Consumers
Power
Company

J W Reynolds
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April 8, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
MIDLAND DOCKET NO 50-329, 50-330
FILE: 0505.16 SERIAL: 16621
ENCLOSURES: (1) SAR CHANGE NOTICE NO 3194
(2) SAR CHANGE NOTICE NO 3195

Enclosures (1) and (2) provide information requested by your Messrs J Rajan and S MacKay, respectively, to facilitate their review of the Midland Units 1 and 2 FSAR with respect to generating the Safety Evaluation Report. This information will be included in an FSAR revision scheduled to be issued on or about April 19, 1982.

Enclosure (1) provides information concerning open item MEB-8 and Regulatory Guide 1.21. Enclosure (2) provides information concerning various test abstracts contained in FSAR Chapter 14. This information should allow the NRC Staff to close open items associated with this material.

JWR/JNL/mkh

CC JWCook, P-26-336B, w/a
RJCook, Midland Resident Inspector, w/a
RHernan, NRC, w/a
RWHuston, Washington, w/a
DBMiller, Midland, w/a

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CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 16621 Dated April 8, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information concerning FSAR Chapter 14 Test Abstracts and a response to open item MEB-8.

CONSUMERS POWER COMPANY

By ______________________
J W Reynolds
Executive Vice-President

Sworn and subscribed before me this 8th day of April 1982.

____
Notary Public
Jackson County, Michigan

My Commission Expires December 14, 1983

mi0382-0052a100

BECHTEL

QUALITY ASSURANCE PROGRAM
SAR CHANGE NOTICE

1. ~~PSAR~~ FSAR

JOB NO. 7220 2. DISCIPLINE/COMPANY Materials / CPCo 3. No. 3194

4. ORIGINATOR H. W. Slager 5. DATE 3/23/82

6. REFERENCED SECTIONS OF SAR

Appendix 3A - Regulatory Guide 1.121 Position and "Varga letter" Open Item MEB 8 Response

7. DESCRIPTION OF CHANGE

~~move RG 1.121 conformance information from MEB 8 to App 3A~~

Tube plugging

8. REFERENCED SPECIFICATIONS OR DRAWINGS

None

9. JUSTIFICATION To provide a proposed resolution to Open Item MEB 8. Change being made per NRC reviewer!

10. BECHTEL DISCIPLINE INTERFACE REVIEW:

- ☐ ARCH
- ☐ CIVIL
- ☐ CONTROL SYS
- ☐ ELEC
- ☐ MECH/NUCLEAR
- ☐ PLANT DSN
- ☐ PQAE
- ☐ STRESS
- ☒ OTHER Licensing + Safety

INTERFACING STAFF REVIEW:

- ☐ ARCH
- ☐ CIVIL
- ☐ CONTROL SYSTEM
- ☐ ELEC
- ☐ GEOTECH
- ☐ M & QS
- ☐ MECH
- ☐ NUCLEAR
- ☐ PLANT DSN
- ☐ RELIABILITY
- ☐ STRESS
- ☐ OTHER

NA		[signature]	3/24/82		
11. REVIEWED BY (Group Supervisor)	DATE	12. REVIEWED BY (SAR COORDINATOR)	DATE	13. REVIEWED BY (NUCLEAR ENGINEER)	DATE
14. CONCURRENCE BY (PROJECT ENGINEER)	DATE	15. APPROVED BY (CPCo)	DATE	16. CONCURRENCE BY (NSSS SUPPLIER)	DATE

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Regulatory Guide 1.121 - BASES FOR PLUGGING DEGRADED PWR STEAM GENERATOR TUBES (Rev. 0, 8/76) 18

RESPONSE 22

The Midland plant will comply with the intent of Regulatory Guide 1.121. Minimum acceptable wall thickness criteria have been developed and are documented in Topical Report BAW-10146, Determination of Minimum Required Tube Wall Thickness for 177-FA Once-Through Steam Generators. This report was submitted for staff review in November 1980. 41

An operational degradation allowance will be determined and this allowance will be combined with the minimum wall thickness criteria to define unacceptable defects. The corrective measures for defective tubes recommended in Regulatory Guide 1.83 will be effected by plugging with qualified welded, explosive, or mechanically inserted plugs. 32

Insert A

Insert A

[redacted] As is described in Chapter 16 (16.3/4.4.5.4) th the tube plugging limit is equal to 40% of the nominal tube wall thickness. Larger values will be used if they can be justified by analysis in accordance with the recommendations of Regulatory Guide 1.121, August 1976

Compliance with Draft Regulatory Guide 1.121 would requires the following analyses to be performed:

a. Definition of the minimum tube wall thickness [Reference - Regulatory Positions C.2.a(1), (2), and (6); C.3.a(1), (2), and (3); and C.3.b(1) and (2)]

b. Definition of an operational degradation allowance (Reference - Regulatory Positions C.2.b and C.3.f)

c. Definition of the allowable through-wall defect size [Reference - Regulatory Positions C.2.a(3), (4), and (5) and C.3.d (1), (2), and (3)]

The analysis of minimum tube wall thickness was submitted to the staff in November 1980 in Topical Report BAW-10146, Determination of Minimum Required Tube Wall Thickness for 177-FA Once-Through Steam Generators. (The report of this analysis addresses Items 1 through 7 and 10 of Regulatory Position C.3.e)

The operational degradation allowance including "consideration of [redacted]

[redacted]

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measurement error and any other significant eddy current testing parameters" [Reference - Regulatory Position C.3.f(3)] will be developed for ~~the~~ inservice degradation, if degradation is experienced. Such development will be based upon the observed degradation in the Midland steam generators and/or applicable experience with other B&W plants as well as industry experience for the measurement error associated with the examination ~~tech~~ ~~tequm~~ technique being used to detect the degradation.

ℙ Relative to definition of the allowable through-wall defect size, [Reference - Regulatory Positions C.2 a(3), (4), and (5) and C.3 d (1), (2) and (3)] there is currently no effort being made to perform the analyses of the regulatory guide.

NUREG-0571 provides a recommendation for continued operation of B&W plants. The considerations described on Page 22 of that document are the bases for inactivity on through-wall defect size at this time.

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MEB 8. Regulatory Guide 1.121

110.55

We require compliance with this Category III regulatory guide. The applicant's response to 110.55 by FSAR Revision 18 requires clarification. This matter impacts TAP A-5 and the related hearing issue.

Response

To provide a response to Draft Regulatory Guide 1.121 which will be acceptable to the NRC staff, it will be necessary to meet with the staff. 30

Compliance with Draft Regulatory Guide 1.121 would require the following analyses to be performed:

a. Definition of the minimum tube wall thickness [Reference - Regulatory Positions C.2.a(1), (2), and (6); C.3.a(1), (2), and (3); and C.3.b(1) and (2)]

b. Definition of an operational degradation allowance (Reference - Regulatory Positions C.2.b and C.3.f)

c. Definition of the allowable through-wall defect size [Reference - Regulatory Positions C.2.a(3), (4), and (5) and C.3.d (1), (2), and (3)]

The analysis of minimum tube wall thickness was submitted to the staff in November 1980 in Topical Report BAW-10146, Determination of Minimum Required Tube Wall Thickness for 177-FA Once-Through Steam Generators. (The report of this analysis addresses Items 1 through 7 and 10 of Regulatory Position C.3.e) 41

The operational degradation allowance is not currently available for the following reasons:

a. Definition of an operational degradation allowance includes "consideration of measurement error and any other significant eddy-current testing parameters" [Reference - Regulatory Position C.3.f (3)]. Eddy-current technology is undergoing significant improvements (e.g., multifrequency) such that the available measurement error data (e.g., NUREG-0512) may not be applicable to the eddy-current techniques used for the Midland plant. However, evaluation of measurement error may not be necessary because NUREG-0512 indicates that eddy-current techniques generally overestimate flaw size, and because degradation rates would be based on eddy-current degradation measurements, it should not be necessary to independently evaluate measurement error. 30

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degradation measurements, it should not be necessary to independently evaluate measurement error.

b. Analysis of degradation of steam generator tubing at operating B&W plants has demonstrated that the degradation rate is dependent on the type of degradation and the location of the degradation within the generator. Also, it must be assumed that plant specific operating conditions (e.g., secondary water chemistry) will affect degradation rates. Because Midland will be performing a preservice inspection of its steam generator tubes, it should be possible to calculate Midland inservice degradation rates which would be plant specific for the type and location of the degradation 30
(but the analyses will not be available prior to the Safety Evaluation Report). For purposes of a preservice plugging limit, it may be necessary to evaluate the flaw indications during preservice by assuming that either there is no degradation applicable to the preservice flaw, or in view of the location of the flaw, inservice degradation may occur. (In the latter case, data from other B&W plants could be used to predict degradation rates.)

Relative to definition of the allowable through-wall defect size, there is currently no effort being made to perform the analyses of the draft regulatory guide. NUREG-0571 provides a recommendation for continued operation of B&W plants. The considerations described on Page 22 of that document are the bases for inactivity on through-wall defect size at this time.

The Midland position on Regulatory Guide 1.121 in Appendix 3A has been revised [illegible] in respons to this open item.

RUSH

QUALITY ASSURANCE PROGRAM
SAR CHANGE NOTICE

JOB NO. 7220   2. DISCIPLINE/COMPANY CPCO   1. [redacted] FSAR 3. No. 3195

4. ORIGINATOR T. A. Buczwinski   5. DATE March 26, 1982

6. REFERENCED SECTIONS OF SAR
Appendix 3A   14.2.11
Table 14.2-4   Figure 14.2-2
14.2.10   Appendix 14A

7. DESCRIPTION OF CHANGE
Revise existing Test Abstracts and add additional Test Abstracts.

8. REFERENCED SPECIFICATIONS OR DRAWINGS

9. JUSTIFICATION
Resolve open items resulting from NRC Staff Review.   SER Critical

10. BECHTEL DISCIPLINE INTERFACE REVIEW:
- ☐ ARCH
- ☑ CIVIL Structural
- ☑ CONTROL SYS
- ☑ ELEC
- ☑ MECH/~~NUCLEAR~~
- ☒ Nuclear
- ☐ PLANT DSN
- ☐ PQAE
- ☐ STRESS
- ☐ OTHER
- ☑ Licensing & Safety

INTERFACING STAFF REVIEW:
- ☐ ARCH
- ☐ CIVIL
- ☐ CONTROL SYSTEM
- ☐ ELEC
- ☐ GEOTECH
- ☐ M & QS
- ☐ MECH
- ☐ NUCLEAR
- ☐ PLANT DSN
- ☐ RELIABILITY
- ☐ STRESS
- ☐ OTHER

NA		[signature]	3/26/82		
11. REVIEWED BY (Group Supervisor)	DATE	12. REVIEWED BY (SAR COORDINATOR)	DATE	13. REVIEWED BY (NUCLEAR ENGINEER)	DATE
14. CONCURRENCE BY (PROJECT ENGINEER)	DATE	15. APPROVED BY (CPCo)	DATE	16. CONCURRENCE BY (NSSS SUPPLIER)	DATE

Regulatory Guide 1.20 - VIBRATION MEASUREMENTS ON REACTOR INTERNALS ~~(12/29/71)~~ (Rev. 1, 6/75)

RESPONSE

The preoperational vibration monitoring program for the Midland plant will comply with Parts d.1, 2, and 4 of Regulatory Guide 1.20. The prototype unit for these internals is Oconee Unit 1. This test program is described in B&W Topical Reports BAW-10038, Prototype Vibration Measurement Program for Reactor Internals, and BAW-10039, Prototype Vibration Measurement Results for B&W's 177 Fuel Assembly 2 Loop Plant. 30

In addition, the Midland vibration monitoring program will be in compliance with the Surveillance Specimen Holder Tubes (SSHT) changes developed and reported in B&W Topical Reports BAW-10051, Supplement 1, and BAW-10038, Supplement 1, as well as BAW-10039, Supplement 1. The prototype testing results from Davis-Besse I reported in BAW-10039, Supplement 1, are directly applicable to the Midland plant reactor internals.

The NRC, in a September 24, 1976, letter from S.A. Varga, Chief, Light Water Reactors Branch 4, to S.H. Howell, on the subject of Mechanical Regulatory Guides, has accepted the position for the Midland plant that B&W is in full compliance with the guidelines of Regulatory Guide 1.20 for reactor internals similar to a valid prototype design. The Oconee Unit 1 reactor internals serve as a valid prototype for 177-FA units such as Midland 1 and 2.

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m. All necessary test instrumentation is specified, installed, properly calibrated, and available for operation.

n. Required communications between staffed areas has been established and tested prior to moving fuel. Continuous voice communications is maintained between refueling areas and the control room during core alterations. 37 30 37 30

o. Control of personnel entry into refueling areas is established.

p. Required staffing levels have been specified and verified. 37

q. Components are either in place or out of the vessel as specified to receive fuel. 30

r. INSTRUMENTATION REQUIRED FOR POST ACCIDENT MONITORING IS PROPERLY TESTED.

