formally reported to PSI.

f. Nonconformance Reports dispositioned "use-as-is" or "repair" are made part of the inspection records and may be forwarded with the hardware to the constuction site.

g. Periodic analysis of these reports is performed and forwarded to management to show quality trends.

h. Provisions for passing the nonconformance control requirements on to subtier contractors.

Methods prescribed by PSI to implement these provisions include tagging or marking of nonconforming items; physical separation of items to prevent inadvertent use; nonconformance reporting, review, and disposition procedures; maintenance of status logs to ensure complete followup on each nonconformance; review and approval of dispositions and corrective actions effected by contractors; and detailed cause-and-effect analysis where necessary to preclude recurrence. During review of dispositions and corrective actions, PSI shall assure that:

a. Applicable requirements and interfacing items are reviewed.

b. Determination is made whether the problem is an isolated case or a symptom of more far-reaching problems.

c. Cause of problems are determined and appropriate preventive measures are proposed.

In addition to imposing requirements on contractors, PSI ensures procedural compliance by reviewing and approving principal contractors' Quality Assurance programs.

PSI shall verify adherence to procedures and instructions for control of nonconforming material, parts or components through audits of principal contractors, contractors and selected subcontractors and suppliers as described in Subsection 1.18 of this document.

PSI shall verify adherence to procedures and instructions by construction contractors for control of nonconforming material, parts or components through surveillance as described in Subsection 1.7 of this document.

1.15.1 Identification of Construction Deficiencies by PSI

a. Construction deficiencies representing departures from design requirements that are detected by PSI Quality Assurance personnel performing inspections on items in PSI custody are documented on a Nonconformance Report.

b. Construction deficiencies representing departures from design requirements that are detected by PSI personnel performing surveillance inspections may be documented on a Corrective Action Request.

c. Deficiencies that are of a programmatic nature which have been detected either by inspections or surveillances may be documented on a Corrective Action Request.

d. Where conflicts occur between drawings, standards and procedures, the conflict and recommended action may be documented by PSI or contractor's personnel on a Field Change Request.

e. The responsibilities and methods to be used by PSI personnel to identify and document deficiencies and conflicts on technical requirements are defined in the PSI Marble Hill Project Quality Assurance Manual.

f. The contractors' Quality Assurance Programs are revised as necessary to standardize forms and methods for identifying deficiencies and conflicts as much as practicable.

1.15.2 Evaluations of Construction Deficiencies and Conflicts

a. Nonconformance Reports and Corrective Action Requests shall be initially evaluated by cognizant PSI Quality Assurance personnel to verify information recorded and to determine if the deficiency is a "Potential NRC Reportable Item". If it is a "Potential NRC Reportable Item", it is submitted to the Marble Hill Safety Review Committee for evaluation and subsequent reporting, if applicable.

b. Evaluation and disposition of PSI Nonconformance Reports shall be done by the PSI Project Engineering Manager and approved by the Quality Engineering Manager and the architect-engineer if the disposition is "Repair" or "Use-As-Is".

c. The PSI Executive Director-Nuclear Quality Assurance is responsible for evaluation and followup for Corrective Action Requests that are written as a result of repetitive deficiencies, lack of response to previous Corrective Action Requests, or for problems that cannot be resolved at the PSI Quality Engineering Manager level. The PSI Quality Engineering Manager is responsible for evaluation and resolution on all other Corrective Action Requests.

d. Field Change Requests are evaluated and approved by the same design organization that approved the original document(s) which the Field Change Request affects.

In addition, Engineering Change Notices may be used by the design organization to make changes to drawings and specifications.

e. The responsibilities and methods for evaluation of construction deficiencies and conflicts is delegated and defined in the PSI Project Quality Assurance Manual.

1.15.3 Processing of Nonconformance Reports, Corrective Action Requests, and Field Change Requests

a. Project Management Procedures provide time limits and flow paths for the evaluation and disposition of Nonconformance Reports and Corrective Action Requests.

b. Provisions have been made in the administrative procedures to provide timely evaluation and resolution of Nonconformance Reports, Corrective Action Requests, and Field Change Requests.

