CHAPTER 14.0

INITIAL TEST PROGRAM

14.2 INITIAL TEST PROGRAM

14.2.2 ORGANIZATION AND STAFFING

14.2.2.1 General Description

Kansas Gas and Electric Company is responsible for the overall administration and technical direction of the WCGS startup program. In recognition of this responsibility, the Director of Nuclear Operations, under the direction of the Vice President - Nuclear, has established a startup organization to coordinate and direct the comprehensive planning, development, implementation and performance of the test program. The Startup Organization is headed by the Startup Manager who reports to the ~~Director of Nuclear Operations~~ Plant Manager both administratively and technically.

During the preoperational startup program, the Startup Manager will act to coordinate activities between the Startup Organization, the construction staff, and the operating staff.

Prior to commencing preoperational testing activities, a Joint Test Group (JTG) as described in Section 14.2.3.2.2 will be formed to review and recommend for approval startup administrative procedures, preoperational test procedures, and preoperational test results. A Plant Safety Review Committee (PSRC) as described in Section 14.2.3.2.3 is organized with the Plant Manager acting as chairman and will review and recommend for approval initial startup test procedures and results.

14.2.2.2 Startup Organization

The Startup Organization, shown in Figure 14.2-1, is directly responsible for the conduct of the WCGS preoperational test program. The duties and responsibilities of the startup organization also include:

1. Familiarization of support personnel with specific tests.

2. Direction to support personnel and others during performance of tests including appropriate interface with station operators.

3. Authority to disallow or terminate testing due to conditions which could endanger personnel or equipment.

4. Identification of deficiencies that could adversely affect test performance.

5. Assembly of test data and preparation of test reports for evaluation of test results by others.

The Startup Organization is composed of system startup engineers, technicians, schedulers, craft labor, and other support personnel. KG&E will provide these personnel and use contractors to supply manpower for those positions that it cannot staff. The staffing level for the Startup Organization will increase as the test program progresses and construction activities decrease. Schedules for ~~the~~ test program are given in Section 14.2.11 of the Standard Plant FSAR. Staffing and training of personnel involved in testing at WCGS is planned to provide sufficient manpower to support the testing schedule.

The Startup Organization, shown in Figure 14.2-1, reports administratively and technically to the Startup Manager; the duties performed by key individuals within the Startup Organization are summarized below.

14.2.2.2.1 Startup Manager

The Startup Manager has the authority and responsibility, as delegated by the Plant Manager ~~Director Nuclear Operations~~, for the overall direction and administration of the functions and activities required to conduct the Startup Program. The responsibilities and duties of the Startup Manager also include:

1. Development of plans and schedules regarding the status of the startup program.

2. Review and approval of administrative and technical test procedures and results.

3. Continuing analysis of construction and equipment installation schedules for compatibility with testing schedules and recommendations for corrective actions to minimize conflict.

4. Review and submital of design related problems requiring engineering resolution, encountered by the Startup Organization in accordance with the appropriate Startup Administrative Procedures.

14.2.2.2.5 Quality Control Section

The Quality Control Section formulates and implements the Startup Quality Control Program. This program monitors the conduct of the Startup Organization's testing activities by reviewing administrative and technical test procedures, by witnessing major evolutions and selected flushes, hydros, and preoperational tests and by reviewing turnover packages. The Quality Control Section is under the direction of the Director Quality. They provide support to the Startup Manager.

14.2.2.3 Operating Staff

The WCGS operating staff is involved in the startup program in several capacities throughout preoperational and initial startup testing. This involvement includes review of test procedures and results and the direct participation in test activities. Operating staff personnel are utilized by the startup organization as required for performance of testing under the direction of system startup engineers. Station operators assist system startup engineers in performing tests and in the routine operations of systems. The operating staff directs the fuel loading and is responsible for plant operation during initial startup testing.

The operating staff is divided into six sections headed by the Operations, Maintenance, Plant Support, Technical Support, Nuclear Training and Regulatory Quality and Administrative Services Superintendents. These section superintendents report administratively and technically to the Plant Manager. The duties and responsibilities of the operating staff during plant operations are described in Chapter 13.0. The duties of key operating personnel with regard to the startup program are summarized below.

14.2.2.3.1 Plant Manager

The Plant Manager has overall responsibility for the station operations and for the conduct of the Startup Program during the Initial Startup Test Phase. He serves as chairman of the PSRC for startup activities as well as operational responsibilities for the PSRC (See the Technical Specifications). He also approves preoperational test procedure results after JTG review.

14.2.2.3.2 Operations Section

The Operations Superintendent is responsible for the routine operation of all equipment and for ensuring that the conduct of the startup program does not place the plant in an unsafe

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14.2.2.2.6 Startup technical Support Section

The Startup Technical Support section is responsible for providing technical support to the Startup Organization during the conduct of the Startup Program. Their Responsibilities include test procedure and test results review and approval, technical planning of major milestone activities, Startup organization training and startup program compliance to FSAR Commitments condition. He is chairman of the JTG and reviews preoperational test procedures. He also reviews initial startup test procedures as directed by the Plant Manager. He provides personnel from the operating staff as required to support the conduct of testing activities.

The Shift Supervisors report to the Operations ~~Superintendent~~ and are responsible for the safe operation of the plant during their assigned shift. They are responsible for the implementation of appropriate safety tagging procedures and have the responsibility to disallow or terminate testing due to conditions which could endanger personnel or equipment.

14.2.2.3.3 Maintenance Section

The Maintenance Superintendent is responsible for performing preventive and corrective maintenance on components and systems as assigned. He provides personnel from the maintenance section to support testing activities as required.

14.2.2.3.4 Plant Support Section

The Plant Support Superintendent is responsible for providing engineers to work in the Startup Section as system startup engineers. At the end of the Startup Program, these engineers will be integrated within the WCGS operating staff.