14.2.10.1.4 Precautions and Limitations

The following precautions and limitations are included in the initial fuel loading procedure: 37

a. Establishment of criteria for stopping fuel loading. Some conditions which might warrant this action are: unexpected subcritical multiplication behavior, loss of communications between control room and fuel loading station, inoperable source range detector, and inoperability of systems required for emergency boron addition. 37

b. Establishment of criteria for boron addition

c. Establishment of criteria for containment evacuation

d. Actions to be followed in the event of fuel damage

e. Actions to be followed or approvals obtained before routine loading may resume after one of the above limitations has been reached or invoked. 37

f. Establishment of criteria for reducing the fuel loading increment

14.2.10.1.5 Detailed Procedure

The following items are addressed in the core loading procedures: 37

a. Loading sequence and pattern for fuel, CRAs and control components, neutron sources, and other components

g. The control rod withdrawal sequence, increments, and
their intervals is specified. (These increments are 37
smaller and the intervals longer than a routine
criticality.) The control rod insertion limits
prescribed in the technical specifications are complied 37
with when criticality is achieved.

h. After initial criticality, a conservative startup rate
limit (no smaller than a 60 second period) is
administratively employed in attaining low power. 37
Control rods are used to level power several decades
below the sensible nuclear heat range in preparation for
low power physics tests.

Information available from similar B&W cores is not used to predict critical conditions. As such, initial criticality is treated as a first-of-a-kind event. However, data taken during the initial approach to criticality may be compared to similar cores as an additional verification that the core's behavior and characteristics are as expected and designed.

14.2.11 TEST PROGRAM SCHEDULE

The test schedule for the Midland project comprises an integrated
two-unit preoperational program, with Unit 2 fuel load occurring
approximately 22 months into the program followed by Unit 1 fuel
load approximately 5-1/2 months later. Following fuel load,
startup testing spans approximately 5-1/2 months for Unit 2 and 32
approximately 8 months for Unit 1. The longer startup testing
phase for Unit 1 is due to the interface of the process steam
evaporators in the Unit 1 program. The integrated schedule has
been computer programmed for ease of monitoring and timely 33
evaluation of potential problem areas. Milestone activities are 32
shown relative to fuel load in Figure 14.2.2 for Units 1 and 2. 33

Manpower loading of the schedule shows that testing personnel
staffing peaks approximately 16 months prior to Unit 2 fuel load
and remains near this level until Unit 1 fuel load. The 37
integrated two-unit preoperational program maximizes effective
utilization of the testing staff due to the flexibility of
switching unit emphasis. Additional testing personnel, if needed
throughout the integrated test program may include use of outside
service organizations. Qualification of all testing personnel is 37
as described in Subsection 14.2.2.8.

Prior to the commencement of major milestone events, such as
those described in Subsection 14.2.5, the test working group or
plant review committee, as applicable, reviews the status of
plant testing. This review verifies that prerequisite tests 37
required for commencement of the particular testing evolution
have been completed and approved. Additionally, this review
ensures that the safety of the plant is not dependent on the
performance of an untested system.

60 60

Operating procedures including emergency procedures are available for onsite review ~~30~~ days prior to initial fuel loading. 60 Preoperational test procedures are available for onsite review by NRC inspectors ~~30~~ days prior to the conduct of the preoperational test. Startup test procedures are available for onsite review by NRC inspectors 60 days prior to initial fuel loading. 37

14.2.12 TEST DESCRIPTIONS

Abstracts of test procedures are provided in Appendix 14A and describe the testing to be performed on structures, systems, and components to fulfill the applicable requirements of the regulatory guides. 30

The test abstract titles are listed in the following tables:

a. Table 14.2-1 - Preoperational Tests

b. Table 14.2-2 - Post Core Load Hot Functional Tests 37

c. Table 14.2-3 - Initial Criticality and Low Power Physics Tests

d. Table 14.2-4 - Power Ascension Tests as described in Subsection 14.2.2.8.3 within the technical department. 400

Table 14.2-1 (continued)

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TABLE 14.2-4

POWER ASCENSION TESTS

Section	Test	Power Level at Which Accomplished			
		15%	40%	75%	100%
14A.4.1	Biological shield survey		x		x
14A.4.2	Reactivity coefficients at power	(1)	x	x	x
14A.4.3	Core power distribution	x	x	x	x
14A.4.4	Integrated control system	x	x	x	x
14A.4.5	Unit acceptance				x
14A.4.6	Power imbalance detector correlation		x	x	X
14A.4.7	Incore monitoring system	x	x	x	X ~~(2)~~
14A.4.8	Loss of offsite power	x			
14A.4.9	Radiochemistry	x	x	x	x
14A.4.10	Psuedo dropped rod		x		
14A.4.11	Psuedo ejected rod		x		
14A.4.12	Shutdown from outside the control room	x			
14A.4.13	Effluent monitoring	x	x	x	x
14A.4.14	Process steam startup	(3)	X ~~(3)~~	(3)	(3)
14A.4.15	Reactor coolant system chemistry	x	x	x	x
14A.4.16	OTSG chemistry	x	x	x	x
14A.4.17	Online computer checkout	x	x	x	(5) ~~(4)~~
14A.4.18	Reactor trip ~~test~~		x		

41

Table 14.2-4 (continued)

14A.4.19 Turbine trip				x	41
14A.4.20 Generator trip				x	
14A.4.21 Turbine testing	x	x	x	x	

(1) At 15% power this test is not considered practical nor essential. Temperature coefficients are determined during low power physics tests. Temperature and power doppler coefficients of reactivity are also determined at 40%, 75%, and 100% test plateaus. 19 41

(2) ~~Once the incore detector system is verified at 75% power no further testing of the system is required. The calibration of excore detectors however, is verified at all levels of the test plateau.~~ Footnote deleted 19

~~(3) See response to Question 423.4(12)~~ 41

~~(4) Once computer calculations are verified at 75% power, the computer is considered acceptable for use at all power all power levels.~~ Insert Z 19

14A.4.22 Natural circulation	(4)				
14A.4.23 Containment concrete temperature survey				X	

Insert Z

(3) APPROXIMATELY 40% REACTOR POWER FROM ONE UNIT IS REQUIRED TO OPERATE THE PROCESS STEAM SYSTEM AT 100% DESIGN LOAD. THE PROCESS STEAM SYSTEM WILL BE ALIGNED TO EACH UNIT SEPARATELY AND TESTED AT SOME POINT IN TIME AFTER THE 40% POWER LEVEL HAS BEEN REACHED.

(4) CONDITIONS TO BE SPECIFIED BY NSSS SUPERVISOR.

[5] Once computer calculations are verified at 75% power, the computer is considered acceptable for use at all power all power levels.

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14A.1.1 MAIN STEAM ISOLATION VALVES

1. Purpose

   To demonstrate the operability of the main steam isolation valves and to verify the ability of the valves to close within specified times under no flow conditions

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Main steam lines depressurized

3. Test Method

   3.1 The control circuits of the main steam isolation valves will be tested to demonstrate proper operation of the following:

      3.1.1 Manual, normal closure

      3.1.2 Manual and automatic channels A and B emergency closure 20

      3.1.3 Failsafe operation (loss of power)

      3.1.4 Normal opening

      3.1.5 Inservice test operation

   3.2 The main steam isolation valves will be opened and a close signal will be inserted. Closing time of the valves will be recorded as time from manual 20 emergency "close" signal until the main steam isolation valve is fully closed. 33

   3.3 Perform test 3.2 during HFT at normal operating temperature to verify that no mechanical binding has 30 occurred during heatup.

4. Acceptance Criteria

   The main steam isolation valves operate as specified in Section 10.3.

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Insert C

3.4 VARIOUS COMBINATIONS OF LOSS OF POWER AND EMERGENCY "CLOSE" SIGNALS WILL BE INSERTED TO PROVE THAT LOSS OF ONE POWER SOURCE WILL NEITHER CAUSE NOR PREVENT VALVE CLOSURE.

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14A.1.2 MAIN TURBINE SYSTEM

1. Purpose

To demonstrate that the plant turbine is capable of operating in a safe and reliable manner

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate instrumentation calibrated and operable

2.3 A suitable steam supply available as required

2.4 All TG auxiliaries previously tested

2.5 Appropriate ac and dc power available

2.6 Main condenser available as required

2.7 Instrument air and hydrogen gas systems available | 33

2.8 Control logic and alarm circuitry functional checks complete

3. Test Method

3.1 Demonstrate proper operation of the turbine stop, control, nonreturn, intercept, and intermediate stop valves. | 20

3.2 Roll the turbine to synchronous speed and verify that vibration, eccentricity, and speed control are acceptable.

* | 30

3.3 DEMONSTRATE PROPER OPERATION OF THE BACK-UP OVERSPEED TRIP CIRCUITRY (handwritten insert)

4. Acceptance Criteria

The main turbine operates as described in Section 10.2. | 20

14A.1.3 CONDENSATE AND CONDENSATE DEMINERALIZER SYSTEMS | 2

1. Purpose

   To demonstrate that the condensate system is capable of supplying an adequate flow of water at the design pressure to support the remainder of the power conversion system.

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Appropriate instrumentation calibrated and operational

   2.3 Instrument air system available

   2.4 Appropriate ac and dc power available

   2.5 Control logic and alarm circuitry functional checks complete

3. Test Method

   3.1 Demonstrate all design flowpaths.

   3.2 Verify pump head and flow characteristics.

   3.3 Demonstrate minimum flow recirculation protections.

   3.4 Demonstrate ~~that chemistry requirements are met by~~ THE PROPER OPERATION OF the condensate demineralizers.

4. Acceptance Criteria

   The condensate system operates as described in Subsections 10.4.6 and 10.4.7. ~~and water of design quality can be produced at specified flowrates.~~ | 2

14A.1.4 Feedwater System 0003195 | 20

1. Purpose

To demonstrate that the feedwater system is capable of supplying feedwater to the steam generators and to demonstrate that system components respond properly upon receipt of simulated ESFAS signals

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate instrumentation calibrated and operable

2.3 A suitable steam supply available for operation of the feedwater pump turbines

2.4 Condensate system operable

2.5 Main condenser operable

2.6 Appropriate ac and dc power available

2.7 Control logic and alarm circuitry functional checks complete

Blind Note for info only

3. Test Method

3.1 Verify pump flow and head characteristics of main feed and feed booster pumps.

3.2 Verify that all mainfeed water trip interlocks function as intended.

3.3 Test all automatic functions of the condensate and feedwater heater controls and valves.

3.4 Confirm response times of feedwater isolation sensors, logic, and valves. 20

3.5 Demonstrate redundancy for the feedwater isolation function.

3.6 Demonstrate minimum flow recirculation protection.

3.7 Demonstrate that system components respond as required upon initiation of simulated ESFAS signal.

3.8 Demonstrate proper operation of the feedwater chemical addition system.

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4. Acceptance Criteria

The feedwater system operates as described in Subsection 10.4.7. ~~Proper operation of the feedwater system will depend on its ability to operate as designed at power levels up to 100%.~~ 2

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14A.1.5 AUXILIARY FEEDWATER SYSTEM

1. Purpose

   To demonstrate proper operation of the auxiliary feedwater system and to demonstrate proper component response following receipt of simulated ESFAS signals.

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Appropriate instrumentation calibrated and operable

   2.3 Condensate storage and transfer system available

   2.4 Appropriate ac and dc power sources available

   2.5 Steam available for auxiliary feedwater pump turbine

   2.6 Control logic and alarm circuitry functional checks complete

3. Test Method

   3.1 Verify the head and flow characteristics of the motor driven auxiliary feedwater pump.

   3.2 Verify the head and flow characteristics of the turbine driven auxiliary feedwater pump over the design range of inlet steam pressures. 20

   3.3 Verify operability of design flowpaths.

   3.4 Verify opening and closing time for valves and starting time for pumps.

   3.5 Demonstrate proper system component response and system response time upon the receipt of simulated ESFAS signals.

   3.6 Ensure redundancy, and electrical independence, ~~and leak tightness~~ of the instrumentation and valves associated with auxiliary feedwater pump suction line protection. 20

   3.7 Ensure that FOGG operates in accordance with design.

   3.8 Conduct a 48 hour endurance test on both auxiliary feedwater pumps. 39

   3.9 Verify the predicted performance of the level rate control system during natural circulation testing. 41

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3.10 ~~3.9~~ DEMONSTRATE FIVE SEQUENTIAL TURBINE DRIVEN AUXILIARY FEEDWATER PUMP STARTS.

3.11 ~~3.10~~ DEMONSTRATE AUTOMATIC TRANSFER OF THE AUXILIARY FEEDWATER SYSTEM, FROM THE NON-SAFETY, TO THE SAFETY GRADE SUCTION SOURCE.

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14A.1.9 REACTOR COOLANT PUMP TESTS

1. Purpose

To demonstrate proper operation of the reactor coolant pumps (RCP).

