Appendix 14A

North Anna 3

Initial Test Program Administration

(Preop & Startup Testing)

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1.0 INITIAL TEST PROGRAM OVERVIEW

This document describes the organizational structure, test personnel qualification and operation of the Initial Test Program (ITP). The Initial Test Program consists of a series of tests categorized as preoperational testing and startup testing and is implemented by the startup and test organization. The startup and test organization has overall responsibility for the administrative and technical control of the test program. The objectives of the ITP are listed in DCD Section 14.2.1. Regulatory Guide 1.206, Regulatory Guide 1.68 and SRP Section 14.2 were used as a reference while developing this program description.

The startup and test organization is directed by the plant manager who reports directly to the site executive. The plant manager has the authority necessary to conduct the test program in conformance with the Startup Administrative Manual (SAM) and related documents associated with accomplishing the startup and test organization objectives. The SAM is a station administrative procedure governed by the requirements set forth in FSAR section 13.5. A description of the SAM contents can be found in DCD 14.2.2.1. The plant manager has the authority to implement an organization to undertake the responsibilities assigned to the startup and test department. Additional information on staff recruitment and training, as well as testing involvement can be found in FSAR Chapter 13AA.

The startup and test organization is divided into two internal groups: the preoperational test organization, which is responsible for all matters relating to preliminary, preoperational, and acceptance testing; and the startup test organization, which is responsible for all matters relating to initial startup testing. Both groups consist of personnel drawn from various organizations such as utility staff, construction personnel, GE-H, and outside consultants. Personnel who formulate or conduct test activities are not the same personnel who designed or are responsible for satisfactory performance of the system or design feature being tested.

Preoperational testing is performed after the system turnover from construction and prior to fuel loading. The preoperational test organization consists of preoperational test organization supervisors (i.e. TI, BOP, electrical, I&C and others as required) each of who reports to the manager in charge of preoperational testing. preop test engineers are assigned to this organization and report to one of the preop test organization Supervisors. Preoperational test objectives are described in DCD 14.2.1.2.

Startup testing is performed from fuel loading, initial criticality, and inspections from zero power to rated power through the warranty run test. The startup test organization consists of startup testing supervisors who report to the manager in charge of startup testing activities. Startup engineers are assigned to this organization and report directly to one of the Startup test supervisors. Startup test objectives are described in DCD 14.2.1.3.

2.0 CODES, STANDARDS AND REGULATORY REQUIREMENTS

2.1 Codes and Standards: The following Codes and Standards are applicable to the initial test program for boiling water reactor power.

2.1.1. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section III, Rules for Construction of Nuclear Power Plant Components

2.2 Regulation and Regulatory Requirements

The regulatory basis of the Initial Test Program is provided in 10CFR50 (Section 50.34 and Appendix B). These regulations specifically apply to testing of structures, systems, and components important to safety, i.e., sufficient testing to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. Regulatory guidelines, as related to testing, are provided to describe scope and depth (administratively and technically) of testing that may be applicable to the Initial Test Program for light-water-cooled nuclear power plants. The following regulation and regulatory requirements are applicable to the initial test program for boiling water reactor power plants.

2.3 U.S. Code of Federal Regulations (CFR)

2.3.1. 10CFR20, "Standards for Protection Against Radiation"
2.3.2. 10CFR30, Section 30.53, "Tests"
2.3.3. 10CFR50, Section 50.34, "Contents of Applications: Technical Information"
2.3.4. 10CFR50.55a, "Codes and Standards"
2.3.5. 10CFR50.63, "Loss of All Alternating Power"
2.3.6. 10CFR50. Appendix A, "General Design Criteria for Nuclear Power Plants"
2.3.7. 10CFR50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants"
2.3.8. 10CFR50, Appendix J, "Primary Containment Leakage Testing for Water Cooled Power Reactors"
2.3.9. 10CFR52.79, "Contents of Application: Technical Information"
2.3.10. 10CFR 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants"

2.4 NRC Regulatory Guides and NUREGs

2.4.1. Regulatory Guide 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing"

2.4.2. Regulatory Guide 1.30, “Quality Assurance Requirements for Installation, Inspection and Testing of Instrumentation and Electrical Equipment (Safety Guide 30)
2.4.3. Regulatory Guide 1.37, “Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants
2.4.4. Regulatory Guide 1.41, “Preoperational Testing of Redundant Onsite Electric Power Systems to Verify Proper Load organization Assignments”
2.4.5. Regulatory Guide 1.52, “Design, Testing, and Maintenance Criteria for Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and adsorption Units of Light-Water-Cooled Nuclear Power Plants”
2.4.6. Regulatory Guide 1.56, “Maintenance of Water Purity in Boiling Water Reactors”
2.4.7. Regulatory Guide 1.68, “Initial Test Programs for Water-Cooled Nuclear Power Plants”
2.4.8. Regulatory Guide 1.68.1, “Preoperational and Initial Startup Testing of Feedwater and Condensate Systems for Boiling Water Reactor Power Plants”
2.4.9. Regulatory Guide 1.68.2, “Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants”
2.4.10. Regulatory Guide 1.80, “Preoperational Testing of Instrument and Control Air Systems
2.4.11. Regulatory Guide 1.95, “Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release
2.4.12. Regulatory Guide 1.116, “Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems,
2.4.13. Regulatory Guide 1.128, “Installation, Design and Replacement of Large Lead Storage Batteries for Nuclear Power Plants”
2.4.14. Regulatory Guide 1.139, “Guidance for Residual Heat Removal”
2.4.15. Regulatory Guide 1.140, “Design Testing and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light Water-Cooled Nuclear Power Plants”
2.4.16. Regulatory Guide 1.152, “Criteria for Digital Computers in Safety Systems of Nuclear Power Plants”
2.4.17. Regulatory Guide 1.168, “Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
2.4.18. Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition)”
2.4.19. NUREG 0800, Standard Review Plan, Section 14.2 Initial Plant Test Program Final Safety Analysis Report

3.0 CONSTRUCTION ORGANIZATION

Additional discussion and/or figures of the construction organization are provided in FSAR Chapter 13.

4.0 PREOPERATIONAL TEST ORGANIZATION (Figure 1)

The preoperational test organization has the primary responsibility for conducting preoperational tests and documenting the results. General information concerning the organization and staffing of the preoperational test organization can be found in DCD 14.2.1.4. This section will further develop the site specific test organization. Figure 1 describes the preop organization chart.

4.1 Site Executive

Description of the responsibilities of the site executive is described in FSAR Section 13.1.

4.2 Plant Manager

Description of the responsibilities of the plant manager is described in FSAR Section 13.1. Qualifications of the plant manager will be equivalent to the qualifications described in ANSI/ANS-3.1 for a plant manager.

4.3 Manager in charge of Operations

The manager in charge of operations, under the direction of the plant manager, is responsible for the day-to-day activities of the operations staff. He coordinates with the manager in charge of preop testing during the initial test program and is a voting member of Joint Test Group (JTG). Qualifications of the manager in charge of operations will be equivalent to the qualifications described in ANSI/ANS-3.1 for an operations manager.