1.16 Corrective Action

1.16.1 Identification of Adverse Conditions

Conditions adverse to quality may be identified through PSI review of documents, conduct of surveillance, performance of audits, and conduct of prerequisite and preoperational testing. Failures, malfunctions, deficiencies, deviations, defective materials and equipment, and nonconformances identified by PSI shall be documented on PSI deviation records by the cognizant PSI reviewer, auditor, or inspector. PSI informs the principal contractors and contractors of conditions adverse to quality and requires these conditions be controlled in accordance with Subsection 1.15 and 1.18.

1.16.2 Corrective Action

PSI requires the responsible individual, group, or organization to reply to PSI-identified nonconformances by submitting proposed dispositions and corrective actions to PSI for approval. PSI shall review and evaluate the reply in accordance with written procedures to confirm that the cause(s) of the condition has been determined and that appropriate corrective action is planned. PSI may elect to require more comprehensive corrective action if deemed appropriate. Subsequent to approval of PSI proposed dispositions and corrective actions, PSI shall be notified of completion of the disposition action and corrective action carried out by the responsible organization, and the date corrective action was placed in effect. PSI Quality Assurance shall maintain current status of each documented nonconformance identified by PSI to ensure initiation of prompt corrective action to preclude recurrence. PSI Quality Assurance shall review corrective actions during audit or surveillance of the responsible organization's facilities.

1.16.2.1 System for Assuring Management Awareness of Problems

a. A program has been established for recording and tracking trends on quality problems identified on Nonconformance Reports and Corrective Action Requests. The PSI Executive Director-Nuclear Quality Assurance shall conduct a trend analysis review of nonconformances and deficiencies of PSI and its contractors. The Executive Director-Nuclear Quality Assurance is responsible to take actions to resolve unsatisfactory quality trends.

   In addition, the Executive Director-Nuclear Quality Assurance reports the results of this review to the Senior Vice President-Nuclear Division in writing.

b. The Chairman and Chief Executive Officer, President and Chief Operating Officer and Senior Vice President Nuclear Division attend periodic meetings with key site personnel, such as, the Vice President-Nuclear Services, Executive Director-Nuclear Quality Assurance, Executive Director Nuclear Operations and others as directed or appropriate.

Site problems or action items shall be reviewed at the meeting. This typically includes such items as staffing progress, development of programmatic controls, or site problems requiring management review or input.

c. Management audits of the Quality Assurance Program are also conducted annually in order to assess the adequacy and effectiveness of the Quality Assurance Program. Performance of Management Audits is described in Section 1.2.7.

1.16.2.2 Description of System to Halt Construction

1.16.2.2.1 System for PSI to Halt Construction

a. PSI Quality Assurance personnel are authorized and assigned the responsibility to stop further processing of unacceptable items or materials by its suppliers and contractors.

PSI Quality Assurance personnel are responsible for notifying cognizant PSI personnel, the organization being stopped, and are responsible for documenting the unacceptable condition.

b. The PSI Executive Director-Nuclear Quality Assurance is fully authorized to stop work of any PSI, contactor, or supplier organization which, in his judgment, must be stopped to correct poor quality trends or performance.

This Stop Work authority is of a broader scope than stopping a single process and may include such things as all design activities of an organization, all installation activities of a contractor, or all fabrication or processing of PSI purchased materials or items.

Upon receipt of the Stop Work order, the PSI Vice President Nuclear Services is required to take those actions necessary to assure that the work is stopped promptly.

If the activity is ASME Code related, the PSI Executive Director-Nuclear Quality Assurance shall notify the Authorized Nuclear Inspector.

1.16.2.2.2 Contractor's Systems to Halt Construction

a. To provide assurance that unacceptable work is stopped, qualified PSI Quality Assurance personnel are reviewing the quality assurance programs of site contractors to determine if adequate authority, responsibility and systems are delegated and defined to the contractor's quality assurance personnel, and are acceptable. The criteria used in this review shall be in consonance with the authorities, responsibilities and methods to be used by PSI, i.e., that the contractor's Quality Assurance personnel have full

authority and responsibility to stop unacceptable work, either of a regular item or process nature, or in a broader sense such as stopping all quality related activities of a contractor as a result of unacceptable conditions or quality trends; and that the methods for notification and documenting the stop work are clearly defined.

b. Where the contractors' Quality Assurance Programs are found to be inadequate as a result of this PSI review, the programs are to be revised to an acceptable condition prior to start or restart of activities by that contractor.

