US-APWR Test Program Description

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Revision History

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1	9	Section 8.2, fifth paragraph. Changed “document” to “procedures”. Editorial change (consistency throughout document)
	9	Section 9.1, second paragraph: Add new paragraph as the second paragraph to include controls to ensure the review of any proposed facility modifications by the original design organization or other designated design organizations. RAI 2954 (CP RAI #75), 14.02-2
	9	Section 9.2, third paragraph: Add the description as the second sentence of the second paragraph to address administrative controls relating to the methods used for initial review of individual segments of multiple tests. RAI 2954 (CP RAI #75), 14.02-8
	10	Section 9.4, second sentence Changed “approved by the original approvers of the procedure…” to “approved organization that originally approved the procedure”. Editorial changes (clarification)
	10	Section 9.4, last sentence Corrected “of the test” to “of the test procedure”. Editorial change (typographical)
	10	Section 9.6, first sentence of the first paragraph Changed “documented on test deficiency reports” to “documented in test deficiency reports”. Deleted comma “,” after “recommended”. Editorial change (typographical)
	10	Section 9.6, second paragraph: Add new paragraph as the second paragraph to include specific procedures to ensure notification of responsible organizations, when test acceptance criteria are not met, specific controls to resolve such problems, and provisions to allow design organizations to participate in the resolution of design-related problems that result in, or contribute to, a failure to meet test acceptance criteria. RAI 2954 (CP RAI #75), 14.02-7

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1 (cont.)	11	Section 10.1, sixth paragraph Add “initials,” before “and signatures have been …..”. Editorial change (clarification)
	11	Section 10.2, first paragraph Changed “conduct that ….” to “conduct of testing that…”. Editorial change (clarification)
	12	Section 11.2, third paragraph Add new paragraph as the third paragraph to include when the training will occur relative to the schedule for preoperational testing and initial startup testing. RAI 2954 (CP RAI #75), 14.02-5

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Abstract

This Technical Report supplements the US-APWR Design Control Document, Chapter 14, Section 14.2 with a description of the administrative control program used to develop and administer the initial test program.

This document describes the organizational structure of the test organization and organizational interfaces, test review groups, organizational responsibilities for testing, transfer of jurisdictional controls from construction to operations, the use of test specifications, development, review, approval, and closure of test procedures, and controls related to performance of testing, test results reports, and certification of test personnel.

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List of Acronyms and Abbreviations

COL	Combined License
DCD	Design Control Document
FSAR	Final Safety Analysis Report
ITAAC	Inspections, tests, analyses, and acceptance criteria
ITP	Initial Test Program
JTG	Joint Test Group
MHI	Mitsubishi Heavy Industries, Ltd
NDE	nondestructive examination
NRC	U.S. Nuclear Regulatory Commission
PWR	pressurized-water reactor
QAPD	quality assurance program description
RG	Regulatory Guide
SSC	system, structure, and component
TRG	Test Review Group

1.0 PURPOSE

This Technical Report provides an outline of the administrative control program used to develop and administer the initial test program (ITP) as defined by Section 14.2 of the US-APWR Design Control Document (DCD). This Technical Report supplements the program description in Section 14.2 of the DCD. The general terms the "startup organization" or "startup program" used in Section 14.2 of the DCD are described as the test organization and test program, respectively, in this Technical Report.
Organizational titles in this report are used as preliminary, descriptive titles and designated in brackets [ ] to indicate that the Combined License (COL) Application reconciles the site-specific organization and organizational titles. Brackets are also used where organizational responsibilities or reporting relationships are defined in the COL Application.

NOTE: All references in this report to the DCD refer to the Design Control Document for the US-APWR, Docket No. 52-021. References to the Final Safety Analysis Report (FSAR) indicate site-specific information addressed in an individual COL Application.

2.0 SCOPE

This Technical Report describes the organizational structure of the test organization and organizational interfaces with the plant operating organization, construction organization, engineering organizations, and vendors during turnover from construction, installation (component-level) testing, preoperational and acceptance testing, and startup testing.

This Technical Report provides a description of the processes and controls employed for development of ITP test specifications and test procedures, test procedure performance, test results report development, test results acceptance, and test closeout. A description of the [Joint Test Group (JTG)] and [Test Review Group (TRG)] charters and membership is included.

3.0 ORGANIZATION AND RESPONSIBILITIES

This section presents a description of the basic functional and programmatic responsibilities of organizations involved with the ITP. The final organizations, position titles, and responsibilities will be defined in the test administrative manual.

