

## 14.6 TEST PROGRAM ORGANIZATION - UNIT 2

### 14.6.1 Organization and Responsibility

The Startup and Test Program encompassed all startup and testing activities for components, systems and facilities from completion of construction activities to final acceptance of the entire unit. The program was divided into three phases, defined as follows:

Phase I            Construction Verification Tests

Phase II           Preoperational Tests

Phase III          Plant Operational Tests

For Unit 2, the titles of the Phase I and II test phases were changed to reflect more clearly industry standards and the division of responsibility at Salem. The scope of testing, however, remained essentially the same as defined in Section 14.1.

The overall responsibility for the startup and test program rested with Public Service Electric & Gas (PSE&G). Specific responsibility for Phases I and II rested with the Engineering and Construction Department (E&CD) through the Project Construction Manager. Specific responsibility for Phase III rested with the Electric Production Department (EPD) through the Manager - Salem Generating Station. The responsibility for all phases was discharged through the Salem Startup Group (SSG), which established the detail, specific requirements for scheduling and testing in support of project requirements; and coordinated and directed, through established organizational structures, all contributing parties responsible for specific activities within the Startup and Test Program. The SSG was composed of two subgroups (see Figure 14.6-2).

The United Engineers & Constructors (UE&C) Test Group (UTG) had the primary responsibility for the Phase I Program. The PSE&G

Startup Group (PSSUG) had primary responsibility for the Phase II and III Programs.

The UTG was directed by a Lead Test Engineer and consisted of a Mechanical Group, an Instrument and Controls Group and an Electrical Group, each having a supervisor and staffed with test engineers as required.

The PSSUG was directed by the Startup Engineer and consisted to an Instrumentation Controls and Electrical (ICE) Group, a Mechanical and Integrated (MI) Test Group, and a Technical Administration Group. Each group was directed by a Senior Construction Engineer and staffed as required with test engineers. The PSSUG Startup Engineer also provided technical direction to the UTG.

The SSG was assisted, as required, through liaison with other Company departments, such as Engineering, Construction, Quality Assurance, and the Energy Laboratory, as shown on Figure 14.6-1.

Westinghouse provided onsite technical consultation to assure that the safety and reliability of Westinghouse supplied systems were not compromised and that equipment was adequately tested.

Westinghouse had neither the responsibility for supervision of PSE&G or UE&C personnel nor direct responsibility for planning, scheduling, or management of testing activities.

The objective of the Phase I Construction Verification Test Program was to: 1) verify that fabrication, construction and erection of plant systems and equipment had been performed in accordance with applicable codes, standards, drawings, specifications, procedures and good engineering practice; 2) to verify individual component cleanliness, integrity and intended functional capability; and 3) to bring together completed systems, functionally checked and ready to support preoperational testing.

This program included pressure testing, cleaning, flushing, and initial running of equipment to support flushing, initial energization of electrical equipment, loop checks and instrument calibration. There were certain exceptions, however, to the UTG's scope of Phase I testing. The E&CD retained primary responsibility for planning and implementation of the Phase I Construction Verification Test Program for the following systems:

1. Computer System
2. Reactor Protection System
3. Process Control Systems
4. Radiation Monitoring System
5. Turbine Supervisory Instrumentation System
6. Loose Parts Monitoring System
7. Status Panel
8. Security System
9. Safeguards Equipment Control System
10. Nuclear Instrumentation System
11. Annunciator System
12. DC Power Systems
13. Rod Control System
14. AC Power Distribution Systems
15. 115 V AC System

## 16. Turbine Hydraulic Control System

The Phase II Preoperational Test Program consisted of individual and multi-system tests through hot functional tests up to initial core load. They were performed to ensure system conformance to engineering design parameters. Primary responsibility for this program rested with the E&CD.

The Phase III Plant Operational Test Program consisted of integrated system tests from the time of initial core load through plant acceptance tests. They were performed to establish unit operational characteristics and ensure conformance with licensing requirements. Primary responsibility for this program rested with the EPD.

