SECTION 14

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SECTION 14

14.0 INITIAL TESTS AND OPERATION

A comprehensive initial testing and operation program was conducted at the Davis-Besse Nuclear Power Station. The purpose of this program was:

a. to assure that the equipment and systems performed in accordance with design criteria,

b. to effect initial fuel loading in a safe, efficient manner,

c. to verify the nuclear parameters, and

d. to bring the unit to rated capacity.

The test program began as the installation of individual components and systems were completed. The individual components and systems were tested and evaluated according to written test procedures. An analysis of the test results verified that the components and systems performed satisfactorily.

The written procedures for the initial tests and operation included the purpose, equipment needed, references, limitations and precautions, prerequisites, procedures, and the acceptance criteria.

14.1 TEST PROGRAM

Participants from Toledo Edison, Babcock & Wilcox (B&W), Bechtel, and the various vendors, as shown in Figure 14.1-1 were involved in the development and execution of the Preoperational and Startup Test Program.

The Startup Procedures Manual identified, to the Toledo Edison Company, Bechtel groups, and to individuals associated with the project, their respective responsibilities and the guidelines under which the startup phase of the project was conducted.

The responsibility for the preparation and execution of the Test Program rested with Toledo Edison. Toledo Edison determined and approved the adequacy of the test program and results. Babcock & Wilcox and Bechtel Company participated in the definition of the programs and, as required, supplied manpower and/or supervision for its execution.

Toledo Edison prepared the test procedures and conducted the tests. Assignment of procedures and tests were made to Station Section Heads. Toledo Edison manpower in the form of Test Coordinators and Test Leaders, Operators, Maintenance, Instrument and Control, and Chemistry & Health Physics personnel were assigned to the Station Section Heads to prepare procedures and conduct tests.

14.1.1 Specific Organization And Responsibilities

a. Station Superintendent

The Station Superintendent had final responsibility for the overall Test Program which included the preparation and approval of the test procedures, scheduling of the tests, and the satisfactory completion and final approval of the tests and results. In his actions the Station Superintendent considered the suggestions of advisory groups such as the Station Review Board (SRB) or the Company Nuclear Review Board (CNRB).

b. Test Working Group

The Test Working Group (TWG) scheduled and coordinated the preparation and review of test procedures, execution of tests and the review of test results of the Test Program.

The TWG membership was comprised of representatives from Toledo Edison, Bechtel, and B&W. Various divisions of Toledo Edison participated as required. The Operations Engineer was the chairman of the TWG. The TWG met at regular intervals varying from about once every two months during initial construction to approximately daily during the most active phases of the program.

c. Test Program Coordinator

The major responsibilities of the Test Program Coordinator (Technical Engineer) was to administer the startup schedule and initiate schedules for station startup and testing as established by the TWG. He worked with the B&W Test Program Manager to coordinate the activities of Toledo Edison, Bechtel, and B&W personnel assigned as Test Coordinators or Test Leaders.

d. Test Program Manager

The responsibility of the Test Program Manager was to organize and coordinate test program phases. He prepared Critical Paths for each phase and developed short and long range schedules.

e. Station Section Heads

The Station Section Heads (Operation Engineer, Technical Engineer, Maintenance Engineer, Chemist & Health Physicist) were responsible for all tests assigned to their Sections. The Station Section Head assigned a Test Coordinator for each test assigned to his group and coordinated the preparation of documents with B&W, Bechtel, and Toledo Edison groups and personnel.

f. Test Leader

A Test Leader was designated for each test. His responsibility was to develop the test procedure, coordinate the performance of the test, analyze results, identify discrepancies in test and acceptance criteria, initiate action to correct discrepancies, obtain approval of other parties when the test had been completed satisfactorily, and file the results in the master final documentation file.

g. Test Coordinator

The responsibility of the Test Coordinator was to coordinate the tests which lasted more than one day and to coordinate testing when more than one test was being conducted at the same time. During Hot Functional Testing, Zero Power Physics Testing, and Power Escalation Testing, the Test Coordinators worked on a shift basis.

h. Toledo Edison Startup Coordinator

The Toledo Edison Startup Coordinator (Maintenance Engineer) was the construction interface who coordinated activities between Bechtel, B&W and the Davis-Besse staff, thereby assuring that the systems were completed for testing. The Startup Coordinator also assisted in the construction testing activities.

i. Station Review Board

The Station Review Board (SRB) has the responsibility of reviewing nuclear safety-related procedures and recommending their approval or disapproval to the Station Superintendent, and acts as a final review group for the results of completed specified tests, prior to their approval by the Station Superintendent.

The SRB has regular meetings as necessary to accomplish its duties.

j. Company Nuclear Review Board (CNRB)

During the conduct of the Initial Test and Operation Program, the CNRB acted as an independent review group, reviewing certain test procedures and completed test results, as selected by them or as directed by others. They reported their findings and recommendations to the Station Superintendent, as well as to the Vice President, Facilities Development.

14.1.2 Development and Approval of Test Procedures

The Davis-Besse station staff was delegated the responsibility for the preparation of the Preoperational (i.e. nuclear safety-related) Test Procedures, which were developed as shown in Figure 14.1-2.

The Section Head responsible for a Test Procedure assigned personnel to prepare the procedure based on the appropriate test specification received from B&W or Bechtel. When a procedure was completed, the Section Head submitted the procedure to the Chairman of the TWG for transmittal to B&W, Bechtel, and other concerned parties for their review. Upon completion of their review, the procedure was returned to the TWG chairman for distribution to the Section Head. The Section Head then revised the procedure and submitted it, along with B&W, Bechtel, and other party sign-offs and exceptions to the SRB for review.

The SRB resolved any exceptions and by a majority vote of the membership, recommended that the Station Superintendent approve the procedure. The opinion of dissenting SRB members was submitted to the CNRB for resolution.

The Station Superintendent could send a procedure back to the SRB for further review, if he so desired. When an impasse occurred between the SRB and the Station Superintendent, the problem was submitted to the CNRB for resolution.

At times, modification to a Test Procedure was needed after it had been approved but prior to the test. If a modification that was nuclear safety-related or that changed the intent of the procedure was necessary, the applicable Section Head obtained the necessary Bechtel, B&W, etc. approvals and sign-offs of the revision. He then resubmitted the revised procedure to the SRB for its recommendation, and to the Station Superintendent for his approval. Revisions to the test procedure were scheduled for completion at least two weeks prior to the test and were listed on the test procedure title page.

14.1.3 Execution of Tests

Figure 14.1-3 shows the title, test code number, and testing interval, referenced to the fuel loading event for the Preoperational tests, the Hot Functional tests, the Zero Power Physics tests, and the Power Escalation tests. The performance of the tests varied somewhat from the sequence shown on Figure 14.1-3 to allow for operational flexibility; however, all prerequisites for a test were met prior to the performance of the test.

The responsible Section Head initiated a final review of each approved Test Procedure three weeks prior to the projected date of the test. Other Station Section Heads, and Bechtel or B&W participated in this review as required. The review pertained to the status of the equipment involved in the test and to the test procedure.

A Test Leader or test Coordinator was responsible for conducting the test. He reported to the Test Program Coordinator and together they maintained control of all test schedules, use and storage of test documents, and requested assignment of manpower for testing from the appropriate Section Head. The Test Coordinator and Shift Foreman, together with the Operators, performed the tests and obtained the required data. The Shift Foremen and Operators were responsible for the actual equipment operation.

If during the conduct of a test, it became necessary to change or modify a test procedure and the change involved nuclear safety, or altered the intent of the test as determined by the Section Head, the test was halted. The appropriate Section Head was then responsible to see that the procedure was revised and approved by the SRB and the Station Superintendent before the test was permitted to resume.

14.1.4 Evaluation and Approval of Test Results

The initial review of the test results was made by the Section Head, the Test Coordinator, or the Test Leader. Their review included an analysis of the test, conclusions, and endorsements that the test was satisfactory, or, if the test was unsatisfactory, recommendations by all the organizations participating in the tests. If the initial review revealed that results were not satisfactory, necessary retests or investigations were initiated by the Section Head.

The results of this review along with the data sheets, Test Procedure, and chronological log of the test, were then forwarded to the SRB through the chairman of the TWG. The SRB reviewed all test results and recommended approval or dissapproval of the results to the Station Superintendent. The opinions of dissenting SRB members were submitted to the CNRB for resolution.

The Station Superintendent could send test results back to the SRB for further review if he so desired. When an impasse occurred between the SRB and the Station Superintendent, the problem was submitted to the CNRB for resolution.

Approval of the test results were entered on the Test Procedure Record of Approval, Changes, and Test Performance Sheet. Audits of nuclear safety related tests and their results was performed by the CNRB.

14.1.5 Resolution of Discrepancies

Any system or component deficiency was reported promptly to the Section Head for documentation. A Deficiency Sheet was filled out and attached to the Test Procedure.

The Section Head then determined and initiated the necessary corrective action. Resolution was noted on the Deficiency Sheet attached to the Test Procedure. The Deficiency Sheet contained a log entry of the action taken and the signature of the responsible party.

If equipment deficiencies, determined by the SRB or Section Head, hampered safe or proper operation of a system or its components then approval of the test was withheld by the Station Superintendent and the system or components were turned back to Bechtel Construction Management for necessary remedial action, and the system retested.

14.1.6 Tests Prior to Reactor Fuel Loading

The tests prior to reactor fuel loading assured that the systems were completed and would operate in accordance with design. An index of the testing prior to fuel loading is given in Table 14.1-1.

The tests prior to fuel loading included the hot functional testing of the reactor coolant system and the associated auxiliary systems, as well as any other tests of systems necessary to assure that the station was ready for fuel loading.

Throughout the conduct of this and subsequent portions of the test program, the normal and emergency operating procedures were verified as much as possible by establishing prerequisites for the test being performed. They simulated operating conditions, by using portions of the operating procedures for the test method and by using operating procedures to return systems and components to their desired state upon completion of tests. Verification that the procedures (or portions thereof in question) would safely accomplish their objectives were documented by responsible members of the station operating staff.

14.1.7 Initial Criticality

The initial criticality tests were performed to ensure a safe initial fuel loading and criticality. The following sections highlight the major steps of the initial program.

14.1.7.1 Initial Fuel Loading

The initial fuel loading was accomplished after all prerequisite tests were satisfactorily completed and the operating license had been issued. Fuel was loaded into the reactor according to the written step-by-step procedure, which included the following:

a. Prerequisites

   1. An identification of responsibility and authority was made.

   2. The required status and readiness of the following systems was prescribed and established.

      a. Nuclear instrumentation and auxiliary neutron monitoring equipment.

      b. Reactor coolant system.

      c. Auxiliary systems.

      d. Containment system.

      e. Fuel handling equipment.

      f. Communications.

      g. Non-nuclear instrumentation.

   3. The specified water quality and water levels were established.

4. The boron concentration in the reactor vessel reactor coolant system, spent fuel pool, and refueling canal was established so that the reactor would be subcritical if all control rods were completely withdrawn.

5. The inspection and readiness of the core control components was prescribed and established.

6. During any reactivity changes, a minimum of two detectors were operating and indicating neutron level after the source was inserted. At all other times, at least one detector was indicating neutron level.

b. Limits and Precautions

1. When an unacceptable increase in count rate was observed on any or all of the responding nuclear channels, fuel loading was suspended while an adequate evaluation was conducted.

2. Core loading procedures specified alignment and checkoff of the fluid systems' control components to prevent inadvertent dilution of the reactor coolant system.

c. Procedure

Included in the fuel loading procedure were items concerning the following:

1. A sequence of loading temporary detectors, sources, control rods, and fuel assemblies in order to maintain shutdown margin requirements.

2. The conditions under which fuel loading continued after each step.

3. Two completely independent plots of reciprocal neutron multiplications as a function of the parameter causing reactivity change were maintained.

4. Neutron count rates were allowed to stabilize prior to the release of the fuel assembly by the fuel handling grapple.

5. An estimate of the reactivity effect for the next fuel addition was made prior to insertion of the next fuel assembly.

6. The valve alignment of the auxiliary systems connected to the reactor coolant system was checked periodically to prevent dilution of the reactor coolant boron concentration.

7. Chemical analysis and water level monitoring were used to assure that inadvertent dilution of the reactor coolant boron concentration had not occurred.

8. Communications between the control room and the fuel handling areas was maintained.

9. Applicable station radiation monitoring systems were in operation.

10. Required health physics and chemistry monitoring services were provided.

11. Documents for the core loading procedure included a detailed check list that prescribed and verified the successive movement of each fuel assembly and its designated inserts from the initial position in the storage racks to the final position in the core.

12. The component serial numbers and the type of each element were checked at successive transfer points to prevent inadvertent misplacements.

14.1.7.2 Precritical Tests

After the initial fuel loading was completed, prestartup checks were made before the approach to initial criticality was begun. An index of the post-fuel loading precritical testing is given in Table 14.1-2.

14.1.7.3 Initial Criticality

A written procedure was followed during the approach to initial criticality. This procedure specified in detail the sequence to be followed, the limitations and precautions, the required station status, and the prerequisite system conditions. This procedure also specified the alignment of fluid systems to ensure controlled boron dilution and core conditions under which the approach to initial criticality proceeded.

Initial criticality was achieved by one of the following two methods:

A.
1. Begin with boron concentration sufficient for shutdown with all CRAs out.
2. Withdraw CRAs in group sequence until CRA groups 6 and 7 are between 25% and 75% withdrawn.
3. Deborate until criticality is achieved.

B.
1. Withdrawal of the control rod assembly groups to ensure at least 1% Δk/k shutdown margin including allowance for a stuck CRA.
2. Boron dilution, until the criticality prediction indicates that initial criticality can be achieved by control rod assembly group withdrawal with the controlling CRA group between 25% and 75% during step (3) below.
3. Withdrawal of the control rod assembly groups in incremental steps until criticality is achieved.

Permissible CRA group withdrawal and deboration was based on calculated reactivity effects. Two independent inverse neutron multiplication curves were maintained during CRA group withdrawal and deboration. A predicted CRA group position or boron concentration for criticality was determined before the next CRA group withdrawal or deboration was started.

14.1.8 <u>Post-Criticality Test Program</u>

The post-criticality test program was performed to provide assurance that the station was operating in a safe and efficient manner. Systems and components which were not operationally tested prior to initial criticality were tested during the post-criticality test program to verify reactor parameters and to obtain information required for station operation. An index of the post-criticality testing is included in Table 14.1-3.

14.1.8.1 Zero Power Physics Tests

Following initial criticality, a program of reactor physics measurements was undertaken to verify the reactor physics parameters. Measurements were made under zero power conditions at sufficient temperature plateaus to verify the calculated worths of an individual CRA and/or CRA groups, moderator temperature coefficient, boron worth, and excess reactivity of the core. In addition, the response of the source and intermediate range nuclear instrumentation was verified.

Detailed written procedures specifying the sequence of tests, parameters to be measured, and the conditions under which each test was performed, were followed. These tests involved a series of prescribed control rod assembly configurations and boron concentrations, with intervening measurements of control rod and/or boron worth taken during either boron dilution or boron injection.

14.1.8.2 Power Escalation Test Program

Following determination of the operating characteristics and physics parameters of the reactor at zero power, a detailed power escalation test program was conducted. This program consisted of specified incremental increases in power levels, up to full power, with appropriate testing conducted at each power level. An analysis of the significant parameters at each major plateau was made prior to initiating an additional power escalation. These parameters include:

(A) Unit heat balance test
(B) Reactivity coefficient measurement
(C) Core power distribution measurement
(D) Unit load steady-state test
(E) Unit load rejection test

The adequacy of radiation shielding was verified by gamma and neutron radiation surveys throughout the station.

The sequence of tests, measurements, and intervening operations was prescribed in the power escalation procedures, together with specific details on the conduct of the several tests and measurements.

14.1.9 Operating Restrictions

During initial tests and operations, normal station safety procedures and Technical Specifications were followed. In addition, special safety precautions or limitations were included in the test procedures, and operating limitations more restrictive than those in the Technical Specifications, were imposed as necessary for safety. The power level trip point of the reactor protection system was initially set at a low value and raised as the power escalation program progressed.

TABLE 14.1-1

Prior to Initial Fuel Loading Testing Index

TABLE 14.1-1 (Continued)

Prior to Initial Fuel Loading Testing Index

TABLE 14.1-1 (Continued)

Prior to Initial Fuel Loading Testing Index

TABLE 14.1-1 (Continued)

Prior to Initial Fuel Loading Testing Index

TABLE 14.1-1 (Continued)

Prior to Initial Fuel Loading Testing Index

(1) Listed in Table 14.1-2 also.

(2) Listed in Table 14.1-3 also.

TABLE 14.1-2

Post Initial Fuel Loading – Precritical Testing Index

Test Title	Test Code Number	Abstract Page Number
REACTOR COOLANT SYSTEM HOT LEAKAGE TEST[1]	(600-10)	14.4-88
REACTOR COOLANT FLOW TEST[1]	(200-11)	14.4-35
INCORE INSTRUMENTATION ELECTRICAL TEST	(302-02)	14.4-99
REACTOR COOLANT SYSTEM CHEMISTRY TEST[1] [2]	(500-01)	14.4-81
INITIAL RADIOCHEMISTRY TEST[1] [2]	(500-03)	14.4-82
PRESSURIZER OPERATIONAL & SPRAY FLOW TEST[1]	(600-13)	14.4-90
CONTROL ROD DRIVE SYSTEM OPERATIONAL TEST[1]	(600-17)	14.4-94

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(1) Listed in Table 14.1-1.
(2) Listed in Table 14.1-3.