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate reactor coolant system instrumentation calibrated and operational

2.3 Reactor coolant system filled and capable of being pressurized for initial pump run

2.4 Reactor coolant pump support systems available

2.5 Appropriate ac and dc power sources available

2.6 Pump control logic and alarm circuitry functional checks complete

3. Test Method

3.1 Demonstrate proper operation of specified RCP alarms and interlocks.

3.2 Operate each RCP motor and obtain pump motor characteristics and vibration data.

3.3 Operate each reactor coolant pump and obtain pump characteristics and vibration data.

3.4 Demonstrate the ability of the antireverse rotation device to prevent reverse rotation of the pump.

4. Acceptance Criteria

4.1 The reactor coolant pumps and pump motor operate in accordance with specified design specifications.

4.1.1 SECTION 5.4, FIGURE 5.4-2

4.1.2 VENDOR MOTOR MANUAL M1.8-101

4.1.3 VENDOR PUMP MANUAL M1.7-60-1

4.1.4 B&W OPERATING SPEC. - SPECIFICATION No. OS-4221 (64-1002960-01)

4.1.5 A FOURTH REACTOR COOLANT PUMP CANNOT BE STARTED ABOVE THE POWER LEVEL SPECIFIED IN ~~SEC.~~ subsection 15.4.4.2.

Blind Note Mech. to verify

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14A.1.10 PRESSURIZER SAFETY VALVE TEST

1. Purpose

   To verify the setpoints and seat tightness of the pressurizer safety valves.

2. Prerequisites

   Pressurizer safety valves have been removed from the system and are available for bench testing.

3. Test Method

   3.1 Determine the lift and reseat pressure AT TEMPERATURE of each safety valve.

   3.2 Test the valve seat leakage at normal operating pressure AND TEMPERATURE

4. Acceptance Criteria

   ~~Safety valves lift at the required setpoint and seat leakage is within specifications.~~

   SAFETY VALVES LIFT AT THE DESIGN SET POINT OF 2500 PSIG AND SEAT LEAKAGE IS NOT OBSERVED WHEN TESTED AT 90% OF THE DESIGN TEST POINT.

14A.1.11 DECAY HEAT REMOVAL SYSTEM

1. Purpose

To demonstrate the operability of the decay heat removal system and to demonstrate proper system component response following receipt of simulated ESFAS signals.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 The decay heat removal system, borated water storage tank, spent fuel pool, and reactor coolant system clean, filled, and operable

2.3 Appropriate system instrumentation calibrated and operational 21

2.4 Cooling water available for pump seals and decay heat removal heat exchanger shell side

2.5 Control logic and alarm circuitry functional checks complete

2.6 Baseline leakage test of system boundary outside of containment performed

2.7 Generic Testing of components has been completed.

3. Test Method

3.1 System flowpaths will be demonstrated by the following:

3.1.1 Backup spent fuel pool cooling mode per subsection 5.4.7.2.2.1

3.1.2 Minimum pump recirculation flow per ~~subsection 5.4.7.[illegible]~~ FSAR Figure 6.3-2(58). 21

3.1.3 BWST recirculation mode per subsection ~~[illegible]~~ 6.3.2.7.

3.1.4 LPI/LPI cross-connected operation mode per subsection 6.3.2.8

3.1.5 RCS low level recirculation mode per Babcock and Wilcox Technical Document TS-3600

3.1.6 RCS normal cooldown mode per subsection 5.4.7.2.2.1

3.1.7 Auxiliary pressurizer spray mode per subsection 5.4.7.2.2.1

3.1.8 DHR purification via MU&P system purification demineralizers mode per subsection 5.4.7.2.2.1 30

3.2 Demonstrate decay heat removal pump design head and flowrates. 21

3.3 Demonstrate automatic isolation of the decay heat removal system by system components upon receipt of simulated reactor coolant pressure approaching decay heat removal design limitations. 21

3.4 Demonstrate that system components respond as required upon receipt of simulated ESFAS signals.

3.5 Demonstrate that $NPSH_a$ from BWST to the decay heat pumps is satisfactory with the associated suction valves wide open. 30 21

4. Acceptance Criteria

The decay heat removal system functions as described in Subsection 5.4.7. System components respond to ESFAS signals as described in ~~Chapter 6.~~ subsection 6.3.2.2.3

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14A.1.12 LOW-PRESSURE INJECTION ENGINEERED SAFETY FEATURES TEST

1. Purpose

   Demonstrate emergency low-pressure injection flow capability to the reactor coolant system from the decay heat removal system.

2. Prerequisites

   2.1 Decay heat removal 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 deenergized

   2.5 Generic Testing of components has been completed.

3. Test Method

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

   3.2 Start a decay heat removal pump and demonstrate flow capability to the RCS.

   3.3 Repeat for second pump system.

   3.4 Steady-state flow conditions will be determined by steady-state flow readings on the permanent plant high-pressure injection flow instrumentation. The flowpaths will be those detailed on the system flow diagrams. 30

4. Acceptance Criteria 21

   4.1 Low-pressure injection flow capability meets or exceeds the values used in the safety analysis as specified in ~~Chapter 6~~ Subsection 6.3.1.2.5

   4.2 The piggyback mode of operation in conjunction with the decay heat removal system will ~~perform as designed~~ be demonstrated per subsection 6.3.2.8

   4.3 The required system flow shall be reached within the time period ~~required by the system design. Required~~ outlined in subsection 6.3.3.8

~~system valve response times will meet those required by system design.~~ 21

14A.1.13 MAKEUP, PURIFICATION, AND CHEMICAL ADDITION SYSTEM

1. Purpose

To demonstrate that the makeup, purification, and chemical addition system operates properly and to demonstrate proper system component response on receipt of simulated ESFAS signals.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate instrumentation calibrated and operational

2.3 Appropriate portions of component cooling water and service water systems operable

2.4 Borated water storage tank clean and filled

2.5 Reactor coolant system operable

2.6 Control logic and alarm circuitry functional checks complete

2.7 Decay heat system operable | 9

2.8 Safety-related valves tested by generic test procedures to demonstrate design closure time | 21

3. Test Method

3.1 Demonstrate proper operation of heat tracing and heaters. | 30

3.2 Demonstrate design head and flow for all pumps.

3.3 Demonstrate that power operated valves fail as designed.

3.4 Demonstrate that system components respond as required on receipt of a simulated ESFAS signal.

3.5 Demonstrate proper operation of the batch controller.

3.6 Demonstrate ability of makeup pumps to receive water from decay heat pumps and discharge the water to the reactor vessel (LPI to HPI cross-connect piggyback mode described in section 6.3.2.2). | 9 | 30

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14A.1.14 HIGH-PRESSURE INJECTION ENGINEERED SAFETY FEATURES TEST

1. Purpose

To demonstrate emergency injection flow capability to the reactor coolant system from the makeup pumps upon receipt of simulated ESFAS signal. 3

2. Prerequisites

2.1 Makeup system and borated water storage tank operable

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

2.3 RC pumps not running and RCS pressure approximately ~~500~~ 600 psig

2.4 Pressurizer level at predetermined level and heaters deenergized

2.5 Test will be done using normal power only 3

3. Test Method

3.1 Open breakers for engineered safety features pumps not under test.

3.2 Start a makeup pump and inject water to the RCS.

3.3 Repeat for specified pump and loop combinations.

DELETE
~~3.4 Demonstrate the "piggyback" mode of operation with the decay heat removal system.~~

3.~~5~~4 Determine steady-state flow values as read on permanent plant instrumentation for flowpaths detailed in the system flow diagrams (Figure 6.3-1). 3

4. Acceptance Criteria

4.1 High-pressure injection capability (both flow and time) meets or exceeds values specified in sub section 6.3.3.8 ~~Chapter 6.~~ 3

4.2 High pressure injection pump motors will not trip out under maximum flow conditions as specified in Table 6.3-1.

~~4.3 The "piggyback" mode of operation, in conjunction with the decay heat removal system, will perform as described in Chapter 6.~~

4.3 Verification of operability of HPI check valves at hot conditions (pressure approximately 2155 psig).

14A.1.15 CORE FLOODING SYSTEM

1. Purpose

To demonstrate that the core flooding system will operate to inject water into the reactor vessel when required.

2. Prerequisites

2.1 Construction activities complete on items to be tested. Insert (A)

2.2 Appropriate system instrumentation calibrated and operational.

2.3 Reactor coolant system capable of receiving water from the core flooding tanks.

2.4 Appropriate ac and dc power available.

2.5 Control logic and alarm circuitry functional checks complete.

3. Test Method

3.1 Demonstrate proper operation of core flood tank high and low level alarms while filling and draining tank.

3.2 Change RCS pressure to a value below core flood tank pressure and verify water flow to the RCS.

3.3 Change RCS pressure to a value above core flood tank pressure and verify no gross backleakage exists to the core flood tanks.

3.4 Change RCS pressure to verify that valve alarms actuate at specified setpoints.

3.5 Demonstrate proper operation of core flood tank isolation block valve position indication lights. | 30

4. Acceptance Criteria

The core flooding system operates as described in Section 6.3.

Insert (A)
Core flood tank discharge line flush complete. Visual inspection of discharge line to DHR injection line complete.

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14A.1.16 REACTOR BUILDING SPRAY SYSTEM

1. **Purpose**

   To functionally demonstrate the operation of the reactor building spray system and to demonstrate proper component response to simulated ESFAS signals.

2. **Prerequisites**

   2.1 Construction activities complete on items to be tested

   2.2 Appropriate instrumentation calibrated and operable

   2.3 Hydrazine Storage Tanks and borated water storage tanks filled with demineralized water | 14

   2.4 Appropriate ac and dc power sources available

   2.5 Baseline leakage test of the system boundary outside of containment performed | 21

3. Test Method

   3.1 Verify pump head and flow characteristics for each reactor building spray pump.

   3.2 Demonstrate that all spray headers and nozzles are free from obstruction by air blow or smoke tests. THIS WILL OVERLAP WATER FLOW PATH DONE IN OTHER TESTING.

   3.3 Verify the operation of the hydrazine injection subsystem and flow characteristics of the hydrazine pumps. | 14

   3.4 Verify the automatic operation of components in response to simulated ESFAS signals.

   3.5 Verify that all power operated valves fail in the design condition upon loss of actuation power.

   3.6 Verify opening and closing times of control valves.

4. Acceptance Criteria

   The reactor building spray system performs as described in Subsection 6.5.2.

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14A.1.17 BORATED WATER STORAGE FACILITY TEST

1. Purpose

   To demonstrate proper operation of the borated water storage facility.

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Appropriate system instrumentation calibrated and operational

   2.3 Source of demineralized water available

   2.4 Borated water storage tank clean and ready to be filled

3. Test Method

   3.1 Prior to filling tank, simulate as necessary to verify operation of tank water level alarms and instrumentation.

   3.2 Measure electrical output of installed heaters with tank filled above level of heaters.

   3.3 Demonstrate satsifactory operation of heat tracing on the borated water storage tank vent.

   3.4 Demonstrate proper operation of the borated water storage tank heater temperature control, temperature indication, and associated alarms. 20

   3.5 Demonstrate the borated water storage tank circulating pump flow and flowpath.

   3.6 Safety-related (ECCAS and RAS) valves MO-1310A&B shall be demonstrated to operate correctly.

4. Acceptance Criteria

   4.1 System interlocks, monitoring, and alarm circuits function as described in Subsection 9.2.8.

   4.2 Installed heater capacity ~~meets design specifications.~~ maintains the BWST water temperature above 40F.

   4.3 Heat tracing on the borated water storage tank vent shall ~~meet design specifications.~~ maintain the temperature above 50F. 20

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4.4 Borated water storage tank heater temperature control, temperature indication, and associated alarms shall function ~~as designed~~ per subsection 9.2.8.3 AND 9.2.8.2.4.

4.5 Borated water storage tank recirculating pump ~~flow~~ shall meet its design capacity as outlined in subsection 9.2.8.2.2 20

4.6 Valves MO-1310A&B shall function ~~as designed~~ per subsection 9.3.3.2.7

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14A.1.18 REACTOR BUILDING LOCAL LEAK TESTS

1. Purpose

To demonstrate that the leak rates of reactor building isolation valves and penetrations are satisfactory by performing Type B and Type C tests on designated penetrations and valves as indicated in Table 6.2-28A. 23

2. Prerequisites

Construction activities complete on items to be tested.

3. Test Method

3.1 Pressurize each reactor building penetration in accordance with Subsection 6.2.6.2 and determine leakage through penetration.

3.2 Pressurize each reactor building isolation valve in accordance with Subsection 6.2.6.3 and determine leakage through valve. 23

4. Acceptance Criteria

Leakage rates through individual reactor building isolation valves and the combined leakage rate through reactor building penetrations are within ~~specified limits.~~ technical specification limits as defined in Subsection 16.3.6.1.2.

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14A.1.19 MAIN CONDENSER AND CONDENSER EVACUATION SYSTEM

1. Purpose

   To demonstrate the ability of the main condenser and air removal system to provide a safe and reliable heat sink for normal operations.