The Quality Assurance Department verified, through their participation in the Startup Program, that applicable regulatory requirements were observed in the preparation and review of procedures, conduct of inspections and tests, recording of data, disposition of nonconformances, performances of repairs, maintenance, storage and preservation of equipment and maintenance of records.

### 14.6.2 Test Procedure Preparation and Review

All tests were performed in strict accordance with approved written test procedures. These test procedures included provisions to ensure that prerequisites were met, adequate protective instrumentation was used and required test monitoring and documentation were performed.

Phase I test procedures within the scope of UE&C were written under the direction of UE&C Lead Test Engineer. Procedures were reviewed and approved by the originator, the UE&C Lead Test Engineer, and the PSSUG Startup Engineer. Phase I test procedures within the scope of PSE&G were written under the direction of the PSSUG Startup Engineer. Site Quality Assurance approved all

standard procedures and all detail procedures for safety-related systems which were not based upon standard procedures.

Phase II startup procedures were written under the direction of the PSSUG Startup Engineer. Final approval to commence testing was given by him after formal review by the following personnel:

1. Author
2. Westinghouse Representative (for NSSS tests)
3. Quality Assurance Representative (for safety-related tests)
4. Preoperational Testing Review Committee (PORC)

The PORC consisted of personnel from the Engineering Department, Production Department, and the PSSUG. The Committee was chaired by a representative of the Engineering Department.

Phase III startup procedures were the responsibility of the EPD. The procedures were written by either EPD or by the PSSUG under the direction of the PSSUG startup engineer. Final approval to commence testing was given by the Station Manager after formal review by the following personnel:

1. Author
2. Westinghouse Representative (for NSSS tests)
3. Quality Assurance Representative (for safety-related tests)
4. Station Operations Review Committee (SORC)

The SORC completed its review of all tests to be performed prior to initial criticality (Table 14.3-1) prior to loading fuel and

completed its review of all post criticality tests (Table 14.4-1) prior to initial criticality. Furthermore, the SORC advised the Station Manager in writing when changes or additions to the station plant manual that resulted from the tests had been properly entered.

All completed test procedures and accompanying data were retained in the form of test reports and are a part of the station's historical record.

The approved startup procedures were retained by the PSSUG until the scheduled test date. At this time, the prerequisites were verified and the procedures were released for test by the PSSUG Startup Engineer.

A specific format was prescribed for the preparation of startup test procedures. The procedures included a statement of test objectives, a list of references used in preparation and a list of prerequisites and initial conditions to be established for each test. Required test or special equipment was specified, and unusual environmental conditions required or generated by the test were described. The specific acceptance criteria for determining the success or failure of the tests were clearly identified (where appropriate) and became a part of the test procedure. Any general precautions or limitations imposed by operational or safety requirements were also specified.

A detailed step-by-step procedure was provided for each Phase II and III test. The test engineer's initials were used to document completion of each step. Where special conditions, such as abnormal valving, or use of jumpers or bypasses became necessary, control measures were specified to ensure that the abnormal configuration was returned to normal upon completion of the test.

The procedures included a section for recommended changes to plant operating procedures and/or the station plant manual that might be generated as a result of the tests. The procedures also contained

a section for remarks related to the tests. A standard cover sheet facilitated formal test procedure review and approval.

#### 14.6.3 Startup Procedure Changes

Changes to approved startup test procedures were reviewed and approved by the same functional groups involved in the preparation of the original document. A change notice was issued which included the change(s) and reason(s) for the change(s).

On-the-spot changes to startup procedures were made only if the change did not modify the original intent of the procedure. A post-change review, however, had to be subsequently conducted by the same functional groups involved in the approval of the original document.

#### 14.6.4 Startup Test Results

Phase II and III startup procedure results were reviewed and approved by the same functional groups who reviewed and approved the original test procedure. The PSSUG Startup Engineer initiated the review process by ensuring that the procedure had been completed and that any exceptions or comments listed by the test engineer who conducted that test were clearly explained. Copies of the final approved test procedure and results were forwarded to the proper quality organization for record retention.