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Our ref: DCP/NRC1624

September 10, 2003

**SUBJECT: Transmittal of AP600 Quality Assurance Program Plan**

Attached please find Revision 4 of WCAP-12600 "AP600 Quality Assurance Program Plan" dated January 1998. This document is referenced in the AP1000 Design Control Document Chapter 17. This report contains no Westinghouse proprietary information.

Please contact me at 412-374-5355 if you have any questions concerning this submittal.

Very truly yours,

A handwritten signature in black ink, appearing to read 'M. M. Corletti'.

M. M. Corletti  
Passive Plant Projects & Development  
AP600 & AP1000 Projects

/Attachment  
WCAP-12600, Revision 4 "AP600 Quality Assurance Program Plan," dated January 1998

10063

DCP/NRC1624

September 10, 2003

**Attachment 1**

**WCAP-12600, Revision 4**

**"AP600 Quality Assurance Program Plan"**

**dated January 1998**

# AP600 DOCUMENT COVER SHEET

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AP600 DOCUMENT NO. GW-GAM-001	REVISION NO. 4	Page 1 of 23	ASSIGNED TO R. B. Tupper
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DESIGN AGENT ORGANIZATION: Westinghouse

TITLE: AP600 Quality Assurance Program Plan

ATTACHMENTS: None

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ORIGINATOR D. N. Alsing, Manager Quality Systems	SIGNATURE/DATE  1/15/98	
AP600 RESPONSIBLE MANAGER W. E. Cummins, NPPD General Manager	SIGNATURE 	APPROVAL DATE 1/16/98

\*Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.

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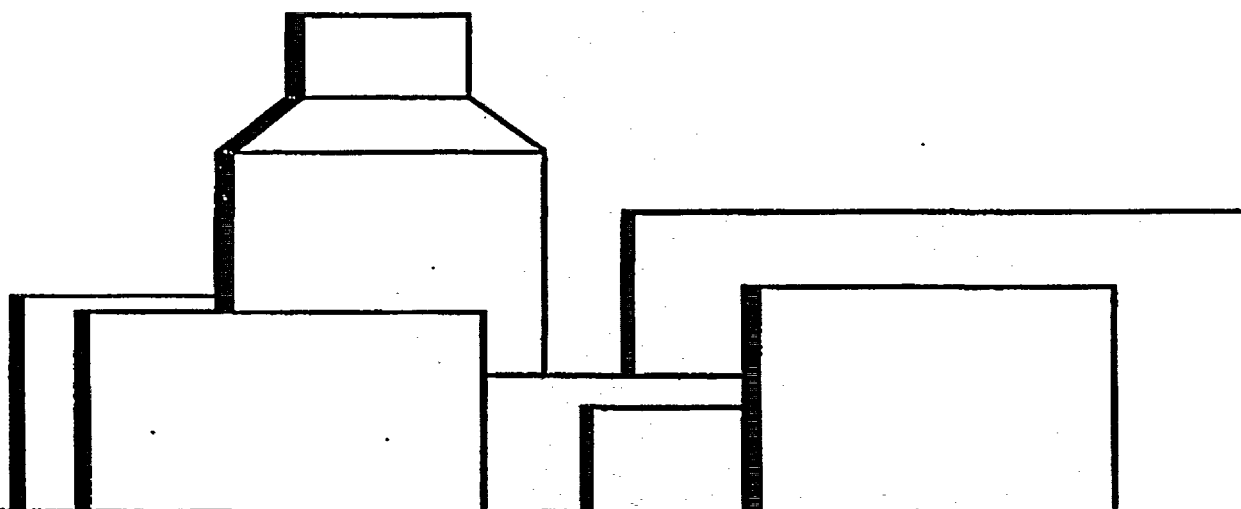
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# **AP600 Advanced Light Water Reactor Design**

## **Quality Assurance Program Plan**

January 26, 1998



® Westinghouse Electric Corporation

# AP600 RECORD OF CHANGES

Form 58203B (9/93)