TABLE 14.1-3

Post-Criticality Testing Index

TABLE 14.1-3 (Continued)

Post-Criticality Testing Index

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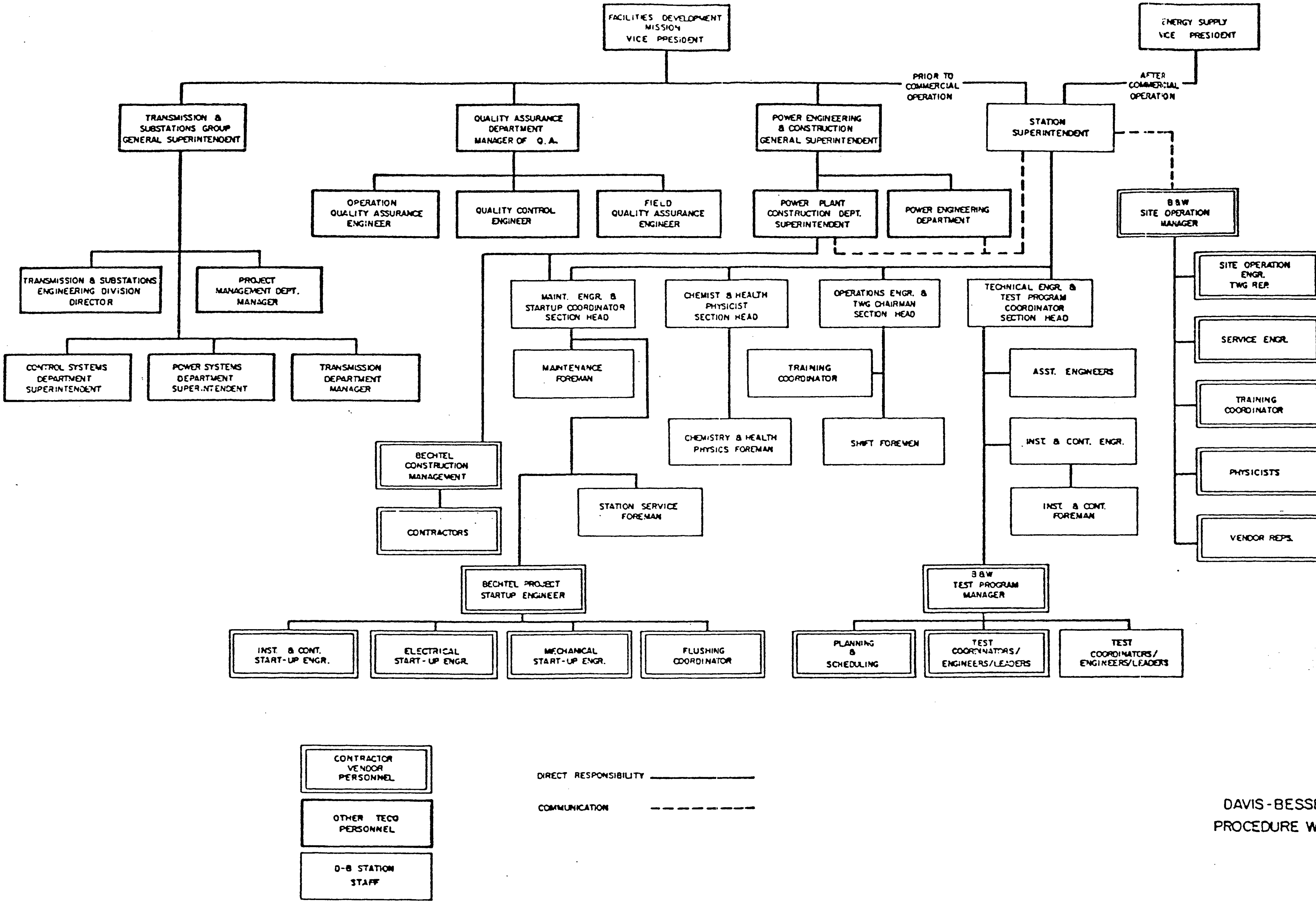
(1) Listed in Tables 14.1-1 & 14.1-2, also.



DAVIS-BESSE NUCLEAR POWER STATION
PROCEDURE WRITING, TESTING & START-UP ORGANIZATION
FIGURE FIGURE 14.1-1

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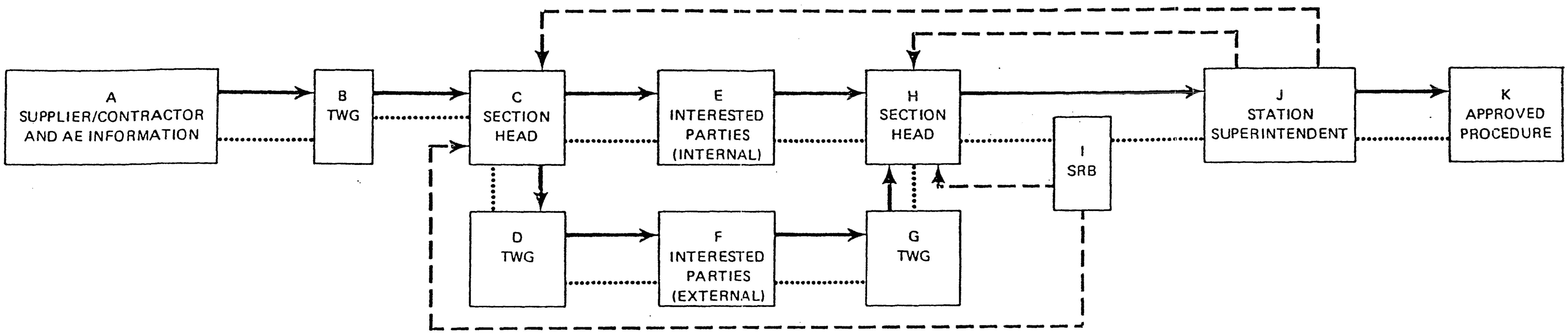
PROCEDURE PREPARATION FLOW CHART



A-B Test specifications, functional descriptions and draft procedures submitted to TWG
B-C TWG distributes information to responsible section heads for preparation of procedures
C-D Completed procedures are presented to TWG for excompany distribution
C-E Responsible section head distributes completed procedure for comments/acceptance to intra-company interested parties
D-F TWG distribute completed procedures for comments/acceptance to ex-company interested parties
F-G Ex-company interested parties return procedures with comments/acceptance to TWG
E-H Intra-company interested parties return procedures with comments/acceptance to section head
H-I Responsible section head submits nuclear safety related procedures to SRB for final action
H-J Responsible section head submits non-nuclear safety related procedures to Station Superintendent for approval
I-J SRB recommends nuclear safety related procedures to the Station Superintendent for approval
J-K Station Superintendent approves procedures
J-H Feedback for minor revision
J-C Feedback for major revision
I-H Feedback for minor revision
I-C Feedback for major revision

.... NUCLEAR SAFETY RELATED PROCEDURES
———— NONNUCLEAR SAFETY RELATED PROCEDURES
— — — — FEEDBACK

DAVIS-BESSE NUCLEAR POWER STATION
PROCEDURE DEVELOPMENT AND APPROVAL
FIGURE FIGURE 14.1-2

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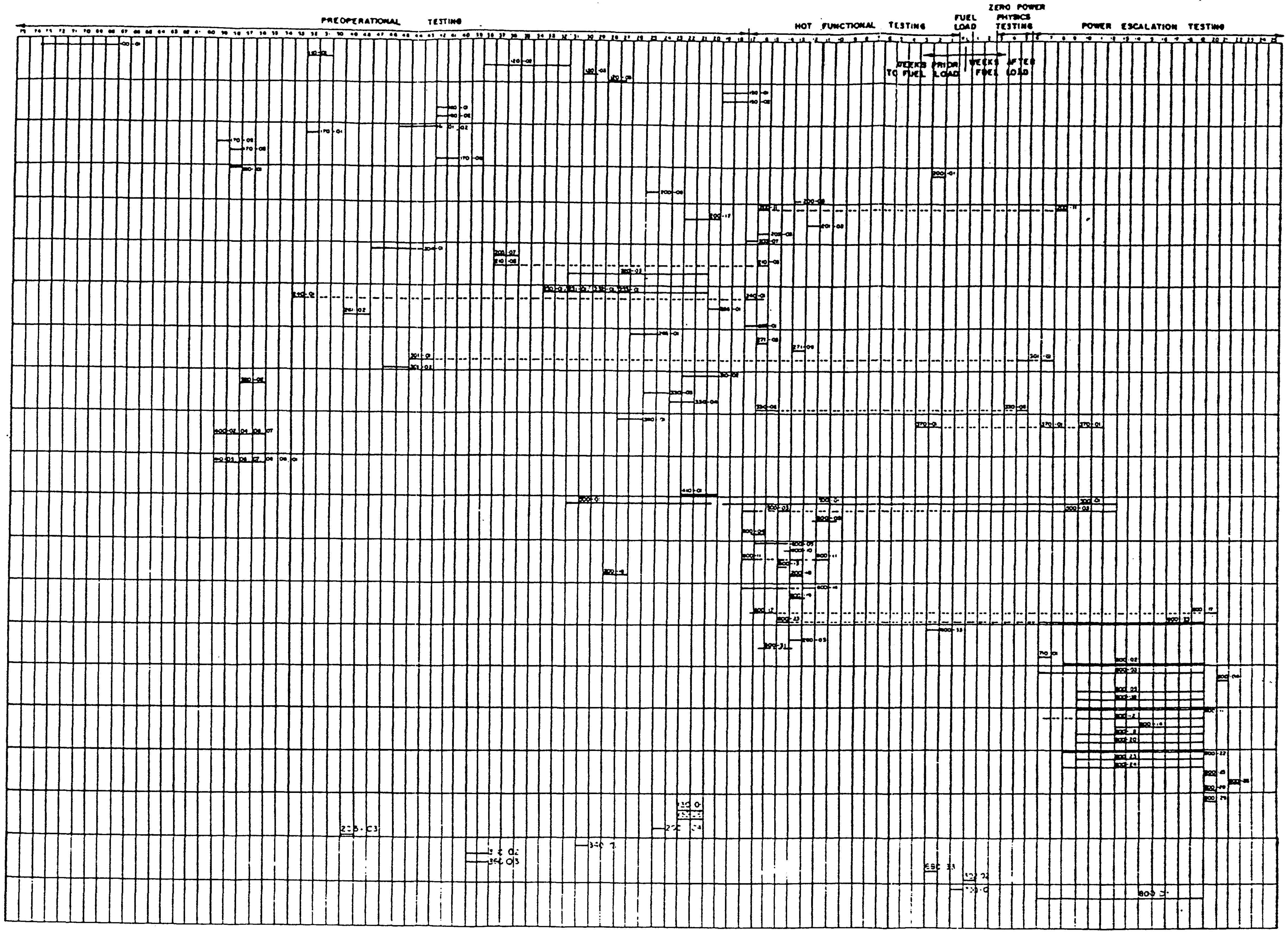
TEST TITLE	TEST CODE NUMBER
STATION COMMUNICATIONS SYSTEM TEST	(100-01)
EMERGENCY VENTILATION SYSTEM TEST	(110-01)
...Y FUEL HANDLING TEST	(120-02)
...EL HANDLING SYSTEM INTEGRATED TEST	(120-03)
...OR VESSEL HEAD AND INTERNALS HANDLING TEST	(130-05)
...MENT VESSEL STRUCTURAL INTEGRITY TEST	(150-01)
...MENT VESSEL INTEGRATED LEAK RATE TEST	(150-02)
C...MENT AIR COOLING SYSTEM TEST	(160-01)
CONTAINMENT PURGE SYSTEM TEST	(160-02)
CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM	(161-01 & 02)
AUXILIARY BUILDING RADWASTE AREA VENTILATION SYSTEM TEST	(170-01)
AUXILIARY BUILDING NON-RADIOACTIVE AREA VENTILATION SYSTEM TEST	(170-02)
CONTROL ROOM HEATING VENTILATION AND AIR CONDITIONING SYSTEM TEST	(170-05)
ABSOLUTE AND CHARCOAL FILTER TESTS	(170-06)
FIRE PROTECTION SYSTEM TEST	(180-01)
REACTOR INTERNALS VENT VALVE INSPECTION TEST	(200-01)
REACTOR COOLANT PUMP INITIAL OPERATION TEST	(200-06)
PRESSURIZER RELIEF VALVE TEST	(200-08)
REACTOR COOLANT PUMP FLOW TEST	(200-11)
REACTOR COOLANT SYSTEM PRESSURE BOUNDARY BASELINE INSPECTION	(200-17)
CORE FLOODING SYSTEM TEST	(301-03)
DECAY HEAT REMOVAL SYSTEM TEST	(303-03)
LOW PRESSURE INJECTION SYSTEM ENGINEERED SAFETY FEATURES TEST	(203-07)
CONTAINMENT SPRAY SYSTEM TEST	(204-01)
HIGH PRESSURE INJECTION SYSTEM ENGINEERED SAFETY FEATURES	(305-07)
CHEMICAL SAMPLING TECHNIQUES TEST	(210-05)
SPENT FUEL POOL COOLING SYSTEM TEST	(230-03)
RADIOACTIVE WASTE SYSTEMS TEST	(230-01)/(231-01) (232-01)/(233-01)
COMPONENT COOLING SYSTEM TEST	(240-01)
STATION RESPONSE TO LOSS OF INSTRUMENT AIR TEST	(256-01)
FREEZE PROTECTION SYSTEM	(261-02)
SERVICE WATER SYSTEM TEST	(263-01)
CONDENSER CIRCULATING WATER SYSTEM TEST	(265-01)
STEAM GENERATOR SAFETY VALVES TEST	(271-05)
MAIN STEAM ISOLATION VALVES	(271-09)
NUCLEAR INSTRUMENTATION CALIBRATION AND FUNCTIONAL TEST	(301-01)
NUCLEAR INSTRUMENTATION DETECTOR CABLING TEST	(301-02)
SAFETY FEATURES ACTUATION SYSTEM TEST	(310-02)
INTEGRATED CONTROL SYSTEM OPEN LOOP TEST	(320-02)
CONTROL ROD DRIVE MECHANISM FUNCTION TEST	(330-03)
CONTROL ROD DRIVE SYSTEM INTEGRATED TEST	(330-04)
CONTROL ROD DRIVE TRIP TEST	(330-05)
PROCESS AND AREA RADIATION MONITORING SYSTEM TEST	(360-01)
ENVIRONMENTAL RADIATION MONITORING SYSTEM TEST	(370-01)
NON-ESSENTIAL AC BUSES TESTS	(400-02, 04, 06, 07)
4160 VOLT ESSENTIAL AND NON-ESSENTIAL SYSTEM TEST	(401-05)
ESSENTIAL 480 VOLT UNIT SUBSTATIONS PREOPERATIONAL TEST	(401-06)
ESSENTIAL 480 VOLT MOTOR CONTROL CENTER PREOPERATIONAL TEST	(401-07)
250 125 VOLT DC SYSTEM PREOPERATIONAL TEST	(401-08)
345 KV SWITCHYARD 125 VOLT DC SYSTEM PREOPERATIONAL TEST	(401-01)
INSTRUMENT AC SYSTEM PREOPERATIONAL TEST	(401-09)
EMERGENCY DIESEL GENERATORS TEST	(410-01)
REACTOR COOLANT SYSTEM CHEMISTRY TEST	(500-01)
INITIAL RADIOCHEMISTRY TEST	(500-03)
SOLUBLE POISON CONCENTRATION CONTROL TEST	(600-03)
... AND PURIFICATION SYSTEM TEST	(600-04)
...ADDITION SYSTEM TEST	(600-05)
...COOLANT SYSTEM HOT LEAKAGE TEST	(600-10)
AUXILIARY FEEDWATER SYSTEM & STEAM GENERATOR LEVEL CONTROL TEST	(600-11)
PRESSURIZER OPERATIONAL & SPRAY FLOW TEST	(600-13)
QUENCH TANK ACCEPTANCE TEST	(200-18)
REACTOR COOLANT SYSTEM EXPANSION & RESTRAINT TESTS	(600-14)
POWER CONVERSION SYSTEM EXPANSION & RESTRAINT TESTS	(600-19)
CONTROL ROD DRIVE SYSTEM OPERATIONAL TEST	(600-17)
REACTOR PROTECTION SYSTEM TEST	(600-23)
REACTOR VESSEL INTERNALS INSPECTION TEST	(600-13)
TURBINE CONTROL VALVES SYSTEM TEST	(280-03)
MAIN STEAM ATMOSPHERIC VENT & TURBINE BYPASS SYSTEM TEST	(600-31)
ZERO POWER PHYSICS TEST	(710-01)
NUCLEAR INSTRUMENTATION CALIBRATION AT POWER	(800-02)
SITE & STATION RADIATION SURVEY	(800-03)
REACTOR COOLANT SYSTEM NATURAL CIRCULATION TEST	(800-04)
REACTIVITY COEFFICIENTS AT POWER TESTS	(800-05)
INTEGRATED CONTROL SYSTEM TUNING AT POWER	(800-08)
CORE POWER DISTRIBUTION TEST	(800-11)
UNIT LOAD STEADY-STATE TEST	(800-12)
TURBINE REACTOR TRIP TEST	(800-14)
POWER IMBALANCE DETECTOR CORRELATION TEST	(800-18)
CONTROL ROD REACTIVITY WORTH MEASUREMENT	(800-20)
NUCLEAR STEAM SUPPLY SYSTEM HEAT BALANCE	(800-22)
UNIT LOAD TRANSIENT TEST	(800-23)
INCORE DETECTOR TEST	(800-24)
SHUTDOWN FROM OUTSIDE CONTROL ROOM TEST	(800-25)
LOSS OF EXTERNAL LOAD INCLUDING OFF SITE POWER TEST	(800-36)
PSEUDO CONTROL ROD EJECTION TEST	(800-28)
DROPPED CONTROL ROD TEST	(800-29)
REACTOR SERVICE CRANE TEST	(130-01)
POLAR CRANE TEST	(130-06)
REACTOR COOLANT SYSTEM HYDROSTATIC TEST	(200-04)
HIGH PRESSURE INJECTION SYSTEM TEST	(305-03)
SEISMOGRAPHIC MONITORING SYSTEM TEST	(340-01)
PERSONNEL MONITORING & SURVEY EQUIPMENT TEST	(360-02)
LABORATORY EQUIPMENT OPERATING TEST	(360-03)
REACTOR INTERNALS INSPECTION TEST	(600-33)
INCORE INSTRUMENTATION ELECTRICAL TEST	(302-02)
AUXILIARY NEUTRON MONITORS SETUP AND SOURCE RESPONSE TEST	(700-01)
SHIELD SURVEY	(800-01)



DAVIS-BESSE NUCLEAR POWER STATION
TESTING SCHEDULE
FIGURE 14.1-3

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14.2 STAFF AUGMENTATION FOR INITIAL TESTS AND OPERATIONS

Assistance in various phases of testing was provided as required to the Davis-Besse Station Staff in the form of additional personnel from B&W, Bechtel, and other Toledo Edison areas. A diagram of the startup organization showing lines of communication and authority is given in Figure 14.1-1. The Toledo Edison Startup Coordinator was the key interface between B&W, Bechtel, and the Davis-Besse Station Staff.