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Appropriate instrumentation properly calibrated and operable

   2.3 A suitable steam supply available

   2.4 Appropriate ac and dc power available

   2.5 Control logic and alarm circuitry functional checks complete

3. Test Method

   3.1 Demonstrate proper operation of the condenser makeup and reject controls.

   3.2 Verify vacuum integrity of the condenser.

   3.3 Demonstrate proper operation of the air ejectors.

4. Acceptance Criteria

   4.1 The main condenser and condenser evacuation systems operate as described in Subsections 10.4.1 and 10.4.2.

   ~~4.2 Proper operation of the condenser and evacuation system will depend upon the system's ability to maintain a proper vacuum and remove noncondensible gases.~~ 20

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14A.1.26 VENTILATION SYSTEMS

1. Purpose

1.1 To demonstrate proper operation of the following ventilation systems:

a. Control room area ventilation system

b. Spent fuel pool area ventilation system

c. Auxiliary and radwaste area ventilation system

d. Turbine building area ventilation system

e. Engineered safety features ventilation system

f. Reactor building ventilation system

g. Diesel generator building ventilation system

h. Service water pump structure ventilation system

i. Reactor building air purification and cleanup system

j. Reactor Bldg Recirculation Air Cooling Units

1.2 To demonstrate proper system component response to simulated ESFAS signals where applicable

1.3 Demonstrate the control room pressurization system operates as required by design. 20

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 System instrumentation calibrated and operational

2.3 Appropriate power sources available

2.4 Control logic and alarm circuitry functional checks complete 27

3. Test Method

3.1 Demonstrate proper operation of system fans and verify air flow, distribution, and pressure control are within specification. 20

3.2 For applicable systems, demonstrate proper system component response and air flow following receipt of simulated ESFAS signals. 27

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4. Acceptance Criteria

4.1 The ventilation systems operate as described in Section 9.4. ESFAS actuated components function as described in ~~Chapter 6~~. SUBSECTIONS 6.2.2.2, 6.2.5, 6.4, 7.3.3 AND ~~SUBSECTION~~ 9.4.9.

4.2 FOR CONTAINMENT RECIRCULATION COOLERS, THE EXTRAPOLATION OF TEST RESULTS DEMONSTRATES FANS WILL OPERATE IN ACCORDANCE WITH SUBSECTION 6.2.2.2, AND DURING DESIGN BASIS ACCIDENT CONDITIONS AS SPECIFIED IN TABLE 6.2-25.

* 3.3 FOR APPLICABLE SYSTEMS, EXTRAPOLATE THE OPERATING PARAMETERS OF SYSTEM FANS AT AMBIENT CONDITIONS OF TEMPERATURE AND PRESSURE AND HUMIDITY TO VERIFY FANS WILL OPERATE PROPERLY DURING DESIGN BASIS ACCIDENT CONDITIONS.

3.4 DEMONSTRATE REDUNDANCE AND ELECTRICAL INDEPENDENCE WHERE APPLICABLE.

14A.1.27 HEPA FILTER AND CHARCOAL ADSORBER TEST

1. Purpose

To demonstrate leaktightness and particle removal ability of HEPA filter banks and charcoal adsorber units in the control room ventilation system, spent fuel pool area ventilation system, auxiliary and radwaste area ventilation system, ESF ventilation system, ~~and~~ reactor building air purification and cleanup system, AND CONTAINMENT COMBUSTABLE GAS CONTROL SYSTEM. 20

2. Prerequisites

2.1 Ventilation systems associated with filters are operational

3. Test Method

3.1 Inject an aerosol of DOP (dioctylphthalate, or equivalent) upstream of HEPA filters. Take a sample downstream of HEPA filter and determine concentrations. 30

3.2 Inject gaseous freon 112 (or equivalent) upstream of charcoal adsorbers. Obtain upstream and downstream samples and determine concentrations.

4. Acceptance Criteria

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** ~~The HEPA filter and charcoal adsorber units meet or exceed the filter leakage requirements given in Regulatory Guide 1.52.~~ 30

2.2 PROPER AIR FLOW DISTRIBUTION THROUGH THE FILTER AND ABSORBER BANKS WILL BE VERIFIED IN THOSE SYSTEMS CONTAINING FILTERS AND ABSORBER BANKS IN ACCORDANCE WITH REG GUIDE 1.52.

2.3 CHARCOAL RADIOIODINE REMOVAL EFFICIENCY WILL BE CERTIFIED PER RDT M 16-1T.

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THE HEPA FILTERS AND CHARCOAL ABSORBER UNITS OF THE CONTROL ROOM EMERGENCY VENTILATION SYSTEMS AND SPENT FUEL POOL AREA EMERGENCY VENTILATION SYSTEM SHALL MEET THE IN-PLACE LEAKAGE REQUIREMENTS AS LISTED IN SECTIONS C.5.C AND C.5.D OF REGULATORY GUIDE 1.52 REV 2 (LESS THEN 0.05% PENETRATION) WHEN TESTED PER SECTIONS 10 AND 12 RESPECTIVELY OF ANSI N510-1980.

THE HEPA FILTERS AND CHARCOAL ABSORBER UNITS OF THE REMAINING SYSTEMS SHALL BE TESTED PER SECTIONS 10 AND 12 OF ANSI N510-1980 AND SHALL HAVE LESS THAN 0.05% PENETRATION LEAKAGE WHEN TESTED AT DESIGN FLOW.

14A.1.28 CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM

1. Purpose

To demonstrate proper operation of the hydrogen monitoring system, the hydrogen recombiner system, and the hydrogen purge system.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate system instrumentation calibrated and operational

2.3 Appropriate power sources available

2.4 Control logic and alarm circuitry functional checks complete

3. Test Method

3.1 Demonstrate proper operation of the hydrogen purge ~~fan.~~ SYSTEM.

3.2 Demonstrate hydrogen purge flowpath.

3.3 Demonstrate proper operation of the hydrogen recombiner.

3.4 Demonstrate proper operation of the hydrogen monitoring system.

3.5 Demonstrate redundance and electrical independence. | 20

3.6 FOR APPLICABLE SYSTEMS, DEMONSTRATE PROPER SYSTEM COMPONENT RESPONSE FOLLOWING RECEIPT OF SIMULATED ESFAS SIGNALS.

3.7 DEMONSTRATE THE PROPER OPERATION OF THE COMBUSTABLE GAS CONTROL SYSTEM DURING POST-LOCA CONDITIONS BY EXTRAPOLATING TEST RESULTS AT AMBIENT CONDITIONS TO POST-LOCA CONDITIONS.

4. Acceptance Criteria

4.1 The containment combustible gas control system operates as specified in Subsection 6.2.5.

14A.1.29 GASEOUS WASTE MANAGEMENT SYSTEM

1. Purpose

To demonstrate the operability of the gaseous waste management system.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate system instrumentation calibrated and operational

2.3 Appropriate power sources available

2.4 Source of cooling water available for required components

2.5 Control logic and alarm circuitry functional checks complete

3. Test Method

3.1 Demonstrate gaseous waste management flowpaths.

3.2 Demonstrate proper operation and capacity of the air compressors and the gaseous waste system

3.3 Test the isolation valves between the nitrogen gas supply header and the radwaste gas tanks as follows:

a. The two isolation valves in the flowpath to the radwaste gas surge tank will be demonstrated to respond to the proper actuating logic and to close as designed.

b. Demonstrate that the manual valves in the flowpaths to the radwaste gas decay tanks and the radwaste gas compressors are capable of isolating this flowpath. 21

3.4 Demonstrate the proper operation of the radwaste gas compressor interlock.

3.5 Demonstrate the proper operation of the combustible gas analysis system.

4. Acceptance Criteria

~~4.1 The radwaste gas compressors shall meet their design capacity.~~

~~4.2 The radwaste gas surge tank and decay tanks shall have the required design capacity.~~

~~4.3 The radwaste gas compressor interlocks shall function as described on the system logic diagrams.~~

~~4.4 The combustible gas analysis system will give an alarm and start nitrogen gas into the gas surge tank for dilution when the oxygen concentration increases to 2%. When the oxygen concentration increases to 4%, a second alarm will be actuated and the gas compressors will be tripped.~~ 21

4.5 .1 The gaseous waste management system functions as described in Section 11.3.

14A.1.30 LIQUID WASTE SYSTEM

1. Purpose

To demonstrate the operability of the liquid waste system.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate system instrumentation calibrated and operational

2.3 Appropriate power sources available

2.4 Steam supply available for running evaporator

2.5 Control logic and alarm circuitry functional tests complete

3. Test Method

3.1 Verify operability of system flowpaths.

3.2 Demonstrate design head and flow characteristics of system pumps.

~~3.3 Demonstrate the ability to receive and process water containing boric acid and to produce deminerlized water of the specified quality.~~

4. Acceptance Criteria

The liquid waste system operates as described in Section 11.2.

3.3 DEMONSTRATE THE ABILITY TO RECEIVE AND CONCENTRATE THE 3.5 WEIGHT PERCENT BORIC ACID IN THE BORON RECOVERY SYSTEM EFFLUENT TO 14 PERCENT IN THE LIQUID WASTE SYSTEM PRIOR TO PROCESSING IN THE SOLID WASTE SYSTEM.

3.4 DEMONSTRATE THE ABILITY TO PROCESS REPRESENTATIVE PROCESS STREAMS (AS PRACTICAL) AND PRODUCE DEMINERALIZED WATER.

3.5 DEMONSTRATE THE ISOLATION FEATURES FOR LIQUID RADWASTE EFFLUENT.

14A.1.31 SOLID WASTE SYSTEM

1. Purpose

To demonstrate the operability of the solid waste system.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate instrumentation calibrated and operational

2.3 Appropriate power and steam sources available

3. Test Method

3.1 Demonstrate operability of solid waste process subsystems.

3.2 Demonstrate proper operation of the solidification subsystem control circuitry.

3.3 Demonstrate flowpaths to the extruder - evaporator. 29

.4 Demonstrate the operability of the asphalt extruder - evaporator.

3.5 Demonstrate the operability of the dry waste subsystem.

3.6 Demonstrate capability of handling equipment for remote removal and transport of filters to the drumming area.

3.7 DEMONSTRATE THE CAPABILITY OF THE SOLIDIFICATION SYSTEM TO SOLIDIFY REPRESENTATIVE CHEMICAL WASTE STREAMS AS PRACTICAL.

4. Acceptance Criteria

The solid waste system operates as described in Section 11.4.

THE SOLID WASTE SYSTEM SOLIDIFIES WASTE SUCH THAT THERE IS NO FREE LIQUID IN SOLIDIFIED PRODUCT.

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14A.1.36 REACTOR HEAD AND INTERNALS HANDLING TESTS

1. Purpose

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

   1.2 Verify the procedures used for head and internals handling.

   1.3 Verify the use of the reactor internals vent valve assembly exercise tool.

   1.4 Obtain baseline data on reactor internals vent valve assembly condition and required opening forces.

   1.5 Demonstrate operability of protective devices, interlocks, and safety devices.

2. Prerequisites

   2.1 Construction activities complete on items to be tested

   2.2 Polar crane operational

   2.3 Reactor vessel head and internals storage facilities functional

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

   2.5 Perform load tests on the polar crane.

3. Test Method

   3.1 Verify polar crane control logic, protective devices, interlocks, and safety devices.

   3.2 Adjust fixtures and lifting rigs as necessary.

   3.3 Verify level lifting, pendant adjustment, and adequate clearances. 30

   3.4 Install reactor vessel internals and head in accordance with applicable procedures.

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

   3.6 Operate and inspect the reactor internals vent valve assembly.

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4. Acceptance Criteria

~~4.1 Polar crane functions as specified.~~

~~4.2 Reactor vessel internals and head installed, removed and stored, and fixtures adjusted.~~

~~4.3 Procedures for reactor vessel head and internals handling verified.~~

~~4.4 Reactor internals vent valve assembly exercise tool performance is proper.~~

~~4.5 Reactor internals vent valve opens within required opening forces.~~

4.1 POLAR CRANE FUNCTIONS AS SPECIFIED BY THE VENDOR MANUAL 7220-M92-77, AND IS USED TO INSTALL AND REMOVE THE REACTOR VESSEL CLOSURE HEAD AND INTERNALS.

4.2 REACTOR VESSEL INTERNALS AND HEAD INSTALLED, REMOVED AND STORED, AND FIXTURES ARE ADJUSTED USING THE MAINTENANCE MECHANICAL PROCEDURES (MAME 9406.1 THROUGH MAME 9406.11 INCLUSIVE) THAT HAVE BEEN DEVELOPED FOR THESE OPERATIONS.

4.3 THE REACTOR INTERNALS VENT VALVE ASSEMBLY IS EXERCISED USING THE EXERCISE TOOL, AND THE REACTOR INTERNALS VENT VALVE OPENS WITH A FORCE OF LESS THAN 120 lbs.

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14A.1.37 FUEL HANDLING EQUIPMENT TESTS

1. Purpose

To demonstrate proper operation of all fuel handling and fuel transfer equipment.

2. Prerequisites

2.1 Functional checkout of equipment is completed.

2.2 Reactor vessel head and plenum removed and core support structure installed.

2.3 Fuel storage racks installed and fuel pool and fuel transfer canal cleaned.

3. Test Method

3.1 Perform load tests on fuel handling cranes and hoists.

3.2 Operate the equipment to functionally demonstrate the design features and functions including specified interlocks and alarms.

3.3 Operate the bridges to index to the proper core and storage positions.

3.4 Operate the fuel handling equipment under simulated fuel handling conditions utilizing a dummy fuel assembly.

4. Acceptance Criteria

4.1 The fuel handling equipment functions as specified in Subsection 9.1.4.

4.2 Selected core and storage rack locations are indexed and repeatability of indexing is ~~verified.~~ checked by verifying that a dummy fuel assembly can be reinserted into a selected number of indexed locations.

~~4.3 Operations of the fuel handling equipment required for normal fueling are verified.~~

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14A.1.38 STUD TENSIONING AND HANDLING EQUIPMENT TEST

1. Purpose

1.1 To test the equipment provided for handling reactor vessel closure head studs, alignment studs, stud nuts, and stud tensioners

1.2 To perform field checkout of the stud tensioner and the stud handling tools

2. Prerequisites

2.1 Reactor vessel head is installed.

2.2 Stud tensioners have been inspected and calibrated according to the equipment instruction manual. Tensioners are accessible for testing.