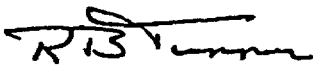
AP600 DOCUMENT NO. GW-GAM-001

REVISION 4

ALTERNATE DOC. NO. WCAP-12600

DESIGN AGENT ORGANIZATION Westinghouse Electric Corporation

TITLE AP600 Quality Assurance Program

CHANGE NUMBER	PARAGRAPH NUMBER	CHANGE DESCRIPTION AND REASON	ENGINEER APPROVAL/DATE
1	Throughout	Nuclear Projects Division was changed to New Plant Projects Division.	
2	Throughout	ESBU was changed to Westinghouse Electric Company	
3	Forward	Reference to ESBU Business Improvement Plan Removed	
4	1.2.2 and 1.2.3 Figure 1	Responsibilities for Design Certification and FOAKE have been combined into AP600 Projects	
5	Throughout	Quality Assurance Manager was changed to Quality Systems Projects Manager	
6	2.0	QA requirements for RTNSS added in Attachment. Reference to Seismic Category II removed.	
7	13.0	Note for "generally does not apply" removed.	
8	Attachment	GW-GAM-200, QA program requirements for RTNSS added.	 15 January '95

**QUALITY ASSURANCE PROGRAM PLAN**  
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## **STATEMENT OF POLICY AND AUTHORITY**

**It is the policy of the New Plant Projects Division to provide systems, products and services that meet or exceed the quality assurance requirements of the Department of Energy, the Advanced Reactor Corporation, and the Nuclear Regulatory Commission.**

**The New Plant Projects Division General Manager is responsible for the AP600 quality assurance program. He ensures its development, implementation and verification, and retains review and approval authority in matters pertaining to the implementation of the requirements of the quality assurance program.**

**The Quality Systems Projects Manager is empowered to act on behalf of the General Manager to ensure the implementation of this Quality Assurance Program Plan and has direct access to the General Manager to ensure that appropriate action is taken to resolve all quality related issues. The Quality Systems Manager is sufficiently free from direct pressure of cost and schedule, and has authority and access to work areas, to identify quality problems; initiate, recommend, or provide solutions to quality problems through designated channels; verify implementation of solutions; and assure that further processing, delivery, installation, or use of items or services is controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred, including the authority to stop unsatisfactory work if necessary.**

**Each performer and manager is fully responsible for implementing these quality assurance requirements to achieve the quality and safety of the simplified passive advanced light water reactor Design Certification and First-of-a-Kind Engineering activities. Each manager is responsible for providing the necessary instruction and training to assure that work is performed in accordance with these requirements.**

**Changes to this document and to this statement of policy and authority will be approved by the New Plant Projects Division General Manager.**



## **FOREWORD**

The Westinghouse Electric Company (WELCO) has committed its resources to the Simplified Passive Advanced Light Water Reactor Plant (AP600) Program. As a supplier of items and services to the nuclear industry, Westinghouse has established a single quality assurance plan that complies with the applicable government regulatory and industry requirements. The plan is identified as the Quality Management System document (QMS). The current revision of the QMS applies to all Westinghouse activities affecting the quality of such items and services, including the AP600. Since the scope of these activities includes operating plants and plants under construction, the QMS commits to meeting 10CFR50 Appendix B, ASME NQA-1, and United States Nuclear Regulatory Commission (NRC) Regulatory Guide 1.28 Revision 3. The QMS has been accepted by the NRC.

The AP600 Quality Assurance Program Plan (QAPP), WCAP-12600, affirms the commitments established in the QMS for the AP600 program. It does not replace the QMS, although it does establish commitments for the AP600 program that are in addition to those in the QMS. WCAP-12600 further describes how some specific features of the program relate to selected criteria of the NRC Standard Review Plan, NUREG-0800, Chapter 17.3, "Quality Assurance Program Description."

WCAP-12600 was initially developed for the Design Certification program, and it continues as an integral program for First-Of-A-Kind Engineering (FOAKE). It therefore applies to both programs.

The commitments in WCAP-12600 to regulatory requirements and industry standards are tied to those established in the QMS, and meet or exceed the requirements of the Design Certification and FOAKE contracts. Commitments are revised when necessary to meet new NRC or customer requirements, or when deemed necessary by Westinghouse management to improve the quality of the items and services provided.

The QMS and WCAP-12600 also provide a foundation for implementing corporate Total Quality goals and supporting Total Quality initiatives. For example, the provisions for training support the human resource excellence initiative; management assessments support the management leadership

initiative; self-assessments support the product/process improvement initiative; and the utilization of the Utility Requirements Document as input to the design process supports the customer satisfaction initiative.