The B&W site operations organization for the station test and startup program worked in the specific areas of preparation of procedures, testing, startup, operations, maintenance, fueling, field analysis, and reports. The Station Test Program obtained technical support from B&W engineers in Lynchburg, Virginia. This support included technical analysis of the results of certain tests.

Bechtel personnel worked in the specific areas of preparation of procedures, startup, testing calibration, etc. When necessary, they provided additional manpower to supplement Toledo Edison Operations, Maintenance, and I&C personnel.

Personnel from the Power Engineering and Construction Group, Transmissions and Substations Group, and other divisions of Toledo Edison and Bechtel, furnished technical support when requested in specific areas. This support was principally applied to the writing of procedures, the evaluation of test procedures prior to approval, the analysis of test results, and the development of modifications to the equipment and systems as initiated by the Davis-Besse Station Test Program.

Testing associated with the physics and thermal-hydraulics aspects of the reactor operation, was the responsibility of the Technical Section, with assistance as needed from B&W Site Operations, B&W physics, thermal, and hydraulics engineers in Lynchburg, Virginia, and Toledo Edison Power Engineering Department nuclear engineers.

14.3 QUALIFICATIONS AND TRAINING OF TEST PERSONNEL

a. Test Coordinator - The qualifications of the Test Coordinators, who were assigned to shift work during the most active portions of the Test Program, are specified in Appendix 13A of the FSAR. In addition, they participated in test procedure preparation and, in some instances, functioned as Test Leaders. They were given off-site training to participate in major events related to nuclear power plant startup, such as HFT, ZPPT, and initial power escalation on plants similar to Davis-Besse, and participated in PWR Technology courses. Specific qualifications and training of the Test Coordinators are included in the Station Training Files.

b. Test Leaders - The Test Leaders received on-the-job training during the preparation of test procedures, system walkdowns and Startup System Interim Release Package reviews, prior to testing. The Test Leaders had either offsite nuclear power plant startup experience or participation in PWR Technology courses. Specific qualifications and training of Test Leaders are included in Appendix 13A of the FSAR and in the Station Training Files.

   B&W personnel utilized as Test Leaders, had nuclear power plant design or startup experience on similar nuclear plants. Their qualifications are included on Experience and Qualification forms in the Station Files.

c. Additional Personnel - During the conduct of tests, additional Toledo Edison personnel from Operations, Technical Section, Chemistry and Health Physics, Maintenance, and Corporate Technical Staff, were utilized to assist the Test Leaders in data acquisition and were trained and qualified in accordance with Chapter 13 of FSAR. Participation in test preparation activities and training in the use of special data acquisition test equipment was provided, as required, prior to the conduct of tests.

d. Administrative Training - All of the above test personnel were trained on Davis-Besse Administrative Procedures used during the conduct of Preoperational and Startup Tests. This training included personnel responsibilities, authority and quality assurance documentation associated with the test program in accordance with Chapter 17 of the FSAR.

Personnel assigned to writing test and operating procedures, served as Test Coordinators during the testing program. They were assigned to specific Station Sections depending upon the work in progress.

The Test Coordinators were each assigned the responsibility to coordinate the preparation, and to conduct and evaluate the specific tests in the startup program. The operating shift personnel conducted the test with assistance and technical guidance provided by the assigned Test Coordinator.

The qualifications of personnel in the key augmenting positions are given in the FSAR.

14.4 TESTS ABSTRACTS

ABSTRACT OF

STATION COMMUNICATIONS SYSTEM TEST (100-01)

1.0 Purpose

1.1 Demonstrate the capability of the station communications system for paging, alarm signaling and normal station communications.

2.0 Prerequisites

2.1 Required 120V AC power available to the communications system.

2.2 Ensure that all system components have been checked for proper operation, prior to and after their installation.

3.0 Test Method

3.1 Test the portable stations, handset stations and jack stations, for proper operation in all modes.

3.2 Test the operation of all isolation and merge-isolation devices.

3.3 Test the operation of all alarms.

4.0 Acceptance Criteria

4.1 Handset stations function to permit broadcasting over the station paging system and to conduct non-broadcast conversation with other stations selected on the same channel.

4.2 Jack stations function to permit plugging in a portable station for use on the station maintenance circuit or the switchyard circuit.

4.3 Portable stations function to permit their operation for maintenance and switchyard communications.

4.4 Isolation devices and merge-isolation devices function according to system design requirements.

4.5 All alarms function according to system design requirements.

4.6 The evacuation broadcast signal can be heard from any location in the station.

4.7 The orientation of all loud speakers and the adjustment of all volume, gain and attenuation controls establish proper operating levels for all equipment.

ABSTRACT OF

EMERGENCY VENTILATION SYSTEM TEST (110-01)

1.0 Purpose

1.1 Demonstrate the ability of the emergency ventilation system to minimize airborne activity levels resulting from all sources of Containment Vessel leakage, by providing a negative pressure within the Shield Building and penetration rooms, when initiated by an SFAS signal.

2.0 Prerequisites

2.1 Required electrical systems are available.

2.2 Instrument air system functional.

2.3 Absolute and charcoal filters are not installed when fans are being operated.

2.4 Dampers, fans, and containment isolation system functional.

2.5 All related instrumentation calibrated.

2.6 Radiation monitoring system available.

2.7 Station vent available.

3.0 Test Method

3.1 Line up system for operation.

3.2 Verify interlocks and correct actuation of system fans and motor operated dampers.

3.3 Simulate SFAS signals and verify operation of fans and dampers.

3.4 Verify each fan's capacity, and determine pressure during single fan operation.

3.5 Verify dual fan capacity and determine pressure in this mode.

3.6 Verify that the differential pressure controllers maintain the setpoint negative pressure within the Shield Building and penetration rooms.

4.0 Acceptance Criteria

4.1 Alarms and interlocks function properly.

4.2 The system performance meets design requirements as described in Chapters 6 and 7 of the FSAR.

4.3 Upon initiation of an SFAS signal, both fan-filter assemblies are started.

ABSTRACT OF

DRY FUEL HANDLING TEST (120-02)

1.0 Purpose

1.1 Verify proper operation of all fuel handling and fuel transfer equipment.

1.2 Demonstrate the index repeatability of fuel grapple tubes on all bridges for representative core, storage rack, and transfer basket positions.

2.0 Prerequisites

2.1 Fuel handling equipment, transfer equipment, and transfer tubes operational.

2.2 Dummy fuel assembly and dummy rod assembly available.

2.3 Fuel transfer canal and spent fuel pool dry.

3.0 Test Method

3.1 Deposit dummy fuel assembly in storage positions representative of each axis.

3.2 Perform control rod and orifice rod handling in storage racks.

3.3 Transfer dummy fuel assembly from storage rack to Containment Vessel.

3.4 Position dummy fuel assembly in core positions representative of each axis.

3.5 Perform control rod and orifice rod handling in Containment Vessel.

3.6 Install dummy fuel assembly in failed fuel container and transfer assembly container from Containment Vessel to spent fuel pool area.

4.0 Acceptance Criteria

4.1 Index repeatability is proven; all fuel handling and transfer equipment performs with no unresolved operating problems.

4.2 Fuel handling system procedures are verified.

ABSTRACT OF

FUEL HANDLING SYSTEM INTEGRATED TEST (120-03)

1.0 Purpose

1.1 Verify proper operation of all fuel handling and fuel transfer equipment.

1.2 Demonstrate the index repeatability of fuel grapple tubes on all bridges for representative core, storage rack and transfer basket positions.

2.0 Prerequisites

2.1 Fuel handling equipment, transfer equipment, and transfer tubes operational.

2.2 Dummy fuel assembly and dummy rod assembly available.

2.3 Fuel transfer canal and spent fuel pool filled with water.

3.0 Test Methods

3.1 Deposit dummy fuel assembly in storage positions representative of each axis.

3.2 Perform control rod and orifice rod handling in storage racks.

3.3 Transfer dummy fuel assembly from storage rack to Containment Vessel.

3.4 Position dummy fuel assembly in core positions representative of each axis.

3.5 Perform control rod and orifice rod handling in Containment Vessel.

3.6 Install dummy fuel assembly in failed fuel container and transfer assembly and container from Containment Vessel to spent fuel pool.

4.0 Acceptance Criteria

4.1 Index repeatability is proven; all fuel handling and transfer equipment performs with no unresolved operating problems.

4.2 Fuel handling system procedures are verified.

ABSTRACT OF

REACTOR VESSEL HEAD AND INTERNALS HANDLING TEST (120-05)

1.0 Purpose

1.1 Verify that the reactor vessel head and internals can be removed, installed, and stored, using the available fixtures and lifting rigs.

1.2 Verify the procedures used for head and internals handling.

2.0 Prerequisites

2.1 Containment Vessel polar crane operational.

2.2. Reactor vessel head and internals storage facilities functional.

2.3 Reactor vessel head and internals ready to be installed or removed from the reactor vessel.

3.0 Test Method

3.1 Install reactor vessel internals, plenum assembly, and head in accordance with the applicable procedures.

3.2 Adjust fixtures and lifting rigs as necessary.

3.3 Remove reactor vessel head and internals in accordance with the applicable procedures.

3.4 Verify level lifting, pendant adjustment, clearances, and adequately sensitive control.

4.0 Acceptance Criteria

4.1 Reactor vessel head and internals installed, removed, and stored, and fixtures adjusted.

4.2 Procedures for reactor vessel head and internals handling verified.

ABSTRACT OF

REACTOR SERVICE CRANE ACCEPTANCE TEST (130-01)

1.0 Purpose

1.1 Assure the operational capabilities of the crane.

2.0 Prerequisites

2.1 Prior to applying any electric power to the crane, a thorough inspection of all moving parts is made to see that they are free and that all shipping blocks are removed.

2.2 Interlocks and safety devices must be tested and adjusted.

2.3 Rails are checked for alignment and level.

2.4 Electrical connections are visually checked for good contact.

2.5 Power supply is checked for correct voltage and phase.

2.6 Brake settings are in conformance with manufacturer's recommendations.

2.7 Inspect all lubrication points and check all oil levels.

2.8 The 125% of rated capacity construction load test has been completed.

3.0 Test Method

3.1 A no-load operational test is performed. Controls and limits are demonstrated.

3.2 Bridge, trolley, and hoist movements are demonstrated.

4.0 Acceptance Criteria

4.1 Each movement of the crane (trolley, bridge, brakes, hoists, and movements of pendant stations) is smooth, and all components with multispeed controls accelerate smoothly.

4.2 The length of the hoisting rope must be sufficient to assure that at least two full turns remain on the hoisting drum when the hook is extended.

4.3 Hoist brakes allow quick application and release for jogging and must automatically be applied when electric power is interrupted.

ABSTRACT OF

POLAR CRANE ACCEPTANCE TEST (130-06)

1.0 Purpose

1.1 Assure structural and operational capabilities of the crane up to 125% of rated capacity of the main and auxiliary hoists.

2.0 Prerequisites

2.1 Prior to applying any electric power to the crane, a thorough inspection of all moving parts is made to see that they are free and that all shipping blocks are removed.

2.2 Interlocks and safety devices must be tested and adjusted.

2.3 Rails are checked for alignment and level.

2.4 Electrical connections are visually checked for good contact.

2.5 Power supply is checked for correct voltage and phase.

2.6 Brake settings conform to manufacturer's recommendations.

2.7 Inspect all lubrication points and check oil levels.

3.0 Test Method

3.1 A no-load operational test is performed, after which a full-load test is performed (125% of rated load).

3.2 Bridge, trolley, and hoist movements are demonstrated.

3.3 Girder deflections are measured.

3.4 Track alignment is checked.

3.5 A thorough check is made after completion of the load test to ascertain that no damage to any components resulted and that rail alignment is still within tolerances.

4.0 Acceptance Criteria

4.1 Controls and limits are demonstrated. Each movement of the crane (trolley, bridge, brakes, hoists, motorized hook, and movements of pendant stations) is smooth and all components with multispeed controls accelerate smoothly.

4.2 The length of the hoisting rope must be sufficient to assure that at least two full turns remain on the hoisting drum when the hook is extended.

4.3 Hoist brakes allow quick application and release for jogging, and must automatically be applied when electric power is interrupted.

4.4 The deflection of runway girders and supporting column alignments must be within tolerances.

ABSTRACT OF

CONTAINMENT VESSEL STRUCTURAL INTEGRITY TEST (150-01)

1.0 Purpose

1.1 Verify the structural integrity of the Containment Vessel.

2.0 Prerequisites

2.1 All penetrations complete.

2.2 Low pressure soap bubble inspection test completed.

2.3 Containment air recirculation cooler system functional.

2.4 Pressurization air supply system available.

2.5 All local leak rate testing complete.

3.0 Test Method

3.1 Close all penetrations, isolation valves and hatches for pressurizing Containment Vessel.

3.2 Pressurize Containment Vessel with filtered, dry, oil-free air at specified rate to overpressure and design test levels and hold for specified periods.

4.0 Acceptance Criteria

4.1 Structural integrity meets design requirements as described in Chapter 6.

ABSTRACT OF

CONTAINMENT VESSEL INTEGRATED LEAK RATE TEST (150-02)

1.0 Purpose

1.1 Leak test each containment penetration and seal at calculated peak accident pressure or above.

1.2 Measure integrated containment leakage rate at calculated peak accident pressure.

2.0 Prerequisites

2.1 Penetrations are installed.

2.2 Overpressure structural integrity test completed.

2.3 All local leak tests completed.

2.4 Containment air cooling system functional.

2.5 Pressurization air supply system available.

2.6 Isolation valves installed.

3.0 Test Method

3.1 Penetration and isolation valve local leak tests are accomplished by pressurizing to a specified pressure between the appropriate boundaries, and observing the pressure decay or measured leakage.

3.2 The Containment Vessel leak rate will be determined at calculated peak accident pressure.

3.3 Close all penetrations, locks and hatches for pressurizing Containment Vessel.

3.4 Pressurize Containment Vessel with filtered air to test pressure.

3.5 Calculate leakage by measuring absolute pressure drop.

4.0 Acceptance Criteria

4.1 The leak rates must not exceed allowable limits as stated in Station Technical Specifications.

ABSTRACT OF

CONTAINMENT AIR COOLING SYSTEM TEST (160-01)

1.0 Purpose

1.1 Demonstrate that the containment air cooling system performance is adequate.

1.2 Demonstrate that the containment air cooling system responds properly to an SFAS signal.

2.0 Prerequisites

2.1 Service water system operational.

2.2 Containment air cooler units operational.

2.3 Power available to required equipment.

2.4 Instrument air system operational.

2.5 All related alarms and instrumentation have been calibrated.

2.6 Applicable portions of the SFAS operational.

2.7 Air balancing complete.

3.0 Test Method

3.1 Start and stop the containment air cooling fans in high speed using the control room and local switches.

3.2 Start and stop the containment air cooling fans in low speed using the control room and local switches.

3.3 Verify cooler efficiencies while running at a reduced capacity.

3.4 Simulate SFAS signal to initiate LOCA operating mode.

4.0 Acceptance Criteria

4.1 Fans respond properly to SFAS signal.

4.2 Cooler efficiencies are satisfactory for test conditions.

4.3 Indications and alarms operate as designed.

4.4 Air balancing report verifies fan capacities and static pressures for all fan combinations are within design limitations.