1.16.2.3 System for Defining Unacceptable Work

a. The criteria for defining acceptable work is established by engineering drawings, design specifications, and applicable codes and standards. Process controls established in approved work procedures necessary to meet the requirements of the engineering drawings and specifications are also criteria for defining acceptable and unacceptable work.

Criteria for defining acceptable programmatic administrative controls are defined by codes, federal regulations, ANSI standard, and regulatory guides.

b. Inspection procedures, instructions and/or checklists are to be used by PSI Quality Assurance personnel when conducting surveillance and inspections. As a minimum, these procedures and instructions shall contain: (a) identification of characteristics to be inspected, (b) accept/reject criteria, (c) individuals or groups responsible for the inspection, (d) method of inspection, (e) verification and certification of inspection and, (f) provision for recording the results of the inspections.

Quality Assurance personnel are required to determine acceptable/unacceptable work based on the accept/reject criteria established by the Engineering drawings, design specification applicable code and standards, and are not authorized to permit deviations from these criteria. Where conflicts occur between these criteria documents or in interpretation of the criteria, these conflicts are to be documented on a change request and resolved by the cognizant design organization.

c. Work control procedures and inspection procedures and instructions are to be prepared by and used by PSI contractors in performance of their construction and inspection activities. These work control procedures and inspection procedures are to be reviewed and approved by PSI Quality Assurance for assurance that qualitative and quantitative accept/reject criteria are adequately defined.

1.17 Quality Assurance Records (PSI)

1.17.1 Records Maintenance and Control

PSI has established Project procedures for control of quality assurance records and storage of these records at the Marble Hill Station site. These procedures were developed utilizing ANSI N45.2.9 for guidance and the PSI procedures comply with its requirements. The PSI quality assurance procedures specify documents to be retained as quality assurance records. The following list represents some of the types of documents to be retained.

a. operating logs;

b. results of reviews, inspections, tests, audits, and material analyses;

c. monitoring of work performance;

d. qualification of personnel, procedures, and equipment;

e. drawings:

f. specifications;

g. procurement documents;

h. calibration procedures and reports; and

i. Nonconformance Reports dispositioned "use-as-is" or "repair".

Requirements for submission of required records from principal contractors, contractors, and suppliers are included in procurement documents. Requirements for record submission, retention, and maintenance subsequent to completion of work are consistent with applicable codes and standards. Where the code requires record retention by the supplier for stated periods, the PSI Executive Director-Nuclear Quality Assurance assures that required quality assurance records are obtained, maintained and retained in accordance with requirements of ANSI N45.2.9.

The content and completeness of quality assurance records are the responsibility of the originating individual, group, or organization. Content requirements for PSI-originated records are specified by the applicable PSI project procedures. PSI shall ensure compliance with content requirements from principal contractors, contractors, subcontractors, and suppliers through review and acceptance of Quality Assurance Programs covering the generation of documents which are retained as quality assurance records. Basic content requirements of inspection and test records applicable to all organizations are as follows:

a. a description of the type of observation;

1.18 Audits

1.18.1 PSI Audit Program

PSI utilizes a comprehensive system of planned and periodic audits to verify all aspects of the PSI Quality Assurance Program and assess its effectiveness. Audits of facilities, records, and activities affecting the quality of safety-related items are conducted by PSI Quality Assurance personnel, and other designated representatives as appropriate. Organizations performing activities affecting quality subject to audit directly by PSI include the following:

a. PSI Project, construction, operations, or support organizations;

b. S&L organizations, groups, or individuals;

c. Westinghouse organizations, groups, or individuals (including all support division);

d. PSI contractors;

e. Selected subtier contractors;

f. Construction contractors; and

g. PSI consultants

The Project Quality Assurance Manual includes requirements governing the following aspects of the audit system:

a. scheduling and planning of audits;

b. performance of audits;

c. audit follow-up; and

d. training, qualifications, and certification.