4.4 Manager in charge of Preop Testing

The manager in charge of preop testing reports to the plant manager. Qualifications of the manager in charge of preop testing will be equivalent to the qualifications described in ANSI/ANS-3.1 for a preoperational test engineer. The manager in charge of preop testing is responsible for:

- Staffing within the preop testing organization during the preoperational test phase.
- Developing procedures associated with preoperational testing.
- Acting as chairman of the JTG.
- Responsible for all contracts associated with the startup testing program.

- Coordinating with station and construction organization heads for assignment of staff personnel to accomplish the test program objectives.

4.5 GE-H Resident Site Manager

The GE-H Resident Site Manager is responsible to the manager in charge of preop testing for technical direction during the preoperational phase of the test program. Qualifications of the GE-H Resident Site Manager will be equivalent to the qualifications described in ANSI/ANS-3.1 for a preoperational test engineer. His specific responsibilities are:

- Acting as liaison with GE-H on testing matters involving GE-H supplied equipment
- Reviewing preoperational tests with emphasis on GE-H NSSS
- Assisting in data reduction, analysis, and evaluation for preoperational tests
- Acting as voting member of JTG
- Providing administrative support and supervision to GE-H onsite personnel involved in the test program.

4.6 Preop Test Organization Supervisors

Preoperational test organization supervisors report to the manager in charge of preop testing. Qualifications of the preop test organization supervisors will be equivalent to the qualifications described in ANSI/ANS-3.1 for a preoperational test engineer. The preoperational test organization supervisors are responsible for:

- Supervising the preoperational test engineers assigned to them.
- Coordinating and scheduling test preparation and test activities.
- Acting as voting member of JTG
- Preparation, review, and performance of the preoperational test procedures.
- Reviewing and making recommendations of the preoperational test results.
- Responsible for the resolution of deficiencies identified during preop inspection and test activities.
- Ensuring test engineers conducting the test are not the same personnel who designed or are responsible for satisfactory performance of the systems or design features being tested.

4.7 Preoperational Test Engineer

Preoperational test engineers report to the preop test organization supervisors as assigned. Qualifications of the preoperational test engineers are described in ANSI/ANS-3.1. Preoperational test engineers may be station staff members, GE-H or contract personnel. The preoperational test engineers are responsible for:

- Determining the nature and degree of testing required for assigned systems.
- Developing test activity milestones, target dates and manpower requirements.

- Following construction progress to support the test program requirements.
- Ensuring that the required detailed preoperational test procedures are available for review and approval.
- Identifying special or temporary equipment or services needed to support testing.
- Assuring test identification tagging and station tagging are implemented as necessary to support testing and turnover.
- Directing all participating groups during preparation for the execution of assigned tasks.
- Identifying and assisting in the resolution of deficiencies and problems found during the construction and testing of assigned systems and areas.
- Reviewing and evaluating test results and prepare test summaries.

4.8 Joint Test Group (Figure 2)

The Joint Test Group (JTG) is the primary review and approval organization during the preoperational test phase of the test program. The JTG is the functional equivalent of the Startup Coordinating Group (SCG) sited in DCD 14.2.1.4. The JTG is organized as shown in Fig. 3. The manager in charge of preop testing is chairman of the JTG. The required JTG quorum will be described in a site specific procedure governing JTG operation. The functions and responsibilities of the JTG are:

- Performs duties delineated in the SAM
- Reviews and approves all preoperational test procedures prior to testing
- Reviews and approves all major changes or revisions to JTG approved test procedures
- Reviews and approves the overall test schedule and sequence
- Reviews and approves the results of preoperational tests
- Recommends the disposition of test deficiencies
- Recommends retests or supplemental tests as required.
- Determines system readiness for turnover to operations.

5.0 STARTUP TESTING ORGANIZATION (Figure 3)

5.1 Plant Manager

The plant manager reports to the site executive, is responsible for safe operation of the plant, and has control over onsite activities necessary for safe operation and maintenance of the plant including the following organizations:

- Operations
- Maintenance
- Outage management

Qualifications of the plant manager will be equivalent to the qualifications described in ANSI/ANS-3.1 for a plant manager.

5.2 Manager in charge of Operations

The manager in charge of operations, under the direction of the plant manager, is responsible for the day-to-day activities of the operations staff. He coordinates with the manager in charge of startup testing during the initial test program. Qualifications of the manager in charge of operations will be equivalent to the qualifications described in ANSI/ANS-3.1 for an operations manager.

5.3 Manager in charge of Startup Testing

The manager in charge of startup testing reports to the Plant Manager. Qualifications of the manager in charge of startup testing will be equivalent to the qualifications described in ANSI/ANS-3.1 for an operations manager. The manager in charge of startup testing is responsible for:

- Staffing within the startup test organization.
- Procedures associated with startup testing.
- Acting as the startup test representative to safety review committee.
- Responsible for all contracts associated with the startup testing program.
- Coordinating with station organization heads for assignment of staff personnel to accomplish the test program objectives.

5.4 GE-H Resident Site Manager

The GE-H resident site manager is responsible to the manager in charge of startup testing as appropriate for technical direction during the startup phase of the test program. Additional description of his duties can be found in DCD 14.2.1.4. Qualifications of the GE-H resident site manager will be equivalent to the qualifications described in ANSI/ANS-3.1 for a startup engineer. His specific responsibilities are:

- Acting as liaison with GE-H on testing matters involving GE-H supplied equipment
- Reviewing initial startup tests with emphasis on GE-H supplied equipment.
- Assisting in data reduction, analysis, and evaluation for initial startup tests
- Providing administrative support and supervision to GE-H onsite personnel involved in the test program.

5.5 Startup Test Organization Supervisors

Startup test organization supervisors report to the manager in charge of startup testing. Qualifications of the startup test organization supervisors will be

equivalent to the qualifications described in ANSI/ANS-3.1 for a startup engineer. The startup test organization supervisors are responsible for:

- Supervising the startup test engineers assigned to them.
- Coordinating and scheduling test preparation and test activities.
- Coordinating and directing testing via the operations shift supervisor for the conduct of all initial startup testing for their shift.
- Assisting in the preparation, review, and performance of the startup test procedures.
- Reviewing, analyzing, and evaluating the test results and data.
- Assisting in the resolution of deficiencies identified during startup testing activities.
- Coordinating with planning and scheduling for initial startup activities.
- Expediting testing progress as necessary to support project schedule.
- Ensuring test engineers conducting the test are not the same personnel who designed or are responsible for satisfactory performance of the systems or design features being tested.

5.6 Startup Test Engineers

Startup test engineers report to the startup test organization supervisor. Qualifications of the startup test engineers will be equivalent to the qualifications described in ANSI/ANS-3.1 for a startup engineer. Startup test engineers may be station staff, GE-H or contract personnel. The startup test engineers are responsible for:

- Preparing the required detailed startup test procedures making them available for review and approval.
- Identifying special or temporary equipment or services need to support testing.
- Directing all participating groups during preparation for the execution of assigned tasks.
- Identifying and assisting in the resolution of deficiencies found during the construction and testing of assigned systems.
- Reviewing and evaluating the test results and data.
- Coordinating with operations during the execution of assigned Tasks.
- Assisting in the supervision and inspection of BOP work, reviewing installation and performance tests, and provide general advice on startup tests.
- Providing engineering support activities and services during startup testing of the turbine generator and testing of main turbine EHC system.