ABSTRACT OF

CONTAINMENT PURGE SYSTEM TEST (160-02)

1.0 Purpose

1.1 Demonstrate the capability of the containment purge system to ventilate the containment and penetration rooms, and to respond to SFAS signals.

1.2 Demonstrate the ability to operate the containment purge system through the emergency ventilation filter units.

2.0 Prerequisites

2.1 Instrument air system functional.

2.2 All required instrumentation calibrated.

2.3 Dampers, louvers, fans and SFAS system functional.

2.4 Absolute filters are not installed when the purge exhaust fan is tested.

2.5 Containment purge supply filters are operational when the purge supply fan is tested.

2.6 Emergency ventilation system filter units and fans are operational.

3.0 Test Method

3.1 Initiate normal containment purge.

3.2 Purge the containment and penetration rooms through the emergency ventilation system filters.

3.3 Simulate SFAS signal to initiate isolation requirements.

4.0 Acceptance Criteria

4.1 The purge supply and exhaust fans provide adequate ventilation as described in FSAR Chapter 6.

4.2 Capability to purge the Containment Vessel and penetration rooms through the emergency ventilation system is demonstrated.

4.3 Upon initiation of a SFAS signal, the purge supply and exhaust fans stop and the purge isolation valves close.

4.4 Containment purge procedures verified.

ABSTRACT OF

CONTAINMENT RECIRCULATION SYSTEM TEST (161-01)

1.0 Purpose

1.1 To demonstrate the capability of the containment recirculation system and its components, to draw air from the Containment Vessel dome and disperse it to the lower portions of the containment.

2.0 Prerequisites

2.1 System louvers, dampers, and fans are operational.

2.2 All required instrumentation calibrated.

3.0 Test Method

3.1 Test containment recirculation fans for static head and flow during normal operation.

3.2 Confirm air distribution by measuring the flow at each outlet.

4.0 Acceptance Criteria

4.1 The fans are capable of providing adequate air flow as described in FSAR Chapter 6.

ABSTRACT OF

CONTAINMENT ATMOSPHERE DILUTION SYSTEM TEST (161-02)

1.0 Purpose

1.1 Demonstrate the capability of the containment atmosphere (hydrogen) dilution system and the hydrogen purge system components to respond to SFAS signals.

1.2 Demonstrate the ability to operate the containment atmosphere dilution system to add air to the Containment Vessel at design or greater capacity.

1.3 Demonstrate the ability of the hydrogen purge system, to exhaust air from the Containment Vessel through the hydrogen purge filter unit to the station vent.

2.0 Prerequisites

2.1 Instrument air system operational.

2.2 All required instrumentation calibrated.

2.3 Dampers, louvers, fans, and SFAS system operational.

2.4 Absolute and charcoal filters not installed when the flow path is verified.

2.5 Station computer operational.

2.6 Service water system operational.

3.0 Test Method

3.1 Test containment atmosphere dilution fans for static pressure and flow during normal operation.

3.2 Test the ability of hydrogen purge system to handle design flow during normal operation without exceeding maximum pressure drops on the filters.

3.3 Simulate SFAS signal to initiate isolation requirements.

4.0 Acceptance Criteria

4.1 The containment atmosphere dilution fans provide adequate flow as described in FSAR Chapter 6.

4.2 Capability to purge the Containment Vessel using the combustible gas control system is demonstrated.

4.3 Upon initiation of an SFAS signal, the dilution and purge isolation valves close.

ABSTRACT OF

AUXILIARY BUILDING RADWASTE AREA VENTILATION SYSTEM TEST (170-01)

1.0 Purpose

1.1 Demonstrate that the Auxiliary Building radwaste area ventilation systems are capable of providing adequate ventilation and controlling airborne activity during all modes of operation.

2.0 Prerequisites

2.1 Instrument air system functional.

2.2 System dampers, louvers, and fans are functional.

2.3 Emergency Ventilation System functional.

2.4 Absolute and roughing filters are not to be installed when initially operating the exhaust fans.

2.5 Main station exhaust system functional.

3.0 Test Method

3.1 Test the radwaste area supply fan during normal operating conditions for total capacity, static pressure and correct position of the associated dampers.

3.2 Test each of the two radwaste area exhaust fans independently for capacity and static pressure. Verify that the associated dampers are correctly positioned to prevent backflow through the idle fan.

3.3 Test the fuel handling area supply fan during normal operating conditions for total capacity, static pressure and correct position of the associated dampers.

3.4 Test each of the two fuel handling area exhaust fans independently for capacity and static pressure. Verify that the associated dampers are correctly positioned to prevent backflow through the idle fan.

3.5 Test the cross-connection damper between the Emergency Ventilation System and the fuel handling area system for correct positioning during ventilation of the fuel handling area through the Emergency Ventilation System.

3.6 Test the isolation of the fuel handling area exhaust damper for correct positioning during fuel handling area ventilation through the Emergency Ventilation System.

3.7 Test the lab hood exhaust system for capacity, static pressure, and correct damper positioning.

4.0 Acceptance Criteria

4.1 Appropriate alarms and interlocks function properly.

4.2 Capable of maintaining a negative pressure in the fuel handling area when exhausting through the Emergency Ventilation System.

4.3 All automatic dampers positioned correctly during all modes of system operation.

4.4 The fans are capable of providing adequate flow in all associated spaces as described in FSAR Chapter 9.

ABSTRACT OF

AUXILIARY BUILDING NON-RADIOACTIVE AREA
VENTILATION SYSTEM TEST (170-02)

1.0 Purpose

1.1 Demonstrate the capability of the Auxiliary Building non-radioactive area ventilation system to adequately provide ventilation, and to remove heat load from the electrical switchgear areas.

2.0 Prerequisites

2.1 Instrument air system functional.

2.2 Dampers, louvers, filters, and fans are functional.

3.0 Test Method

3.1 Test the supply and exhaust fans for total capacity and static pressure, during normal operating conditions.

3.2 Check the recirculating, exhaust, and supply modulating dampers for adequate air mixing and temperature control.

4.0 Acceptance Criteria

4.1 Alarms and interlocks function properly.

4.2 Fans capable of providing adequate flow in all associated spaces as described in FSAR Chapter 9.

ABSTRACT OF

CONTROL ROOM HEATING, VENTILATION AND AIR CONDITIONING SYSTEM TEST (170-05)

1.0 Purpose

1.1 Demonstrate that the control room heating, ventilation, and air conditioning system is capable of providing adequate environmental control, during normal and abnormal conditions.

2.0 Prerequisites

2.1 Instrument air system functional.

2.2 Required electrical systems operational.

2.3 Dampers, louvers, fans, and radiation monitoring system are functional.

2.4 Roll-O-Matic filters are installed and controls verified.

2.5 Charcoal and absolute filters are not installed when the control room emergency filter fans are tested.

3.0 Test Method

3.1 Test the actuation of the remote-manual switches for all control room ventilation fans.

3.2 Test the actuation of the remote-manual switches for all control room ventilation dampers.

3.3 Test all return fans, control room air handling fans, and control room filter fans for total capacity and static pressure.

4.0 Acceptance Criteria

4.1 The dampers and fans respond to remote manual signals as designed.

4.2 The system is capable of providing adequate heating, cooling and humidity control to protect critical equipment as described in FSAR Chapter 9.

4.3 Audible and visual alarms function as designed.

4.4 The system must be capable of maintaining the control room at a higher pressure than adjacent portions of the station.

4.5 The system is capable of operation in the recirculation mode as described in FSAR Chapter 7.

ABSTRACT OF

ABSOLUTE AND CHARCOAL FILTER TESTS (170-06)

1.0 Purpose

1.1 Verify leak tightness and particle removal ability of absolute filters.

1.2 Verify leak tightness and absorbancy of charcoal filters.

2.0 Prerequisites

2.1 Ventilation systems associated with filters are operational.

3.0 Test Method

3.1 The absolute (HEPA) filters are tested in accordance with procedure 136-300-175A, "Instruction Manual for the Installation, Operation and Maintenance of Penetrometer Filter Testing, DOP Q107," U.S. Army, Edgewood Arsenal, Md. (January 15, 1965), or equivalent.

3.2 Testing of charcoal filters is done using Freon-112 in accordance with procedure "Standardized Non-destructive Test of Carbon Beds for Reactor Containment Applications" by D. R. Muhlbaier, DP-1082, July 1967, or equivalent.

4.0 Acceptance Criteria

4.1 Absolute filters have an efficiency of $\geq$99.95% for the dioctyl-phthalate (DOP) smoke test.

4.2 Charcoal filters must exhibit a removal efficiency of 99.5% of Freon-112.

Note: Although test results are expressed as % efficiency, all in-place tests are basically leak tests.

ABSTRACT OF

FIRE PROTECTION SYSTEM TEST (180-01)

1.0 Purpose

1.1 Demonstrate the ability of the fire protection system to provide an adequate extinguishing agent and alarm system to prevent the spread of potential station fires.

2.0 Prerequisites

2.1 Make-up water treatment system functional.

2.2 Fuel oil supply system and day tank operable.

3.0 Test Method

3.1 Line up system for normal operation.

3.2 Simulate signals to verify proper operation of pumps and valves.

4.0 Acceptance Criteria

4.1 Alarms and interlocks function properly.

4.2 The system performance meets design requirements as described in FSAR Chapter 9.

ABSTRACT OF

REACTOR INTERNALS VENT VALVE INSPECTION TEST (200-01)

1.0 Purpose

1.1 To demonstrate the use of the internals vent valve exercise tool.

1.2 To obtain baseline data on valve condition, initial opening force and wide open force applied to the internals vent valve.

2.0 Prerequisites

2.1 Reactor vessel internals installed and accessible, head and plenum removed from vessel.

2.2 Core support assembly and internals vent valves installed.

2.3 Fuel handling bridge operable.

3.0 Test Method

Exercise each valve using the exercise tool and measure opening forces.

4.0 Acceptance Criteria

4.1 Valves operate within specified force limits using the exercise tool.

ABSTRACT OF

REACTOR COOLANT PUMP INITIAL OPERATION TEST (200-06)

1.0 Purpose

1.1 Demonstrate that the reactor coolant pumps have been properly installed and operate satisfactorily.

1.2 Monitor the initial phase of pump operation.

2.0 Prerequisites

2.1 Reactor coolant system filled and vented.

2.2 Reactor coolant pumps installed with their power supply, cooling water, and seal injection systems operable.

2.3 Appropriate alarm and interlock functions operable.

3.0 Test Method

3.1 Verify specified alarm and interlock operation.

3.2 Operate each reactor coolant pump taking vibration and temperature data during startup and operation.

4.0 Acceptance Criteria

4.1 Specified pump and motor parameters remain within specified limits during normal operation.

ABSTRACT OF

REACTOR COOLANT SYSTEM HYDROSTATIC TEST (200-04)

1.0 Purpose

1.1 Verify the integrity of the reactor coolant system and the connected design piping and components.

2.0 Prerequisites

2.1 Reactor coolant system and other piping within the RCS pressure boundary, filled and vented.

2.2 At least one reactor coolant pump operable.

2.3 RCS insulation removed from areas to be checked.

2.4 Hydrotest pump connected to RCS.

2.5 Calibrated test pressure gauges installed.

2.6 Makeup and purification system operable.

2.7 Reactor coolant sampling system operable.

2.8 Component cooling system operable.

2.9 Nitrogen available to pressurizer.

2.10 Portions of feed and condensate systems operable.

2.11 Steam generator secondary sampling system operable.

3.0 Test Method

3.1 Heat reactor coolant system above the DTT by the RC pumps. NPSH is provided by adding nitrogen to the pressurizer.

3.2 When test temperature is reached, the nitrogen is vented and the RC system filled solid with water at the same temperature.

3.3 Raise system pressure in 500 psig increments to 2100 psig.

3.4 Inspections are made at each increment.

3.5 Increase pressure to 125 percent of design pressure and hold for 10 minutes.

3.6 Reduce pressure to 2500 psig and make a detailed inspection for leaks.

3.7 After all inspections are made, RC system is depressurized.

3.8 Any leaking gaskets or packings are tightened or replaced.

3.9 Code reliefs are then installed and the system repressurized to operating pressure to test the flanges.

4.0 <u>Acceptance Criteria</u>

4.1 All piping, welds, and vessels exhibit no leakage.

4.2 Valves cycle at design pressure and demonstrate no undue leakage.

4.3 Valves or other locations where packings or gaskets which are found to leak were tightened or replaced and shown not to leak at 2155 psig.

ABSTRACT OF

PRESSURIZER RELIEF VALVE TEST (200-08)

1.0 Purpose

1.1 Verify the lift pressure of the pressurizer code relief valves.

2.0 Prerequisites

2.1 The pressurizer code relief valves are available for bench testing.

3.0 Test Method

3.1 The setpoint of the pressurizer code relief valves are determined by bench testing.

4.0 Acceptance Criteria

4.1 Valves lift at set pressure $\pm$ 1%.

ABSTRACT OF

REACTOR COOLANT FLOW TEST (200-11)

1.0 Purpose

1.1 To measure reactor coolant flow and flow coastdown characteristics for selected pump combinations, under cold and hot conditions, with and without the core installed.

1.2 To compare measured reactor coolant flow with design calculations and to verify adequate core flow.

2.0 Prerequisites

2.1 Reactor coolant system pressure and temperature maintained within DTT and pump NPSH limits for cold condition testing.

2.2 Reactor coolant system pressure and temperature maintained at approximately 525°F and 2155 psig for hot condition testing.

3.0 Test Method

3.1 Predetermined pump combinations are used to obtain data and verify the design predictions.

3.2 Trips of predetermined pump combinations will define reactor coolant flow coastdown characteristics.

4.0 Acceptance Criteria

4.1 Core flow must meet minimum allowable values for each pump combination.

4.2 Core flow during each coastdown must meet the minimum allowable flow calculated to prevent DNB.

ABSTRACT OF

REACTOR COOLANT FLOW COASTDOWN TEST (200-12)

1.0 Purpose

1.1 Determine reactor coolant flow decay versus time for various (worst case) reactor coolant pump trip combinations and compare flow coastdown with the minimum design flow coastdown.

2.0 Prerequisites

2.1 Applicable portions of the reactor coolant pump flow test completed.

2.2 Reactor coolant system temperature and pressure maintained at approximately 535°F and 2155 psig.

3.0 Test Method

3.1 Test cases are run to define the reactor coolant flow coastdown characteristics for various pump combinations. The results of the "Reactor Coolant Pump Flow Test" are used to determine which pump combinations are run.

3.2 For each pump combination selected, trip pumps and measure flow versus time.

4.0 Acceptance Criteria

4.1 Reactor coolant flow during each coastdown case is equal to, or greater than, the calculated minimum allowable flow.

ABSTRACT OF

REACTOR COOLANT SYSTEM PRESSURE BOUNDARY BASELINE INSPECTION (200-17)

1.0 Purpose

1.1 Establish as-installed reactor coolant system pressure boundary baseline data for use during subsequent inservice inspections, as required by Station Technical Specifications.

2.0 Prerequisites

2.1 Reactor coolant system components fabricated and/or installed and ready for testing.

3.0 Test Method

3.1 Non-destructive tests to be performed on reactor coolant system components which are subject to future inservice inspections as defined in the Technical Specifications.

3.2 Where practical, inspection techniques representative of those anticipated to be used in subsequent inservice inspections are to be employed.

3.3 Shop examination records of components are used as the baseline where such examinations are conducted under conditions and with techniques equivalent to those anticipated in subsequent inservice inspections.

4.0 Acceptance Criteria

4.1 Reactor coolant system pressure boundary baseline non-destructive test results meet applicable code requirements.

4.2 Records of the baseline inspection are useable for comparison with results of subsequent inservice inspections.

ABSTRACT OF

CORE FLOODING SYSTEM TEST (201-03)

1.0 Purpose

1.1 Verify the core flooding system discharge capability.

2.0 Prerequisites

2.1 Core flooding system operable.

2.2 Core flooding tanks filled and pressurized with nitrogen.

2.3 Reactor coolant system filled with indicated level in pressurizer.

2.4 Core not installed in reactor vessel.

3.0 Test Method

3.1 Core flooding stop valves are opened and pressurizer vented to containment vent header.

3.2 Core flooding tank levels are monitored.

4.0 Acceptance Criteria

4.1 Core flooding valves open and core flooding tanks discharge into the reactor coolant system.

ABSTRACT OF

DECAY HEAT REMOVAL SYSTEM TEST (203-03)

1.0 Purpose

1.1 Functionally check the components of the decay heat removal system.

1.2 Test the operability of the decay heat removal system in the following modes:

1.2.1 Decay heat removal during reactor coolant cooldown

1.2.2 Reactor coolant system fluid purification

1.2.3 Decay heat removal during reactor coolant component repair

1.2.4 Decay heat removal during refueling

1.2.5 Fuel transfer canal filling and draining

2.0 Prerequisites

2.1 Demineralized water system operable.

2.2 Reactor coolant system clean, filled, and at elevated pressure and temperature.

2.3 Decay heat system flushed, certified clean, filled and vented.

3.0 Test Method

3.1 The decay heat system functional test procedure is broken down into a series of tests. All tests utilize the operating procedure and valve lineup for verification of the different modes of operation.