14.2.2.3.5 Technical Support Section

The Technical Support Section was discussed in Section 14.2.2.2.3.

14.2.2.3.6 Nuclear Training Section

The Nuclear Training Manager reports to the Plant Manager. He is responsible for insuring training staff qualifications including reviewing instructor evaluation records with the Training and Simulator Supervisors. He reviews the contents of training programs for technical completeness and compliance with Regulatory Standards. He is also responsible for auditing the quality of onsite training programs. Additional information is provided in Section ~~13.1.1.2.3.1~~.

14.2.2.3.7 Regulatory Quality and Administrative Services Section

The Regulatory Quality and Administrative Services Superintendent reports to the Plant Manager. He is charged with the responsibility for providing direction and guidance to the Document Control Supervisor, Administrative Supervisor, Safety Supervisor and Site Emergency Plan Administrator and to provide liaison for the Plant Manager and staff with other organizations.

14.2.2.4 Major Participating Organizations

14.2.2.4.1 Bechtel

Bechtel, as power block architect-engineer for WCGS, is responsible for the design and engineering of power block systems, review and approval of design changes and engineering input into the startup program. In addition, KG&E has also contracted Bechtel to provide personnel experienced in nuclear plant startup to augment the startup organization for WCGS. Bechtel employees are assigned consistent with the startup program schedules.

14.2.2.4.2 Daniel International Corporation (DIC)

DIC, as contractor for WCGS, is responsible for the construction completion, and orderly release of components and turnover of systems to KG&E consistent with the startup program schedules. This responsibility includes:

1. Certification that documentation for components, systems and structures, as required by purchase and installation specifications, is complete and available; and the maintenance of these certification files which provide the documentary evidence, and

2. Provision of dedicated craft manpower support as required for performance of the startup program.

14.2.2.4.3 Westinghouse Electric Corporation

Westinghouse, as the Nuclear Steam Supply System (NSSS) supplier, is responsible for providing technical assistance to KG&E during preoperational and initial startup testing performed on the NSSS equipment and systems. Technical assistance is defined as technical guidance, advice and counsel based on current engineering, installation, and testing practices. Westinghouse employees are assigned consistent with the Startup Program schedules. This responsibility includes:

1. Assignment of personnel to provide advice and assistance to KG&E for test and operation of all equipment and systems in the Westinghouse area of responsibility.

2. Supportive engineering services, including special assistance during the initial fuel loading.

3. Providing test procedure outlines and technical assistance for tests of Westinghouse furnished components and systems.

14.2.2.4.4 General Electric (GE)

GE is the supplier and installer of the turbine generator. GE supplies technical support for the startup and testing of the turbine generator. Some of the prerequisite testing (i.e., turbine oil flush) will be performed by the GE personnel. GE has supplied recommended procedures for starting, operating, and shutting down equipment in their technical manuals for the turbine generator.

14.2.2.5 Quality Assurance

The KG&E Quality Assurance ~~Division~~ Branch is responsible for assuring the quality of construction, plant testing, and operations activities in accordance with the WCGS Quality Program which is described in Chapter 17.0.

14.2.2.n Qualifications of Key Personnel

The qualifications for key plant operating personnel are described in Chapter 13.0.

The qualification requirements for startup personnel involved in the WCGS startup program conform to capability levels per ANSI N45.2.6 and Regulatory Guide 1.8 recommendations.

All test personnel will be indoctrinated in the startup administrative procedures, methods and controls.

14.2.3 TEST PROCEDURES

14.2.3.2 Procedure Review and Approval

14.2.3.2.1 Prior to submittal to the JTG for review and approval recommendation, each preoperational test procedure receives the review specified in Section 14.2.3.2 of the Standard Plant FSAR. The preoperational test procedures are then designated SU3 (Safety-Related) or SU4 (Non Safety-Related) as appropriate in lieu of the Standard Plant FSAR (S03, S04) designators.

14.2.3.2.2 Joint Test Group (JTG)

A subcommittee of the PSRC, the JTG will be organized by KG&E to review preoperational test procedures and preoperational test results.

The primary JTG functions will be to:

1. Review preoperational test procedures and recommend their approval by the Startup Manager.
2. Evaluate and authorize changes to preoperational test procedures as detailed in the Startup Administrative Manual.
3. Evaluate preoperational test procedure results and recommend their approval to the Startup Manager and Plant Manager.
4. Recommend system transfer from Startup to Operations to the Startup Manager and the Plant Manager, for their approval.
5. Review safety-related aspects of the startup administrative procedures.

Membership in the JTG will include the following personnel or their designated representatives:

1. Superintendent of Operation - Chairman
2. Superintendent of Plant Support
3. Superintendent of Regulatory, Quality and Administrative Services
4. Startup Technical Support Supervisor
5. Assistant Startup Manager
6. Operations Quality Assurance (non-voting member)
7. Bechtel Power Corporation-Engineering (non-voting member)
8. Westinghouse-Engineering (non-voting member)

Others may be requested to provide technical support to the JTG. This support will be based on the procedure being reviewed, required technical expertise or other applicable factors. Participation in the JTG meeting will be with the concurrence of the JTG and is limited to technical input only.

14.2.3.2.3 Plant Safety Review Committee (PSRC)

The PSRC is organized by KG&E to ensure effective coordination of the engineering, construction, and operations activities affecting the startup program.

The appropriate PSRC members ensure sufficient review of initial startup test procedures and results.

The primary PSRC startup functions are:

1. Review all initial startup test procedures and make recommendations to the Plant Manager.

2. Evaluation and authorization of changes to initial startup test procedures.

3. Evaluation of initial startup test procedure results.

Membership in the PSRC is given in the Technical Specifications, Section 6.5.1.2.