3.1 Construction

The construction organization, hereafter referred to as [Construction], is responsible for installation and fabrication of the plant, performance of construction acceptance tests, and the preparation of structures, systems, and components (SSCs) for turnover to the plant operating organization. Construction provides support to the test organization during installation testing, preoperational and acceptance testing, and startup testing.

3.2 Testing

The test organization, hereafter referred to as [Testing], is responsible for installation testing, preoperational and acceptance testing, and startup testing, and participates as the owner's agent in the construction turnover process.

The [Test Manager] reports to the [Plant Manager] and has the overall responsibility for administration of the test program, scheduling test evolutions, and staffing the test organization. The [Test Manager] coordinates testing activities with support organizations including plant staff, engineering, licensing, construction, and equipment vendors.

The [Installation Test Manager] reports to the [Test Manager]. The [Installation Testing Group] is responsible for scheduling and facilitating the construction turnover process and timely completion of installation tests to ensure system readiness for preoperational and acceptance testing.

The [Preoperational and Acceptance Test Manager] reports to the [Test Manager]. The [Preoperational and Acceptance Test Group] is responsible for scheduling and managing preoperational and acceptance test procedure preparation, performance and closure activities.

The [Preoperational and Acceptance Test Manager] is a member of the [Joint Test Group].

The [Startup Test Manager] reports to the [Test Manager]. The [Startup Test Group] is responsible for scheduling and managing startup test procedure preparation, data collection during startup testing, and test procedure closure activities for fuel load, initial criticality, low power testing, and power ascension testing. The [Startup Test Manager] is a member of the [Test Review Group].

The [Operations Startup Manager] reports to the [Plant Manager] and is responsible for the performance of startup testing. The [Operations Startup Manager] is a member of the [Test Review Group].

The [Test Program Manager] reports to the [Test Manager] and is responsible for maintaining the test administrative manual, test personnel certification and qualification, and oversight of the test program administration.

Test engineers report to their respective test group manager and are responsible for the preparation, performance, and closure of test procedures.

3.3 Plant Staff

The organizational structure and responsibilities of the plant staff are described in Section 13.1 of the FSAR. Specific responsibilities of plant staff organizations during the ITP are described below.

The [Plant Manager] is responsible for providing direction and guidance to the [Test Manager] and overall coordination of test support during the ITP. The [Plant Manager] provides the final approval of the test administrative manual, startup test procedures and startup test results, and authorizes proceeding to higher power levels following completion of major power plateau testing.

The [Director, Operations], and the operations department, hereafter referred to as [Operations], are responsible for the coordination of operator support with the test organization during the ITP.

The [Director, Maintenance], and the maintenance department, hereafter referred to as [Maintenance], are responsible for performing preventative and corrective maintenance on mechanical and electric equipment, instrumentation and controls following turnover from [Construction].

The [Nuclear Training Manager] is responsible for directing the nuclear training programs for test personnel in order to provide personnel with the requisite skills and knowledge for effectively performing ITP test activities.

3.4 Joint Test Group

The [Joint Test Group] is charged with reviewing preoperational test activities. The [Joint Test Group] advises the [Test Manager] on the disposition of those items reviewed.

The primary function of the [Joint Test Group] is the review and approval of preoperational test procedures, procedure revisions, and test results. The [Joint Test Group] approves the test administrative manual prior to the review and approval of preoperational test procedures.

The [Joint Test Group] is comprised of certain station supervisory and technical personnel and includes managers, supervisors, or technical representatives from the organizations listed below.

- [Testing]
- [Operations]
- [Plant Engineering]
- Mitsubishi Heavy Industries, Ltd. (MHI) [and/or a qualified engineering party equivalent to MHI] (for preoperational testing performed on the nuclear steam support system and associated auxiliary systems)
- [Quality Assurance]

The members and their alternates, including the chairman, are designated in writing by the appropriate level of cognizant management.

In addition to the above, representatives of other organizations participate as requested by the chairman.

3.5 Test Review Group

The [Test Review Group] is charged with reviewing initial startup test activities and advising the [Plant Manager] on the disposition of those items reviewed. The primary function of the [Test Review Group] is the review and approval of startup test procedures, procedure revisions, and test results. The [Test Review Group] approves the test administrative manual prior to the review and approval of startup procedures.