5.7 Document Control Coordinator

The Document Control Coordinator reports to the manager in charge of startup testing. The Document Control Coordinator is responsible for:

- Tracking test procedure changes
- Reviewing, approving and tracking document changes (including drawings, vendor tech manuals, procedures, design changes, etc)
- Verifying that the test schedules are up to date with regard to latest testing results
- Processing final test packages through final review and approval by the safety review committee.

5.8 Safety Review Committee

Commencing with initial fuel load, the safety review committee supplants the JTG as the primary review and approval organization of the test program. The safety review committee is responsible for review of all procedures that require a regulatory evaluation under 10 CFR 50.59 and 10 CFR 72.48 as well as all tests and modifications that affect nuclear safety. During the initial start test phase, the safety review committee is advised by the manager in charge of startup testing and the GE-H resident site manager. The safety review committee is responsible for review and approval of all startup test procedures. Additional detail concerning safety review committee activities can be found in site specific procedures.

6.0 INITIAL TEST PROGRAM

6.1 Overview (major phases, prerequisites and objectives)

The purposes of Initial Test Program are to confirm the design basis and demonstrate, to the extent practicable, that the plant operates and responds to anticipated transients and postulated accidents as designed. Also, preoperational and startup testing is used to confirm that the plant warranty specified in the contract and the systems and equipment specification requirements are satisfied. A description of the test program, schedule and sequence can be found in DCD Section 14.2.

A comprehensive system of planned and periodic audits shall be carried out to verify compliance with the ITP. The audits shall be performed in accordance with written procedures or check lists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audit results shall be documented and reviewed by management having responsibility for the ITP. Follow-up action, including re-audit of deficient areas, shall be taken where indicated.

Training on the overall test program shall be conducted prior to scheduled preoperational and initial startup testing and as new employees are added to the test groups. A training program for each fundamental organization in the organization will be developed, with regard to the scheduled preoperational and initial startup testing, to ensure that the necessary plant staff is ready for

commencement of the Initial Test Program. Additional discussion on staff training can be found in FSAR 13AA, 13BB and Figure 13AA-202. The training program shall include:

- Systems to be tested and acceptance criteria review
- Training by selected major equipment vendors, e.g., turbine; plant control
- A review of test program administration
- Content of test procedures
- Test sequence
- Test conduct and closure

6.2 Test Plateaus

The Startup Test Program is implemented in five Test Plateaus (or Test Conditions). These Test Plateaus are the plant operating conditions at which required Startup Tests are to be performed. The definitions of Test Plateaus are shown as follows:

- Open Vessel (OV) With the RPV head removed, from initiation of fuel loading to cold conditions with a fully loaded core.
- Heat-Up (HU) During nuclear heat-up, from ambient conditions and 0 KPa to rated temperature and pressure within the RPV, with reactor power typically less than 5% of rated.
- Lower Power (LP) between 5% and 25% of rated thermal power.
- Mid Power (MP) between approximately 50% and 75%.
- High Power (HP) along and just below (+0, -5%) the 100% power rod line.

6.3 Test Sequence

The schedule sequence for preoperational testing is dependent on many factors. These include construction schedule, manpower availability, availability of supporting equipment, etc. These factors will be input to the master schedule to determine actual sequencing.

The Startup Test Program is performed in sequence from Open Vessel testing, Initial Heatup, Low power, Mid Power and then High Power. DCD Table 14.2-1 describes the Power Ascension Test Matrix and which systems are tested in each plateau. Testing at low power and flow is typically performed prior to testing at higher power and flow levels. The normal recommended sequence of a startup test within a given test plateau is:

- Core Performance Analysis
- Steady-State Tests
- Control System Tuning
- System Transient Tests

- Major Plant Transients, including trips.

Test prerequisites are specified in each test procedure. These prerequisites must be confirmed prior to test commencement. Upon completion of a given test, a preliminary evaluation will be performed which confirms acceptability for continued testing. Smaller transient changes are performed initially, gradually increasing to larger transient changes. Test results at lower powers will be extrapolated to higher power levels to determine acceptability of performing the test at higher powers. This extrapolation will be included in the analysis section of the lower power procedure. At the completion of the Startup Test Program, a plant capacity warranty test is performed to satisfy the contract warranty and to confirm safe and stable plant operation.

6.4 Startup Test Program Planning

Startup Test Program planning information is provided based on previous plant startup experience and is provided so that lessons learned from these experiences can be applied. In addition, areas have also been identified where increased emphasis on operator training can be beneficial. As part of the preparations for fuel load, a review will be conducted of recent initial test programs and recent operating experience to identify any new lessons learned for incorporation into the test program. The review will include internal lessons learned from various utility sites as well as external OE. Site specific administrative procedures require review of recent internal and external operating experience when preparing test procedures and when performing prejob briefs immediately prior to the conduct of a test. A summary of this review, including findings, will be included in the SAM as well as a discussion on how the ITP was modified.

6.4.1 Open Vessel Tests

a) Cold Functional Tests (prior to fuel loading) are performed to assure:

- Plant systems are available to support fuel loading
- Shift personnel have operating experience with plant equipment. Each operating shift has functioned together to operate the plant systems on an integrated basis
- Certain plant operating and surveillance procedures have been exercised and are usable
- Specified plant equipment has been tested and the plant and personnel are ready for fuel loading. Testing shall be performed using plant procedures and controlled and documented by use of checklists. Checklists provide a signoff sheet to assure that each operating shift has received training and experience on specified systems.

b) Prerequisites for Fuel Loading

- Completion of the Preoperational Test Program. A discussion of the required preoperational testing is presented in DCD 14.2.6. Inspections, tests, analyses, and acceptance criteria (ITAAC) in the Combined License should be satisfactorily completed prior to fuel load.
- If possible, surveillance test procedures will be implemented during the preoperational test program to identify and correct problems with the procedures. All required plant surveillances shall be complete and current. A review of the long term (24 month) surveillances will be performed and if necessary, these surveillances will be scheduled to be re-performed during a planned outage as part of the startup test program. Additional detail is included in DCD 14.2.6, Pre-Fuel Load Checks.
- If possible, the plant control systems, e.g., Neutron Monitoring System (NMS), Feedwater Control System (FWC), etc., will be energized and remain energized to detect component failures for several months prior to fuel load. In addition, the software and hardware of these systems will be tested with the final version of component software.
- The Startup Range Neutron Monitoring System (SRNM) surveillance will be performed in accordance with Tech Spec 3.3.1.6 prior to loading fuel. Surveillances on special movable detectors will also be performed, if used.

c) Initial Fuel Loading

Initial fuel loading will be controlled via a startup test procedure (Fuel Load), which will contain specific instructions and guidance to load fuel safely, correctly, and efficiently to the full core size. Core verification follows fuel loading and is part of the fuel load procedure.

6.4.2 Closed Vessel Tests

Following core verification, reactor vessel assembly and Control Rod Drive friction and scram testing will progress concurrently. The equipment necessary for vessel assembly, such as stud tensioner and reactor building crane, will be checked for operability prior to vessel assembly. Nuclear instrument settings will be reviewed before plant startup to ensure that the correct settings have been used. Pre-Criticality testing is described in DCD 14.2.7.

6.4.3 Criticality

During initial criticality, operation of arc or electrical welding equipment in the Reactor and Control Building will be prohibited in order to avoid noise problems on the Neutron Monitoring Systems and malfunctions of electronic equipment. The Initial Criticality Startup Test Procedure will provide the

necessary controls and instructions for performing initial criticality. Additional information on initial criticality can be found in DCD 14.2.6.