14.2.4 CONDUCT OF TEST PROGRAM

14.2.4.1 Administrative Procedures

The conduct of the preoperational startup program is controlled by administrative procedures. The preparation, maintenance, and implementation of these procedures is the responsibility of the Startup Manager. The startup administrative procedures prescribe controls for startup activities such as:

All components released in this manner shall be incorporated into the scope of a subsequent system or subsystem turnover.

14.2.4.3 Component and Prerequisite Testing

Upon Startup acceptance of a turned-over system, subsystem, or released component, prerequisite-type testing is performed to demonstrate proper operability and functional ability in support of, and prior to, the performance of preoperational testing. Local containment leak rate testing, as described in SNUPPS FSAR Section 14.2.12.1.78, is performed at WCGS as part of the prerequisite test program.

Administrative procedures are established to ensure that all prerequisites are met before testing is initiated. Upon completion of all prerequisite tests applicable to a system or subsystem, a documented review is conducted by Startup personnel to verify that appropriate documentation is available and that required prerequisite tests have been satisfactorily completed. All deficiencies which would prevent performance of preoperational tests or generate negative test results are identified and dispositioned prior to implementation of the preoperational tests.

14.2.4.4 Preoperational Testing

Technical direction and administration, including test execution, and data recording, of the preoperational testing is the responsibility of the startup organization. The system startup engineers are responsible for the performance of tests and providing appropriate interface with station operators. The Startup Manager is responsible for the administration and surveillance of all testing activities during the preoperational test program. The WCGS operating staff assumes control and responsibility for each system after preoperational testing is completed on the system and a formal transfer is executed.

14.2.4.5 Initial Startup Testing

During the initial startup testing phase, the Plant Manager has overall authority and responsibility for the startup program. The Startup Organization provides support to the plant operating staff which has responsibility for performing equipment operations and maintenance in accordance with the provisions of the plant operating license. The WCGS operating staff is also ~~be~~ responsible for ensuring that the conduct of testing does not place the plant in an unsafe condition at any time.

The shift supervisors have the authority to terminate or disallow testing at any time.

14.2.4.6 Test Prerequisites

Each test procedure contains a set of prerequisites and initial conditions as prescribed by the startup administrative procedures. The system startup engineer ensures that all specified prerequisites are met prior to performing the test. The format for test procedures is described in Section 14.2.3.1 of the Standard Plant FSAR.

14.2.4.7 Test Evaluation

Upon completion of system preoperational testing, the test results are submitted to the JTG for its review and subsequent recommendation for approval to the Startup Manager and Plant Manager.

Between each major phase of the initial startup test program, the test results for all tests that have been performed will be reviewed by the PSRC. This review ensures that all required systems have been tested satisfactorily and that test results are approved before proceeding to the next stage of testing.

These reviews are described in Section 14.2.5.

14.2.4.8 Design Modifications

Modifications to the design of the equipment during the test program may be initiated in order to correct deficiencies discovered as a result of testing. Any such modifications will either be developed by the original design organization or other designated organizations. Modifications made to components or systems after completion of preoperational or initial startup testing will be reviewed for retesting requirements on affected portions of the system.

14.2.5 REVIEW, EVALUATION, AND APPROVAL OF TEST RESULTS

The responsibility for review, evaluation, and recommendation for approval of test results from all preoperational tests rests with the JTG. In the case of all initial startup tests, it rests with the PSRC.

Following completion of a preoperational test, the responsible system startup engineer will assemble the test data package for submittal to the members of the JTG for evaluation. Each test data package will be reviewed to ensure that the test has been performed in accordance with the approved procedure and that all required data, checks, and signatures have been properly recorded and that system performance meets the approved acceptance criteria.

Members of the JTG will review the evaluation findings and recommend corrective action to be taken to resolve any outstanding deficiencies. If the deficiencies are not resolved to the satisfaction of the JTG, then appropriate retesting may be required. If the evaluation indicates that deficiencies in the test method are responsible for unsatisfactory test results, the test procedure will be revised accordingly before retesting is initiated. The review and approval process for procedure revisions is carried out in the manner described in Section 14.2.3. Whenever an evaluation of test results indicates deficiencies in system performance, the JTG will refer the problem to the responsible engineering organization for evaluation.

If the test documentation and system performance are acceptable, the JTG will recommend approval of the test by Startup Manager and the Plant Manager.

Following each major phase of the initial startup test program, the PSRC will verify that all required tests have been performed and that the test results have been approved. This verification will ensure that all required systems are operating properly and that testing for the next major phase will be conducted in a safe and efficient manner. This type of review will be performed to the extent required before major initial startup test phases such as fuel load, initial criticality, and power ascension. During the power ascension phase, review and approval of initial startup test procedure results will be completed for each of these plateaus - 25 percent, 50 percent, and 75 percent, prior to proceeding to the next plateau.

14.2.6 TEST RECORDS

Test procedures and test data relating to preoperational and initial startup testing will be retained in accordance with the measures described in Section 17.2.17.

14.2.8 UTILIZATION OF REACTOR OPERATING AND TESTING EXPERIENCE IN DEVELOPMENT OF TEST PROGRAMS

The operating experience assessment for Wolf Creek Generating Station Unit No. 1 (WCGS) will be conducted by the nuclear divisions and plant staff who possess the appropriate experience in the area of concern. The sources of operating experience information includes the use of the NOTEPAD system and the INPO/NSAC SEEIN system. An administrative system which will control the flow of information from NOTEPAD, INPO/NSAC SEEIN, etc., to the cognizant organizations including the Independent Safety Engineering Group (ISEG) will be developed and functioning prior to fuel load.

The Licensing Section is responsible for coordinating the review by the Applicant's of the NRC Information and Enforcement (IE) Bulletins, Circulars, and Information Notices.

The Startup Group reviews information provided by the other KG&E Nuclear Divisions and information provided by Bechtel and Westinghouse to determine its effect on the Wolf Creek Initial Test Program, making revisions to test and administrative procedures as required.