[The [Test Review Group] functions as a committee responsible to the [Plant Manager] for initial startup testing matters. As determined in the site-specific FSAR, a station operating review committee may be established to assist the [Plant Manager] in the review of safety-related operating procedures, test procedures, test results and other related documents.

Where a station operating review committee is established, the [Test Review Group] is established as a subcommittee of the station operating review committee.]

The [Test Review Group] is comprised of certain station supervisory and technical personnel. The [Test Review Group] includes managers, supervisors, or technical representatives from the organizations listed below:

- [Testing]
- [Operations]
- [Plant Engineering]
- MHI [and/or a qualified engineering party equivalent to MHI]
- [Quality Assurance]

The members and their alternates, including the chairman, are designated in writing by the [Plant Manager] and appropriate level of cognizant management.

In addition to the above, representatives of other organizations participate as requested by the chairman.

4.0 TESTING

4.1 Construction Tests

Construction testing is discussed in Subsection 14.2.1.2.1 of the DCD. Roles, responsibilities, and administrative controls are clarified in this section.

4.1.1 Construction Acceptance Tests

During plant installation and erection, [Construction] performs construction acceptance tests to verify proper installation and code compliance. These tests include hydrostatic tests, HVAC integrity tests, and cable integrity tests. Some of these tests also satisfy the test requirement identified in inspections, tests, analyses, and acceptance criteria (ITAAC) such as hydrostatic, pressure integrity and preoperational nondestructive examination (NDE) requirements. Construction acceptance tests are controlled by the [Construction] work control process.

4.1.2 Installation Tests

Installation tests are controlled and directed by [Testing] with the support of [Maintenance] and oversight by [Plant Engineering]. This phase of testing immediately follows turnover from [Construction] and includes

- Verification that the plant is configured in accordance with the design by piping walkdowns, equipment verifications, and electrical scheme checks.
- Component-level testing to verify functionality and controls interface, including initial energization of electrical distribution systems, motor rotation verification, instrument calibrations, control device setups, and proper functionality verification.
- Establishment of system cleanliness through flushing, air blows, and steam blows, etc., verified to meet Regulatory Guide (RG) 1.37 (Ref. 12.1) cleanliness criteria.

The guidance provided in RG 1.68 (Ref. 12.2), Appendix C, Section 1.a is considered in development of installation test requirements.

Installation testing is performed using approved procedures based on equipment vendor specifications, installation/setup manuals, applicable industry standards, engineering design, and system operating requirements. Procedures are developed for specific equipment types or repetitive activities, where possible, and used to perform testing on multiple components, with each usage documented independently. Where practical, plant maintenance procedures are used to perform these tests.

The performance of these tests is controlled by [Testing]. The results of these tests are reviewed and approved by the [Installation Test Manager] or designee. Installation tests which satisfy ITAAC requirements are identified.

Specification of required installation tests is identified for each system and tracked to completion as prerequisites for preoperational and acceptance tests.

This process is defined and procedurally controlled in the test administrative manual, including controls for the preparation, review, approval, closeout, and records retention of installation test procedures.

4.2 Preoperational and Acceptance Tests

4.2.1 Preoperational Tests

Refer to Subsection 14.2.1.2.2 of the DCD. Preoperational tests are controlled and directed by [Testing] with the support of [Maintenance] and [Operations]. Preoperational tests are procedurally controlled in the test administrative manual, including controls for the preparation, review, approval, closeout, and records retention of test procedures. Preoperational test activities which satisfy ITAAC requirements are identified.

4.2.2 Acceptance Testing Program

System-level and integrated testing performed on systems or components that are outside of the scope of the ITP and, therefore, not controlled as preoperational or startup tests are identified as acceptance tests. Although outside of the scope of the ITP as defined in Section 14.2 of the DCD, these tests are prepared and performed by [Testing] with appropriate level of reviews and approvals.

Acceptance tests are controlled and directed by [Testing] with the support of the [Maintenance] and [Operations] organizations. This process is defined and procedurally controlled in the test administrative manual, including controls for the preparation, review, approval, closeout, and records retention of test procedures. Acceptance test activities which satisfy ITAAC requirements are identified.

4.3 Startup Tests

Refer to Subsection 14.2.1.2.3 of the DCD. Startup tests are controlled and directed by [Testing] with the support of the [Maintenance] and [Operations]. At approval to load fuel, the performance of the startup tests is the responsibility of the [Operations Shift Supervisor] and the [Operations Startup Manager]. The testing organization assumes a support role. Test engineers perform data collection and maintain the test procedures while [Operations] controls the plant operating configurations. Startup tests are procedurally controlled in the test administrative manual, including controls for the preparation, review, approval, closeout, and records retention of test procedures. In addition, the control and revision of startup test procedures is in accordance with the plant procedure change program.