PSI audit planning entails identifications of all activities affecting the quality of safety-related structures, systems, and components during design, procurement, manufacturing, construction and installation, inspection, and testing. The following activities are included as a minimum:

a. the determination of site features which affect plant safety (e.g., core sampling, site preparation, and metrology);

b. the preparation, review, approval, and control of the SAR, design criteria, specifications, procurement documents, instructions, procedures and drawings;

b. evidence of completing and verifying a manufacturing, inspection, or test operation;

c. the date and results of the inspection or test;

d. information related to nonconformances;

e. inspector or data recorder identification;

f. a statement as to the acceptability of the results; and

g. records shall provide sufficient information to permit identification of the record with the item(s) or activity to which it applies.

1.17.2 Retrievability

PSI has established a system for identifying quality assurance records to preserve their identity and ensure retrievability at a future date. Computer coding may be used to assign unique numbers to each record and allow for rapid reference to records in storage. The filing system will be used for all quality assurance records retained by PSI at the Marble Hill Station Site.

1.17.3 Storage Facilities

Methods for receipt, screening, classification, and storage of PSI quality records are prescribed by written procedures. In addition, guidelines for establishing permanent storage facilities and the associated security system are also provided in these procedures. ANSI N45.2.9 formed the framework of these procedures, and facilities will be established in compliance with its requirements. Records are maintained at the Marble Hill Site, both in microfiche and hard copy form. Measures have been established to assure security and protection of records.

c. request for proposals and evaluation of bids;

d. indoctrination and training programs; and

e. other applicable 10 CFR 50, Appendix B, criteria.

Planning also identifies the organizations, disciplines, and work groups performing each activity. Audit scheduling utilizes work schedules provided by the various organizations to determine the necessary points in the work process for auditing to be accomplished.

Audits are regularly scheduled on the basis of the status and importance of activities to assure the adequacy and effectiveness of the Quality Assurance Program.

Audits of the entire PSI Quality Assurance Program are conducted by PSI Quality Assurance personnel at intervals not exceeding one (1) year. Applicable elements of contractor's Quality Assurance Programs are audited at least annually or once within the life of the activity whichever is shorter. When suppliers are qualified in accordance with Subsection 1.7 and the provided items are such that PSI's sole method of acceptance is by receiving inspection, periodic audits of these suppliers is not required. For other suppliers, applicable elements of their Quality Assurance Programs are audited at a minimum of once every three years (triennially) or once within the life of the activity, whichever is shorter, with the exception of suppliers of ASME items and material who do not hold Quality Systems Certificates or Certificates of Authorization. These suppliers are audited on an annual basis, or once within the life of an activity; whichever is shorter. When not audited on an annual basis, PSI Quality Assurance performs and documents an evaluation of the supplier's performance on an annual basis.

The PSI procedure for conduct of audits prescribes methods and responsibilities for selection of an audit team which is free of direct responsibility for activities to be audited; notification of the organization to be audited; orientation of the audit team; preparation, review, and approval of individual audit plans and detailed checklists; conduct of the audit, including evaluation of work areas, activities, processes, and items, and the review of documents and records, processes, and items, and the review of documents and records, review of audit results with cognizant management; and preparation and submission of the audit report. Individual audit checklists are prepared to ensure that an objective evaluation is conducted of quality-related practices, procedures, and instructions; of the effectiveness of implementation; and of the conformance with policy directives.

Audit follow-up measures include communication with responsible management of the audited organization to resolve difficulties and assure timely response to the audit report, review and approval of proposed

corrective actions for cited nonconformances, communication with the audited organization to resolve difficulties regarding implementation of corrective measures and to keep abreast of progress in corrective action, and scheduling re-audits as appropriate to verify the effectiveness of corrective actions. A tracking system is utilized to assist in maintaining the status of corrective action.

The PSI training and qualifications procedures delineates requirements to assure adequate training and qualification of audit team members. Audit team leaders are trained in accordance with ANSI N45.2.12 and qualified in accordance with ANSI N45.2.23.

Quality trends evidenced by audit data are analyzed and presented to PSI executive management.