14.2.12.1.2 Essential Service Water Pump Preoperational Test (SU3-EF02)

This test was combined with Test SU3-EF01, Essential Service Water System Preoperational Test, which is described in Section 14.2.12.1.32 of the Wolf Creek Addendum.

14.2.12.1.4 Power Conversion and ECCS Thermal Expansion Test (SU3-0004)

14.2.12.1.4.1 Objective

To demonstrate snubber operability on all safety-related systems whose operating temperature exceeds 250°F.

14.2.12.1.4.2 Prerequisites

a. Preservice examinations as specified in the Tedesco letter to KG&E dated 3/10/81 have been completed on the systems being checked within the last 6 months.

b. Other required component testing and instrument calibration are completed.

c. Required electrical power supplies and control circuits are operational.

d. Preoperational testing is in progress.

14.2.12.1.4.3 Test Method

a. During initial system heatup and cooldown, at specified temperature intervals, verify the expected thermal movement for any system which attains operating temperature.

b. For those systems which do not attain operating temperature, verify by observation and/or calculation that the snubber will accommodate the projected thermal movement.

c. Verify snubber swing clearances at specified heatup and cooldown intervals.

14.2.12.1.4.4 Acceptance Criteria

a. The expected thermal movement for any system that attains operating temperature is within design specifications.

b. The expected thermal movement determined by observation and/or calculation for any system that does not attain operating temperature is within design specifications.

c. Snubber swing clearance at specified heatup and cooldown intervals is within design specifications.

14.2.12.1.5 Auxiliary Feedwater Pump Turbine Preoperational Test (SU3-FC01)

14.2.12.1.5.1 Objectives

a. To demonstrate the operation of the auxiliary feedwater pump (AFWP) turbine and its support equipment, while uncoupled from the pump.

b. To demonstrate control of the AFWP turbine from the control room as well as the auxiliary shutdown panel.

14.2.12.1.5.2 Prerequisites

a. Required component testing, instrument calibration and system flushing/cleaning are complete.

b. Steam is available to the AFWP turbine.

14.2.12.1.5.3 Test Method

a. AFWP turbine system valves are operated and required response to various signals is verified.

b. The turbine is operated and proper control is verified from the control room as well as the auxiliary shutdown panel, and operating data are recorded.

c. The turbine is brought to high speed at which time the mechanical and electronic overspeed trips are verified.

14.2.12.1.5.4 Acceptance Criteria

a. The AFWP turbine can be controlled from the control room panel and the auxiliary shutdown panel.

b. The mechanical and electronic overspeed trips actuate to shut down the turbine in accordance with the design.

14.2.12.1.8 Auxiliary Feedwater Turbine-Driven Pump and Valve Preoperational Test (SU3-AL02)

14.2.12.1.8.1 Objectives

a. To verify the auxiliary feedwater pump turbine mechnical trip and throttle valve automatic operation on an auxiliary feedwater actuation signal (AFAS).

b. To perform the initial coupled operation of the turbine-driven auxiliary feedwater pump. Full flow characteristics of the turbine-driven pump will be demonstrated during hot functional testing.

c. To perform five consecutive, successful, cold starts of the turbine-driven auxiliary feedwater pumps.

14.2.12.1.8.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The steam generators are available to receive water from the auxiliary feedwater pumps.

d. The steam generator blowdown system is available to maintain the normal operating levels in the steam generators during auxiliary feedwater pump operation.

e. The auxiliary steam system is available to supply steam to the auxiliary feedwater pump turbine.

f. For the performance characteristic test of this pump, hot functional testing (HFT) is in progress.

14.2.12.1.8.3 Test Method

a. An AFAS is simulated, and opening of the mechanical trip and throttle valve is verified.

b. The turbine-driven auxiliary feedwater pump is operated during HFT, and performance characteristics are recorded.

c. The ability of the turbine-driven auxiliary feedwater pumps to start successfully five consecutive times from cold conditions is verified.

14.2.12.1.8.4 Acceptance Criteria

a. The auxiliary feedwater pump mechnical trip and throttle valve opens automatically on an AFAS.

b. Operating characteristics of the turbine-driven auxiliary feedwater pump are in accordance with design.

c. The turbine driven auxiliary feedwater pump starts successfully 5 consecutive times from a cold start.

14.2.12.1.26 Charging System Preoperational Test (SU3-BG03)

14.2.12.1.26.1 Objectives

To demonstrate positive displacement charging pump operating characteristics and to verify the operation of the regenerative heat exchanger inlet isolation valves and the letdown isolation valves, including their response to a safety injection signal (SIS).

14.2.12.1.26.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The volume control tank contains an adequate supply of demineralized water for the performance of this test.

d. The component cooling water system is available to provide cooling water to the positive displacement charging pump.

e. The reactor coolant system is available to receive charging system flow.

14.2.12.1.26.3 Test Method

a. The positive displacement charging pump is operated, and pump operating data are recorded.

b. Regenerative heat exchanger inlet isolation valve and letdown system isolation valve control circuits are verified, including valve response to safety injection signals.

14.2.12.1.26.4 Acceptance Criteria

a. Positive displacement charging pump operating characteristics are within design specifications.

b. Charging pump to regenerative heat exchanger inlet isolation valves close on receipt of an SIS. Valve closure times are within design specifications.

c. The letdown line containment isolation valves close on receipt of a containment isolation signal. Valve closure times are within design specifications.

14.2.12.1.27 Boron Thermal Regeneration System Preoperational Test (SU3-BG04)

14.2.12.1.27.1 Objectives

To verify the operation of the boron thermal regeneration system, and associated control circuits, ~~including valve response to safety signals.~~ Performance characteristics of the chemical and volume control system chiller pumps are also verified.