The QMS governs all Westinghouse nuclear work and provides for certain interfaces with the NRC. For example, the QMS has been submitted for NRC acceptance, and the NRC must be notified of changes in accordance with 10CFR50.55 (f)(3). Commitment to specified Regulatory Guides for the QA program is addressed in the Standard Safety Analysis Report (SSAR). Since WCAP-12600 continues to apply to activities associated with the Design Certification program, the QA program provides for a management position with responsibilities for interfacing with the NRC.

Changes to the commitments contained in this Quality Assurance Program Plan will be submitted to the Advanced Reactor Corporation (ARC) and to the Department of Energy (DOE) for review.

## **INTRODUCTION**

Application of the QMS to AP600 activities is described in the following sections, which are numbered to correspond to the QMS. Some sections of the QMS are oriented to the production of hardware, and are therefore not applicable to the scope of the AP600 project.

### **1.0 MANAGEMENT RESPONSIBILITIES**

See QMS Section 1.0. Application of the QMS to AP600 activities includes the following:

- o Management regularly assesses the adequacy and effectiveness of the quality assurance program and its implementation for compliance with the requirements of this Quality Assurance Program Plan. Management assesses their functional areas by evaluating such documents as internal assessment and external audit reports, self-assessment reports, nonconformance reports, procedures, and instructions. Additionally, consideration is given to updating the program as the result of changes brought about by reorganizations, new technologies, and quality concepts, to ensure its continuing suitability and effectiveness. These assessments are documented, and actions are identified and followed to close-out.

Details of the specific organizational structure for AP600 activities are provided below.

### **1.1 GENERAL**

The New Plant Projects Division of the Westinghouse Electric Company is responsible for Design Certification and First-of-a-Kind Engineering for the Simplified Passive Advanced Light Water Reactor Plant (AP600) and for control of the technical interfaces between Westinghouse engineering groups and suppliers providing engineering services. Westinghouse management is responsible for activities affecting quality as required throughout this Quality Assurance Program Plan.

## **1.2 RESPONSIBILITY**

The authority and responsibility of each group within the New Plant Projects Division is established by the General Manager. Responsibility for the establishment of the Quality Assurance Program Plan and for assuring its effective implementation is assigned by the General Manager to the Quality Systems Projects Manager.

The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality are defined in Figure 1, Page 12 and throughout this Quality Assurance Program Plan.

Responsibility for achieving quality is assigned to each individual or organization performing the work. The verification of quality achievement is assigned to individuals or groups not directly responsible for performing the work.

Each manager with responsibilities in the quality assurance program may delegate work to others but shall retain responsibility for the work. Each manager is responsible for control of engineering cost and schedule for assigned activities; performing the design effort in accordance with approved design criteria and guidelines and applicable government, industry and environmental standards; and developing standards and procedures as needed.

### **1.2.1 Program Control and Contract Administration**

The Program Control and Contract Administration (PCCA) Manager is responsible for the administration, implementation, and maintenance of the Westinghouse AP600 management control system; program cost and schedule reporting; customer interaction on contractual matters; and administration of all subcontracts and technical agreements with international participants.

In addition, the PCCA Manager is responsible for coordinating the preparation and issue of AP600 program operating procedures and operating the AP600 Central File.

### **1.2.2 AP600 Projects Manager**

The AP600 Projects Manager is responsible for all aspects of managing and directing the successful implementation of the AP600 Design Certification program. He is also responsible for managing and directing all aspects of implementing the FOAKE contract with ARC and DOE, consistent with the design developed in the Design Certification phase. These activities include Design Certification test programs and related analyses; safety, regulatory, and probabilistic analyses; interfacing with NRC on licensing matters; coordinating responses to NRC Requests for Additional Information (RAIs) and Draft Safety Evaluation Report (DSER) open items; and maintenance and revision of the Standard Safety Analysis Report (SSAR) and the Probabilistic Risk Assessment (PRA) Report.

FOAKE activities include the design and analysis of safety and non-safety systems, structures, and components throughout the plant; establishing functional requirements; review and approval of design and manufacturing drawings and specifications; man-machine interface design, control systems, and control room design; modularization; plant arrangement; constructability, construction methods, and construction schedule; plant cost estimate; and plant information management system. The AP600 Projects Manager is also responsible for managing, directing, and integrating the technical design and development activities performed by supporting engineering groups, both internal and external to Westinghouse.