4.4 Test Administrative Manual

The test administrative manual consists of administrative procedures that implement the requirements specified in Section 14.2 of the DCD and this Technical Report. The test administrative manual includes procedures for the following:

- Test program administration (provides a description of the test organization, roles, and responsibilities of its members, applicability of the test program and interfacing organizations and responsibilities)
- [Joint Test Group] and [Test Review Group] review committees (charter, membership, and responsibilities)
- Construction turnover process
- System Release for Operation process
- Preparation, review, and approval of construction installation test procedures
- Preparation, review, and approval of preoperational, acceptance and startup test procedures
- Conduct of testing, including test log entries, pre-test briefings, test change requests, test deficiency reports, and retests
- Test closure process, including test data packages, test results reports, test open items, and records preparation
- Control of post-modification and post-maintenance testing
- Test engineer and supervisor certification and qualification

5.0 JURISDICTIONAL CONTROLS

5.1 Turnover from Construction to the Plant Operating Organization

Transfer of jurisdictional control of the plant occurs in a phased approach as the installation, and construction acceptance tests of plant equipment, systems, subsystems or areas are completed by [Construction]. The transfer of jurisdictional control from [Construction] to the plant operating organization, known as construction turnover, is a formal process utilizing turnover scoping drawings to define turnover scope and boundaries. Turnover readiness is verified by [Testing] through walkdowns, punchlisting, and review of construction records.

During the turnover process, systems and components are reviewed for completeness, installation damage, and conformance with appropriate installation and/or design documents. Outstanding construction document and test deficiencies are identified and controlled prior to fuel load. Hydrostatic, pressure integrity and preoperational NDE testing which satisfies ITAAC requirements are identified.

Administrative control of the construction turnover process and formal acceptance of turnovers is controlled by the plant operating organization. [Testing] participates as the owner's agent in the construction turnover process

This process includes administrative controls to transfer jurisdictional control back to [Construction] for rework or modifications. Upon completion of construction work, the impacts of work performed on completed testing, or additional testing required due to modifications, are identified and tracked to completion.

5.2 System Release for Operation

Upon the acceptance of preoperational or acceptance testing, the system is designated as Released for Operation. Preoperational test activities which satisfy ITAAC test requirements must be completed prior to designating a system or subsystem as Released for Operation. This process is defined and procedurally controlled in the test administrative manual.

6.0 WORK CONTROLS

Plant administrative procedures establish controls for the issuance of work permits, tracking of work permits to completion and maintaining plant status control during all phases of the ITP.

[Testing] will review, authorize field performance, and review the results of all field work on SSCs turned over from [Construction] to ensure impacts on testing and plant conditions are carefully monitored and controlled and the as-tested status of SSCs is maintained.

Configuration control of SSCs turned over from [Construction] is established and maintained following turnover during all phases of testing and maintenance.

7.0 TEST SPECIFICATIONS

Test specifications provide the technical requirements and acceptance criteria that are to be incorporated into the preoperational and startup test procedures. Upon approval, they are issued as controlled documents. Approved test specifications are required to be available during the preparation and review of preoperational and startup test procedures.

In addition to the requirements in this section, test specifications affecting the safety-related and non-safety related SSCs within the scope of the reliability assurance program are prepared and reviewed in accordance with Subsection 17.4.4 of the DCD and the FSAR.

The preparation, review, and approval of test specifications is defined and procedurally controlled by the engineering design organization responsible for the system or systems.

7.1 Preparation of Test Specifications

Test specifications are prepared by the engineering design organization responsible for the system or systems(s).

Test specifications include the following:

- Test objectives
- Test prerequisites
- Initial conditions and plant configuration during testing
- Special considerations to be addressed during preparation or performance of testing
- Acceptance criteria
- Test methods
- Data collection requirements
- Test results evaluation methods (as applicable)
- Test restoration requirements (as applicable)

8.0 TEST PROCEDURES

The preparation, review, approval, performance of test procedures is defined and procedurally controlled in the test administrative manual.

In addition to the requirements in this section, test procedures affecting the safety-related and nonsafety-related SSCs within the scope of the reliability assurance program are prepared and reviewed in accordance with Subsection 17.4.4 of the DCD and the FSAR.