6.4.4 Hot Functional Tests

The Hot Functional Testing starts with the first test performed during Open Vessel Testing and continues through the Mid Power plateau. Systems will be checked out by a combination of the surveillance tests, startup test procedures and plant specific operating procedures with the required systems in operation. The master Startup Checklist will be completed and all other necessary documents reviewed and approved. Station operation procedures shall be verified during the entire startup phase. Integrating system performance shall be verified at rated temperature and pressure at the lowest practical power level to maintain those conditions before proceeding to higher power levels. Systems will be continuously monitored by operations and system engineering to verify the performance of each system. All plant parameters that are normally displayed or recorded in the main control room will be closely monitored on a routine basis for indication of abnormal plant or equipment operation and for verifying Technical Specification compliance. In addition, Surveillance Tests shall be conducted in accordance with the plant specific Technical Specification requirements. Vendor startup representatives should be on site and used to assist with the startup of specialized equipment, if needed.

At the beginning of the Startup Test Program, the outage management organization will be in place with adequate planning and scheduling personnel to plan short term and long-term outages. A spare parts program will be in place to minimize delays during the test program. Software and hardware will be properly checked out to assure that the system is ready to support the startup test program. All plant procedures, which could produce a scram if performed incorrectly, will be identified and selected for review prior to the start of test program. If the procedure could cause a scram, the applicable procedure will be highlighted or otherwise marked so that it is obvious, and appropriate care is taken during the conduct of the procedure. A review shall be performed to identify which startup tests shall receive senior licensee management oversight. Test procedures so identified will have this requirement included in the prerequisites.

6.4.5 Low Power Test Plateau Tests

During the period of low power operation, systems such as main turbine, generator, and feedwater are placed in service between arrival at rated temperature and pressure and completion of 25% power testing. During low power operation, each reactor feedwater pump will be operated. This effort is expected to be performed on all multiple component equipment such as Steam Jet Air Ejectors (SJAEs), condensate pumps, feedwater booster pumps, etc.

Following subsequent plant shutdown, the main condenser shall be inspected for baffle plate failures, and repairs made if needed.

6.4.6 Mid/High Test Plateau Tests

Before extensive mid and high power testing, Instrument and Control (I&C) technicians will check out the moisture separator drain control system calibration and performance. The Startup Test Program during operation at the Mid and High Power Test Plateaus is devoted to dynamic tuning of the plant and determining its reactions to induced problems.

6.5 Startup Test Program Scheduling

The Document Control Coordinator, under the direction of the manager in charge of startup testing, is responsible for updating test schedules with respect to most recent startup testing so that the test schedules remain current. Test schedules include the Master Schedule (Level 1) and Integrated Schedule (Level 3). The Master Schedule will provide broad overview of milestones and activities and the Integrated Schedule provides task listing and logic for key activities. The test sequence will be incorporated into the Integrated Schedule to provide coordination between all members of the project team and will describe each major phase of the ITP. The Master Schedule for individual startup tests will establish, insofar as practicable, that test requirements will be completed prior to exceeding 25 percent power for all plant System Structures, Components and Supporting Software (SSCS's) that are relied upon to prevent, limit, or mitigate the consequences of postulated accidents. The Master Schedule will provide verification that the safety of the plant will not depend on the performance of untested SSCS's. The Master Schedule will also establish that test requirements will be completed in accordance with plant technical specification requirements for SSCS operability before changing modes. The planned shutdown maintenance and repair schedules will also be included. This schedule will be prepared showing the anticipated start and completion dates of each startup test and major startup activity. The schedule will be used to organize and coordinate all startup related activities such as test procedure development for each major phase of the ITP. The startup test portion of the Startup Summary Schedule shall begin with Fuel Loading and extend to the warranty run.

7.0 CONDUCT OF TESTING

The conduct of the initial test program is described in DCD 14.2.2.3. The Startup Administrative Manual will govern the Initial test Program and will be issued 60 days prior to the beginning of the Preoperational phase.

7.1 Distribution and control of Procedures

A general discussion concerning Test Procedure development and review can be found in DCD 14.2.2.2. and 14.2.2.4. This initial test program description will build on those descriptions. When a test procedure has been approved and electronically posted then the approved test procedures are available for electronic distribution. Because procedures may be approved for implementation weeks or months in advance of the scheduled test date, a review of the approved test procedure is required before commencement of testing. The Test Engineer is responsible for ensuring:

- Drawing and document revision numbers listed in the reference section of the test procedure agree with the latest revisions.
- The procedure text reflects any design change(s) made since the procedure was originally approved for implementation in the areas of acceptance criteria, FSAR, Technical Specifications, piping changes, etc.

7.2 Procedure Adherence

Tests will be conducted from the latest revision of the approved test procedures. Documents, drawings, manuals, etc., used for references in conducting a test must be the latest revision, reflect the system as-built condition, and be approved for design use. Procedures, sections or steps, will be performed in sequence using verbatim compliance. However, an exception to in-sequence performance may be made when it is clearly identified by a note within the applicable procedure as to which section(s) or step(s) may be accomplished out of sequence. When a test document is in error or cannot be followed, it will be revised before continuing testing in accordance with a site specific procedure governing the procedure change process.

7.3 Performance of Preop and Startup Tests

7.3.1 Performance of Preop Tests

a) System Turnover: During the Construction Phase, systems, subsystems, and equipment are completed and turned over in an orderly and well-coordinated manner. Guidelines will be established to define the boundary and interface between related system/subsystem and used to generate boundary scope documents, for example, marked up Piping and Instrument Diagrams (P&IDs), Electrical Schematic Diagrams, etc. for scheduling and subsequent development of component and system turnover packages. The system turnover process will include requirements for the following:

   - Documenting inspections performed by the construction organization (e.g. highlighted drawings showing areas inspected).
   - Documenting results of construction testing

- Determining the construction-related inspections and tests that need to be completed before preoperational testing begins. Any open items will be evaluated for acceptability of commencing preoperational testing.
- Plans will be developed and implemented for correction of adverse conditions and open items, and means exist for tracking such conditions and items.
- Verify completeness of construction and documentation of incomplete items

During performance of preoperational testing it may be necessary to return system control to construction to repair or modify the system or to correct new problems. Preop administrative procedures will include direction for:

- Means of releasing control of systems and or components to construction.
- Methods used for documenting actual work performed and determining impact on testing.
- Identification of required testing to restore the system to operability status and to identify tests to be re-performed based on the impact of the work performed.
- Determinations of operability and unavailability are properly tracked and authorized.
- Verifying retests stay in compliance with ITAAC.

b) Work Control: The preoperational test organization is responsible for preparing work requests when construction assistance is required. Work requests will be issued in accordance with a site specific procedure governing the work management process. The plant staff, upon identifying a need for construction assistance, will coordinate their requirements through the appropriate System Startup Engineer. Activities requiring construction work efforts are performed under the plant tagging procedures. Tagging requests will be governed by a site specific procedure for equipment clearance. Tagging procedures shall be used for protection of personnel and equipment and for jurisdictional or custodial conditions that have been turned over in accordance with the turnover procedure. The preop test organization will be responsible for supervising minor repairs and modifications, changing equipment settings, and disconnecting and reconnecting electrical terminations as stipulated in a specific test procedure. Test engineer's may perform independent verification of changes made in accordance with approved test procedures.

c) M&TE: During the preop test program, as well as the startup test program, most activities that lead to plant commercial operation involve design value verifications. Measuring and Test Equipment (M&TE) used during these activities will be properly controlled, calibrated, and adjusted at specified

intervals to maintain accuracy within necessary limits. Measuring and Test Equipment will be governed by a site specific procedure for control of Measuring and Test Equipment. M&TE includes portable tools, gauges, instruments, and other measuring and testing devices not permanently installed, e.g., startup test instruments prepared by the preop test organization as well as those provided by construction or provided by vendors.