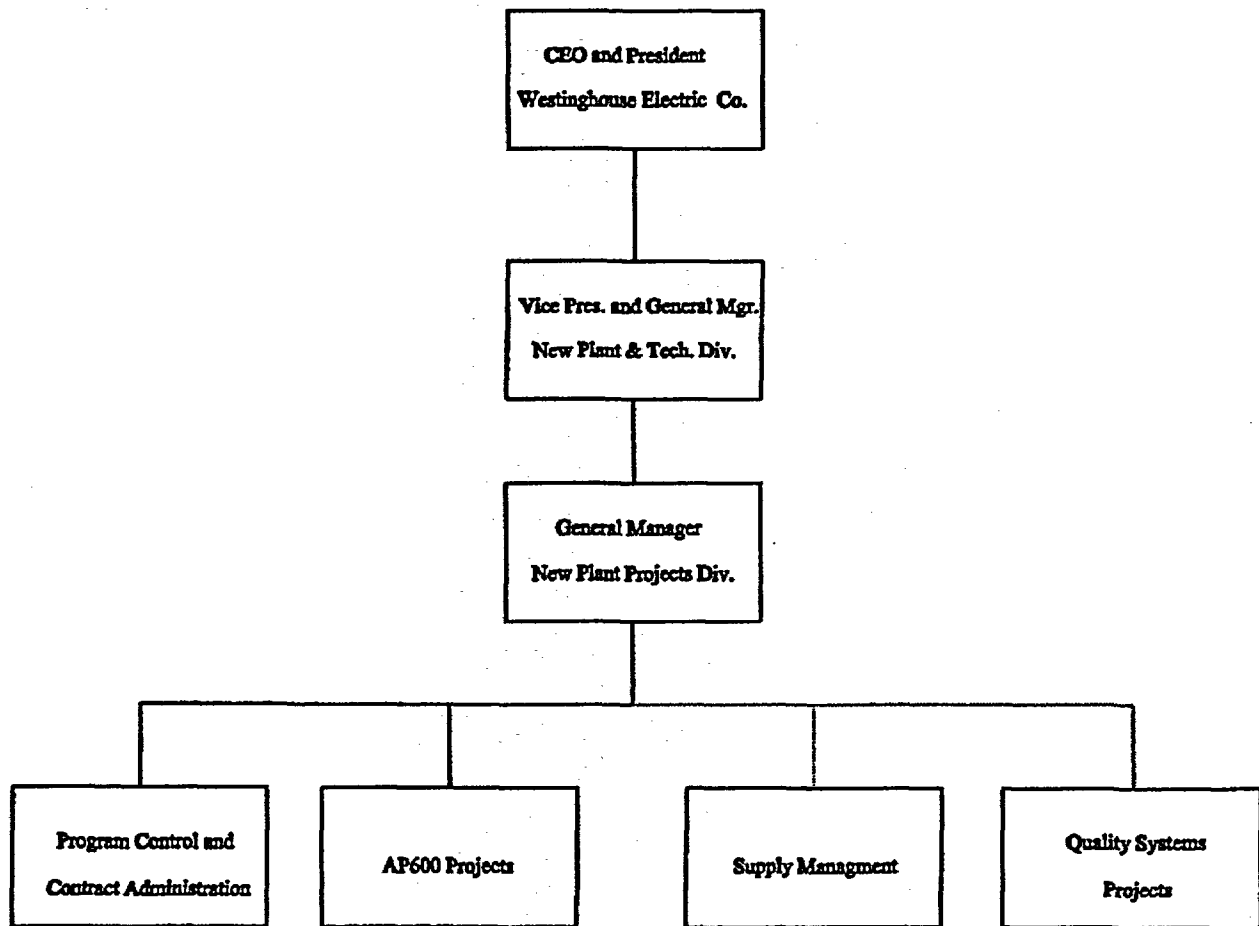
### **1.2.3 Quality Systems Projects**

Quality assurance support is provided on a matrix basis by Quality Systems Projects. The Quality Systems Projects Manager is responsible for developing the Quality Assurance Program Plan; documenting, approving and verifying implementation of a quality assurance program that meets the requirements of this Quality Assurance Program Plan; assuring the development of implementing procedures; verifying that activities affecting quality have been correctly performed; and reporting to management the degree of compliance. In addition, the Quality Systems Projects Manager has no responsibilities unrelated to quality assurance that would prevent full attention to quality assurance functions.