8.1 Preparation of Test Procedures

Test procedures are prepared based on formats specified by the test administrative manual, consistent with Subsection 14.2.3.5 of the DCD. These standard formats help ensure that each procedure contains the information and instructions required to satisfactorily perform and document the test. Preoperational test activities which satisfy ITAAC test requirements are identified in the test procedures.

8.2 Review and Approval of Test Procedures

Test procedures are, at a minimum, reviewed by MHI [or a qualified engineering organization equivalent to MHI], [Testing], [Operations], [Quality Assurance], [Maintenance], and [Licensing].

Preoperational test procedures are reviewed and approved by the [Joint Test Group].

Acceptance test procedures are approved by the [Test Manager].

Startup test procedures are approved by the [Test Review Group]. Final approval is by the [Plant Manager]. [Startup test procedures are also approved by the station operating review committee at sites that establish a station operating review committee.]

Revisions to test procedures are reviewed and approved by the same organizations and committees that initially approved the procedures.

Preoperational and startup test procedures are provided to the NRC for review in accordance with Subsection 14.2.3 of the DCD.

9.0 CONDUCT OF TESTING

The test administrative manual includes controls for the performance of test procedures as discussed below.

9.1 Configuration Controls

Configuration controls within test procedures provide for documenting the installation and removal of test jumpers, lifted leads, test equipment and off-normal system configurations and ensure restoration to a prescribed configuration at the conclusion of the test.

All proposed plant modifications and repairs identified as a result of testing are reviewed by the original design organization, [Plant Engineering], [Testing], the [Joint Test Group] and the [Test Review Group]. Impacts to test methods and/or test acceptance criteria, requirements for additional testing or repeat of completed testing, and impacts on test sequences and tests which rely upon the satisfactory completion of completed testing, are identified and incorporated into the affected test procedures.

9.2 Test Coordination

[Testing] is responsible for coordination of testing activities, including the completion of test prerequisites, assessment of the potential impacts of simultaneous tests on multiple systems, test boundaries, and off-normal conditions during testing.

The test administrative manual includes controls relating to the methods used for initial review of individual parts of multiple tests (e.g., hot functional testing) in order to assure coordination of plant conditions related to these tests.

Test procedures which are required to be performed in parallel, sequentially, or are considered individual parts of multiple tests as specified or identified in the Chapter 14 test abstracts:

- are sent to the reviewing organizations at the same time,
- receive a detailed review to verify coordination of plant conditions with related tests,
- identify all interface requirements, restrictions, prerequisites and post-requisites with related test procedures, and
- include additional reviews for impacts to related procedures when revised or amended by a Test Change Request.

9.3 Procedure Control

Only one official test copy will be issued for use in the field. Test change requests are immediately incorporated into the official test copy.

9.4 Procedure Changes

Changes that are required to test procedures during test performance are documented on a test change request form. Major changes which affect the intent of the test or affect test acceptance criteria are reviewed and approved by the organization that originally approved the procedure. Changes not classified as major are reviewed and approved by the cognizant test supervisor. Changes are incorporated into the official test copy prior to the resumption of testing. Test change requests are numbered uniquely, logged, and maintained with the working copy of the test procedure.

9.5 Procedure Performance

The test administrative manual includes controls for documenting completion of prerequisites, pre-test briefings, test interruptions and restarts, retesting, documenting of test deficiencies, continuation of testing following discovery of test deficiencies, shift turnovers, and required entries into test logs.

9.6 Test Deficiencies

Test deficiencies are documented in test deficiency reports, which include a statement of the deficiency, recommended and completed corrective actions, retesting requirements and results. Approval requirements for continuation of testing, corrective actions, and closure are specified in the test administrative manual. Test deficiencies are noted at the appropriate test step, logged, and tracked to closure within the Official Test Copy of the test procedure.

Test deficiencies documenting the failure to meet test acceptance criteria are evaluated by the responsible engineering design organization for resolution of design-related problems. The resolution of failed acceptance criteria is reviewed by the [Joint Test Group] for preoperational tests and the [Test Review Group] for startup tests.

10.0 TEST RESULTS

Following each major phase of the test program, test results and/or test status are reviewed to ensure that required tests have been performed and that the test results have been evaluated.

This evaluation ensures that required systems are operating properly and that testing for the next major phase can be conducted in a safe and efficient manner. This type of review is performed to the extent required before major test phases such as fuel load, initial criticality, and power ascension. During the power ascension phase, review and evaluation of startup test procedure results is completed for each major power plateau prior to proceeding with power ascension testing to the next plateau.