14.2.12.1.27.2 Prerequisites

a. Required component testing, instrument calibration and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The volume control tank contains an adequate supply of demineralized water for the performance of this test.

d. The chemical and volume control system chiller surge tank contains an adequate supply of demineralized water for the performance of this test.

14.2.12.1.27.3 Test Method

a. The chemical and volume control system chiller pumps are operated and performance characteristics are verified.

b. Boron thermal regeneration system component control circuits are verified.

14.2.12.1.27.4 Acceptance Criteria

a. The chemical and volume control system chiller pumps' operating characteristics are within design specifications.

b. The chemical and volume control system chiller pumps start automatically when the boron thermal regeneration system is placed in the borate or dilute mode of operation.

14.2.12.1.32 Essential Service Water System Preoperational Test (SU3-EF01)

14.2.12.1.32.1 Objectives

a. To demonstrate the capability of the essential service water system to provide cooling water flow during the LOCA mode of operation. The operation and response of system valves to align the system in the LOCA flow mode on safety injection signals, load sequence signals, and low suction pressure signals are also verified.

b. To demonstrate the operating characteristics of the essential service water (ESW) pumps and verify their response to safety signals.

c. To demonstrate the operability of the backpressure control valves, including their response to safety signals.

14.2.12.1.32.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The site essential service water pumps are available to supply flow to the essential service water system.

c d. The compressed air system is available to the system air-operated valves.

14.2.12.1.32.3 Test Method

a. System operating characteristics are verified in the LOCA mode of operation.

b. Safety signals are simulated, and the responses of the system valves and the ESW pumps are verified.

c. The ESW pumps are operated and pump operating data are recorded.

d. The operability of the backpressure control valves, including their response to safety signals is verified.

14.2.12.1.32.4 Acceptance Criteria

a. Components supplied by the essential service water system receive flows that are within design specifications in the LOCA mode of system operation.

b. System valve operation in response to safety signals is within design requirements.

c. System valve operating times are within design specifications.

d. The ESW pumps' operating characteristics are within design specifications.

e. Each ESW pump responds properly to load sequence and load shed signals.

f. The time required for each ESW pump to reach rated flow is within design specifications.

g. System backpressure valves close upon receipt of a LOCA sequencer or safety injection signal.

h. An auxiliary feedwater pump low suction pressure signal will close the ESW pump breakers if a zero sequencer signal is not present.

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14.2.12.1.39 Boron Injection Tank and Recirculation Pump Test (~~S-03EM04~~) (SU3-EM04)

14.2.12.1.39.1 Objective~~s~~

To demonstrate the operating characteristics of the boron injection recirculation pumps and verify that the associated instrumentation and controls are functioning properly. The pump and valve responses to safety signals are also verified.

14.2.12.1.39.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

~~c. The chemical volume and control system (CVCS) is available to supply flow through the boron injection tank to the boron recycle system.~~

~~d. The reactor makeup water system is available to supply dilution flow during the CVCS to boron recycle system flow verification.~~

14.2.12.1.39.3 Test Method

a. The boron injection recirculation pumps are operated in the recirculation mode, and their operating characteristics are verified.

~~b. The CVCS charging pumps are operated through the boron injection tank to the boron recycle system. During this evolution, dilution flow from the reactor makeup water system is verified.~~

b ~~c~~. The boron recirculation system control circuits are verified, including the operation of system pumps and valves on receipt of safety signals.

14.2.12.1.39.4 Acceptance Criteria

a. The boron injection recirculation pump performance characteristics are within design specifications.

b. Boron recirculation pump and valve responses to load shed and safety injection signals, respectively, and response times are in accordance with design specifications.

14.2.12.1.43 Miscellaneous Building HVAC System Preoperational Tests (SU3-GF01, SU3-GF02, SU3-GF03)

14.2.12.1.43.1 Objectives

To demonstrate the capacity of 1) the auxiliary feedwater pump room cooler fans, 2) the main steam enclosure building supply and exhaust fans and 3) the tendon gallery transfer fans and to verify that the associated instrumentation and controls are functioning properly. The responses of the main steam enclosure building dampers and tendon access gallery dampers to safety signals are also verified.

(At Wolf Creek Generating Station, this test will be performed in three independent parts. In addition, the auxiliary boiler room fan will be treated as part of preoperational test SU4-GF01.)

14.2.12.1.43.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. The miscellaneous building HVAC system is air balanced.

14.2.12.1.43.3 Test Method

a. Flow data are recorded while the fans are operating.

b. The response of system dampers to a safety injection signal (SIS) is verified.

14.2.12.1.43.4 Acceptance Criteria

a. System fan capacities are within design specifications.

b. The main steam enclosure building and tendon access gallery dampers close on receipt of a SIS.

14.2.12.1.54 Spent Fuel Pool Crane Preoperational Test (SU3-KE01)

14.2.12.1.54.1 Objectives

a. To demonstrate proper operation of the spent fuel pool bridge crane control circuits and associated interlocks.

b. To document the data obtained during testing of the spent fuel pool bridge crane at 125 percent of rated load.

c. To verify the ability of ~~this~~ The spent fuel pool bridge crane and associated fuel handling tools to transfer a dummy fuel assembly.

14.2.12.1.54.2 Prerequisites

a. Required component testing and instrument calibration are completed.

b. Required electrical power supplies and control circuits are operational.

c. A dummy fuel assembly is available.

14.2.12.1.54.3 Test Method

a. Operability of the spent fuel pool bridge crane control circuits and associated interlocks is verified.

b. Ability of the spent fuel pool bridge crane and associated fuel handling tools to transfer a dummy fuel assembly is verified.

14.2.12.1.54.4 Acceptance Criteria

a. The spent fuel pool bridge crane electric and manual hoists support 125 percent of their rated load.

b. The spent fuel pool bridge crane monorail center span deflection at rated load is within design specifications.

c. The spent fuel pool crane bridge, trolley and hoist speeds at rated loads are within design specifications.

d. All control circuits and interlocks associated with the spent fuel pool bridge crane operate in accordance with system design.