4.0 Acceptance Criteria

4.1 Performance in each of the operating modes when system is lined up per system operating procedure meets decay heat removal requirements.

4.2 The operating procedure for the system is verified.

ABSTRACT OF

LOW PRESSURE INJECTION SYSTEM ENGINEERED SAFETY FEATURES TEST (203-07)

1.0 Purpose

1.1 Demonstrate the emergency low pressure injection flow capability to the reactor coolant system from the decay heat removal system, and verify that the operating times of engineered safety features components are within USAR limits.

2.0 Prerequisites

2.1 Low-pressure injection system and borated water storage tank operable.

2.2 Core not installed in reactor vessel, but reactor vessel internals may be installed. Vessel closure head installed.

2.3 Reactor coolant pumps not running and reactor coolant system pressure approximately 50 psig.

2.4 Pressurizer at predetermined level, and heaters de-energized.

3.0 Test Method

3.1 Open motor control breakers engineered safety features pumps and valves not under test (all systems), except those required for normal operation.

3.2 Simulate an SFAS signal for low-pressure injection.

3.3 Repeat for second pump system.

4.0 Acceptance Criteria

4.1 Low-pressure injection components function properly.

4.2 Low-pressure injection flow capability meets or exceeds the values used in the safety analysis as specified in Chapter 6.

4.3 Operating times of engineered safety features components are within the values given in FSAR Chapter 6.

ABSTRACT OF

CONTAINMENT SPRAY SYSTEM TEST (204-01)

1.0 Purpose

1.1 Demonstrate the capability of the containment spray system to provide sufficient flow and to respond to a SFAS signal as designed.

1.2 Demonstrate that the spray nozzles are open.

2.0 Prerequisites

2.1 Decay heat removal suction header operational.

2.2 Borated water storage tank available.

2.3 Service air system available.

2.4 Required electrical systems operational.

3.0 Test Method

3.1 Line up system to recirculate to borated water storage tank.

3.2 Initiate a SFAS signal.

3.3 Force air or smoke through each spray header to check flow.

4.0 Acceptance Criteria

4.1 System responds properly to SFAS signal.

4.2 Each containment spray pump performs in accordance with design.

4.3 Spray nozzle flow paths are open.

ABSTRACT OF

HIGH PRESSURE INJECTION SYSTEM TEST (205-03)

1.0 Purpose

1.1 To functionally test the operation of the components within the high-pressure injection system, including the HPI pump run-in tests.

1.2 To verify operability of the system alarms and interlocks.

2.0 Prerequisites

2.1 High-pressure injection system flushed, certified clean, filled, and vented.

2.2 Demineralized water system operable.

2.3 Component cooling water system operable.

2.4 Borated water storage tank operable and contains at least 15,000 gallons.

3.0 Test Method

3.1 The high-pressure injection pump run-in test is performed in the recirculation mode to the borated water storage tank. Test the pumps for vibration, total head, and flow.

3.2 Regulate the pump discharge flow and verify the high and low flow alarms to the reactor coolant systems.

4.0 Acceptance Criteria

4.1 High-pressure injection pumps are capable of providing adequate flow as described in FSAR Chapter 6.

4.2 The high-pressure injection system alarms and interlocks function properly.

ABSTRACT OF

HIGH PRESSURE INJECTION SYSTEM ENGINEERED SAFETY FEATURES TEST (205-07)

1.0 Purpose

1.1 Demonstrate the emergency injection flow capability to the reactor coolant system from the high pressure injection system and to measure the operating times of the high pressure injection valves.

2.0 Prerequisites

2.1 High pressure injection system and borated water storage tank operable.

2.2 Core not installed in reactor vessel, but the reactor vessel internals may be installed. Vessel closure head installed.

2.3 RC pumps not running and reactor coolant system pressure approximately 350 psig.

2.4 Pressurizer at predetermined level and heaters de-energized.

3.0 Test Method

3.1 Open motor control breakers for engineered safety features pumps and valves not under test as required by system design.

3.2 Simulate an SFAS signal to the high pressure injection system to one pump.

3.3 Repeat for second pump.

4.0 Acceptance Criteria

4.1 High pressure injection system components function properly.

4.2 High pressure injection capability meets or exceeds the values used in the safety analysis.

ABSTRACT OF

REACTOR COOLANT CHEMICAL ADDITION SYSTEM TEST (210-03)

1.0 Purpose

1.1 Verify that chemicals can be added to the reactor coolant system from the reactor coolant chemical addition system.

2.0 Prerequisites

2.1 Applicable Portions of the chemical sampling system operable as required.

2.2 Demineralized water system is available.

2.3 Chemical addition system is operable.

3.0 Test Method

3.1 Fill the lithium hydroxide and hydrazine mix tank 1-1 with demineralized water and start the tank mixer.

3.2 Check the pump capacities as specified stroke settings for the lithium hydroxide pump 1-1 and hydrazine pump 1-1.

3.3 Fill the boric acid mix tank and start the tank mixer.

3.4 Transfer the contents in the boric acid mix tank 1-1 to the boric acid addition tanks 1-1 and 1-2 and perform pump capacity checks for boric acid pumps 1-1 and 1-2.

3.5 Add contents from the boric acid addition tanks to the makeup filters, borated water storage tank and spent fuel pool.

3.6 Add contents from the lithium hydroxide and hydrazine tank to the makeup filters.

3.7 Check temperature controls and alarms on the system.

4.0 Acceptance Criteria

4.1 Temperature controls and alarms function within specified limits.

4.2 Contents from the boric acid addition tanks can be pumped to the makeup filters, borated water storage and spent fuel pool.

4.3 Contents from the lithium hydroxide and hydrazine tank can be pumped to the makeup filters.

ABSTRACT OF

CHEMICAL SAMPLING TECHNIQUES TEST (210-05)

1.0 Purpose

1.1 Verify that representative samples can be taken from specified sampling points in the chemical addition system and the reactor coolant system.

2.0 Prerequisites

2.1 Reactor coolant system filled, vented, and operable.

2.2 Chemical addition system is operable.

2.3 Makeup and purification system operable.

2.4 Chemical sampling system operable as required.

3.0 Test Method

3.1 Fill the specified tanks (boric acid mix tank, boric acid addition tanks, etc.) and systems with known concentrations of solution.

3.2 For each specified sample point, purge a specified amount of the solution being sampled prior to drawing the sample.

3.3 Analyze the sampled solution to ensure it is representative of the solution in the tank or system being sampled.

3.4 As specified, vary the concentration in the tank or system (dilute or strengthen) and take samples from within the tank or system at the different concentrations. After purging a specified amount of solution, draw a sample and analyze.

4.0 Acceptance Criteria

4.1 The samples taken are within specified limits of the solution concentrations in the tank or system being sampled.

4.2 Specified sampling procedures are verified.

ABSTRACT OF

SPENT FUEL POOL COOLING SYSTEM TEST (220-03)

1.0 Purpose

1.1 Demonstrate that the spent fuel pool cooling system is capable of the following in accordance with FSAR design requirements.

1.1.1 Spent fuel pool cooling pumps are capable of providing adequate flow through the cooling system.

1.1.2 Flow can be established through the spent fuel pool cleanup system.

1.1.3 Protecting the system against the possibility of a complete loss of the spent fuel pool water.

2.0 Prerequisites

2.1 Decay heat removal system functional.

2.2 Borated water storage tank functional.

2.3 Component cooling water system functional.

2.4 480V AC and 125V DC electrical systems are available.

2.5 Refueling canal is functional.

3.0 Test Method

3.1 Test the two spent fuel pool cooling pumps for total head and flow.

3.2 Verify that the spent fuel pool can be filled by the spent fuel pool pumps and the decay heat removal pumps.

3.3 Verify that the spent fuel pool can be drained by the borated water recirculating pump.

3.4 Verify that the cask pit and fuel transfer pit can be filled and drained by the borated water recirculating pump.

3.5 Verify the flow path from the borated water storage tank through the spent fuel pool cleanup system via the borated water recirculating pump.

3.6 Verify flow capacities through the spent fuel pool heat exchangers.

3.7 Verify the proper functions of the spent fuel pool and refueling canal skimmer systems.

4.0 Acceptance Criteria

4.1 Spent fuel pool cooling and cleanup system alarms function properly.

4.2 Spent fuel pool cooling pumps are capable of providing adequate flow as described in FSAR Chapter 9.

4.3 Spent fuel pool cleanup system is capable of supplying the required flow as described in FSAR Chapter 9.

4.4 All connections to the spent fuel pool are installed to preclude gravity or siphon flow of the spent fuel pool water through leaking valves or piping.

ABSTRACT OF

RADIOACTIVE WASTE SYSTEMS TEST (230-01) / (231-01)
(232-01) / (233-01)

1.0 Purpose

1.1 Demonstrate the ability of the radioactive waste systems to provide controlled handling and disposal of liquid, gaseous and solid wastes.

2.0 Prerequisites

2.1 Demineralized water available.

2.2 Instrument air system functional.

2.3 Primary water storage tank available.

2.4 System to be tested is operational.

3.0 Test Method

3.1 Line up system to be tested for operation.

3.2 Measure component flows and capacities where possible.

3.3 Simulate signals to verify operation of pumps, compressors and valves.

4.0 Acceptance Criteria

4.1 The system performance meets design requirements as described in FSAR Chapter 11.

ABSTRACT OF

COMPONENT COOLING SYSTEM TEST (240-01)

1.0 Purpose

1.1 Demonstrate the capability of the component cooling system to respond to SFAS signals, and supply cooling requirements for various systems handling reactor coolant.

2.0 Prerequisites

2.1 The component cooling system is operable.

2.2 The service water system is operable.

2.3 Instrument air, demineralized water, primary water storage tank, equipment drain system and safety features actuation system operational.

3.0 Test Method

3.1 With the system in normal operation, an SFAS signal is inserted to initiate LOCA operation.

3.2 Perform step 3.1 for each component cooling pump.

4.0 Acceptance Criteria

4.1 Normal system operation conforms to design criteria as specified in FSAR Chapter 9.

4.2 Upon initiation of a safety feature actuation signal, all SFAS components respond in accordance with FSAR Chapter 6.

ABSTRACT OF

STATION RESPONSE TO LOSS OF INSTRUMENT AIR TEST (256-01)

1.0 Purpose

1.1 Demonstrate that upon a loss of instrument air, all pneumatically-operated safety-related valves and dampers assume their respective safe positions.

2.0 Prerequisites

2.1 Prior to testing, ensure that the valve(s) and/or damper(s) to be tested is operational.

3.0 Test Method

3.1 Isolate the valve(s) and/or damper(s) to be tested as required.

3.2 Place the valve(s) and/or damper(s) in its non-safe position.

3.3 Reduce pressure to the isolated valve(s) and/or damper(s) in specified increments.

3.4 Monitor actions of the pneumatically-operated nuclear safety-related valve(s) and/or damper(s) at each pressure increment.

3.5 Log pressures at which the valve(s) and/or damper(s) moves to its safe position.

4.0 Acceptance Criteria

4.1 All pneumatically-operated valves and dampers listed in Table 9.3-1, except for the main steam isolation valves and RC pump seal injection inlet valves, assume the position specified in that figure upon a loss of instrument air.

4.2 Containment air cooler service water discharge valves assume their safety features mode upon loss of instrument air.

4.3 Gaseous and liquid radwaste discharge valves assume their closed position upon loss of instrument air.

4.4 Waste gas decay tank isolation valves assume their closed position upon loss of instrument air.

ABSTRACT OF

FREEZE PROTECTION SYSTEM TEST (261-02)

1.0 Purpose

1.1 Verify the ability of the freeze protection system to maintain specified temperatures of various portions of the systems transporting boric acid solutions.

1.2 Demonstrate the ability to maintain a desired temperature within the boric acid addition tank room.

2.0 Prerequisites

2.1 Freeze protection system operable, including associated instrumentation.

2.2 Required 480V AC available.

2.3 Chemical addition system operational.

2.4 Clean liquid radwaste system operational.

3.0 Test Method

3.1 Place freeze protection and boric acid addition tank room heating systems in operation.

3.2 Operate heat traced portions of chemical addition and clean liquid radwaste systems in modes appropriate for checking freeze protection effectiveness.

3.3 Monitor temperatures maintained by each heat tracing circuit and boric acid addition tank room temperatures.

4.0 Acceptance Criteria

4.1 Each heat tracing circuit maintains the temperature as specified in FSAR Chapter 9.

4.2 Boric acid addition tank room maintained at design temperature.

ABSTRACT OF

SERVICE WATER SYSTEM TEST (263-01)

1.0 Purpose

1.1 Demonstrate the capability of the service water system to respond to an SFAS signal; also to provide adequate cooling water to the Auxiliary Building and containment components; also to provide service water backup to the auxiliary feedwater system.

2.0 Prerequisites

2.1 Instrument air system and safety features actuation system operational.

2.2 Intake structure flooded and functional.

3.0 Test Method

3.1 With system in normal operation, insert a SFAS signal to initiate LOCA operation. (To be done with No. 3 pump supplied from C-Bus and again with it supplied from D-Bus).

3.2 Perform Step 3.1 for each service water pump.

4.0 Acceptance Criteria

4.1 Normal system operation conforms to design criteria as specified in FSAR Chapter 9.

4.2 Upon initiation of a safety feature actuation signal, all SFAS components respond in accordance with FSAR Chapter 6.

ABSTRACT OF

CONDENSER CIRCULATING WATER SYSTEM TEST (265-01)

1.0 Purpose

1.1 Demonstrate that the condenser circulating water system is capable of providing an adequate heat sink as required.

2.0 Prerequisites

2.1 Cooling tower operational.

2.2 Intake structure flooded, traveling screens, screen wash system, and cooling tower make-up and blowdown systems functional.

2.3 Condenser operational.

2.4 Condenser circulating water pumps operational.

3.0 Test Method

3.1 Line up system for operation.

3.2 Operate circulating water system, noting system pressures and differential pressure across condensers, and circulating water flows.

4.0 Acceptance Criteria

4.1 The system performance meets design requirements as described in FSAR Chapter 10.

ABSTRACT OF

STEAM GENERATOR SAFETY VALVES TEST (271-05)

1.0 Purpose

1.1 Verify the popping pressure setpoints of the steam generator code safety valves, by operation while installed on the main steam headers.

2.0 Prerequisites

2.1 Main steam lines pressurized to normal operating pressure with steam.

2.2 Reactor coolant system temperature maintained by reactor coolant pump heat input.

2.3 Turbine bypass valves, condenser, circulating water, condensate, feedwater and vacuum systems operational; turbine generator is functional.

3.0 Test Method

3.1 Steam generator safety valves not under test are gagged.

3.2 Main steam pressure gradually raised with reactor coolant pump heat until safety valve popping point is attained.

3.3 Safety valve popping pressure data is recorded.

3.4 Adjustments are made as necessary until satisfactory settings are achieved.

3.5 Above procedures repeated for each main steam safety valve.

4.0 Acceptance Criteria

4.1 Actual popping pressure is within one percent of setpoint.

4.2 No valve leakage or chatter occurs on reseat.

ABSTRACT OF

MAIN STEAM ISOLATION VALVES TEST (271-09)

1.0 Purpose

1.1 To verify the operability of the main steam isolation valves.

1.2 To verify the ability of the main steam isolation valves to close within five seconds or less under no-flow conditions.

2.0 Prerequisites

2.1 Main steam isolation valves are operable.

2.2 Main steam lines are depressurized.

2.3 Safety features actuation system is operable.

3.0 Test Method

3.1 The control circuits of the main steam isolation valves are tested to verify proper performance of the circuits under various modes of operation.

3.2 The main steam isolation valves are opened and a close signal is inserted. The closing stroke of these valves is timed.

4.0 Acceptance Criteria

4.1 The main steam isolation valves can be operated from the control stations.

4.2 The main steam isolation valves close upon signal within five seconds or less under no-flow conditions.

ABSTRACT OF

NUCLEAR INSTRUMENTATION PREOPERATIONAL CALIBRATION TEST (301-01)

1.0 Purpose

1.1 To align and calibrate the nuclear instrumentation prior to initial criticality.

2.0 Prerequisites

2.1 Neutron detectors and instrumentation installed with interconnecting cables connected and tested.

3.0 Test Method

3.1 Source, intermediate and power range detector voltages and associated settings are initially set.

3.2 Source, intermediate and power range nuclear instrumentation are tested for proper response to a test source.

3.3 Test signals are inserted into the nuclear channels simulating the detector signals and the channel gains and bistable trip points are verified.

4.0 Acceptance Criteria

4.1 The initial gain, high voltage and discriminator settings for the source range, have been determined.

4.2 The initial detector high voltage and compensating voltage have been set for the intermediate range.

4.3 The high voltage and full scale current settings have been set for the power range.

4.4 The initial bistable trip valves have been verified for the nuclear instrumentation system.

4.5 The source, intermediate and power range detectors respond to the check sources.

4.6 The nuclear instrumentation respond to simulated inputs and are operating in accordance with system logic.

ABSTRACT OF

NUCLEAR INSTRUMENTATION DETECTOR CABLING TEST (301-02)

1.0 Purpose

1.1 Verify that the nuclear instrumentation detector cabling is routed in accordance with isolation requirements, is continuous, correctly connected, and meets the insulation electrical requirements.