Quality Systems Projects activities include review of design specifications (and drawings when used as such design specifications) for which New Plant Projects Division is the design agent and procurement documents; performance of supplier evaluations and audits; maintenance of the quality assurance program; review and development of procedures; performance of internal assessments and, at the discretion of the Quality Systems Projects Manager , participation in work schedule and status meetings.

#### **1.2.4 Supply Management**

Supply Management provides procurement services and acts as the interface between the Nuclear Projects Division and suppliers of procured items and services. Supply Management also provides cost information on components from suppliers to support the plant cost estimate. Procurement activities for items and services are accomplished in accordance with established procedures and the requirements of this Quality Assurance Program Plan.



**Figure 1 Westinghouse AP600 Organization**

## **2.0 QUALITY SYSTEM**

See QMS Section 2.0. Application of the QMS to AP600 activities includes the following:

- o The graded application of quality requirements is based on a documented safety classification system that designates the safety class of equipment, components, and structures. Quality requirements appropriate to each safety class are applied.
- o For systems, structures, and components to which regulatory treatment of non-safety systems (RTNSS) criteria apply, Westinghouse applies quality requirements defined in the Appendix.
- o Regulatory commitments are as specified in AP600 Standard Safety Analysis Report GW-GL-021. The commitments in the QMS are consistent with those in the Standard Safety Analysis Report.
- o The principal document establishing the procedures for activities that affect quality is the ESBU Quality Policy / Procedures Manual (QPPM), Nuclear Service and Projects Edition. Additional procedures specific to the AP600 program are contained in WCAP-12601, "AP600 Operating Procedures Manual." WCAP-12601 contains a matrix showing the relationship between WCAP-12601 procedures, the applicable procedures of the QPPM, and the QA program criteria of NQA-1.
- o Project-specific procedures are prepared by the organizations that have primary responsibility for the activities. Procedures identify the responsible functions and specific actions necessary to implement these activities. Procedures are reviewed by Quality Systems Projects Manager and approved by the General Manager.
- o The AP600 Quality Assurance Program meets the requirements of ASME NQA-1-1989 edition through NQA-1b-1991 addenda as required for the FOAKE contract, and meets or exceeds the requirements of NQA-1-1986 edition as required for Design Certification.



### **3.0 CONTRACT REVIEW**

See QMS Section. 3.0.

### **4.0 DESIGN CONTROL**

See QMS Section 4.0. Application of the QMS to AP600 activities includes the following:

- o Changes to a design that has been previously released in a document for project use and placed under configuration control are subject to review and approval by a Configuration Control Board. The organization, responsibilities, and activities of the Configuration Control Board are in accordance with written procedure.

### **5.0 DOCUMENT CONTROL**

See QMS Section 5.0. Application of the QMS to AP600 activities includes the following:

- o Documents that portray the AP600 design or its basis are uniquely identified in accordance with a documented numbering system that is applied to all internal and external participating design organizations.
- o An Information Management System (IMS) is implemented among interfacing internal and external design organizations, which provides an effective means (using a plant-wide numbering system) to acquire, store, and retrieve the documents and data necessary to design the plant.

## **6.0 PURCHASING**

See QMS Section 6.0. Application of the QMS to AP600 activities includes the following:

- o Technical and quality requirements are communicated to organizations that supply testing and engineering services through Purchase Orders and technical cooperation agreements. Technical cooperation agreements require the same degree of review and approval as Purchase Orders.
- o Procurement documents specify technical requirements (for procured items) by reference to design documents that are prepared, reviewed, approved, issued, and revised in accordance with NQA-1 Supplement 3S-1. When changes to technical documents are made directly in procurement documents, the appropriate design documents are revised and incorporated into the contract before the item is released.
- o The initial qualification and subsequent performance evaluation of suppliers to which technical cooperation agreements apply is performed in the same manner as for suppliers of purchased items and services.
- o Supplier selection is not based on history alone unless at least one of the following conditions applies:
  - 1. The supplier has been audited within three years for procurement of similar products or services,
  - 2. An evaluation of the supplier's technical and quality capability is made, or
  - 3. The items are both relatively simple and standard in design, manufacturing, and testing and are adaptable to standard or automated inspections or tests of the end product to verify critical characteristics after delivery.

- o The performance of each supplier is evaluated on an annual basis, commensurate with the complexity and importance to safety of the items or services provided. The evaluation is documented and includes evidence, based on direct observation of the work performed by the supplier, that the supplier's quality assurance program is continuing to operate successfully.