10.1 Review and Approval of Test Results Reports

Following completion of a particular test, a test engineer assembles the test data package for evaluation. A test results report is prepared and included in the test data package. The test results report summarizes the scope and objectives of the test, test deficiencies and their resolution, test changes or revisions, and test acceptance criteria and results showing that each criterion was satisfied.

Construction installation tests do not require test results reports. Results are reviewed and approved by the cognizant test supervisor (approval of results for ITAAC closure is performed under a separate program).

Acceptance test results are reviewed by [Plant Engineering] and approved by the [Preoperational and Acceptance Test Manager] (approval of results for ITAAC closure is performed under a separate program).

Preoperational test results are reviewed and approved by appropriate members of the [Joint Test Group] (approval of results for ITAAC closure is performed under a separate program).

Startup test results are reviewed by appropriate members of the [Test Review Group]. Final approval is by the [Plant Manager]. [Startup test results are also approved by the station operating review committee at sites that establish a station operating review committee.]

Each test data package is reviewed to ensure that the test has been performed in accordance with the written approved procedure and that required data, checks, initials, and signatures have been properly recorded and that system performance meets the approved acceptance criteria.

Completed preoperational test activities which satisfy ITAAC test requirements are identified for ITAAC closure documentation.

Deficiencies with the test data packages that are identified in the review process are resolved to the satisfaction of the appropriate review group. If the evaluation indicates that deficiencies in the test method are responsible for unsatisfactory test results, the test procedure is modified accordingly before retesting is initiated. Whenever an evaluation of test results indicates deficiencies in system performance, the problem is referred to the appropriate engineering organization for evaluation.

The [Test Manager] is responsible for the final approval of preoperational test results.

The [Plant Manager] authorizes proceeding to a higher power level following completion of major power plateau testing (i.e., 0-5 percent, 30 percent, 50 percent and 75 percent).

This process is defined and procedurally controlled in the test administrative manual.

10.2 Open Deficiencies

Unresolved test deficiencies, open items requiring testing, or deficiencies identified with test methods or conduct of testing that are identified during the test procedure closure process shall be identified as test open items.

The resolution of test open items shall be reviewed and approved by the [Joint Test Group] for preoperational tests and the [Test Review Group] for startup tests.

This process is defined and procedurally controlled in the test administrative manual.

10.3 Test Closure and Test Records

Completed test packages are assembled for submittal as life-of-plant records in accordance with Subsection 14.2.6 of the DCD. The assembled test package includes:

- The completed test procedure with all attachments, data sheets, test logs, test

deficiency reports, and test change requests

- Data collection records
- Test specifications referenced by the procedure
- Approved test results report

This process is defined and procedurally controlled in the test administrative manual.

11.0 CERTIFICATION AND QUALIFICATION OF TEST PERSONNEL

11.1 Test Engineer Certification and Qualification

Test engineer qualification is accomplished within the framework of the quality assurance program description (QAPD) described in Chapter 17 of the FSAR. Records shall be maintained providing evidence of education, experience, plant-specific training, and level of certification.

11.2 Training

Test engineers, supervisors and managers are indoctrinated in the use of applicable administrative procedures, test procedures and familiarized with applicable quality assurance requirements.

Test engineers, supervisors, and managers complete systems training to provide familiarization with system and component operations unique to the design of pressurized-water reactor (PWR) nuclear power plants.

Personnel involved in preoperational testing or startup testing are required to complete necessary training prior to the preparation or review of preoperational or startup test procedures and prior to conducting or participating in the performance of preoperational or startup tests.

11.3 Supervisory Qualifications

Personnel who are responsible for the review and approval of preoperational or initial startup test procedures and results, and who direct or supervise the conduct of preoperational or initial startup tests shall meet the qualification and training requirements of ANSI/ANS-3.1-1993 (Ref. 12.3) with the additions, exceptions and clarifications provided by RG 1.8 (Ref. 12.4).

Qualification of supervisors and managers is accomplished within the framework of the QAPD described in Chapter 17 of the FSAR.

12.0 REFERENCES

12.1 Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants, Regulatory Guide 1.37, Rev. 1, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007

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12.4 Qualification and Training of Personnel for Nuclear Power Plants, Regulatory Guide 1.8, Rev. 3, U.S. Nuclear Regulatory Commission, Washington, DC, May, 2000.