2.0 Prerequisites

2.1 Nuclear instrumentation cables installed.

2.2 Nuclear instrumentation cabinets and modules installed and power available to the nuclear instrumentation cabinets.

3.0 Test Method

3.1 Trace the nuclear instnmentation cables for proper routing and connection.

3.2 De-energize modules, disconnect, and perform resistance, capacitance and continuity measurements on the cables.

3.3 Reconnect the cables and energize the nuclear instrumentation modules.

4.0 Acceptance Criteria

4.1 All nuclear instrumentation cabling is routed consistent with isolation requirements, meets resistance and capacitance criteria, and is correctly connected to the nuclear instrumentation modules.

ABSTRACT OF

REACTOR PROTECTION SYSTEM PREOPERATIONAL CALIBRATION TEST (305-01)

1.0 Purpose

1.1 To verify that each of the four RPS channels responds to simulated inputs and to assure that the installed equipment operates as specified.

2.0 Prerequisites

2.1 All control rod drive mechanisms de-energized.

2.2 Power available to the reactor protection system cabinets.

3.0 Test Method

3.1 Reactor protection system instrumentation is tested using simulated test inputs from the installed test modules.

3.2 Bistable trip setpoints are verified using simulated test inputs from the installed test modules.

3.3 Response time from the input terminals at the RPS cabinets to the trip of the control rod drive breakers is determined for each parameter trip.

4.0 Acceptance Criteria

4.1 Instrument channels are calibrated in accordance with the test method.

4.2 All bistable trip setpoints are set in accordance with the Station Technical Specifications.

4.3 Each channel trips when the preset trip point of each bistable is reached.

ABSTRACT OF

SAFETY FEATURES ACTUATION SYSTEM TEST (310-02)

1.0 Purpose

1.1 Demonstrate that the SFAS functions as designed, initiates the engineered safety features system, and prevents an accidental release of radioactivity.

2.0 Prerequisites

2.1 Required electrical systems operational.

2.2 Reactor vessel closure head removed.

2.3 Individual systems actuated by the SFAS are connected to the SFAS and are operational.

2.4 SFAS individual channels checked for proper operation.

2.5 All plant systems not part of this test, but required to be in operation, have been connected to power sources which were not interrupted during this test.

3.0 Test Method

3.1 All safety related systems are placed in their normal operating mode, with the following exceptions:

Containment Spray: discharge aligned to recirculate to BWST.

High-Pressure Injection: discharge valves closed but open limit switches adjusted to limit pump runout.

So as not to have to abort test due to excess water in the refueling canal, it was necessary in the course of testing to partially recirculate high and low pressure injection to the BWST.

3.2 Using the manual trip pushbutton in the Control Room, actuate SFAS actuated equipment associated with actuating channel number 1 with a simulated failure of offsite power. Continue to run the ESF equipment in this mode for approximately 2 hours.

3.3 Repeat Step 3.2 for all SFAS actuated equipment associated with actuating channel number 2.

4.0 Acceptance Criteria

4.1 The Safety Features Actuation System actuates the Engineered Safety Features Equipment and Containment Isolation, responding as described in FSAR Chapter 7.

ABSTRACT OF

INTEGRATED CONTROL SYSTEM OPEN LOOP TEST (320-02)

1.0 Purpose

1.1 Verify the proper operation of the integrated control system under static open loop conditions.

2.0 Prerequisites

2.1 Integrated control system installed and calibrated.

2.2 Required 120V AC system operable.

2.3 Associated alarm system operable.

3.0 Test Method

3.1 Simulate specified plant conditions and verify the correct output from the integrated control system.

4.0 Acceptance Criteria

4.1 Integrated control system responses to simulated plant conditions are consistent with expected performances based on system design requirements.

ABSTRACT OF

CONTROL ROD DRIVE MECHANISM FUNCTIONAL TEST (330-03)

1.0 Purpose

1.1 Measure the minimum currents which each CRDM requires to latch and unlatch.

1.2 Verify normal run current and the capability of the CRDM to remain latched, with only one phase energized.

2.0 Prerequisites

2.1 CRD service power supply available.

2.2 Each CRDM installed and preoperational calibration testing completed.

2.3 Each CRDM filled and vented with primary system water, and cooling water flow established.

2.4 Stator temperature indication operational, and each CRDM operated until the stator temperatures have stabilized.

3.0 Test Method

3.1 Using the CRD service power supply, latch the CRDM and hold; measure the temperature rise and verify operation.

3.2 Run CRDM part way out, stop and reduce phase current until the CRDM trips; record trip current.

3.3 Verify latching at the specified current; withdraw the rod part way out, stop and measure the single phase trip current.

3.4 Repeat above steps for all CRDM's except axial power shaping rods.

3.5 Measure engagement and partial disengagement current for the axial power shaping CRDM's.

4.0 Acceptance Criteria

4.1 CRDM's latch and operate at the specified minimum currents and unlatch above the specified current.

4.2 The CRDM's respond correctly to the service power supply and operate with stator temperatures below 160°F.

ABSTRACT OF

CONTROL ROD DRIVE SYSTEM INTEGRATED TEST (330-04)

1.0 Purpose

1.1 Check each control rod drive mechanism power supply under load.

1.2 Verify each CRDM can be operated and its position controlled and indicated, and that the control logic and interlocks respond to their position feedback signals.

2.0 Prerequisites

2.1 Control rod drive system operable.

2.2 All position indicator boards and electronic modules calibrated according to their associated operating manual.

2.3 Control rod drive stator temperature indication available.

2.4 Each control rod drive mechanism filled and vented.

2.5 Component cooling water supplied to control rod drives prior to energizing control rod drive stator.

3.0 Test Method

3.1 Energize the control rod drive mechanisms sequentially and verify the power supplies maintain their output within specifications.

3.2 Functionally test the position indication system.

3.3 Rod position alarm and control checks.

4.0 Acceptance Criteria

4.1 The system operates as required by instruction manuals and operating instructions.

ABSTRACT OF

SEISMOGRAPHIC MONITORING SYSTEM TEST (340-01)

1.0 Purpose

1.1 To demonstrate the ability of the seismographic monitoring system to actuate upon detection of a seismic event, record on magnetic tape vibrations of the Containment Vessel and Auxiliary Building, and give a graphic readout of the data stored on the magnetic tapes.

2.0 Prerequisites

2.1 The seismographic monitoring system is installed and functional.

2.2 Power is available to the regulated instrument breaker panel YAR.

3.0 Test Method

3.1 Place the system in standby operation.

3.2 Check the seismic trigger actuation of the system.

3.3 Perform a functional test of the accelerometers and the graphic recorder, using a test signal.

3.4 Make a graphic readout of tapes made in step 3.3.

3.5 Simulate an event occurring while performing a graphic printout.

3.6 Perform a test of the system batteries and battery chargers.

4.0 Acceptance Criteria

4.1 The seismic trigger actuates the recording system.

4.2 The accelerometers record on the magnetic tape and graphic recorder when a test signal is initiated.

4.3 While making a printout of a prerecorded tape, the graphic recorder will shift to record an actual event when simulated.

4.4 Batteries and battery chargers function properly.

ABSTRACT OF

PROCESS AND AREA RADIATION
MONITORING SYSTEM TEST (360-01)

1.0 Purpose

1.1 Demonstrate the ability of the process and area radiation monitoring system to continuously detect and record the radiation in the station effluents and to protect station personnel from exposure to excessive radiation levels.

2.0 Prerequisites

2.1 Process and area radiation monitoring system functional.

2.2 Isolation valves associated with process and area radiation monitoring system operational.

3.0 Test Method

3.1 Line up system for operation.

3.2 Simulate signals to verify operation of isolation valves and related components.

4.0 Acceptance Criteria

4.1 Alarms and interlocks function properly.

4.2 Appropriate valves close on high radiation signals.

4.3 The system performance meets design requirements described in FSAR Chapters 11 and 12.

ABSTRACT OF

PERSONNEL MONITORING AND SURVEY EQUIPMENT TEST (360-02)

1.0 Purpose

1.1 Verify the operational capability and calibration of personnel monitoring equipment (friskers, hand and foot counter, portal monitors, pocket dosimeters, and thermoluminescent dosimeters), and survey instrumentation (for alpha, beta, gamma, and neutron measurements).

2.0 Prerequisites

2.1 Known radioactive sources are available to perform the calibration tests.

3.0 Test Method

3.1 Test signals, when possible, are inserted into the instrumentation to simulate detector signals.

3.2 Known radioactive sources are used to calibrate the equipment.

4.0 Acceptance Criteria

4.1 Instruments, when applicable, respond properly to test signals.

4.2 Instruments exhibit proper response to a test source.

ABSTRACT OF

LABORATORY EQUIPMENT OPERATING TEST (360-03)

1.0 Purpose

1.1 Verify the operational capability and calibration of the atomic absorption and flame unit, spectrophotometers, pH meters, and radioactivity counting equipment.

2.0 Prerequisites

2.1 Water chemistry and radiochemistry laboratory facilities available.

3.0 Test Method

3.1 Instruments are checked with known calibrated standards for wavelength and radioactivity.

4.0 Acceptance Criteria

4.1 Wavelength, pH, and radioactivity measurements are within specified limits.

ABSTRACT OF

ENVIRONMENTAL RADIATION MONITORING SYSTEM TEST (370-01)

1.0 Purpose

1.1 Verify the environmental radiation monitoring system's capability to measure contributions to the existing radioactivity levels from nuclear operations.

2.0 Prerequisites

2.1 Reactor subcritical for base line data.

2.2 Reactor at specified power level.

2.3 Environmental monitoring equipment calibrated and installed at predetermined sampling stations.

2.4 Portable monitoring equipment calibrated and functional.

2.5 HVAC systems functional as needed.

2.6 Radwaste systems functional as needed.

3.0 Test Method

3.1 Establish base line background data by samples taken from all designated sampling stations prior to nuclear power generation.

4.0 Acceptance Criteria

4.1 Each component of the environmental monitoring system is capable of monitoring each portion of the specified environment as stated in Section 11.6 of the FSAR.

4.2 All appropriate alarms function properly.

ABSTRACT OF

NON-ESSENTIAL AC BUSES' TESTS (400-02, 04, 06, 07)

1.0 Purpose

1.1 Verify that the non-essential auxiliary electrical systems are capable of providing reliable electrical power during specified modes of station operation.

2.0 Prerequisites

2.1 Normal power supply to all non-essential unit auxiliary loads provided.

2.2 Off-site power available from the 245KV system.

2.3 Meters, relays, interlocks, and protective devices calibrated, tested, and verified.

3.0 Test Method

3.1 Record the voltage on permanently installed indicators.

3.2 Verify that the non-essential buses can be transferred between all designed sources.

3.3 Verify normal operating control of the non-essential AC system.

4.0 Acceptance Criteria

4.1 The non-essential AC buses can be transferred between all designed sources.

4.2 The normal operating control of the non-essential AC system is accomplished.

ABSTRACT OF

4160 VOLT ESSENTIAL AND NON-ESSENTIAL SYSTEM TEST (401-05)

1.0 Purpose

1.1 Verify that 4160V essential buses, C1 and D1, and non-essential buses, C2 and D2, can be energized from their respective normal and reserve sources.

2.0 Prerequisites

2.1 4160V system is operable.

2.2 Meters, relays, interlocks, and protective devices are calibrated, tested, and verified.

2.3 345KV, 13.8KV, and 125V DC systems are available.

3.0 Test Method

3.1 Record 4160V essential and non-essential bus voltages.

3.2 Transfer 4160V essential and non-essential buses between their normal and reserve sources.

3.3 Load each 4160V bus tie transformer to the 4160V running load.

4.0 Acceptance Criteria

4.1 The 4160V essential and non-essential buses are capable of being energized from their normal and reserve sources.

4.2 The 4160V bus tie transformers AC and BD are capable of carrying the 4160V running load.

ABSTRACT OF

ESSENTIAL 480 VOLT UNIT SUBSTATIONS PREOPERATIONAL TEST (401-06)

1.0 Purpose

1.1 Verify that the essential 480V unit substations can be energized from their normal and reserve sources.

1.2 Verify that the essential 480V unit substations can be manually transferred between the normal and reserve sources.

2.0 Prerequisites

2.1 Essential 480V unit substations are operable.

2.2 Meters, relays, interlocks, and protective devices are calibrated, tested, and verified.

2.3 4160V AC and 125V DC systems are available.

3.0 Test Method

3.1 Energize each 480V essential unit substation from its normal source.

3.2 Record the voltage at each essential 480V unit substation.

3.3 Transfer each essential unit substation from its normal source to reserve source and return it to the normal source.

3.4 Record the voltage at each essential 480V unit substation for each mode of operation.

4.0 Acceptance Criteria

4.1 The essential 480V unit substations are capable of being energized from their normal and reserve sources.

4.2 The essential 480V unit substations can be transferred manually between their normal and reserve sources.

ABSTRACT OF

ESSENTIAL 480 VOLT MOTOR CONTROL CENTER PREOPERATIONAL TEST (401-07)

1.0 Purpose

1.1 To verify that the essential 480V motor control center buses can be energized from their normal and reserve sources.

1.2 To verify that the essential 480V motor control center buses can be manually transferred between the normal and reserve sources.

2.0 Prerequisites

2.1 Essential 480V MCCs are operable.

2.2 Meters, relays, interlocks and protective devices are calibrated, tested and verified.

2.3 Essential 480V systems available.

3.0 Test Method

3.1 Energize each 480V essential MCC from its normal source.

3.2 Record the voltage at each essential 480V MCC section.

3.3 Where applicable, transfer essential 480V MCCs from normal, to reserve sources, and return to normal sources.

3.4 Record the voltage at each essential 480V MCC for each mode of operation.

4.0 Acceptance Criteria

4.1 The essential 480V MCC buses are capable of being energized from their normal and reserve sources.

4.2 The essential 480V MCC buses can be transferred manually between their normal and reserve sources.

ABSTRACT OF

250/125 VOLT DC SYSTEM PREOPERATIONAL TEST (401-08)

1.0 Purpose

1.1 Demonstrate that the DC system is capable of providing power during normal and abnormal conditions.

2.0 Prerequisites

2.1 Batteries and DC distribution system including protective devices, checked for operations and in service.

2.2 Battery chargers installed and operational.

2.3 Sufficient load available for discharge tests.

3.0 Test Method

3.1 Discharge the batteries at a controlled rate to verify amp-hour capacity.

3.2 While under load, switch the DC channel from a flow charge configuration to operation with batteries only.

3.3 While under load, switch to operation with chargers only.

3.4 While under load, switch each 125V DC bus to operate from its standby charger only.

4.0 Acceptance Criteria

4.1 The batteries have sufficient capacity to supply emergency load.

4.2 The DC system is capable of supplying the test load connected.

ABSTRACT OF

345KV SWITCHYARD 125 VOLT DC SYSTEM PREOPERATIONAL TEST (401-01)

1.0 Purpose

1.1 Demonstrate that the DC system is capable of providing power during normal and abnormal conditions.

2.0 Prerequisites

2.1 Batteries and DC distribution system, including protective devices, checked for operations and in service.

2.2 Battery chargers installed and operational.

2.3 Sufficient load available for discharge tests.

3.0 Test Method

3.1 Trip AC source to chargers and observe battery acceptance of DC load.

3.2 Discharge the batteries at a controlled rate to verify amp-hour capacity.

3.3 Restore AC source to chargers and observe chargers' assumption of a battery load.

4.0 Acceptance Criteria

4.1 The DC system is capable of supplying the test loads connected on a loss of AC Power.

ABSTACT OF

INSTRUMENT AC SYSTEM PREOPERATIONAL TEST (401-09)

1.0 Purpose

1.1 Demonstrate the capabilities of the essential instrument AC system to supply instrumentation and control voltage requiring regulation under specified operating conditions.

2.0 Prerequisites

2.1 120V AC instrument system operable.

2.2 Meters, relays, interlocks and protective devices are calibrated, tested and verified.

2.3 Specified 480V AC systems and DC system available.

3.0 Test Method

3.1 With all essential channels being supplied by their normal power source, trip the normal power source.

3.2 Verify that the essential channels are being supplied by their reserve sources.

3.3 Verify the ability to energize all essential channels while their respective inverters are isolated for maintenance.

3.4 Record specified channel voltage levels.

4.0 Acceptance Criteria

4.1 All four essential channels (1, 2, 3 and 4) are capable of being energized from their normal and reserve supplies.

4.2 Automatic essential channel transfer to the reserve course occurs when the normal DC supply source is tripped.

4.3 Inverters for all essential channels (1, 2, 3 and 4) are capable of being isolated for repair while their respective channel is being supplied from the regulated source of AC power.

4.4 Essential channels are maintained at specified voltage levels when inverter DC supply is varied over its maximum operating range.

ABSTRACT OF

EMERGENCY DIESEL GENERATORS' TEST (410-01)

1.0 Purpose

1.1 Demonstrate that the emergency diesel generators are capable of starting automatically and have the ability to maintain the essential buses on loss of off-site power. This also includes operation of the bus load shedding and subsequent sequential loading of the generator.