2.3 Reactor vessel closure head studs, nuts, and handling tools are clean and accessible for checkout. 30

3. Test Method

3.1 Install/remove reactor vessel closure head studs and nuts utilizing associated handling equipment and stud tensioners in accordance with established procedures.

3.2 Install/remove stud tensioners using associated handling equipment in accordance with established procedures.

4. Acceptance Criteria

~~Equipment provided for handling reactor vessel closure head studs, alignment studs, stud nuts, and stud tensioners performs its design functions.~~

THE REACTOR VESSEL CLOSURE HEAD STUDS, ALIGNMENT STUDS, STUD NUTS, AND STUD TENSIONERS ARE INSTALLED AND REMOVED USING THE HANDLING EQUIPMENT AND PROCEDURES DESCRIBED IN M1.1-45.

THE REACTOR VESSEL CLOSURE STUDS ARE TENSIONED AND DETENSIONED USING THE STUD TENSIONERS AND PROCEDURES AS DESCRIBED IN M1.1-45. (ALSO CATALOGUED AS B&W DOCUMENT # 01-280-02)

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14A.1.39 SURVEILLANCE AND RADIATION SPECIMEN HANDLING TEST

1. Purpose

To verify the operation of the surveillance specimen handling equipment | 30

2. Prerequisites

2.1 Core support assembly installed

2.2 Reactor vessel head and plenum assembly removed

3. Test Method

3.1 Install surveillance and radiation specimen capsules and closure and holddown assemblies in all holder tubes in accordance with established procedures. | 30

3.2 Remove all closure and holddown assemblies and surveillance and radiation specimen capsules from holder tube and place in storage container in accordance with established procedures. | 30

4. Acceptance Criteria

THE ~~All~~ surveillance and radiation specimen handling equipment ~~performs its design functions.~~ INSTALLS AND REMOVES THE SURVEILLANCE AND RADIATION SPECIMEN CAPSULES. | 30

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14A.1.40 NON-CLASS 1E AC POWER DISTRIBUTION TEST

1. Purpose

   To demonstrate that the non-Class 1E electrical systems are capable of providing reliable electrical power during specified modes of station operation.

2. Prerequisites

   2.1 Offsite power available

   2.2 Appropriate meters, relays, interlocks, and protective devices calibrated and operable

   2.3 During testing breakers positioned to prevent unscheduled loss of power to unit under test or other unit via common cross ties.

3. Test Method

   3.1 Demonstrate that the non-Class 1E buses can be transferred between all design sources.

   3.2 Demonstrate that the loss of preferred power supply can be detected. 30

   3.3 Demonstrate that the standby power supply is independent of the preferred power supply.

4. Acceptance Criteria

   The non-Class 1E ac buses can be transferred between all design sources and separation is maintained between systems AS described in FSAR Chapter 8 section 8.3. 30

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14A.1.41 CLASS 1E AC POWER DISTRIBUTION TEST

1. Purpose

   To demonstrate that the Class 1E electrical distribution system provides a realiable source of power and to measure steady-state and transient voltage levels. 39

2. Prerequisites

   2.1 Offsite power available

   2.2 Appropriate meters, relays, interlocks, and protective devices calibrated and operable

   2.3 Diesel generators capable of supporting busloads when required

   2.4 Sufficient electrical load is available to load all Class 1E buses to at least 30%. 39

   2.5 During testing breakers positioned to prevent unscheduled Loss of Power to unit under test or other unit via common cross ties.

3. Test Method

   3.1 Demonstrate that the Class 1E ac buses can be transferred between all design sources.

   3.2 Demonstrate that the loss of the preferred power supply can be detected. 30

   3.3 Demonstrate that the standby power is independent of the preferred power supply.

   3.4 Establish at least 30% of the bus normal loading on all Class 1E buses down to the 120Vac level.

   3.5 Record the existing offsite power voltage and all distribution bus voltages from the Class 1E 4,160V switchgear to the Class 1E 120Vac level. Record power flows in watts and VARs.

   3.6 While monitoring and recording the same voltages measured in Step 3.5, start a large Class 1E motor. 39

   3.7 While monitoring and recording the same voltage measured in Step 3.5, start a large non-Class 1E motor.

4. Acceptance Criteria

   4.1 The Class 1E ac buses can be transferred between all design sources as described in FSAR Chapter 8 Section 8.3

   4.2 The steady-state and transient voltage levels have been recorded. 39

14A.1.42 EMERGENCY DIESEL GENERATOR SYSTEM

1. Purpose

To demonstrate the ability of the emergency diesel generators and their support systems to provide reliable emergency power. 30

2. Prerequisites

2.1 Construction activities complete on equipment and systems to be tested, including functional testing 30

2.2 Instrumentation calibrated and operable

2.3 Appropriate ac and dc power sources available

2.4 Control logic and alarm circuitry functional checks complete 11

3. Test Method

3.1 Demonstrate proper operation of the diesel generator support. 30

3.2 Demonstrate proper operation of the diesel generators including manual and automatic controls, interlocks, and trips and operation following a simulated start failure signal AND ALSO FOLLOWING A LOSS OF ALL A.C VOLTAGE 20

3.3 Demonstrate diesel generator load test at full continuous rated load demand for an interval of not less than 24 hours (minimum 22 hours at 5,250kW, 2 hours at 5,775kW) and verify design heat removal, frequency, and voltage control capability.

3.4 Demonstrate that the emergency diesel generator will shed the continuous rated load (5,250kW) AND THAT OVERSPEED LIMITS ARE NOT EXCEEDED 11

3.5 Demonstrate functional capability at full load temperature conditions by performing a loss of offsite power start-test immediately after the load shed test described in Item 3.4 above. 30

3.6 Demonstrate that the emergency diesel generator will shed and pick up the largest single load, which will be a load of at least 900kW (equivalent to the service water pump). This test will be performed at a minimum load of 50% of continuous rated load (2,625kW).

3.7 Demonstrate ability of each diesel unit to transfer load to offsite source by:

a. Synchronizing the diesel generator unit with offsite power carrying a load equal to or greater than maximum engineered safety features load demand

b. Transferring a load equal to or greater than maximum engineered safety features load from the diesel generator to the startup transformers

c. Unloading the diesel unit 30

d. Restoring the unit to standby status

3.8 Demonstrate reliability of each diesel generator by means of 35 consecutive valid tests with no failures (valid tests and failures to be determined in accordance with RG 1.108).

3.9 Demonstrate reliability of diesel generator units by simultaneous starting of redundant units.

4. Acceptance Criteria

4.1 The diesel generators and their auxiliaries perform in accordance with Subsection 8.3.1 and Section 9.5 respectively.

4.2 Specified temperatures are not exceeded during the load test of the diesel generators.

4.3 Frequency and voltage are maintained within required limits during various operational tests of the diesel generators. 30

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14A.1.43 INTEGRATED ENGINEERED SAFETY FEATURES ACTUATION TEST

1. Purpose

   To demonstrate proper integrated operation of the engineered safety features system and to demonstrate that the diesel generators will start and maintain required loads when necessary.

2. Prerequisites

   2.1 Reactor vessel closure head removed and fuel transfer canal prepared for filling

   2.2 ESFAS actuated systems operable

   2.3 Operational testing of diesel generators complete

3. Test Method

   3.1 Demonstrate proper bus stripping, separation of nonvital loads, and proper sequencing of vital loads by performing the following:

   a. ESFAS followed by a loss of offsite power

   b. Loss of offsite power followed by ESFAS. This test will be performed twice, once for each redundant combination of diesel generator and actuated devices. 21

   c. Loss of offsite power only

   d. ESFAS only

   ~~3.2 Demonstrate diesel generator start times are within specified time.~~

   ~~3.3~~ 3.2 The redundancy and electrical independence of the ESFAS will be demonstrated by the test method in Item 3.1.b above by completely deenergizing the Class 1E ac and dc distribution systems not under test. The deenergized buses will be monitored during this test. POWER SOURCES WILL BE MONITORED TO VERIFY ESF LOADS DO NOT EXCEED SOURCE FULL LOAD CAPACITY. 21

   This test will include all the following emergency conditions:

   a. Refueling accident 37

   b. Control room isolation

   c. Containment isolation

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d. Letdown cooler isolation

e. Steam and feedwater line break 37

f. Auxiliary feedwater actuation

3.4 Demonstrate proper diesel generator voltage and frequency regulation during transient and steady-state condition.

3.5 Demonstrate that the emergency diesel generator will shed and pick up the largest single load, which will be a load of at least 900kW (equivalent to the service water pump). Demonstrate that the emergency diesel generator will reject the continuous rated load. These tests will be performed at a minimum load of 50% of continuous rated load (2,625kW). 30

3.3 ~~3.6~~ Simulate low BWST level and demonstrate proper transfer to the sump recirculation flowpath.

3.4 ~~3.7~~ Demonstrate automatic operation of ESF components.

3.8 Demonstrate ability of each diesel unit to:

a. Synchronize the diesel generator unit with offsite power while the unit is carrying a load equal to or greater than the maximum engineered safety features load demand.

b. Transfer a load equal to or greater than the maximum engineered safety features load from the diesel generator to the startup transformers. 30

c. Isolate the diesel unit.

d. Restore the unit to standby status.

4. Acceptance Criteria

Emergency loads are sequenced [Table 7.3-3] and [ECCAS actuated] ~~ESF~~ components are actuated as described in ~~Chapter 6~~. The emergency power system responds during steady-state and transient conditions as described in [Subsection 8.3.1.1.3] ~~Chapter 8. Voltage and frequency are maintained within requirements.~~ 30

Blind Note UCo-Site to verify

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14A.1.44 120Vac CONTROL, INSTRUMENTATION, AND PREFERRED POWER SYSTEM 20

1. Purpose

To demonstrate that the 120Vac preferred buses, control and instrumentation buses, and associated power supplies are capable of supporting their design loads and can be transferred to the alternate sources. 20

2. Prerequisites

   2.1 Construction activities completed on items to be tested

   2.2 Instrumentation calibrated and operable

   2.3 All 125Vdc power systems available to ac inverters for the vital buses

   2.4 Alternate power source available

3. Test Method

   3.1 Demonstrate that the preferred buses can be transferred between the normal and reserve source.

   3.2 Load test each inverter using both its normal and alternate power supply.

   3.3 Demonstrate the availability of 120Vac power at the control and instrumentation buses. 20

   3.4 Demonstrate that the loss of the preferred power supply can be detected. 30

4. Acceptance Criteria 20

The 120 Vac power system will perform all functions described in Subsection 8.3.1.

2.5 During testing breakers positioned to prevent unscheduled loss of power to unit under test or other unit via common cross ties.

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14A.1.45 125 Vdc POWER SYSTEM |20

1. Purpose

To demonstrate that the dc power system provides a reliable source of power and is capable of supplying the design load capacity under emergency conditions

2. Prerequisites

2.1 Construction activities complete on all items to be tested

2.2 Appropriate instrumentation calibrated and operable

2.3 Batteries fully charged or at charge state required for testing *

2.4 Battery room ventilation available

2.5 Appropriate ac and dc power sources available in both units

2.6 During testing breakers positioned to prevent unscheduled loss of power to unit under test or other unit via common cross ties.

3. Test Method

3.1 Battery charger performance will be verified in both the float and equalize mode.

3.2 The battery's ability to supply its design duty cycle load will be verified with a controlled battery discharge on the Class 1E batteries.

3.3 A performance discharge test will be performed on each battery to verify the design capacity while remaining within its design limits. |20

3.4 Demonstrate that the loss of the preferred power supply can be detected. 30

3.5 Demonstrate that the standby power supply is independent of the preferred power supply.

→ INSERT F

4. Acceptance Criteria

The Class 1E power system is capable of performing all functions described in Subsection 8.3.2. Each charger can supply largest steady state load defined in table 8.3.7 while floating the battery and can recharge the battery from minimum design charge state within 24 hours while supplying the largest steady state load defined in table 8.3.7.

INSERT F 0CC3195

3.6 DEMONSTRATE THAT SAFETY RELATED DC SYSTEM LOADS FUNCTION PROPERLY AT THE MINIMUM EXPECTED DC SYSTEM VOLTAGE.

NOTE: IN CASES OF IDENTICAL LOADS, ONLY THE LOADS WITH THE LOWEST MEASURED VOLTAGE WILL BE TESTED. ALSO, THE DIESEL GENERATOR FIELD FLASHING CIRCUIT WILL NOT BE OPERATED FOR THE TEST. THIS VOLTAGE WILL BE MEASURED AT THE DIESEL AND VERIFIED TO BE WITHIN THE MANUFACTURER'S REQUIREMENTS.