A calibration program will be implemented. For standard M&TE equipment, calibration procedures will be prepared for each type of M&TE calibrated onsite. Calibration intervals will be established by the I&C organization for each item of M&TE. However, if the calibration requirement of a particular piece of M&TE is beyond the capabilities or resources of the onsite I&C department, this M&TE will be sent to an offsite certified calibration or testing agency. If special test equipment, used only for the initial test program, is necessary, the responsible vendor will provide this equipment with the appropriate calibration documentation.

d) Station Quality: Station quality is responsible for implementation of the Quality Control Program as delegated by the Plant Manager and inspection of quality-related activities during the preop test program.

e) Preop Testing: The manager in charge of preop testing controls start of testing. The control room shift supervisor must authorize individual testing activities. Test engineers shall verify that general and specific prerequisites are completed and documented properly prior to signoff in the test procedure. General prerequisites may include items, such as:

- All required test apparatus and equipment required for performing the tests are available.
- Communications systems (temporary or permanent) are available and working.
- Verification that interfacing support systems are operable or in a condition that will satisfy the testing requirements.
- Access control is present in areas where possible hazardous conditions might exist during testing.
- Adequate and qualified test personnel are available to perform the test.
- Specific test prerequisites are listed in the prerequisite section of the Test Procedure.

f) Preop Test Briefing: Test briefings shall be conducted in order to prevent errors and ensure all data is collected. Prior to commencing an individual test the test engineer will conduct a test briefing with all required test and support personnel. Briefings will be governed by a site specific procedure for conduct of operations. The test engineer shall:

- Provide an overview of the testing to be performed.
- Verify that test personnel have proper test instrumentation and equipment, spare data sheets, and information copies of the procedure, etc.
- Inform test personnel of specific precautions, equipment limitations, and hazardous conditions during the test to be performed, discuss expected responses and abort criteria (if applicable)
- Identify personnel locations and communication paths.

g) Procedure Content: During the conduct of a specific preoperational test, a test chronological log is maintained by the test engineer, which will become a permanent part of the test package. In addition, step verifications and data sheets are completed, reviewed, signed, and dated by the test engineer or the designated test personnel as they are performed. This verification requirement plus identification of all data recorded on special forms (e.g. strip charts, computer listings, etc.) shall be attached to the preop test procedure.

7.3.2 Performance of Startup Tests

a) Quality: Station Quality: Station Quality is responsible for implementation of the Quality Control Program as delegated by the Plant Manager and inspection of quality-related activities during the startup test program. The test engineer shall notify the station quality organization at least 24 hours in advance of the intended schedule for performance of an upcoming test and confirming QC Hold Points.

b) Corrective Action: The corrective action program will provide the requirements for documenting, processing, reviewing and approving closure of all deficiencies, discrepancies, exceptions, and nonconformance items identified during the Initial Test Program. The corrective action program is described in the Site Quality Assurance Program. When a condition adverse to quality is identified, the responsible organization will review the nonconformance and identify what corrective action is to be taken. This action should include modifications needed to correct the problem, what retests need to be performed following corrective action and an evaluation as to whether any test previously performed needs to be re-performed. Prior to the submittal of the test results, the test engineer shall attempt to resolve all problems identified during testing. If a test is approved with an exception or nonconformance, each outstanding exception or nonconformance shall be evaluated. Test exceptions and nonconformances must be maintained as part of the test procedure package.

c) Operations: During the test, the plant operating staff is responsible for the safe and proper operation of systems and equipment. The test engineer

shall coordinate equipment operation and control with operations. For testing which occurs over several shifts, days or is being restarted following a test interruption, a test briefing will be conducted prior to the restart of testing. Temporary modifications of plant equipment may be necessary in order to facilitate testing during the Startup Test Phase of the Initial Test Program. These modifications will be clearly identified and documented in accordance with site safety and tagging procedures to ensure proper restoration and to notify personnel of their existence. Plant modifications will be governed by a site specific procedure including appropriate testing for restoration of modifications. Should an unsafe condition arise, the plant operating staff will take whatever action is necessary including, but not limited to, stopping the test in order to restore safe plant conditions and the condition shall be documented in the corrective action program. The test engineer shall inform operations and required test personnel of test progress and significant test results. In addition, test personnel shall inform the test engineer of observed operating conditions, especially any unexpected or potentially hazardous conditions during the test.

For normal test interruptions (i.e., end of shift, holidays, manning restraints, etc) the test engineer shall notify operations of the test interruption and take the required actions to place the system and plant/equipment/system in a safe and stable condition. The test engineer will notify the startup test organization leaders, and take the required actions to ensure testing conditions/ prerequisites are satisfied prior to restart of the test. There may be occasions when it is not possible to continue a test due to plant conditions or due to technical or procedural problems. Should this occur, the test engineer will carefully consider what actions to take to restart the test since invalidating preceding or subsequent test data or step verification may result. The following options are acceptable:

- If a step or series of steps can be deferred such that the test can continue without invalidating subsequent test steps, the test engineer shall initiate a test exception.
- If a step or series of steps are invalidated, then the step or series of steps will be re-performed after test restart.
- If a change of the procedure is required to permit continuation of testing, the test engineer shall initiate the procedure change request.

d) Startup Procedures: Any startup test procedure, which could produce a scram or unplanned actuation of an engineered safety feature (ESF) if performed incorrectly, must be identified and discussed prior to start of the test. If the test engineer determines that procedure corrections (including changes in test sequence) are required during the conduct of the test, he shall suspend testing and notify operations and test personnel of the

required change. For all such corrections, the test engineer prepares and processes a procedure change request as delineated in a site specific procedure for processing procedure changes. Revisions are classified into two categories based on the intent of the change. The intent of a procedure is the specific task or goal that is to be accomplished by the procedure.

1. Intent changes are changes to:

- Purpose
- Initial conditions (or prerequisites)
- Acceptance criteria or tolerances
- Scaling or setpoints
- The method for meeting a commitment identified in the procedure
- Step verification (independent or simultaneously verified)
- System/component as left condition(s)
- Reactivity Management (changes that impact the operator's ability to monitor, control, or manipulate the reactor)
- Changes that add or delete a subsection
- Changes that decrease personnel safety or Fire Protection effectiveness
- Change that deletes, relocates, or adds a Hold Point
- Change to CAUTION or WARNING statements.
- A change to a procedure that has been identified as being an infrequently conducted or complex test.
- Change start-up test procedure testing sequence

2. Non intent changes and revisions do not change the intent of the procedure. These include:

- Correcting obvious typographical errors
- Providing steps for temporary suspension of testing and for documenting steps to be taken to restart testing.
- Steps which are re-performed to document testing following correction of a problem.
- Waive pre-requisites that are obviously not applicable to a given test section.
- Provide additional steps/clarifications needed to perform a given test step.