14.2.12.1.55 New Fuel Elevator Preoperational Test (SU3-KE02)

14.2.12.1.55.1 Objectives

a. To demonstrate proper operation of the new fuel elevator control circuits and associated interlocks.

b. To verify the ability of the new fuel elevator to raise and lower a dummy fuel assembly.

14.2.12.1.55.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. A dummy fuel assembly is available.

14.2.12.1.55.3 Test Method

Operability of the new fuel elevator including control circuits and associated interlocks is verified.

14.2.12.1.55.4 Acceptance Criteria

a. All control circuits and interlocks associated with the new fuel elevator operate in accordance with system design.

b. While raising and lowering a dummy fuel assembly, the new fuel elevator operates in accordance with system design.

c. The spent fuel cask handling crane hoist supports 125 percent of rated load.

d. The spent fuel cask handling crane bridge center span deflection at rated load is within design specifications.

e. The spent fuel cask handling crane bridge, trolley and hoist speeds at rated loads are within design specifications.

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e. While transferring a dummy fuel assembly, the spent fuel pool bridge crane and associated fuel handling tools operate in accordance with system design.

14.2.12.1.56 ~~Spent~~ Fuel ~~Cask~~ Handling and Storage ~~Crane~~ Preoperational Test (SU3-KE03)

14.2.12.1.56.1 Objectives

a. To verify the ability of the spent fuel cask handling crane, and associated fuel handling tools to transfer a dummy fuel assembly.

b. To demonstrate proper operation of the spent fuel cask handling crane control circuits and associated interlocks.

c. To document the data obtained during testing of the spent fuel cask handling crane at 125 percent of rated load.

14.2.12.1.56.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. A dummy fuel assembly is available.

14.2.12.1.56.3 Test Method

a. During the transfer of a dummy fuel assembly, the operability of the spent fuel cask handling crane and associated fuel handling tools is verified.

b. Operability of the spent fuel cask handling crane control circuits and associated interlocks is verified.

14.2.12.1.56.4 Acceptance Criteria

a. While transferring a dummy fuel assembly, the spent fuel cask handling crane and associated fuel handling tools operate in accordance with system design.

b. All control circuits and interlocks associated with the spent fuel cask handling crane operate in accordance with system design.

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14.2.12.1.56a Fuel Handling System Integrated ~~and Storage~~ Preoperational Test (SU3-KE07)

14.2.12.1.56a.1 Objective

To verify the ability of the refueling machine, new fuel elevator, fuel transfer system, spent fuel bridge crane, spent fuel cask handling crane and associated fuel handling tools to transfer a dummy fuel assembly.

14.2.12.1.56a.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. The reactor vessel, refueling pool, refueling canal and spent fuel pool are filled with demineralized water.

d. A dummy fuel assembly is available.

14.2.12.1.56a.3 Test Method

During the transfer of a dummy fuel assembly, the operability of the refueling machine, new fuel elevator, fuel transfer system, spent fuel bridge crane, spent fuel cask handling crane and associated fuel handling tools is verified.

14.2.12.1.56a.4 Acceptance Criteria

While transferring a dummy fuel assembly, the refueling machine, new fuel elevator, fuel transfer system, spent fuel bridge crane, spent fuel cask handling crane and associated fuel handling tools operate in accordance with system design.

14.2.12.1.57 Fuel Transfer System Preoperational Test (SU3-KE04)

14.2.12.1.57.1 Objectives

a. To demonstrate proper operation of the fuel transfer system control circuits and associated interlocks.

b. To verify the ability of the fuel transfer system and associated handling tools to transfer a dummy fuel assembly.

14.2.12.1.57.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. A dummy fuel assembly is available.

14.2.12.1.57.3 Test Method

a. Operability of the fuel transfer system control circuits and associated interlocks is verified.

b. During the transfer of a dummy fuel assembly, the operability of the fuel transfer system and associated handling tools is verified.

14.2.12.1.57.4 Acceptance Criteria

a. All control circuits and interlocks associated with the fuel transfer system operate in accordance with system design.

b. While transferring a dummy fuel assembly, the fuel transfer system and associated handling tools operate in accordance with system design.

14.2.12.1.58 Refueling Machine and RCC Change Fixture Preoperational Test (SU3-KE05)

14.2.12.1.58.1 Objectives

a. To demonstrate proper operation of the refueling machine, rod cluster control change fixture and containment building polar crane control circuits and associated interlocks.

b. To document the data obtained during testing of the containment building polar crane at 125 percent of rated load.

c. To verify the ability of the refueling machine to transfer a dummy fuel assembly.

14.2.12.1.58.2 Prerequisites

a. Required component testing and instrument calibration are complete.

b. Required electrical power supplies and control circuits are operational.

c. A dummy fuel assembly is available.

d. A dummy control rod assembly is available.

14.2.12.1.58.3 Test Method

a. Operability of the refueling machine and rod cluster control change fixture control circuits and associated bridge, trolley, hoist and gripper interlocks is verified.

b. Operability of the containment building polar crane control circuits and associated interlocks is verified.

14.2.12.1.58.4 Acceptance Criteria

a. All control circuits and interlocks associated with the refueling machine and rod cluster control change fixture operate in accordance with system design.

b. The control circuits and interlocks associated with the containment building polar crane operate in accordance with system design.

c. The containment polar crane main and auxiliary hoists support 125 percent of their rated load.

d. The containment polar crane bridge center span deflection at rated load is within design specifications.

e. The containment polar crane bridge, trolley, and hoist speeds at rated loads are within design specifications.

f. While transferring a dummy fuel assembly, the refueling machine operates in accordance with system design.