2.0 Prerequisites

2.1 Station batteries charged and DC control power available.

2.2 Relays calibrated and all normal bus protection checked for operation and in service.

2.3 Diesel engine auxiliaries checked and operational.

2.4 Diesel room ventilation and fire protection system checked and functional.

2.5 Breaker operating procedures written, breakers positioned and tagged, and all personnel involved thoroughly indoctrinated.

2.6 Fuel oil supply system and day tanks operable.

2.7 Sufficient connected load available for emergency diesel generator load test.

3.0 Test Method

3.1 Engine compressed air starting system operated to verify capacity of proper operation.

3.2 Engine controls are operated to verify capability to control engine in all modes of operation.

3.3 Generator controls are operated to verify capability of responding to undervoltage and SFAS signals.

3.4 Circuit breakers and protective relaying respond to distribution system signals.

4.0 Acceptance Criteria

4.1 Exciter and field control - Regulator functions to regulate and maintain voltage in all modes of operation.

4.2 Generator and engine controls - Functions according to FSAR Chapter 8.

4.3 Generators capable of loading in accordance with loss of off-site power requirements.

ABSTRACT OF

REACTOR COOLANT SYSTEM CHEMISTRY TEST (500-01)

1.0 Purpose

1.1 Establish proper reactor coolant system water chemistry during initial fill, prior to hydrotesting, during hot functional testing and operations through initial power ascension.

2.0 Prerequisites

2.1 Sampling system operable.

2.2 Water chemistry laboratory facilities available.

3.0 Test Method

3.1 Sample water to be used for filling.

3.2 Sample the reactor coolant system during initial fill, prior to hydro, during hot functional testing and operations through initial power ascension.

3.3 Analyze samples for hydrazine, chloride, fluoride, suspended solids, pH, dissolved hydrogen, boron concentration, conductivity, oxygen, lithium and total gas as applicable.

4.0 Acceptance Criteria

4.1 Concentrations measured are maintained within specified limits.

ABSTRACT OF

INITIAL RADIOCHEMISTRY TEST (500-03)

1.0 Purpose

1.1 Monitor activity buildup in the reactor coolant during fuel loading, startup, and operation.

1.2 Establish baseline data enabling rapid detection of failed fuel and/or a primary to secondary system leakage.

2.0 Prerequisites

2.1 Reactor coolant, steam generator, spent fuel pool, and refueling canal sample systems operational.

2.2 Reactor prepared for fuel loading.

3.0 Test Method

3.1 Sample spent fuel pool, refueling canal, reactor coolant system, steam generator, and auxiliary cooling water systems as specified.

3.2 Analyze samples for gross gamma and beta activity, gaseous activity, cesium, strontium, tritium, and corrosion products as specified for each.

3.3 Plot buildup curves.

4.0 Acceptance Criteria

4.1 Procedures for collection and analysis of samples are verified.

4.2 Buildup curves established and baseline data recorded.

ABSTRACT OF

SOLUBLE POISON CONCENTRATION CONTROL TEST (600-03)

1.0 Purpose

1.1 Demonstrate the boron concentration change predictions and the capability to maintain a specified boron concentration.

2.0 Prerequisites

2.1 Hot functional testing ready to begin.

2.2 All systems involved with boron control operational.

2.3 Purification demineralizers bypassed.

2.4 Demineralized water and boric acid available.

3.0 Test Method

3.1 Borate reactor coolant system to a specified boron concentration.

3.2 Dilute to a specified boron concentration and evaluate the procedures and calculations used.

4.0 Acceptance Criteria

4.1 Borating and deborating prediction calculations verified.

4.2 Boron concentration control procedures verified or amended as necessary.

ABSTRACT OF

MAKEUP AND PURIFICATION SYSTEM TEST (600-04)

1.0 Purpose

1.1 Demonstrate the operational capability of the makeup and purification system.

1.2 Verify the makeup and purification system operating procedure.

1.3 Verify operation of specified alarms and interlocks in the makeup and purification system.

2.0 Prerequisites

2.1 Reactor coolant system filled, vented, and operable.

2.2 Nitrogen and hydrogen supplies operable.

2.3 Demineralized water supply and specified portions of waste disposal systems operable.

2.4 Reactor coolant makeup and purification system instrumentation in service.

3.0 Test Method

3.1 Heat the reactor coolant system, operating the makeup and purification system as specified in the operating procedures.

3.2 Verify letdown and seal return cooler capability.

3.3 Verify automatic pressurizer level control and take system baseline data.

3.4 Verify boron concentration batch controller batch size.

3.5 Cool down the reactor coolant system, operating the makeup and purification system according to operating procedures.

3.6 Verify capability of purification demineralizer resin replacement, filter replacement, and hydrogen addition to the reactor coolant system in order to verify these procedures.

4.0 Acceptance Criteria

4.1 Makeup and purification system successfully operated in accordance with operating procedures.

4.2 Boron concentration batch controller operation is as specified.

4.3 Purification demineralizer resin and filter cartridge replacement procedures verified.

4.4 Specified makeup and purification system alarms and interlocks function properly.

ABSTRACT OF

CHEMICAL ADDITION SYSTEM TEST (600-05)

1.0 Purpose

1.1 Demonstrate the operability of the chemical addition system under hot pressurized conditions.

2.0 Prerequisites

2.1 Chemical addition system functional test completed.

2.2 Makeup and purification system functional test completed.

2.3 Reactor coolant system filled, vented, and operable.

3.0 Test Method

3.1 Mix the boric acid solution to the specified concentration and at the maximum boric acid mix tank operating level. Verify that the solution temperature is maintained within the allowable range. Verify a flowpath to each boric acid addition tank.

3.2 Alternately run the boric acid pumps to pump boric acid to:

3.2.1 Spent fuel Pool

3.2.2 Borated water storage tank

3.2.3 Reactor coolant makeup system

3.3 Collect reactor coolant samples and analyze as specified.

3.4 Mix lithium hydroxide solution in lithium hydroxide mix tank. Add to the makeup system as required by the reactor coolant system chemistry. Verify that the reactor coolant system lithium concentration has increased to the desired value.

3.5 Add hydrazine to the makeup system when the reactor coolant temperature is within the specified range. Verify that the reactor coolant system hydrazine level increased to the desired value.

4.0 Acceptance Criteria

4.1 No specified reactor coolant system chemistry limits are exceeded as tests are performed concurrently with normal operations.

4.2 Uniform mixing of chemical additives within the reactor coolant system verified.

ABSTRACT OF

REACTOR COOLANT SYSTEM HOT LEAKAGE TEST (600-10)

1.0 Purpose

1.1 Demonstrate that reactor coolant leakage, at hot pressurized system conditions, is within the limits set in the Station Technical Specifications.

2.0 Prerequisites

2.1 Hydrostatic tests of the systems which form the reactor coolant boundary are complete.

2.2 The makeup and purification system and the reactor coolant system are operating as a closed system.

2.3 Performed concurrent with hot functional testing.

3.0 Test Method

3.1 Calculate the reactor coolant inventory change by measuring the changes in pressurizer and/or makeup tank levels during a specified time interval, with corrections made for any reactor coolant temperature change.

3.2 A leak is simulated by establishing a known outflow and the procedure is repeated to verify measurement and calculation techniques.

4.0 Acceptance Criteria

4.1 Reactor coolant leakage does not exceed limits set by the Station Technical Specifications.

ABSTRACT OF

AUXILIARY FEEDWATER SYSTEM AND STEAM GENERATOR LEVEL CONTROL TEST (600-11)

1.0 Purpose

1.1 Verify that the normal feedwater control system acceptably controls the steam generator to the minimum level setpoint.

1.2 Determine that the integrated control system acceptably controls the feedwater system and steam generator level for simulated situations.

1.3 Verify the starting capability of the turbine driven auxiliary feedwater system.

2.0 Prerequisites

2.1 Hot functional heatup test completed.

2.2 Feedwater and auxiliary feedwater systems operable.

2.3 Integrated control system operable.

3.0 Test Method

3.1 Establish minimum steam generator level control with the startup feedwater control valves.

3.2 Verify that the auxiliary feedwater control system establishes the correct steam generator level for emergency situations by simulating all reactor coolant pumps tripped and both main feedwater pumps tripped.

3.3 Simulate auxiliary feed pump start signals; verify the starting operation and record pump/turbine characteristics.

4.0 Acceptance Criteria

4.1 The steam generator level can be controlled to a predetermined setpoint under both normal and emergency conditions.

4.2 The auxiliary feedwater system operates as designed.

ABSTRACT OF

PRESSURIZER OPERATIONAL AND SPRAY FLOW TEST (600-13)

1.0 Purpose

1.1 Verify the operational capabilities of the pressurizer, its controls and instrumentation.

2.0 Prerequisites

2.1 Reactor coolant system hydrostatic test completed.

2.2 All reactor coolant pumps operable.

2.3 Reactor coolant system heated to specified temperature.

2.4 Pressurizer filled to specified level.

2.5 Pressurizer spray flow control valve intermediate limit switch and pressurizer spray flow control bypass valve set at specified initial settings.

3.0 Test Method

3.1 Compute temperature compensated level from pressurizer indicated temperature. Compare and recalibrate level compensator if necessary. Repeat at predetermined temperature intervals.

3.2 Vary pressurizer level, and test alarm setpoints and heater interlocks. Verify automatic level controller.

3.3 Vary reactor coolant pressure and determine heater pressure setpoints. Raise and lower reactor coolant pressure by using heaters, and determine the spray valve setpoints.

4.0 Acceptance Criteria

4.1 The pressurizer level and pressure setpoints agree within a specified band of the predetermined setpoints.

4.2 Pressurizer level transmitter outputs must indicate within four inches of each other.

ABSTRACT OF

QUENCH TANK ACCEPTANCE TEST (200-18)

1.0 Purpose

1.1 Demonstrate the capability of the pressure relief system to provide adequate control and space for reactor coolant discharge by further disposal to the reactor coolant drain tank and the clean liquid radwaste system.

2.0 Prerequisites

2.1 Instrument air system is functional.

2.2 Reactor coolant system is functional.

2.3 Make-up water system is functional.

2.4 Pressurizer quench tank system is functional.

2.5 Reactor coolant drain tank system is functional.

2.6 Clean liquid radwaste system as required is functional.

2.7 Nitrogen system is functional.

3.0 Test Method

3.1 Line up system for normal operation.

3.2 Operate system in simulated pressurizer relief mode.

4.0 Acceptance Criteria

4.1 Normal system operation conforms to design criteria as specified in FSAR Chapter 5.

ABSTRACT OF

REACTOR COOLANT SYSTEM
EXPANSION & RESTRAINT TESTS (600-14)

1.0 Purpose

1.1 Verify that during specified operating modes, the travel indications on the reactor coolant pump constant load supports and specified reactor coolant system piping deflections are within the required margin.

2.0 Prerequisites

2.1 Reactor coolant system prepared for hot functional testing.

3.0 Test Method

3.1 Record cold position on hangers prior to heat up for hot functional testing.

3.2 Record hot positions and adjust hangers as necessary.

3.3 Record cold indications after the reactor coolant system has been cooled down.

4.0 Acceptance Criteria

4.1 Hot and cold position indications fall within, or have been adjusted to fall within, the specified limits.

ABSTRACT OF

POWER CONVERSION SYSTEM
EXPANSION & RESTRAINT TESTS (600-19)

1.0 Purpose

1.1 Verify that during heatups and cooldowns, the piping, snubbers and spring hanger deflections are within limits.

2.0 Prerequisites

2.1 Power conversion systems operable and available for transient operations.

2.2 All spring hanger stops have been removed.

3.0 Test Method

3.1 Log cold settings on all piping constant supports (or equivalent) hangers, and snubbers.

3.2 Mark specific points in systems for movement measurements.

3.3 Heatup systems to normal operating conditions.

3.4 Log hot setting movements at specific points in the systems.

3.5 Operate power conversion systems at various operating plateaus and log the appropriate piping, snubber, and spring hanger movements.

4.0 Acceptance Criteria

4.1 All specified spring hangers and snubber movements remain within cold and hot setpoints.

4.2 Piping movements do not cause piping rubs or interference with other equipment.

4.3 Piping movements do not cause undue stresses on associated pumps or cause misalignments.

ABSTRACT OF

CONTROL ROD DRIVE SYSTEM OPERATIONAL TEST (600-17)

1.0 Purpose

1.1 Assure proper control rod drive operation under all modes of control during actual thermal operating conditions.

2.0 Prerequisites

2.1 Control rod drive system operable.

2.2 Control rod drive guide and support assemblies in reactor vessel.

2.3 Reactor coolant system is hot, filled, vented, and pressurized.

2.4 Component cooling water is supplied to the control rod drives prior to energizing any control rod drive motor stator.

2.5 Each control rod drive mechanism must be filled and vented.

3.0 Test Method

3.1 Control rod drive operating procedures are used to exercise the drives in all modes of control.

3.2 Cycle each control rod drive periodically during hot functional testing to assure there is no binding or obstruction of travel.

3.3 The position indication system is to be calibrated at reactor coolant system ambient temperature and checked for drift and repeatability after reaching operating temperature.

3.4 Each control rod drive is tripped at reactor coolant operating temperature, pressure and full flow.

4.0 Acceptance Criteria

4.1 Control rod drive system operates satisfactorily at hot operational conditions.

4.2 Stator temperature must not exceed its limit.

4.3 Position indication must be within tolerance.

ABSTRACT OF

REACTOR PROTECTION SYSTEM LOGIC TEST (600-23)

1.0 Purpose

1.1 To verify the proper operation of the interlocks and trip logic to the appropriate control rod drive system circuit breakers associated with the reactor protection system trip module.

2.0 Prerequisites

2.1 All control rod drives de-energized with breakers installed and operable.

2.2 Power available to the nuclear instrumentation/reactor protection system cabinets.

3.0 Test Methods

3.1 Verify proper operation of the interlocks of each of the four RPS trip modules.

3.2 Verify proper operation of the two-out-of-four and two-out-of-three trip logics of each of the four RPS trip modules.

3.3 Verify proper operation of the two manual reactor trip switches.

4.0 Acceptance Criteria

4.1 All interlocks associated with the four reactor trip modules operate properly.

4.2 RPS trip relays operate in a two-out-of-four logic during normal RPS operation.

4.3 RPS trip relays operate in a two-out-of-three logic when a single channel is bypassed.

4.4 Appropriate circuit breakers in the CRD System open when the associated RPS trip relays trip.

ABSTRACT OF

REACTOR INTERNALS INSPECTION TEST (600-33)

1.0 Purpose

1.1 To visually inspect the reactor vessel internals for signs of vibration induced wear, galling, cracking, or loosening of parts following hot functional testing.

2.0 Prerequisites

2.1 Hot functional testing completed.

2.2 Reactor vessel head removed.

2.3 Internals indexing fixture in place and preparations for removing internals made.

3.0 Test Method

3.1 Remove plenum assembly and inspect bearing surfaces, control rod guide assemblies, and mating surfaces at hot leg piping.

3.2 Remove core support assembly and inspect bearing surfaces, mating surfaces at hot leg piping, core shield assembly/core barrel bolting, and thermal shield.

3.3 Inspect thermal shield, surveillance specimen holder tubes, lower flow distributors, bolting, keyways, and incore monitor guide tubes.

3.4 Inspect keys, support lugs, incore monitor stubs, and the bottom of the vessel.

4.0 Acceptance Criteria

4.1 Clearances deviating from those specified are reported and resolved.

4.2 Any discrepant items noted in the inspection are resolved.

ABSTRACT OF

MAIN STEAM ATMOSPHERIC VENT AND TURBINE BYPASS SYSTEM TEST (600-31)

1.0 Purpose

1.1 Demonstrate the ability of the main steam atmospheric vent valves to provide adequate cooldown of the steam generators.

1.2 Demonstrate the ability of the turbine bypass valves to control main steam pressure during load swings and for removal of decay heat.

2.0 Prerequisites

2.1 Instrument air system functional.

2.2 Main steam system functional.

2.3 Circulating water and condenser vacuum systems are functional.

2.4 Condensate and feedwater systems functional.

2.5 Integrated control system functional.

3.0 Test Method

3.1 Line up system for normal operation.

3.2 Simulate normal control signals and verify operation of valves.

3.3 Simulate an SFAS signal to initiate isolation requirements.

4.0 Acceptance Criteria

4.1 Alarms and all interlocks function properly.

4.2 Normal system operation meets design requirements as described in FSAR Chapter 10.

4.3 Upon initiation of the SFAS signal, appropriate components respond in accordance with FSAR Chapter 9.

ABSTRACT OF

AUXILIARY NEUTRON MONITORS
SETUP AND SOURCE RESPONSE TEST (700-01)

1.0 Purpose

1.1 Establish auxiliary neutron monitor settings and verify detector response to a neutron source.

2.0 Prerequisites

2.1 Auxiliary neutron monitoring system installed.

2.2 All systems ready for fuel loading.

3.0 Test Method

3.1 Simulate an input to the amplifier of the auxiliary neutron monitor instrument string and establish the proper instrument settings.