7.4 Operator Training

The objectives of this task are to increase the capability of shift crews to operate facilities in a safe and competent manner by assuring that training for plant changes and off-normal events was conducted. The major thrust of TMI Action Plan Task I.G is to use the preoperational and startup test programs as a training exercise for operating crews.

NUREG 0933 contains a discussion of the proposed actions and the conclusions made. NUREG 0800 section 14 was revised to address the original issue of this action item. NUREG 0933 discusses three anticipated operational occurrences applicable to the ESBWR. These are pressure controller failed high, pressure controller failed low and stuck open safety/relief valve. These events are addressed in the abnormal operating procedures. Operators will receive training on them as part of their initial training. Operators will participate in preoperational and startup testing. Operators will be trained on the specifics of the Initial Test Program schedule, administrative requirements and tests. Specific just in time training will be conducted for selected startup tests.

The ITP may result in discovery of acceptable plant or system response differing from expected response. Test results are reviewed to identify these differences and the training for operators is changed to reflect them. Training is conducted as soon as is practicable in accordance with training procedures.

8.0 TEST CONTROL

Testing during all phases of the test program is conducted using approved test procedures to control the conduct of each test. This section describes the contents of test procedures and establishes the requirements for the test procedure control, which includes preparation, initial review, implementation update, final review and approval, and revision control. Test procedures will be written in accordance with a site specific technical procedure writers guide. Details of procedure development, review and schedule for other than preop and startup procedures can be found in FSAR Chapter 13.5.

8.1 Content of Test Procedures

Test procedures are required to demonstrate the capability of systems, structures, and components to meet safety concerns, performance and design requirements for the nuclear power plant. The testing to be performed and the applicable acceptance criteria for each test are documented in test procedures. Test procedures will maximize the use of plant operating and maintenance procedures for the performance of test tasks. This can take the form of referencing a plant procedure to perform a task, or extracting the steps from the plant procedure for use in the preoperational and startup test procedures. This should include the use of emergency procedures for verifying appropriate emergency actions as described in DCD 14.2.5. Step-by-step instructions on how to conduct the applicable test are described and are coordinated with plant procedures wherever applicable in the Test Procedure.

Each test procedure includes the following standard format:

8.1.1 Cover page

The cover page provides approval signatures and effective dates (signatures may be maintained on file and may not appear on the cover page). The Title and the unit designator water mark shall appear on the cover page.

8.1.2 Table of Contents

The second page will be the table of contents.

8.1.3 Purpose Section

This section identifies the goal of the specific preoperational/startup test. This is established by stating those systems, subsystems, or components that are included in the test and a series of summarized specific functions to be demonstrated during the test.

8.1.4 Reference Section

This section identifies the references that were used in the preparation or revision of the preop or startup test procedure and any documents used or referenced in the performance of the procedure.

8.1.5 Initial Conditions

This section shall identify those independent actions or procedures which shall be completed, and plant conditions that shall exist, or shall be verified to exist, before performing the Instructions Section of the procedure. Any prerequisites required, such as a previous preop test or startup test or plateau requirement, will be included in this section.

8.1.6 Precautions and Limitations Section

This section alerts users to important measures which should be taken to protect personnel and equipment. If the procedure could cause a scram precautions would be added in this section so that appropriate care is taken during the conduct of the procedure.

8.1.7 Special Tools and Equipment Section

This section lists test equipment and special tools not routinely carried, plus any unusual expendable items recommended to perform the procedure.

8.1.8 Instructions Section

This section provides the step-by-step instructions necessary to fulfill the purpose of the preop or startup procedure.

8.1.9 Follow-On Section

This section will include the following:

a) Acceptance criteria for judgment of plant and system performance (as described in the applicable test specification). Those test criteria that show compliance with the Combined License Inspections Tests, Analyses, and Acceptance Criteria (ITAAC), will be identified in this section. When test criterion for a preoperational test is not met, the test engineer shall document the failure through the corrective action process and contact the applicable preoperational test supervisor to determine what action to take (may require submitting a work request).

   For the startup test program, criteria are divided into three categories depending on significance of the parameter or function. The following paragraphs describe the degree of each kind of test criterion, and the actions to be taken by the test engineer after an individual test criterion is not satisfied.

   - Level 1 Criteria: Level 1 criterion relate to the values of process variables assigned in the design or analysis of the plant and component systems or associated equipment. Violation of these Level 1 criteria may have plant operational or plant safety implications. If a Level 1 test criterion is not satisfied, the plant must be placed in a suitable hold condition that is judged to be satisfactory to safety based on the results of prior testing. The test engineer will notify the on shift SRO, (who may declare the equipment inoperable), notify startup manager/test organization supervisor, initiate condition report and issue work requests as needed. Plant operating or test procedures or the Technical Specifications will guide the decision on the direction to be taken. Startup tests compatible with this hold condition may be continued. Resolution of the problem must be documented and pursued by appropriate equipment adjustments or through engineering support personnel. Following resolution, the applicable test portion must be repeated to verify that the Level 1 requirement is ultimately satisfied. A description of the problem resolution shall be included in the report documenting the successful test.

   - Level 2 Criteria: Level 2 criteria are specified as key plant performance requirements that are equipment design specification values or requirements for the measured response. The expected plant response

is predicted by best estimate computer code and the desired trip avoidance margins. Level 2 failures that occur during tuning and system adjustment must be documented in the test report and following resolution, the applicable test portion must be repeated (retesting could occur at a higher power level with safety review committee approval) to verify that the Level 2 criterion requirement is satisfied. If a Level 2 criterion requirement is not satisfied after a reasonable effort, then the cognizant design and engineering organization shall document the results in the corrective action program with a full explanation of their recommendations. In order for the system as a whole to be acceptable, all Level 2 requirements have to be satisfied or documentation provided that either modifies Level 2 requirements or changes specific design criteria.

- Level 3 Criteria: Level 3 criteria are associated with specifications on the expected or desired performance of individual control loop components. Meeting Level 3 criteria helps assure that overall system and plant response requirements are satisfied. Therefore, Level 3 criteria are to be viewed as highly desirable rather than required to be satisfied. Good engineering judgment is appropriate in the application of these rules. Since overall system performance is a mathematical function of its individual components, one component whose performance is slightly worse than specified can be accepted provided that a system adjustment elsewhere will positively overcome this small deficiency. Large deviations from Level 3 performance requirements are not allowable. If a Level 3 criterion requirement is not satisfied, the subject component or inner loop shall be analyzed closely. However, if all Level 1 and Level 2 criteria are satisfied, then it is not required to repeat the transient test to satisfy the Level 3 performance requirements. The occurrence of this Level 3 criterion failure shall be documented in the test report and with a condition report

b) Follow-on Tasks: This subsection shall include activities that must be performed to complete the test procedure. The signature log will be contained in this section and will identify all personnel whose signature or initials appear in the procedure.

c) Completion Notification: This subsection shall be included to identify whom to notify that the procedure has been completed.

d) Procedure Reviews: This subsection shall be included to specify reviews and comments by various personnel

e) Records Disposition: Records disposition guidance is described in site specific procedures for procedure adherence and usage.