14.2.12.1.77 Integrated Containment Leak Rate Test (SU3-GP01)

14.2.12.1.77.1 Objective

To demonstrate that the total leakage from the containment does not exceed the maximum allowable leakage rate at the calculated peak containment internal pressure. The operability of the containment cooling fans at design accident pressure is also verified.

14.2.12.1.77.2 Prerequisites

a. The containment penetration leakage rate tests (type B tests) and containment isolation valve leakage tests (type C tests) are complete and the containment has been pressurized to 115 percent of the design pressure.

b. All containment isolation valves are closed by normal actuation methods.

c. Containment penetrations, including equipment hatches and personnel airlocks, are closed.

d. Portions of fluid systems that are part of the containment boundary, that may be opened directly to the containment or outside atmosphere under post-accident conditions, are opened or vented to the appropriate atmosphere to place the containment in as close to post-accident conditions as possible.

e. Required instrument calibration is complete.

14.2.12.1.77.3 Test Method

a. The integrated containment leak rate test (type A test) is conducted, using the absolute method, described in the ANSI/ANS 56.8-1981 Containment System Leakage Testing Requirements. Measurements of containment atmosphere dry-bulb temperature, dew point and pressure are taken to calculate the leakage rate. A standard statistical analysis of data is conducted, using a linear least squares fit regression analysis to calculate the leakage rate.

14.2.12.1.78 Local Containment Leak Rate Test (SU8-GP01)

This test is described in SNUPPS FSAR Section 14.2.12.1.78. It has been assigned a different test number for WCGS.

14.2.12.1.79 Reactor Containment Structural Integrity Acceptance Test (SU3-GP02)

This test is described in SNUPPS FSAR Section 14.2.12.1.79. It has been assigned a different test number for WCGS.

14.2.12.1.87 Auxiliary Feedwater Motor-Driven Pump Endurance Test (SU3-AL03)

14.2.12.1.87.1 Objectives

a. To demonstrate that the motor-driven auxiliary feedwater pumps can operate for 48 continuous hours without exceeding any of their limiting design specifications.

b. To demonstrate that the motor-driven auxiliary feedwater pumps can operate for 1 hour after a cool down from the 48-hour test.

c. To demonstrate that the room environmental conditions are not exceeded during the 48-hour test.

14.2.12.1.87.2 Prerequisites

a. Required component testing, instrument calibration and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The appropriate auxiliary feedwater pump room coolers are operational.

d. The condensate storage tank is available as a water source and to receive recirculation flow.

14.2.12.1.87.3 Test Method

Each motor-driven pump will be started and operated for 48 hours after reaching rated speed and rated discharge pressure and flow, or a greater pressure and less flow. During the endurance run, pump-operating data and the pump room environmental conditions will be recorded. At the completion of each endurance test, the pump will be cooled for 8 hours and until pump data returns to within 20°F of the original pretest data. The pump will then be started and operated for 1 hour.

14.2.12.1.87.4 Acceptance Criteria

a. The operating parameters (vibration, bearing temperatures, etc.) of each motor-driven auxiliary feedwater pump do not exceed the design specifications.

b. The environmental conditions of each motor driven auxiliary feedwater pump room do not exceed the design specifications.

14.2.12.1.87a Auxiliary Feedwater Turbine-Driven Pump Endurance Test (SU3-AL05)

14.2.12.1.87a.1 Objectives

a. To demonstrate that the turbine-driven auxiliary feedwater pump can operate for 48 continuous hours without exceeding any of its limiting design specifications.

b. To demonstrate that the turbine-driven auxiliary feedwater pump can operate for 1 hour after a cool down from the 48-hour test.

c. To demonstrate that the room environmental conditions are not exceeded during the 48-hour test.

14.2.12.1.87a.2 Prerequisites

a. Required component testing, instrument calibration and system flushing/cleaning are complete.

b. Required electrical power supplies and control circuits are operational.

c. The appropriate auxiliary feedwater pump room coolers are operational.

d. The condensate storage tank is available as a water source and to receive recirculation flow.

e. A steam source is available.

14.2.12.1.87a.3 Test Method

The pump will be started and operated for 48 hours after reaching rated speed and rated discharge pressure and flow, or a greater pressure and less flow. The turbine-driven auxiliary feedwater pump operating steam will be as close to normal operating temperature as possible and will be at least 400°F. During the endurance run, pump-operating data and the pump room environmental conditions will be recorded. At the completion of the endurance test, the pump will be cooled for 8 hours and until pump data returns to within 20°F of the original pretest data. The pump will then be started and operated for 1 hour.

14.2.12.1.87a.4 Acceptance Criteria

a. The operating parameters (vibration, bearing temperatures, etc.) do not exceed the design specifications.

b. The environmental conditions of the turbine-driven auxiliary feedwater pump room do not exceed the design specifications.

14.2.12.2 Nonsafety-Related Preoperational Test Procedures

14.2.12.2.1 Circulating Water System Preoperational Test ~~(SU3-0004)~~ (SU4-DA01)

14.2.12.2.1.1 Objectives

a. To demonstrate the operating characteristics of the circulating water pumps, water box venting pumps, and the condenser drain pump and verify the operation of their associated control circuits.

b. To demonstrate by operational test that the circulating water pump discharge valves operating times are within design specifications.

c. To demonstrate that the gland water system flow to the circulating water pumps is within design specifications.

14.2.12.2.1.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are completed.

b. Required electrical power supplies and control circuits are operational.

c. The circulatng water system and condenser are available to receive flow from the circulating water pumps.

14.2.12.2.1.3 Test Method

a. The circulating water pumps, water box venting pumps, and the condenser drain pump are operated and pump operating data is recorded.

b. The response of the circulating water pumps and the condenser drain pump to control signals is verified.

c. Circulating water pump discharge valve operating times are recorded.