## **7.0 CUSTOMER-SUPPLIED ITEM**

See QMS Section 7.0. NOTE: This criterion generally does not apply to the AP600 project.

## **8.0 PRODUCT IDENTIFICATION AND TRACEABILITY**

See QMS Section 8.0. Application of the QMS to AP600 activities includes the following:

- o The AP600 program uses a comprehensive, plant-wide numbering system to provide standard identification for all systems, components, facilities, and documentation.

## **9.0 PROCESS CONTROL**

See QMS Section 9.0. NOTE: This criterion generally does not apply to the AP600 project.

## **10.0 INSPECTION AND TESTING**

See QMS Section 10.0. Application of the QMS to AP600 activities includes the following:

- o AP600 testing activities are categorized as safety related, non-safety related, or basic research tests; quality requirements appropriate to each category are applied.
- o A Test Specification and Test Procedure(s) are developed for each test program. Test Specifications define the test objective(s) and prescribe requirements for the test facility,

test articles, instrumentation and data acquisition system, test conditions and parameters, quality assurance, reports, and records. Test Procedures detail the activities and provisions for assuring that calibrated instruments, appropriate equipment, and trained personnel are used; that the condition of test equipment and the item(s) to be tested are verified; that suitable environmental conditions are maintained; that adequate instrumentation and provisions for data acquisition are used; and that the necessary monitoring is performed.

#### **11.0 INSPECTION, MEASURING, AND TEST EQUIPMENT**

See QMS Section 11.0.

#### **12.0 INSPECTION, TEST, AND OPERATING STATUS**

See QMS Section 12.0. NOTE: This criterion generally does not apply to the AP600 project.

#### **13.0 CONTROL OF NONCONFORMING ITEMS**

See QMS Section 13.0.

#### **14.0 CORRECTIVE ACTION**

See QMS Section 14.0.

#### **15.0 HANDLING, PACKAGING, STORAGE, AND DELIVERY**

See QMS Section 15.0. NOTE: This criterion generally does not apply to the AP600 project.

## **16.0 QUALITY RECORDS**

See QMS Section 16.0. Application of the QMS to AP600 activities includes the following:

- o New Plant Projects Division retains responsibility for maintaining AP600 design documents by requiring submittal of all lifetime design documents from suppliers unless otherwise agreed by contract.

## **17.0 ASSESSMENTS**

See QMS Section 17.0. Application of the QMS to AP600 activities includes the following:

- o Assessments are scheduled and prioritized based on the activity's importance to safety. Assessments, however, include non-safety activities important to quality. Emphasis is placed on the successful performance of activities, and provision is made for the direct observation of activities in process.
- o A self-assessment program is implemented to confirm that activities affecting quality are performed in compliance with the quality assurance program and to identify opportunities for quality improvement. Following established instructions, periodic self-assessments typically focus on instructions and procedures which control activities affecting quality, with the intent of assessing both the adequacy of those instructions and procedures and the effectiveness of their implementation. The results of the self-assessment are reported to management for action.

## **18.0 TRAINING**

See QMS Section 18.0. Application of the QMS to AP600 activities includes the following:

- o The training of personnel who perform or manage activities affecting quality includes indoctrination to the requirements of this Quality Assurance Program Plan, related quality program standards and implementing procedures, and special skills required for the performance of activities. This training is documented and identifies the name of the trainer, personnel in attendance, the subject and scope or content of the training, the location where the training was received, and the duration of the training. Management annually evaluates and documents the maintenance of proficiency of personnel in activities affecting quality.

## **19.0 SERVICING**

See QMS Section 19.0. NOTE: This criterion generally does not apply to the AP600 project.

## **20.0 STATISTICAL TECHNIQUES**

See QMS Section 20.0. NOTE: This criterion generally does not apply to the AP600 project.

**Attachment**

**QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR RTNSS  
SYSTEMS, STRUCTURES, AND COMPONENTS**

**GAM-GW-200 Revision 1**

# AP600 DOCUMENT COVER SHEET

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PROJECT: AP600

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ORIGINATOR K. A. Kloes	SIGNATURE/DATE <i>K. A. Kloes</i> 1-2-98
AP600 RESPONSIBLE MANAGER D. N. Alsing	SIGNATURE* <i>[Signature]</i>
	APPROVAL DATE 1/2/98

\*Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.