8.1.10 Attachments

Supporting information is contained in test procedure attachments and will contain equations and evaluation methods to be used in the analysis of the obtained data. This attachment lists the most pertinent signals to be recorded by the transient recording system. Analysis and evaluation attachments outline the calculations to be performed and provides for an evaluation of the test.

8.2 Preparation, Review and Approval of Test Procedures

Test procedure format will be governed by a site specific technical procedure writers guide. Available information on operation and test experiences of other operating nuclear power reactors shall be factored into the test procedures wherever applicable as described in DCD 14.2.4. In each test procedure, interfacing support system requirements are specified. Data sheets required by all specified test conditions are also provided. Completion of each procedure step requires a sign-off by the test personnel involved. After or during testing, analysis is performed to determine if all applicable test acceptance criteria are satisfied. These analysis steps must be signed off as being satisfactorily completed prior to proceeding to the next test. The original draft of each test procedure is prepared by the designated organizations and is subject to a formal review and approval process. The startup manager (or his designee) is responsible for coordinating this process and for resolving reviewer comments. Review comments are resolved between the procedure writer and the reviewers. After the initial reviews and inclusion of required changes, preoperational test procedures will be submitted to JTG for review, and startup test procedures are submitted to the safety review committee for review. Test procedures and any comments are sent to the procedure writers for required resolution and updating. Upon satisfactory resolution of comments, the test procedure is transmitted to the JTG or the safety review committee for final approval. All approved test procedures shall be made available for the NRC's review approximately 60 days prior to their intended use for preoperational testing and 60 days prior to scheduled fuel loading for startup testing.

The test engineer is responsible for preparing and processing changes and therefore submitted to JTG (or the safety review committee for startup test procedures) for review and approval. In addition, changes to the scope or intent of the affected test procedure shall be reviewed and approved by the individuals or groups that perform those functions for the original test procedure.

8.3 Procedure Revisions/Test Modifications

Test procedures may require changes following test procedure approval. These changes are made by revising the entire test procedure or processing a procedure change request against the originally approved test procedure. For large or

extensive changes where procedure change requests are not practical, a procedure revision is warranted. A procedure may be revised before, or after testing has commenced. This constitutes generation of a new test procedure. All previously applicable test data may be referenced or transcribed to the new procedure. Only uncompleted, added or revised steps, or steps affected by the changes need to be performed. Procedure revisions will be governed by a site specific procedure for procedure revision process control. Timely notification to the NRC of changes in approved test procedures that have been reviewed by the NRC will be controlled by the SAM.

9.0 TEST RESULTS REVIEW AND APPROVAL

9.1 Test Results

Upon completion of each specified preop or startup test the test engineer evaluates test results and verifies them as acceptable. Then, the test engineer shall complete a test summary for the applicable test as soon as possible after the test is completed. The test summary is a concise form indicating when the test was performed, the plant conditions, and an assessment whether acceptance criteria were met. The summary and actual data will be provided to the safety review committee for preliminary approval of the individual tests and to enable the plant manager to release testing to the next test plateau. The format to be used is the responsibility of the individual responsible party. Also, a brief description of the content of each section is listed below:

- Abstract - The Abstract is a brief assessment of the performance of the test and whether the acceptance criteria were met.
- Plant Conditions - This section summarizes the date and time the test was performed, and the operating conditions, including reactor power, reactor pressure, reactor water level, and test plateau at which the applicable test is performed.
- Results - This section summarizes the results of the tests referring to the overall acceptance or exceptions to the tests.
- Exceptions - This section contains a list of exceptions, which are deviations from a test procedure, from expected test results, or from acceptance criteria for which corrective action was required.
- Final Resolution - This section summarizes how the test exceptions (if any) are to be resolved. The resolution can refer to other written documents (e.g., procedure change request), but a copy of the resolution document shall be attached to the test summary report.
- Test Engineer - Enter the name of the test engineer who prepares the test summary report.

9.2 Review and Approval of Test results

Upon completion of each specified preoperational and startup test, the responsible test engineer or other support personnel evaluates the test results and verifies it is acceptable. Test discrepancies, deficiencies, open items and/or omissions identified during testing or during review of test results will be documented as test exceptions. The review and approval process will be governed by the Startup Administrative Manual.

9.2.1 For Preoperational Testing, the test engineer assembles the test package, which includes the test chronological log, all procedure change requests issued, all corrective actions issued, turnover exceptions, open items, and the preoperational test procedure and associated data records. The test engineer will also identify which testing completes actions required by the ITAAC as part of this test package. The preoperational test organization supervisor reviews and discusses the test package with the test engineer and then submits it to the station quality organization and startup manager for in-depth review of all preoperational test results. Upon completion of this review, the preoperational test results are submitted to the JTG for final review and approval.

9.2.2 For Startup Testing, the startup test organization leader discusses the startup test results with the test engineer and reviews the test summary. After signifying his review and acceptance of the test summary and associated test exceptions/nonconformances, the startup test organization leader will then submit the test package to other management personnel for their concurrence review. When all reviews are complete the responsible test engineer shall forward the completed test package to the Document Control Coordinator for processing and final review and approval by the safety review committee.

9.3 JTG Review and Recommendations

For preoperational tests, the preop supervisor provides copies of the test package to the JTG as requested. The JTG chairman will disseminate copies of the test package to members responsible for performing in-depth review and evaluating test results. If the result of the JTG review indicates that the system or component does not meet design specifications or does not fall within the acceptance criteria, these unsatisfactory test results will be documented in the preop test record. If the JTG determines that additional testing is required or that portion(s) of the test must be repeated for any reason, these requirements must also be added to the preop test record.

9.4 Safety Review Committee Approval or Acceptance

The safety review committee is responsible for final approval or acceptance of startup test results. The safety review committee members will perform a review of the test results and make recommendation in the safety review committee meeting for approval or disapproval of the test results. Once the test package is approved in the safety review committee meeting, the safety review committee chairman signs and dates the startup test record. The Plant Manager (or his designee) will then release the plant to test at the next test plateau. The approved test of each test plateau, with or without a test exception, then shall be filed in accordance with the plant administrative procedure requirements.

9.5 Outstanding Test Exceptions

If a test is approved with discrepancies, deficiencies, and/or open items (e.g., turnover exceptions, nonconformances), each discrepancy, deficiency, and/or open item identified during the test and the review of test results will be documented as a test exception. Each outstanding test exception will be evaluated and assigned a required completion date. When each outstanding open items and/or test exception is resolved, the safety review committee chairman (for startup tests) or the JTG chairman (preoperational tests) will sign/date the appropriate closure record.

9.6 Test Plateau Prerequisites

The startup test program commences with the start of nuclear fuel loading and terminates with the completion of power ascension testing and the performance of warranty tests. The completion of all testing constitutes completion of the startup test program. Commencement of each major test phase of the startup test program requires that the following test procedure review and approval commitments be satisfied:

- Commencement of initial fuel loading and open vessel phase testing requires the results of the preoperational tests of designated systems be reviewed and approved.
- Commencement of initial heatup phase testing requires the results of the initial fuel loading and open vessel phase testing be reviewed and approved.
- Commencement of power ascension phase testing requires the results of the initial heatup phase testing be reviewed and approved.
- Commencement of warranty tests requires the results of the power ascension phase testing be reviewed and approved.