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14A.1.49 Reactor PLANT SAMPLING SYSTEMS

1. Purpose

To demonstrate that specified quantities of representative fluids can be obtained safely and at specified conditions from each sampling point.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Appropriate system instrumentation calibrated and operational

2.3 System to be sample filled at its normal operating conditions of pressure and temperature

3. Test Method

3.1 Demonstrate EACH FLOWPATH AND that adequate flowrates exist from each sample location.

3.2 Demonstrate sample containers and quick disconnects function properly.

3.3 Demonstrate that samples are cooled to design temperatures by the heat exchangers.

3.4 DEMONSTRATE THAT THE DELAY TIMES FOR REACTOR COOLANT SAMPLES ARE IN ACCORDANCE WITH SUBSECTION 9.3.2.1.3.2

3.5 DEMONSTRATE THAT PLANT PROCEDURES ARE ADEQUATE FOR OBTAINING REACTOR PLANT Samples

4. Acceptance Criteria

Acceptance will be based on verification that representative samples can be obtained under design conditions AS STATED IN SUBSECTION 9.3.2.1

14A.1.50 OTSG CHEMISTRY TEST

1. Purpose

To maintain proper water chemistry for the OTSG and feedwater systems during initial system fill and preoperational tests.

2. Prerequisites

2.1 Condensate, feedwater, and sampling systems operable and cleanup completed

2.2 Water chmistry laboratory facilities available and instruments calibrated

3. Test Method

3.1 Sample the water to be used for filling.

3.2 Sample the condensate, feedwater, and OTSG systems during and upon completion of filling and at specified conditions through the preoperational test phase.

4. Acceptance Criteria

Concentrations measured are maintained within the ~~specified~~ limits.

OF SPECIFICATION NO. 2050-02/02 78.
BABCOCK & WILCOX STANDARD GUIDE SPECIFICATION FOR WATER CHEMISTRY REQUIREMENTS FOR INITIAL FILL AND TESTING OF REACTOR COOLANT SYSTEM, STEAM GENERATOR AND PREBOILER CYCLE

3.2 Combinations of actuation signals will be utilized to verify proper operation of the two-out-of-four matrix logic.

3.3 For each input parameter, signals will be simulated to determine the response times of the safety channels. 39

4. Acceptance Criteria

4.1 The ESFAS system functions as described in Subsection 7.1.1.3.

4.2 The response times are within the limits of overall response times listed in Table 16.3.3-5. System response time will be verified by measuring the response times of discrete portions of the system and showing that the sum of all response times is within the limits ~~of the overall system requirement.~~ are listed in Table 16.3.3-5. 39

14A.1.53 REACTOR PROTECTION SYSTEM

1. Purpose

To demonstrate proper operation of the reactor protection system logic for all four of the RPS channels, including verification of proper calibration, and to demonstrate channel response times.

2. Prerequisites

   2.1 Reactor protection system calibrated and operational

   2.2 Construction activities complete on trip circuit breakers

   2.3 Appropriate power supplies available

3. Test Method

   3.1 Simulated test signals will be utilized to verify proper setpoint adjustments, correct operation of indicators and alarms, and proper logic operation in all operating modes.

   3.2 For each input parameter, signals will be simulated to determine the response time of the instrument channels.

4. Acceptance Criteria

   4.1 The reactor protection system functions as described in Section 7.2

   4.2 The response times are within the limits ~~of the overall response times listed in Section 16.3/4.3~~. Verification of system response time will be accomplished by measuring the response times of discrete portions of the system and showing that the sum of all response times is within the limits of the overall system requirement. 21

   INSERT G

   4.2.1 ~~For instrumentation utilizing pressure sensors, the sensor shall be included in the test setup for the determination of total response time~~.

   4.2.2 For instrumentation utilizing RTDs as sensors, the sensor response time as certified by the manufacturer shall be used in the determination of total response time.

* ... SPECIFIED IN TABLE 16.3.3-2 ~~OF THE FSAR~~

4.2.3 For instrumentation utilizing neutron detectors as sensors, the sensors are exempted from sensor response time. The test setup will initiate measurement of the neutron flux signal response of the channel at the input to the first electrical component in the channel. 21

4.2.4 SENSING LINES ~~Process to sensor coupling (sensing lines, etc)~~ will not be included in the response time determination because of limitations in the design of the equipment provided.

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4.2.1 For instrumentation utilizing Pressure Sensors, the process variable will be simulated at the input to the sensor, and the response time between the process input and the sensor output will be determined.

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14A.1.56 CONTROL ROD DRIVE SYSTEM TESTS Functional

1. Purpose

To verify that the control rod drive control system (CRDCS) and the control rod drive mechanisms (CRDMs) operate in accordance with design requirements.

2. Prerequisites

The following prerequisites apply to Paragraphs 3.2 through 3.4 of the test method.

2.1 Each CRDM is filled with primary system water and vented as required for CRDM operation.

2.2 The CRDM stator temperature indication is operational.

2.3 The control rod drive/component cooling water (CRD/CCW) interlock has been tested and the component cooling water system is available.

2.4 Drive guide assemblies are coupled to the CRDMs in place of the control rod assemblies 30

3. Test Method

CRDCS testing will be performed in several phases, as follows.

3.1 With the CRDMs disconnected, perform a functional test of the CRDCS including the control panel, power conversion equipment, alarms, and interlocks.

3.2 Using the CRD service power supply, verify the minimum latching current, minimum unlatching current, and minimum running current for each mechanism. Also, verify the CRDM stator insulation and winding resistances and the stator thermocouple resistance.

3.3 With drive guide assemblies coupled to the CRDMs, demonstrate satisfactory integrated operation of the entire control rod drive system. This testing includes ~~normal and scram~~ operation ~~of the system,~~ proper operation of the CRDM ~~under hot and cold plant conditions~~, verification of CRDM withdrawal and insertion speeds, verification of rod group sequencing and inhibit interlocks, and verification of rod position indication.

during hot functional testing.

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4. Acceptance Criteria

4.1 The CRDM stator temperatures ~~do not exceed the alarm setting.~~ are within the limits specified in B&W Test Specification 62-1005778 (Reference TS-4300) 30

4.2 The CRDMs operate as specified in Subsections 3.9.4 and 4.6.3.

4.3 The CRDCS operates as specified in Subsections 7.4.1.1.3 and 7.7.1.3.

14A.1.60 REACTOR BUILDING LEAK RATE TEST 0003195

1. Purpose

To demonstrate that the integrated leakage rate from the containment does not exceed the DBA leakage rate.

2. Prerequisites

2.1 Containment activities complete on items to be tested.

2.2 Containment ventilation system, personnel airlock, and isolation valves are operable

2.3 Containment inspection completed

2.4 Test instrumentation and equipment installed and operable

2.5 Reactor building ventilation system operating to control air temperature prior to and during the test

2.6 Individual local leakage tests on reactor building isolation valves and penetrations complete

3. Test Method

The integrated leak rate test sequence of events is illustrated in Subsection 6.2.6.1. The leakage rate will be determined by measuring the leakage from the reactor building after the building temperature and pressure have stabilized. The absolute pressure-temperature method of measuring leakage from the reactor building will be employed during the test. The leakage rate test will be performed both at a peak accident pressure and at a reduced pressure. 2:

4. Acceptance Criteria

The measured reactor building leakage rate does not exceed ~~specified limits.~~ TECHNICAL SPECIFICATION, AS DEFINED IN Subsection 16.3.6.1.2.

14A.1.61 REACTOR BUILDING STRUCTURAL INTEGRITY TEST

1. Purpose

Demonstrate the structural integrity of the reactor building at 115% of design pressure.

2. Prerequisites

2.1 Construction activities complete on items to be tested

2.2 Test equipment properly installed and operable

2.3 Reactor building ventilation system operating to control air temperature prior to and during the test

2.4 Individual local leakage tests on reactor building isolation valves and penetrations complete

3. Test Method

The reactor building will be pressurized in steps up to a maximum or 115% of design pressure. At selected pressure levels, data will be recorded and inspections made to verify structural integrity. Data will also be recorded at specified levels during depressurization. During the test, the reactor building hatches, penetrations, and gaskets are visually inspected.

4. Acceptance Criteria

The reactor building structure withstands pressurization to 115% of the design pressure and data ~~taken~~ conforms with design predictions.

Maximum radial displacement of the RX Bldg
Maximum vertical displacement of the RX Bldg
Maximum increase in concrete crack width in the crack mapped areas

These data will be compared to values predicted by design calculations. These design calculations will be provided by ~~architect engineer.~~ amendment.

Blind Note to CPCo - site
If you wish Bechtel to perform additional design calculations, submit a letter to our Project Engineer. No work will be performed or scheduled until then.

14A.1.62 REACTOR COOLANT SYSTEM (RCS) HYDROSTATIC TEST

1. Purpose

To demonstrate the integrity and leaktightness of the RCS and connected 2,500 psig design piping by hydrostatically testing the system in accordance with ASME Code Section III.

2. Prerequisites

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

2.2 All systems and portions of systems required for conducting this test are available for operation

2.3 Special test instrumentation and relief valves installed

3. Test Method

3.1 RCS is heated to specified temperature with the reactor coolant pumps

3.2 Pressurizer is filled solid and pressure increased in increments to the hydrotest pressure with inspections as required at each intermediate plateau.

3.3 Examination for leakage will be made subsequent to application of the hydrostatic test pressure for the Code specified time period.

3.4 RCS is restored to desired conditions at conclusion of test (layup as required).

3.5 Code reliefs are then installed and the system is repressurized to operating pressure to test flanges and locations where packings or gaskets were tightened or replaced. (This step may be performed as part of hot functional testing.)

4. Acceptance Criteria

All piping, welds, and vessels exhibit no leakage except where specifically permitted by ~~design specifications~~ ASME SECTION III NB6200. (e.g., mechanical joint).

14A.1.63 ONCE-THROUGH STEAM GENERATOR (OTSG) HYDROSTATIC TEST | 32

1. Purpose

To demonstrate the integrity and leaktightness of the secondary side of the OTSG and associated piping up to the main steam isolation valves and feedwater stop valves by hydrostatically testing the system in accordance with the ASME Code Section III. | 32

2. Prerequisites

2.1 Preoperational calibration completed on specified secondary plant instrumentation

2.2 OTSG and piping within the hydroboundary filled with water meeting the specified chemistry limits | 32

2.3 Main steam piping hangers pinned

2.4 Specified temperatures of the OTSG shell and associated piping are met. | 32

3. Test Method

3.1 Increase OTSG secondary side pressure in increments to the test pressure. | 32

3.2 Inspect the system for leaks at each intermediate plateau. | 32

3.3 Examination for leakage will be made subsequent to application of the hydrostatic test pressure for the Code specified time period.

3.4 Depressurize, drain steam lines, and unpin hangers. | 32

3.5 Lay up OTSG and associated piping system as required.

4. Acceptance Criteria

Piping, welds, and vessels exhibit no leakage except where specifically permitted by ~~design specifications (e.g., mechanical joint)~~. ASME Code, Section III NB 6200. | 32

Blind Note
CPCo Site — Which code? B&PV?

3.9 Demonstrate the ability of the reactor building cooling system to maintain reactor building temperatures withing specified limits; perform a temperature survey of the control rod drive housing structure to verify adequacy of circulating fans. |30

Insert H

3.10 Demonstrate the response of the auxiliary feedwater system to a simulated trip of all four reactor coolant pumps and a trip of both main feedwater pumps and the ability of the auxiliary feedwater system to maintain OTSG level within specified ranges. Verify that initiation of the auxiliary feedwater system does not result in unacceptable water hammer. |30

3.11 Demonstrate the turbine bypass valves and atmospheric dump valves capability to control steam header pressure at no load T_{avg} conditions. Demonstrate local manual operation of the atmospheric dump valves to control steam header pressure at no load, T_{avg} conditions. |30 |23

3.12 Demonstrate main steam safety valve setpoints are within specified limits, per Technical Specifications at temperature 532F by use of a hydro-assist. |30

3.13 Cycle main steam isolation valves and verify that the closure time is within specified limits. |23

3.14 Demonstrate the ability of the auxiliary feedwater system to initiate a stable cooldown of the reactor coolant system. Demonstrate the ability of the decay heat removal system to cool down the RCS at specified rates after RCS pressure and temperature, during hot function cooldown, reach specified values. During cooldown by decay heat, ability of the check valve (closest to reactor vessel) to function at hot conditions will be demonstrated. |30

3.15 Perform final flow balance of component cooling and service water systems. |30

3.16 Demonstrate the adequacy of the component cooling and service water systems to remove heat from the decay heat removal system during cooldown. |23

3.17 Conduct visual inspection of selected piping systems for acceptable steady-state vibration levels.

3.18 Verify acceptable piping system transient response for selected dynamic events. |30

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4. Acceptance Criteria

Acceptance criteria will be based upon verification that systems operate in accordance with design specifications.

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Extrapolate the results of this survey to verify Control Rod Drive Housing Temperature do not exceed design limits when the Reactor Building is at its Technical Specification Limit, and that the Reactor Building Recirculating air coolers are adequate.

Insert I

3.19 Demonstrate that concrete temperatures surrounding hot Containment Penetrations without cooling systems do not exceed design limits by monitoring surface temperature during Hot Functional Testing.

3.20 Containment Isolation Values Functional and Closing timing tests will be preformed to the extent possible (i.e. without causing unsatisfactory conditions or damage to equipment) During Hot Functional testing

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14A.1.65 Reactor Internals Component Inspection

1. PURPOSE

To determine if the Reactor Internals are subject to degradation that may be caused by flow-induced vibration.