14.2.12.2.3 Fire Protection System Preoperational Test (SU4-FP03)

14.2.12.2.3.1 Objectives

a. To demonstrate the operating characteristics of the Fire Protection (FP) system jockey pump, motor-driven fire pump and the diesel-driven fire pump and verify the operation of their associated control circuits.

b. To demonstrate the operability of the diesel oil system, including system instrumentation and controls.

14.2.12.2.3.2 Prerequisites

a. Required component testing, instrument calibration, and system flushing/cleaning are completed.

b. Required electrical power supplies and control circuits are operational.

14.2.12.2.3.3 Test Method

a. The jockey pump, motor-driven fire pump and the diesel-driven fire pump are operated and operating data are recorded.

b. The response of the motor-driven fire pump and diesel-driven fire pump to automatic start signals are verified.

c. With the diesel-driven fire pump operating at rated capacity, the capacity of the diesel oil day tank is verified.

14.2.12.2.3.4 Acceptance Criteria

a. The FP pumps operating characteristics are within design specifications.

b. The motor-driven fire pump and the diesel-driven fire pump automatically start upon receipt of their associated decreasing fire protection system pressure signal.

c. With the diesel fire pump operating at rated capcity, the capacity of the diesel oil day tank is within design specifications.

d. With the diesel fire pump operating at rated capacity and upon receipt of a diesel oil day tank low level alarm, the remaining capacity of the diesel oil day tank is within design specifications.

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14.2.12.2.11 Fire Protection System (Water) Preoperational Test (SU4-KC01)

This test is described in SNUPPS FSAR Section 14.2.12.2. At WCGS this test will be accomplished in two parts (SU4-KC01A and SU4-KC01B)

14.2.12.2.27 Plant Performance Test (SU8-0007)

This test is described in SNUPPS FSAR Section 14.2.12.2.27. It has been assigned a different test number for WCGS.

14.2.12.2.36 Loose Parts Monitoring System Test (SU4-SQ02)

This test is described in SNUPPS FSAR Section 14.2.12.2.36. It has been assigned a different test number for WCGS.

TABLE 14.2-1
(Sheet 1)

SAFETY-RELATED PREOPERATIONAL TEST PROCEDURES

Test Number	Title	Test Abstract FSAR Section
SU3-NG02	480 V Class IE System (ESW) Preoperational Test	14.2.12.1.1
	Deleted	14.2.12.1.2
SU3-GD01	Essential Service Water System Preoperational Test	14.2.12.1.3
SU3-0004	Power Conversion and ECCS Thermal Expansion Test	14.2.12.1.4
SU3-FC01	Auxiliary Feedwater Pump Turbine Preoperational Test	14.2.12.1.5
SU3-AL02	Auxiliary Feedwater Turbine-Driven Pump and Valve Preoperational Test	14.2.12.1.8
SU3-BG03	Charging System Preoperational Test	14.2.12.1.26
SU3-BG04	Boron Thermal Regeneration System Preoperational Test	14.2.12.1.27
SU3-EF01	Essential Service Water System Preoperational Test	14.2.12.1.32
SU3-EM04	Boron Injection Tank and Recirculation Test	14.2.12.1.39
SU3-GF01 GF02 GF03	Miscellaneous Building HVAC System Preoperational Test	14.2.12.1.43
SU3-KE01	Spent Fuel Pool Crane Preoperational Test	14.2.12.1.54
SU3-KE02	New Fuel Elevator Preoperational Test	14.2.12.1.55
SU3-KE03	Spent Fuel ~~Cask~~ Handling and Storage ~~Crane~~ Preoperational Test	14.2.12.1.56
SU3-KE07	Fuel Handling System Integrated ~~and Storage~~ Preoperational Test	14.2.12.1.56a

TABLE 14.2-1
(Sheet 2)

SAFETY-RELATED PREOPERATIONAL TEST PROCEDURES

Test Number	Title	Test Abstract FSAR Section
SU3-KE04	Fuel Transfer System Preoperational Test	14.2.12.1.57
SU3-KE05	Refueling Machine and RCC Change Fixture Preoperational Test	14.2.12.1.58
SU3-GP01	Integrated Containment Leak Rate Test	14.2.12.1.77
SU8-GP01	Local Containment Leak Rate Test	14.2.12.1.78
SU3-GP02	Reactor Containment Structural Integrity Acceptance Test	14.2.12.1.79
SU3-AL03	Auxiliary Feedwater Turbine Pump Endurance Test	14.2.12.1.87
SU3-AL05	Auxiliary Feedwater Motor Pump Endurance Test	14.2.12.1.87a

TABLE 14.2-2

NONSAFETY-RELATED PREOPERATIONAL TEST PROCEDURES

Test Number	Title	Test Abstract FSAR Section
SU4-DA01	Circulating Water System Preoperational Test	14.2.12.2.1
SU4-EA01	Service Water System Preoperational Test	14.2.12.2.2
SU4-FP03	Fire Protection System Preoperational Test	14.2.12.2.3
SU4-KC01	Fire Protection System (Water) Preoperational Test	14.2.12.2.11
SU8-0007	Plant Performance Test	14.2.12.2.27
SU4-SQ02	Loose Parts Monitoring System Test	14.2.12.2.36

b. On completion of the leak rate test, a verification test is conducted to confirm the capability of the data acquisition and reduction system to satisfactorily determine the calculated integrated leakage rate. The verification test is accomplished by imposing a known leakage rate on the containment, or by pumping back a known quantity of air into the containment through a calibrated flow measurement device.

c. While at the design accident pressure, data is recorded for the containment cooling fans.

14.2.12.1.77.4 Acceptance Criteria

The containment integrated leakage does not exceed the maximum allowable leakage rate at a calculated peak containment internal pressure, as defined in 10 CFR 50, Appendix J.

The containment cooling fan operation at design accident pressure is in accordance with design.