Prior to the transition to a new testing plateau, station management will conduct a readiness review in accordance with site procedures to ensure that

all aspects of plant operation are ready to support testing at the next higher plateau. The completion of startup testing and appropriate signatures in a particular test plateau signifies the completion of that test plateau. Once the test package is approved in the JTG or safety review committee meeting, the JTG or safety review committee chairman signs signifying his review and acceptance of the startup testing performed during this specific test plateau and releases the plant to test at the next condition.

9.7 Final Startup Report

The final startup report transmitted to the NRC in accordance with RG 1.16, Reporting of Operating Information, shall include the following information:

- A description of the method and objectives for each test.
- A comparison of applicable test data with the related acceptance criteria, including the systems' responses to major plant transients (such as reactor scram and turbine trip.
- Design and construction related deficiencies discovered during testing, system modifications and corrective actions required for correcting those deficiencies, and the schedule for implementing these modifications and corrective actions unless previously reported to the NRC.
- Justification for acceptance of systems or components that are not in conformance with design predictions or performance requirements.
- Conclusions regarding system or component adequacy.

FIGURE 1
Preoperational Test Organization (Typical)

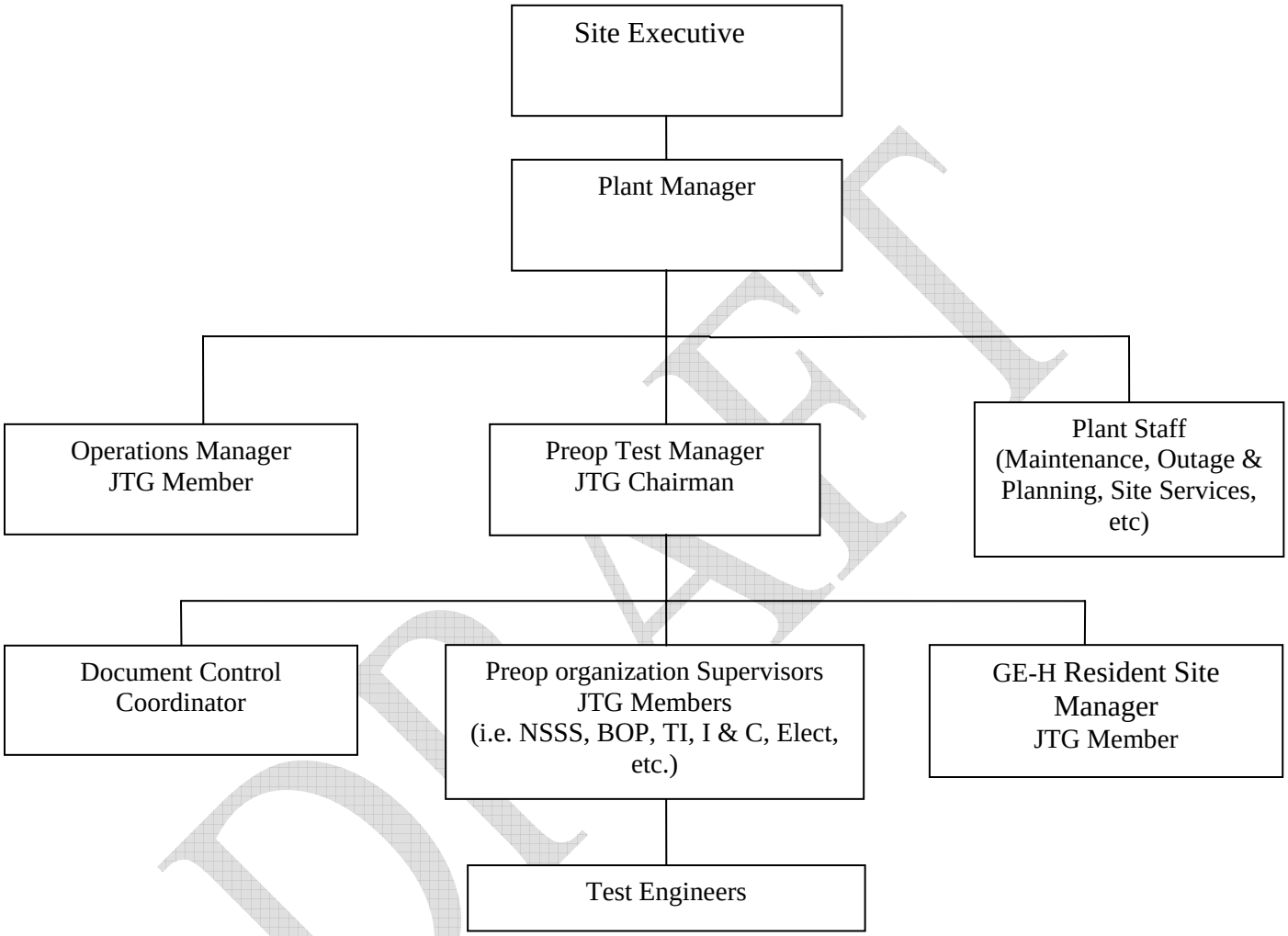

FIGURE 2
Joint Test Group (Typical)

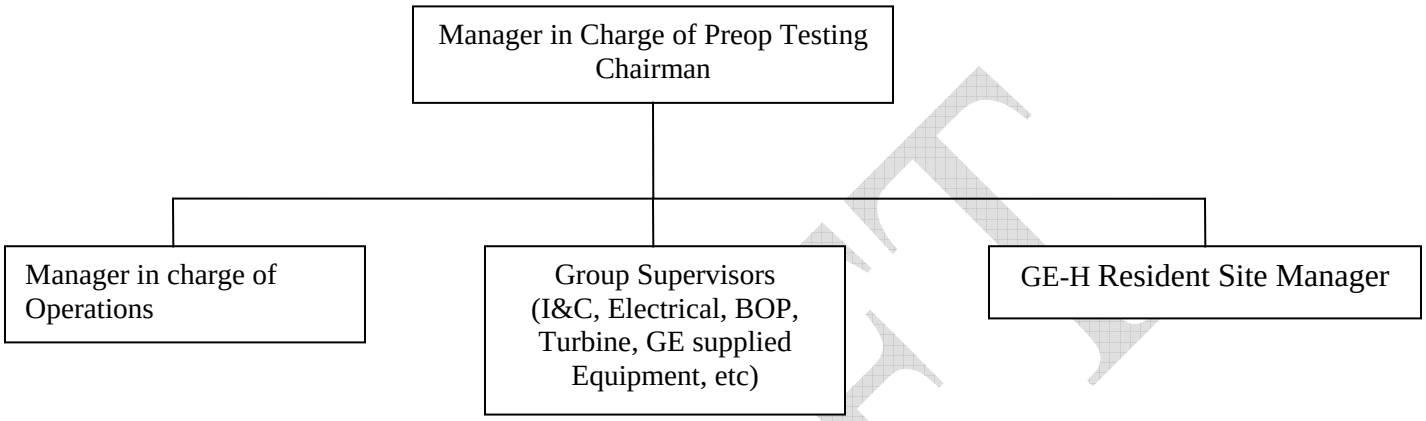

FIGURE 3
Startup Test Organization (Typical)