3.2 Place a neutron source in the vicinity of the detectors and verify that the detectors respond.

4.0 Acceptance Criteria

4.1 The auxiliary neutron monitoring system responds to the neutron source.

ABSTRACT OF

INCORE INSTRUMENTATION ELECTRICAL TEST (302-02)

1.0 Purpose

1.1 Verify proper connection and continuity of all incore instrument detectors.

2.0 Prerequisites

2.1 Station computer system installed and operable.

2.2 Incore monitor recorders installed and operable.

2.3 Fuel loaded into the reactor vessel with the head installed.

2.4 The incore assemblies are installed.

3.0 Test Method

3.1 Insert appropriate signals into the connecting signal leads at the incore detector connections, and verify proper computer and recorder response.

3.2 Verify that all detector shields are properly grounded, that all detectors are isolated from each other, and that all detectors are not grounded by appropriate resistance measurements.

3.3 Verify that all leadwires are continuous by means of capacitance measurements.

4.0 Acceptance Criteria

4.1 The incore detector, recorder, and station computer respond correctly for the simulated input values.

4.2 The detector shields are properly grounded, and the individual detectors are isolated from one another and grounded.

4.3 The detector leadwires are continuous.

ABSTRACT OF

ZERO POWER PHYSICS TEST (710-01)

1.0 Purpose

1.1 Verify design physics parameters after the initial core has been loaded into the reactor vessel and before unit startup begins.

2.0 Prerequisites

2.1 The reactor core is installed.

2.2 The reactor protection system trip set limits conform to Station Technical Specification.

2.3 The reactor coolant system is operable and the boron concentration is greater than or equal to the refueling boron concentration.

2.4 The combination of power range amplifier sensitivity and bistable trip setting set for reactor trip at less than 5 percent rated power.

2.5 Containment integrity is established.

2.6 All reactor areas and systems are ready for criticality.

2.7 All precritical checks are completed.

3.0 Test Method

3.1 Heatup the reactor coolant system for zero power testing with the reactor coolant pumps. Obtain the following:

3.1.1 Differential control rod assembly group worths as functions of group positions.

3.1.2 Differential boron worths as functions of group positions.

3.1.3 All rods out boron concentration data.

3.1.4 Temperature coefficients of reactivity as a function of control rod assembly group position.

3.1.5 Ejected control rod assembly worths for selected rods.

3.1.6 Total control rod assembly worths.

3.1.7 Stuck rod margin shutdown capability for selected rods.

4.0 Acceptance Criteria

4.1 Applicable design features in FSAR Chapter 4 are verified.

4.2 Technical Specification parameters are verified.

ABSTRACT OF

SHIELD SURVEY (800-01)

1.0 Purpose

1.1 Determine and detect the radiation levels, in accessible representative locations, adjacent to the Shield Building and secondary shielding.

2.0 Prerequisites

2.1 Personnel monitoring system functional.

2.2 Portable radiation monitoring instruments calibrated and functional.

2.3 Reactor operating at specified power.

3.0 Test Method

3.1 Pre-select the location where the measurements are to be taken.

3.2 Establish shield background radiation prior to nuclear power generation.

3.3 Operate the reactor at specified power levels and take radiation measurements adjacent to the shielding using portable survey instruments.

4.0 Acceptance Criteria

4.1 Base line data established for accessible representative locations at specified power levels.

4.2 Survey results verify limitation of station personnel exposure to exposure rates as stated in FSAR Chapter 12.

ABSTRACT OF

NUCLEAR INSTRUMENTATION CALIBRATION AT POWER (800-02)

1.0 Purpose

1.1 Verify that the power range nuclear instrumentation indicates the thermal power level and axial power imbalance at predetermined power levels.

1.2 Verify that the required overlap between intermediate and power range nuclear instrumentation exists.

2.0 Prerequisites

2.1 Nuclear instrumentation preoperational calibration and testing completed.

2.2 Reactor at power level specified.

2.3 Incore monitoring system operable.

3.0 Test Method

3.1 Obtain heat balance.

3.2 Adjust the power range channels to heat balance.

3.3 Adjust the out-of-core axial power imbalance indication to that detected by the incore monitors.

3.4 Record overlap between intermediate and power range channels.

4.0 Acceptance Criteria

4.1 The power range nuclear instrumentation indicates the power level within 2 percent of the heat balance, and the axial power imbalance within predetermined limits.

4.2 The required overlap exists between intermediate and power range channels.

ABSTRACT OF

SITE AND STATION RADIATION SURVEY (800-03)

1.0 Purpose

1.1 Determine and detect if there is any direct radiation exposure to persons at the site boundary from sources contained within the station and on the site.

1.2 Determine exposures to station personnel and establish station radiation zones for controlled entry by station personnel during various phases of reactor operation.

2.0 Prerequisites

2.1 Personnel monitoring system functional.

2.2 Portable radiation monitoring instruments calibrated and functional.

2.3 Multi-channel analyzer functional.

2.4 Process and area radiation monitoring systems functional.

2.5 Environmental radiation monitoring system functional.

2.6 Required 125V DC and 125V AC electrical systems functional.

2.7 All radiation alarms and recording instruments functional.

2.8 HVAC systems functional.

2.9 Reactor operating at specified power.

3.0 Test Method

3.1 Establish station background radiation before nuclear power generation.

3.2 Operate the reactor at specified power levels to determine radiation background dose rates in specified areas of the station.

3.3 Measure and record radiation exposure rates using the area and environmental radiation monitoring systems.

3.4 Measure radiation exposure rates in specified areas with hand-held portable survey instruments.

3.5 Measure the airborne activity at specified locations.

4.0 Acceptance Criteria

4.1 Base line data established in all areas of the station at specified power levels.

4.2 Various station radiation exposure zones established, based on the radiation survey.

4.3 Survey results verify the limitation of station personnel exposure to those exposure rates as stated in 10CFR20 and FSAR Chapter 12.

4.4 Verification that site boundary dose rates from direct radiation exposure sources are at, or below, normal background level.

ABSTRACT OF

REACTOR COOLANT SYSTEM NATURAL CIRCULATION TEST (800-04)

1.0 Purpose

1.1 Verify the capability of the reactor coolant natural circulation to remove core decay heat.

2.0 Prerequisites

2.1 Reactor coolant system operational.

2.2 Sufficient heat output is available from the core to verify the decay heat removal capabilities of natural circulation.

3.0 Test Method

3.1 Stop the reactor coolant pumps and monitor reactor coolant system temperatures.

4.0 Acceptance Criteria

4.1 Natural circulation in the reactor coolant system is sufficient to remove core decay heat.

ABSTRACT OF

REACTIVITY COEFFICIENTS AT POWER TESTS (800-05)

1.0 Purpose

1.1 Determine the Doppler coefficient of reactivity and the moderator coefficient of reactivity at power.

2.0 Prerequisites

2.1 Establish the following conditions for determining reactivity coefficients at power:

2.1.1 Stable reactor power

2.1.2 Stable reactor coolant temperature

2.1.3 Stable reactor coolant pressure

2.2 Axial Power Shaping Rod Assemblies positioned to maintain power balance.

3.0 Test Method

3.1 Verify previously generated rod worth data.

3.2 At constant reactor power, make the prescribed changes to reactor coolant temperature and calculate the associated moderator coefficient of reactivity.

3.3 At constant reactor coolant temperature, make the prescribed changes to reactor power and calculate the power Doppler coefficient of reactivity.

4.0 Acceptance Criteria

4.1 The power Doppler and moderator reactivity coefficients are consistent with limits specified in the USAR.

ABSTRACT OF

INTEGRATED CONTROL SYSTEM TUNING AT POWER (800-08)

1.0 Purpose

Verify the capability of the integrated control system to control feedwater flow, control rod position, and main steam pressure.

2.0 Prerequisites

2.1 The unit is in the power escalation sequence with unit load conditions as required by the Unit Load Steady-State Test or Unit Load Transient Test.

3.0 Test Method

3.1 Specified unit parameters are monitored and recorded as the unit load is maneuvered.

3.2 The integrated control system is tuned to optimize control of the unit.

4.0 Acceptance Criteria

4.1 Unit control is within applicable safety criteria of FSAR Chapter 4.

ABSTRACT OF

CORE POWER DISTRIBUTION TEST (800-11)

1.0 Purpose

1.1 Measure core power distribution at predetermined power levels and control rod configurations.

2.0 Prerequisites

2.1 Incore monitoring system operable.

2.2 Steady-state reactor power.

3.0 Test Method

3.1 Using the incore monitoring system, obtain the required data as predetermined conditions of reactor power and control rod positions and calculate the steady-state thermal power.

4.0 Acceptance Criteria

4.1 The DNBR and the maximum linear heat rate are within the limits specified in the Station Technical Specifications.

4.2 Maximum/average power ratios are within design limits.

ABSTRACT OF

UNIT LOAD STEADY-STATE TEST (800-12)

1.0 Purpose

1.1 Measure the reactor coolant system and steam generator steady-state parameters as a function of reactor power.

2.0 Prerequisites

2.1 All the necessary systems are ready for power operation.

3.0 Test Method

3.1 At selected power levels, measure reactor coolant system performance by:

3.1.1 Establishing steady state conditions at test power level with T_{avg} constant.

3.1.2 ΔTc set to zero for proper load sharing between steam generators.

3.1.3 Integrated control system in automatic and unit load demand in manual.

3.1.4 Measure power by performing a heat balance.

3.1.5 Predict the trend of the nuclear steam supply system parameters from all measured steady-state data for the next selected power level.

3.1.6 Repeat test at next selected power level.

4.0 Acceptance Criteria

4.1 Unit parameters do not exceed equipment limits or limiting safety settings.

ABSTRACT OF

TURBINE/REACTOR TRIP TEST (800-14)

1.0 Purpose

1.1 Measure unit response during and after a deliberate reactor or turbine trip from power.

1.2 Verify nuclear steam supply system design, and optimize the control system performance based on test results.

2.0 Prerequisites

2.1 Reactor at the power level specified.

2.2 Reactor coolant pressure and inventory control in automatic.

2.3 Integrated control system in automatic.

2.4 Makeup tank at its normal operating conditions.

3.0 Test Method

3.1 From predetermined steady-state power level:

3.1.1 Trip the reactor, with subsequent turbine trip, and record the transient response.

3.1.2 Trip the turbine and record the transient response.

4.0 Acceptance Criteria

4.1 For a turbine trip:

4.1.1 Main steam pressure at the steam generator outlet does not exceed 110% of design pressure.

4.1.2 Reactor power runs back to approximately 15% in a predetermined time interval.

4.2 For a reactor trip:

4.2.1 Reactor coolant pressure remains above the actuation pressure for high-pressure injection.

4.2.2 Main steam pressure at the steam generator outlet does not exceed 110% design pressure.

4.2.3 Turbine bypass system performs as required by design.

ABSTRACT OF

POWER IMBALANCE DETECTOR CORRELATION TEST (800-18)

1.0 Purpose

1.1 Determine the relationship between the indicated out-of-core axial power distribution and the measured in-core axial power distribution.

2.0 Prerequisites

2.1 Incore monitoring system tested and operational.

2.2 Reactor at predetermined power level.

2.3 Nuclear instrumentation preoperational calibration complete.

2.4 Integrated control system in automatic.

2.5 Equilibrium xenon concentration established.

3.0 Test Method

3.1 The Axial Power Shaping Rods (APSR) are moved to create a core flux imbalance and measurements are taken to obtain information regarding the correlation between incore and outcore detectors.

4.0 Acceptance Criteria

4.1 The indicated out-of-core imbalance represents the imbalance as detected by the incore system within allowable limits.

ABSTRACT OF

CONTROL ROD REACTIVITY WORTH MEASUREMENT (800-20)

1.0 Purpose

1.1 Determine differential control rod assemblies reactivity worth during power operation.

1.2 Determine differential boron worth using rod worth data, when rod worth data is taken during boron concentration transient.

2.0 Prerequisites

2.1 Reactor at specified power.

3.0 Test Method

3.1 Determine control rod assemblies differential reactivity worth measurements during power operation.

3.2 If boron concentration is changing during the rod worth measurement, then differential boron worths will be determined by dividing integral reactivity worths of measured control rod assemblies by the change in critical boron concentration at constant temperature, pressure and power.

4.0 Acceptance Criteria

4.1 Measured rod worths compare favorably with predicted rod worths and are within the limits of FSAR Chapter 15.

ABSTRACT OF

NUCLEAR STEAM SUPPLY SYSTEM HEAT BALANCE (800-22)

1.0 Purpose

1.1 Determine reactor core thermal power, by calorimetric methods, by using plant instrumentation used in operating the nuclear steam supply system during power tests.

2.0 Prerequisites

2.1 Zero power tests completed.

2.2 Reactor at specified power level.

3.0 Test Method

3.1 At steady-state power levels do the following:

3.1.1 Record data required for primary and secondary heat balance.

3.1.2 Calculate core power level from primary and secondary heat balance.

3.1.3 Perform heat balance calculations at each test power level.

4.0 Acceptance Criteria

4.1 Core thermal power is determined.

ABSTRACT OF

UNIT LOAD TRANSIENT TEST (800-23)

1.0 Purpose

1.1 Demonstrate that unit load swings can be made at the design rates.

2.0 Prerequisites

2.1 Unit operating at specified power.

3.0 Test Method

3.1 Perform a load reduction followed by a load increase at selected power levels between 15% and 100% power.

3.2 Repeat Step 3.1 with a reduced number of reactor coolant pumps in operation.

4.0 Acceptance Criteria

4.1 The reactor coolant system follows step and ramp load changes under automatic control without relief valve or turbine bypass valve action as stated in FSAR Chapter 5.

4.2 No equipment limits or limiting safety settings exceeded.

ABSTRACT OF

INCORE DETECTOR TEST (800-24)

1.0 Purpose

1.1 Check the incore monitoring system for proper operation.

2.0 Prerequisites

2.1 Reactor at a constant power level.

3.0 Test Method

3.1 Plot all incore detector readings for an assembly and compare that shape with the nearest similar detector.

4.0 Acceptance Criteria

4.1 All detector outputs are consistent, reasonable, and any exceptions are identified.

ABSTRACT OF

SHUTDOWN FROM OUTSIDE CONTROL ROOM TEST (800-25)

1.0 Purpose

1.1 Demonstrate the capability of shutting down the nuclear reactor plant and maintaining a hot standby condition when the control room is inaccessible.

2.0 Prerequisites

2.1 Reactor operating at specified power level.

2.2 All reactor support systems functional.

3.0 Test Method

3.1 Simulate departure from the control room, leaving observers inside to evaluate operator actions.

3.2 Trip the reactor from outside the control room.

3.3 Maintain the reactor system in a hot standby condition from outside the control room.

4.0 Acceptance Criteria

4.1 Verification that the reactor plant can be shut down and maintained in a hot standby condition, from outside the control room.

ABSTRACT OF

LOSS OF EXTERNAL LOAD INCLUDING OFF-SITE POWER TEST (800-26)

1.0 Purpose

1.1 Verify that upon a loss of off-site power, including loss of external load, the turbine-generator runs back and continues to supply in-house auxiliary loads.

2.0 Prerequisites

2.1 All normal station systems operable.

2.2 Station is in normal operation at a specified power.

3.0 Test Method

3.1 Isolate the switchyard from the main and startup transformers.

3.2 Verify that turbine generator runback is accomplished.

4.0 Acceptance Criteria

4.1 Turbine-generator is capable of running back from specified power to in-house load condition.

4.2 Turbine-generator continues to supply any in-house loads upon a loss of offsite power.

4.3 All station systems respond to the load transient in a manner consistent with nuclear safety.

ABSTRACT OF

PSEUDO CONTROL ROD EJECTION TEST (800-28)

1.0 Purpose

1.1 Determine the worth of the most reactive control rod assembly as it is moved from its nominal full power position to the fully withdrawn position.

2.0 Prerequisites

2.1 Reactor at specified power level.

2.2 Equilibrium xenon established.

2.3 Control rods at their normal full power rod configuration.

3.0 Test Method

3.1 Move a single control rod from its normal bank position to the fully withdrawn position.

3.2 Determine the worth of the portion of the rod withdrawn.

4.0 Acceptance Criteria

4.1 The worth of the portion of the withdrawn rod is less than that amount used in the analysis of the rod ejection accident in FSAR Chapter 15.

ABSTRACT OF

DROPPED CONTROL ROD TEST (800-29)

1.0 Purpose

1.1 Part I

1.1.1 Determine the reactor core power distribution when a single control rod assembly has been fully inserted below its normal bank position.

1.2 Part II

1.2.1 Demonstrate the operation of the rod withdrawal inhibit for an asymmetric rod condition.

1.2.2 Demonstrate the integrated control system runback operation for an asymmetric rod condition.

2.0 Prerequisites

2.1 Part I

2.1.1 Reactor at specified power level.

2.1.2 Equilibrium xenon established.

2.1.3 Control rods at their normal full power rod configuration.

2.2 Part II

2.2.1 Reactor at specified power level.

2.2.2 Runback setpoint reset to at least 10% of rated power below test power if below 70% full power.

3.0 Test Method

3.1 Part I

Obtain core power distribution data when a single control rod assembly has been fully inserted below its normal bank position.

3.2 Part II

Verify load demand runback and rod withdrawal inhibit functions when a rod is positioned greater than the specified distance from bank average.

4.0 Acceptance Criteria

4.1 Radial peaking factors are within the limits specified in the FSAR.

4.2 Runback and rod withdrawal inhibit functions operate as specified.