Form 58202G(5/94)

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# AP600 RECORD OF CHANGES

Form 58204 (1-91)

AP600 DOCUMENT NO. GW-GAM-200

REVISION 1

ALTERNATE DOC. NO. -

DESIGN AGENT ORGANIZATION Westinghouse

TITLE Quality Assurance Requirements for RTNSS Systems, Structures, and Components

CHANGE NUMBER	PARAGRAPH NUMBER	CHANGE DESCRIPTION AND REASON	ENGINEER APPROVAL/DATE
0			Initial Issue
1		Deleted Reference to Seismic Category II to properly identify applicability	K. A. Kloes <i>K.A. Kloes 1-2-90</i>

## **Quality Assurance Program Requirements for RTNSS Systems, Structures, and Components**

This document defines the quality assurance program requirements for suppliers of systems, structures, or components to which the USNRC requirements for the regulatory treatment of non-safety systems (RTNSS) apply.

### **1 Organization**

The normal line organization may verify compliance with the requirements of this document. A separate or dedicated quality assurance organization is not required.

### **2 Quality Assurance Program**

It is expected that the existing body of supplier's procedures or practices will describe the quality controls applied to the subject equipment. A new or separate QA program is not required.

### **3 Design Control**

Measures shall be established to ensure that contractually established design requirements are included in the design. Applicable design inputs shall be included or correctly translated into design documents, and deviations therefrom shall be controlled. Normal supervisory review of the designer's work is an adequate control measure.

### **4 Procurement Document Control**

Applicable design bases and other requirements necessary to assure component performance, including design requirements, shall be included or referenced in documents for procurement of items and services, and deviations therefrom shall be controlled.

### **5 Instructions, Procedures, and Drawings**

Activities affecting quality shall be performed in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. This may include such things as written instructions, plant procedures, cautionary notes on drawings and special instructions on work orders. Any methodology which provides the appropriate degree of guidance to personnel performing activities important to component functional performance will satisfy this requirement.

### **6 Document Control**

The issuance and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are employed.

### **7 Control of Purchased Items and Services**

Measures are to be established to ensure that all purchased items and services conform to appropriate procurement documents.

## **8 Identification and Control of Purchased Items**

Measures shall be established, where necessary, to identify purchased items and preserve their RTNSS important functional performance capability. Examples of circumstances requiring such control include the storage of environmentally sensitive equipment or material, and the storage of equipment or material that has a limited shelf-life.

## **9 Control of Special Processes**

Measures shall be established to control special processes, including welding, heat treating, and non-destructive testing. Applicable codes, standards, specifications, criteria, and other special requirements may serve as the basis of these controls.

## **10 Inspection**

Inspections shall be performed where necessary to verify conformance of an item or activity to specified requirements, or to verify that activities are being satisfactorily accomplished.

Inspections need not be performed by personnel who are independent of the line organization. However, inspections, where necessary, shall be performed by knowledgeable personnel.

## **11 Test Control**

Measures shall be established, as appropriate, to test equipment prior to installation to demonstrate conformance with design requirements.

Tests shall be performed in accordance with written test procedures. Test results shall be recorded and evaluated to ensure that test requirements have been met.

## **12 Control of Measuring and Test Equipment**

Measures shall be established to control, calibrate, and adjust measuring and test equipment at specific intervals.

## **13 Handling, Storage, and Shipping**

Handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration.

## **14 Inspection, Test, and Operating Status**

Measures shall be established to identify items that have satisfactorily passed required tests and inspections, and to indicate status of inspection, test, and operability as appropriate.

## **15 Control of Nonconforming Items**

Items that do not conform to specified requirements shall be identified and controlled to prevent inadvertent installation or use.

## **16 Corrective Action**

Measures shall be established to ensure that failures, malfunctions, deficiencies, deviations, defective components, and nonconformances are promptly identified, reported, and corrected.

## **17 Records**

Records shall be prepared and maintained to furnish evidence that the above requirements for design, procurement, document control, inspection, and test activities have been met.

## **18 Audits**

Audits which are independent of line management are not required, if line management periodically reviews and documents the adequacy of the supplier's processes and takes any necessary corrective action. Line management is responsible for determining whether reviews conducted by line management or audits conducted by an organization independent of line management are appropriate.

If performed, audits shall be conducted and documented to verify compliance with design and procurement documents, instructions, procedures, drawings, and inspection and test activities.