2. PREREQUISITES

2.1 The RV closure head is removed

2.2 The plenum is removed

2.3 The core support assembly is removed

3. TEST METHOD

3.1 Inspect the internals prior to hot functional testing (HFT) to establish a baseline condition.

3,2 Inspect the internals post HFT for comparison to the baseline condition.

4. ACCEPTANCE CRITERIA

4.1 Prior to HFT - A baseline condition of the reactor internals is established.

4.2 Post HFT - The inspection data is compared to the baseline and no degradation exists.

Blind Note
New
Abstract
there is no 14A.1.65 in FSAR.

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14A.1.66 REACTOR COOLANT SYSTEM CHEMISTRY TEST

1. Purpose

To demonstrate that proper reactor coolant system water chemistry during initial fill and that preoperational testing can be maintained within specification.

2. Conditions Prior to Test

The reactor coolant system must be locally cleaned and/or inspected and all auxiliary systems that are capable of supplying water to the reactor coolant system must have been flushed, locally cleaned, and/or inspected to ensure that they are at their required level of cleanliness prior to the initial fill of the reactor coolant system.

3. Test Method

3.1 Sample the water to be used for filling.

3.2 Sample the reactor coolant system during and upon completion of fillings and at specified conditions through preoperational testing.

3.3 Perform specified analyses on samples.

4. Acceptance Criteria

4.1 Concentrations measured are maintained within ~~specified limits.~~ LIMITS DEFINED IN:

4.1.1 PLANT PROCEDURE 2010.1

4.1.2 PLANT PROCEDURE 2020.1

4.1.3 B&W WATER CHEMISTRY REQUIREMENT SPECIFICATION NO. 2050-02/0278

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14A.1.67 RADIOCHEMISTRY TESTS

1. Purpose

   To establish baseline activity levels

2. Prerequisites

   2.1 Radiochemistry laboratory operational

   2.2 Systems from which samples are to be taken are functional to permit sample collection.

3. Test Method

   3.1 Obtain samples from specified systems at designated times during the preoperational test program.

   3.2 Perform specified analyses.

4. Acceptance Criteria

   Baseline activity levels have been established for ~~specified systems~~ SYSTEMS AS SPECIFIED IN B&W TEST SPECIFICATION TS-0180.

14A.1.70 RCS LOW-PRESSURE OVERPROTECTION FEATURES 0003195

1. Purpose

To verify ~~proper~~ operation of relief and alarm actuation of the low temperature overpressure protection features.

2. Prerequisites

2.1 The DHRS suction from RCS relief valves has been satisfactorily tested in accordance with ASTM Section XI, Subsection 1WV3510.

2.2 The RCS is operating in the DHR mode with a pressurizer steam bubble above 35 psig and below 220F. 21

3. Test Method

3.1 Simulate, in turn, each DHRS suction isolation valve from the RCS not open.

3.2 Simulate pressurizer pressure above the power operated relief valve (PORV) setpoint.

4.0 Acceptance Criteria

4.1 Alarms on each DHRS suction isolation valve function ~~properly~~ Per Subsection 7.6.1.6.

4.2 PORV opens and closes at the required setpoints. OUTLINED in Subsection 7.6.1.6

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14A.1.73 RADIO FREQUENCY INTERFERENCE (RFI) FIELD DEMONSTRATION TEST

1. Purpose

   1.1 To demonstrate RFI immunity of instrumentation in areas where two-way radio communication equipment will be utilized.

   1.2 To establish exclusion areas where two-way radio communication equipment may not be used.

2. Prerequisites

   Plant is in hot functional testing sequence with reactor coolant system at operational temperature and pressure.

3. Test Method

   3.1 For equipment rooms in the Midland plant containing safety-related equipment, radio transmitters will be keyed in close proximity to the equipment. 30

   ~~3.2 Control room personnel will monitor plant equipment for RFI susceptability during normal equipment operation.~~

INSERT 5

4. Acceptance Criteria

   ~~4.1 Locations which are demonstrated to be immune to RFI will be considered as areas where two-way communication may be used.~~

   ~~4.2 Locations which exhibit RFI sensitivity will be considered exclusion areas for radio use. This exclusion may be for certain modes of operation or it may be a total exclusion.~~

" ..-.-

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~~Proposed~~ Changes to 14A.1.73

~~RFI Testing~~

~~In response to NRC Questions dated 18 January 1982, item 423.41, the following change is proposed.~~

INSERT I

3. Test Method

3.2 Control Room Operations personnel will closely monitor all control room instrumentation and plant equipment parameters for plant perturbations or off-normal indication during the Radio Transmition Testing.

3.3 Should a plant perturbation or off-normal indication or event occur during the radio transmition testing, the testing shall stop until the control room operating personnel have stabilized the plant and have informed the test engineer that testing may be started again.

4. Acceptance Criteria

4.1 Locations which are demonstrated not to cause perturbations in Control Room Monitored Instrumentation or plant equipment of 1% normal scale or less will be considered as areas where two-way communication may be used.

4.2 Locations which are demonstrated to cause perturbations in Control Room Monitored Instrumentation or plant equipment ofgreater that 1% normal scale will be considered exclusion areas for radio use. This exclusion may be for certain modes of operation or it may be a total exclusion. Appropriate warning signs will be posted.

4.3 Locations that contain plant control equipment that the manufacturer has explicitly stated tohave low immunity to RFI will not be tested and an exclusion zone will be determined and appropriately posted.

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14A.1.74 PRESERVICE EXAMINATION OF SAFETY-RELATED PIPING SYSTEMS AND PIPING SUPPORTS

1. Purpose

1.1 To ensure proper installation and adequate movement clearance for safety-related piping system supports (variable spring hangers, supports, constant load supports, snubbers, etc).

1.2 To verify the operability of safety-related snubbers which are identified in Tables 16.3.7-4a and 16.3.7-4b of the Midland Plant Technical Specifications. 33

2. Prerequisites

2.1 The location, orientation, identification, and installation of supports must be in accordance with design specifications and/or have been analyzed to ensure stress levels are within allowable tolerances.

2.2 All hydraulic snubbers must have satisfactorily completed factory acceptance testing.

2.3 Each large mechanical snubber must have been exercised to the fully extended and retracted position during installation. 34

3. Test Method Insert K

The following visual examination(s) will be performed: 1

3.1 Each support will be examined to verify that no visible signs of damage or impaired operability exist as a result of storage, handling, or installation. 33

3.2 Each support will be inspected during walkdown to verify that its location and position setting are in accordance with arrangement drawings.

3.3 The support area will be examined to ensure that the area is free of debris and free of any plant features that could impair the support function or lead to future damage or impairment.

3.4 Each small mechanical snubber will be inspected to ensure it is not frozen or jammed.

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Insert K

after snubber Installation, but not more than six months prior to initial system pre-operational testing. If the period between initial pre-service examination and initial system pre-operational test exceeds six months due to unexpected situations, re-examination of items 3.1, 3.5 and 3.6 shall be preformed.

Insert L 0003195

4.1 Supports are built in accordance with the hanger design sketches provided by the architect engineer and there are no visible indications of damage or impaired operability.

4.2 Piping systems and supports are free to expand from the cold to hot conditions as specified in the hanger sketches provided by the architect engineer.

4.3 All snubbers are not frozen or jammed.

4.4 All supports have been adjusted in accordance with hanger installation specifications 7220-M32 and 7220-M327 and hanger sketches provided by the architect engineer

4.5 All restraints requiring shim installation in the cold condition have been completed in accordance with restraint design drawings ~~referenced in the architect engineer drawings~~ C-416~~(Q)~~, C-417~~(Q)~~, C-673~~(Q)~~, C-674~~(Q)~~ ~~and~~ C-675~~(Q)~~

Blind Note VPCo - Site

If you wish to reference these drawings, mark-up and submit copies of the appropriate 1.7 Tables identifying which sheets and revisions you wish to be submitted

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3.5 Each snubber will be inspected to ensure adequate clearance is available for the snubber to move within design specification.

3.6 Each hydraulic snubber will be inspected to verify proper hydraulic fluid level, and to verify there is no visual evidence of fluid leakage.

3.7 Structural connections such as pins, fasteners, and other connecting hardware will be examined to ensure correct installation.

4. Acceptance Criteria 33

4.1 All supports are installed in accordance with design specifications, and there are no visible indications of damage or impaired operability.

4.2 There is adequate clearance for thermal growth of piping systems and supports.

4.3 All snubbers are not frozen or jammed.

4.4 All supports have been set to the design cold setting.

4.5 All restraints requiring cold shim adjustments have been satisfactorily adjusted.

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14A.1.75 THERMAL EXPANSION VERIFICATION

1. Purpose

To verify that safety-related piping systems and piping supports exhibit thermal movement within design limits during initial heatup and cooldown. Only safety-related systems which normally operate at temperatures greater than 250F will be physically verified. Other systems will be visually inspected during heatup and cooldown.

2. Prerequisites

2.1 Preservice examinations are complete for piping systems and piping supports in accordance with the test abstract in Subsection 14A.1.74.

2.2 The NSSS is prepared for the hot functional tests (HFT) in accordance with the prerequisites of the test abstract in Subsection 14A.1.64.

3. Test Method

3.1 During the HFT heatup and cooldown, perform the following:

a. Verify piping and support movements are within design limits. 33

b. Verify that there are no interferences for piping and supports.

c. Verify that adequate clearances exist to accommodate projected growth.

3.2 For those systems which do not attain normal operating temperatures, verify by measurement and evaluation that adequate clearances exist between the piping systems and supports for the projected thermal movement.

3.3 At the final HFT hot plateau, install and/or adjust support and restraint shims as required by design documents.

4. Acceptance Criteria

4.1 The piping systems and supports exhibit thermal movements ~~which are within design limits.~~ Insert M

4.2 The piping systems and supports exhibit unrestricted movement during heatup and cooldown.

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Insert ~~OO~~ M

in accordance with the thermal expansion test matrix and hager design sketches to be provided by amendment.

Blind Note C Co Site

If you wish Bechtel to perform this work, submit a letter to the Project Engineer. No work will be scheduled or started until that letter is received.

4.3 All supports and restraints which require hot shim adjustments have been ~~satisfactorily adjusted.~~ | 33

completed in accordance with the restraint design drawings referenced in ~~the architect engineer~~ drawings C-416(Q), C-417(Q), C-673(Q), C-674(Q) and C-675(Q).

Blind Note Mo-Site

If you wish to reference these drawings, submit marked up copies of the 1.7 Tables identifying which sheets and revisions you wish to submit

14.A.1.77 Incore Monitoring System Tests

0003195

1. PURPOSE

To assure that the plant computer and incore instrumentation recorders indicate the correct detection location, polarity and magnitude using simulated input signals.

2. PREREQUISITES

2.1 Plant computer system operational

2.2 Incore instrumentation installed calibrated

XX

3. TEST METHOD

Input picoamp source into incore cable connections and monitor indications on recorders and plant computer.

4. ACCEPTANCE CRITERIA

Incore monitoring system recorders and plant computer respond to the simulated inputs as described in B&W Test Specifications 62-1004489.

Blind Note New Abstract

REVISION XX
DATE

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14A.1.78 Rotating Machinery Vibration Monitoring Program

1. PURPOSE

Demonstrate acceptable vibration of safety related pumps during operation.

2. PREREQUISITES

2.1 Construction activities complete on items to be tested

2.2 Appropriate instrumentation calibrated and operational.

2.3 A permanent identification made of the pumps and locations for measurements on the pumps.

3. TEST METHOD

3.1 For in-field analysis gather overall vibration and/or vibration signatures.

3.2 For laboratory analysis gather vibration transducer voltages with a magnetic tape recorder. Process the data to result in a vibration signature.

3.3 Use overall vibration and vibration signatures to identify proper operation of pumps and to determine possible origins of improper operation.

4. ACCEPTANCE CRITERIA

Acceptable vibration is defined by ASME Boiler and Pressure Vessel Code Section XI, National Hydraulics Institute Standards, applicable vendor manuals, and established industry vibration criteria.

Blind Note New Abstract

REVISION XX
DATE

14A.1.79 Ultimate Heat Sink 0003195

1. PURPOSE

To demonstrate operability of the ultimate heat sink.

2. PREREQUISITES

2.1 Construction activities complete

2.2 Cooling pond filled with water to minimum operating level.

3. TEST METHOD

3.1 Verify the absence of sunken debris and/or silt accululations in the service intake channel orreservoir.

4. ACCEPTANCE CRITERIA

4.1 The ultimate heat sink is operable as specified in subsection 9.2.5.

XX

Blind Note
New Abstract

REVISION XX
DATE

14A.1.30 Reactor Building Penetration Pressurization System

1. PURPOSE

To demonstrate the capability of the Reactor Building Penetration Pressurization System to pressurize penetrations during a simulated Reactor Building Isolation Signal (RBIS).

2. PREREQUISITES

2.1 Construction activities complete on items to be tested.

2.2 Appropriate system instrumentation calibrated and operational.

2.3 Appropriate power sources available

2.4 Demineralized water and nitrogen are available to the system.

3. TEST METHOD

3.1 Demonstrate the capability to operate in the standby mode. XX

3.2 Demonstrate that upon a simulated RBIS-I both the isolation valve seal water and penetration air pressurization systems actuate to apply pressurization at all penetrations in both subsystems.

3.3 Demonstrate that upon a simulated RBIS-II signal initiates pressurization at all penetrations either open to the containment atmosphere or potentially open to the containment through failure of nonseismic category I piping beyond the isolation valve, with the exception of the component cooling water penetrations and potentially high-pressure penetrations which are isolated by a RBIS-I only.

Bliny Note New Abstract

4. ACCEPTANCE CRITERIA

4.1 The Reactor Building Penetration Pressurization System performs as specified in subsection 6.8.

REVISION XX
DATE

14.A.1.81 Room Water Level Monitoring System

0003195

1. PURPOSE

To demonstrate proper operation of the room water level monitoring system.

2 PREREQUISITES

2.1 Construction complete on items to be tested

2.2 Appropriate AC and DC sources available

3. TEST METHOD

Simulate water levels at the appropriate detectors and verify proper annunciation within the control room.

4. ACCEPTANCE CRITERIA

Room water level monitoring system provides proper detection as described in Subsection 3.4.2.3 ~~of FSAR.~~

XX

New Abstract
Blind Note

Revision XX
DATE

14A.1-88

14A.1.82 Piping Systems Vibration Monitoring Program

1. PURPOSE

To verify that safety-related piping systems exhibit vibrations within design limits during initial heatup and cooldown.

2. PREREQUISITES

2.1 Preservice examinations are complete of safety-related piping systems and supports in accordance with the test abstract in subsection 14A.1.64.

2.2 The NSSS is prepared for HFT in accordance with the prerequisites of the test abstract in subsection 14A.1.64.

3. TEST METHOD

3.1 During preoperational testing of individual systems, perform the following:

a. Visual walkdowns of piping and supports to verify that steady-state vibrations do not exceed limits.

b. Verify that steady-state vibrations do not result in contact with structures, systems, or components.

c. Secure vibration data, such as amplitudes, using hand-held instrument techniques if the visual methods indicate a potential vibration problem.

d. Visual observations of selected points in the piping during transient system tests to determine the response acceptability. Hand-held or temporarily-mounted instrumentation will be utilized, if the visual observations indicate a potential problem.

3.2 During HFT heatup and cooldown, perform the following on systems that are heated up or affected by the transients to be performed:

a. Visual walkdowns of piping and supports to verify that steady-state vibrations do not exceed limits.

Blind Note
New Abstract

XX

Revision XX
Date

b. Verify that steady-state vibrations do not result in contact with structures, systems, or components.

c. Secure steady-state vibration data, such as amplitudes, using hand-held instrument techniques if visual methods indicate a potential vibration problem.

d. Visually observe pre-selected points in safety-related systems for transient responses during planned transient tests. Either hand-held or temporarily mounted instrumentation may be utilized if a potential problem is indicated.

3.3 During Post Core Load HFT, Initial Criticality and Power Ascension tests, perform visual walkdowns of safety-related systems that are accessible and secure transient vibration data at pre-selected points that are affected by planned transients. Only those systems not confirmed in HFT will be monitored unless previous tests or other information specifically indicate a need for repeat-testing. Either hand-held or temporarily mounted instrumentation may be utilized if a potential problem is indicated. XX

4. ACCEPTANCE CRITERIA

4.1 No visible indications of steady-state vibration problems are identified.

4.2 When measurements are obtained, comparison of the steady-state or transient data with analysis results at the pre-selected points confirms acceptability.

REVISION XX
DATE

14A.1.83 Containment Concrete Temperature Survey

1. Purpose

   To measure the temperature of concrete surrounding hot containment penetrations without cooling systems.

2. Prerequisites

   2.1 Penetration construction activities complete

   2.2 Process line at operating temperature and sufficient soak time elapsed

3. Test Method

   3.1 Monitor concrete temperature at predetermined locations

4. Acceptance Criteria

   4.1 Measured concrete temperatures less than the maximum allowable specified by ~~the architect-engineer~~ amendment

   4.2 Measured concrete temperatures within the temperature profile map provided by ~~the architect~~-engineer amendment

   Note: Utilized when maximum expected concrete temperature locations are not available due to physical arrangement or limitations such as personnel safety, etc

XY

Blind Note New Abstract

Blind Note
PCo Site —
If you wish Bechtel
to perform this work,
submit a letter to the
Project Engineer — No work
will be started or scheduled
until then

Revision XX
Date

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14A.2.1 PRESSURIZER SPRAY FLOW TEST

1. Purpose

    1.1 To adjust the pressurizer spray valve to the spray flow setpoint

    1.2 To adjust the pressurizer spray valve bypass valve to its setpoint

2. Prerequisites

    2.1 Core installed with RCS at specified temperature and pressure and stabilized as required

    2.2 Four reactor coolant pumps running

3. Test Method

    3.1 Adjust the spray valve as required in order to obtain effective pressure decrease

    3.2 Adjust the bypass spray valve as required

4. Acceptance Criteria

    4.1 The pressurizer spray valve is adjusted to obtain ~~effective pressure reduction.~~ A Spray Flow per B&W Test Spec. TS-5900

    4.2 The pressurizer bypass spray valve is ~~adjusted~~ per B&W Test Spec. TS-5900

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14A.2.3 REACTOR COOLANT FLOW AND FLOW COASTDOWN TEST

1. Purpose

   1.1 To measure reactor coolant system flow for selected pump combinations under hot conditions with the core installed

   1.2 To compare measured reactor coolant system flow with design calculations

   1.3 Determine reactor coolant system flow versus time for various (worst case) reactor coolant pump trip combinations and compare flow coastdown with minimum design flow coastdown

   1.4 THE PRESSURE DROP THRU THE CORE WILL NOT BE DEMONSTRATED - THE PROTOTYPE PLANT DATA WILL BE UTILIZED. FLOW VERIFICATION WILL SUPPORT SYSTEM PRESSURE DROP CALCULATIONS.

2. Prerequisites

   2.1 All required systems operating for RC pump operation.

   2.2 Reactor coolant system pressure and temperature maintained within specified limits.

   2.3 THE PIPING VIBRATION PROGRAM SHALL BE IN PLACE & FUNCTIONAL.

   2.4 THE PIPING VERIFICATION PROGRAM SHALL BE IN PLACE & FUNCTIONAL.

3. Test Method

   3.1 Specified pump combinations ADDRESSED IN B&W SPEC. TS 4201 will be used to obtain data and verify the design predictions.

   3.2 Trips of specified combinations will define reactor coolant system flow coastdown characteristics.

4. Acceptance Criteria

   4.1 Reactor coolant system flowrates must be within the ~~minimum and maximum values for each pump combination.~~ LIMITS DEFINED IN B&W TEST SPEC - TS 4201.

   4.2 Reactor coolant system flowrates during each coastdown must meet the ~~minimum allowable flowrate calculated.~~ MINIMUM FLOW VS TIME AS DEFINED IN B&W TEST SPECIFICATION - TS4201.

   4.3 PIPING DYNAMIC RESPONSE AND VIBRATION LEVELS WILL BE PER THE DESIGN, AS DISCUSSED IN FSAR SECTION 3.?

14A.2.5 NUCLEAR INSTRUMENTATION, REACTOR PROTECTION SYSTEM PRECRITICAL CHECK

1. Purpose

   1.1 To verify the proper response of the nuclear instrumentation

   1.2 To verify that each reactor protection system (RPS) trip module will actuate to open its associated control rod drive control system (CRDCS) breaker

2. Prerequisites

   2.1 Neutron sources installed for source range tests

   2.2 RPS/CRDCS interface checkout complete

3. Test Method

   3.1 Source range response will be checked using a test source.

   3.2 Perform calibration checks of the NI and RPS

   3.3 Each RPS trip channel will be activated using test trip switches to open its associated CRDCS breaker.

4. Acceptance Criteria

   ~~Nuclear instrumentation and reactor protections system properly calibrated and operable~~

   4.1 Nuclear instrumentation responds as described in Subsection 7.8.1 ~~of the FSAR~~

   4.2 RPS responds as described in Subsection 7.2.1 ~~of the FSAR~~

14A.2.6 INCORE DETECTOR ELECTRICAL TESTS

1. Purpose

   To verify the incore detector electrical characteristics are within the specified tolerances following installation

2. Prerequisites

   2.1 Fuel loaded prior to final installation tests

   2.2 Initial preinstallation checks complete

3. Test Method

   Measure incore detector electrical parameters as a final check following installation subsequent to fuel loading.

4. Acceptance Criteria

   The detector electrical characteristics are within their ~~design~~ tolerances and variance between detectors is within the ~~specified factor.~~

value specified in B&W test Specification 62-1004489 (Reference TS 2400).

0003195

14A.2.7 REACTOR COOLANT SYSTEM CHEMISTRY TEST*

1. Purpose

   To verify proper reactor coolant system water chemistry during the startup test phase and initial fuel load

2. Prerequisites

   Water chemistry laboratory facilities available

3. Test Method

   3.1 Sample the reactor coolant system during specified conditions through the startup test program

   3.2 Perform specified analysis on samples

4. Acceptance Criteria

4.1 Concentrations measured are maintained within the ~~specified limits.~~ LIMITS AS DEFINED IN:

4.1.1 PLANT PROCEDURE 2010.1

4.1.2 PLANT PROCEDURE 2020.1

4.1.3 B&W WATER CHEMISTRY REQUIREMENT - SPECIFICATION NO. 2050-02/0278

*Portions of this test will be performed at various points of the startup test program. ~~as specified conditions become available.~~

0003195

14A.2.8 OTSG CHEMISTRY TEST*

1. Purpose

To maintain proper water chemistry for the OTSG and feedwater systems during the startup test phase and initial fuel load

2. Prerequisites

Water chemistry laboratory facilities available

3. Test Method

3.1 Sample the water to be used for filling

3.2 Sample the condensate and feedwater systems and OTSGs during and upon completion of filling and at ~~specified conditions~~ defined Frequencies per B&W Spec. 62-1003742-01 (Reference TS-5560) through layup periods and post-core load HFT

4. Acceptance Criteria

Concentrations measured are maintained within the specified limits. Per B&W SPEC 62-1003742-01 (REFERENCE TS-5560)

* Portions of this test will be performed at various points of the startup test program as specified conditions become available.

0003195

Info only

14A.3.2 LOW POWER PHYSICS TEST

1. Purpose

   1.1 To demonstrate that reactor core physics parameters are within specified limits. Also to verify that required overlap exists between source and intermediate range nuclear instrumentation

   1.2 To demonstrate that the reactor can be taken critical in a safe and controlled manner

2. Prerequisites

   2.1 Initial Criticality

      a. Plant systems meet the limiting conditions for operation in accordance with technical specifications

      b. Appropriate test equipment installed and operable

      c. Plant testing through post-core load hot functionals complete and the plant review committee has concurred in the commencement of initial criticality 19

   2.2 Low Power Physics Test

   Reactor coolant system temperature and pressure at hot zero power conditions

3. Test Method

   3.1 Initial Criticality

      a. Withdraw rod banks in group sequence until controlling bank is at specified height.

      b. Deborate at a controlled rate while monitoring inverse multiplication on at least two out-of-core detectors until criticality is achieved.

   3.2 Low Power Physics Test

      a. Verify source and intermediate range nuclear instrumentation overlap.

      b. Determine the neutron flux level corresponding to the initiation of sensible heat production.

c. Verify that reactimeter accurately computes reactivity changes.

d. Verify the design calculation of the all-rods-out critical boron concentration. 19

e. Verify the design calculation of the isothermal temperature coefficient (and moderator temperature coefficient) at various predetermined conditions.

f. Verify the integral reactivity worth of control rod groups 5 through 8 and the total reactivity worth of control rods. 32

g. Verify the design calculation of the differential boron worth.

h. Measure the predicted maximum stuck rod worth and the shutdown margin. 19

i. Verify the design calculation of ejected rod worth.

41

4 Acceptance Criteria

4.1 The reactor plant can be taken critical in a safe and controlled manner and ~~the critical rod positions are within specified limits for the boric acid concentration.~~ INITIAL CRITICALITY OCCURS WITHIN THE ACCEPTANCE CRITERIA OF B&W TECHNICAL DOCUMENT, TS 7371 ZERO POWER PHYSICS TEST. 19

4.2 Low Power Physics Test

a. Source range and intermediate range overlap is within technical specification ~~limits.~~ 16.3.3.1.1 LIMITS.

b. The reactimeter accuracy is within ~~specified~~ THE tolerance SPECIFIED IN B&W TECHNICAL DOCUMENT, TS 7371, ZERO POWER PHYSICS TEST.

c. ~~Within specified tolerances~~ The physics parameters measured ~~should correspond to values predicted by the Midland Plant Units 1 and 2 physics manuals and, when applicable, meet the requirements of the technical specifications.~~ ARE WITHIN THE ACCEPTANCE CRITERIA OF B&W TECHNICAL DOCUMENT, TS 7371 ZERO POWER PHYSICS TEST.

14A.3.3 REACTOR COOLANT SYSTEM CHEMISTRY TEST*

1. Purpose

To verify proper reactor coolant system water chemistry during the startup test phase.

2. Prerequisites

Water chemistry laboratory facilities available

3. Test Method

3.1 Sample the reactor coolant system during specified conditions through the startup test program.

3.2 Perform specified analysis on samples

4. Acceptance Criteria

4.1 Concentrations measured are maintained within ~~specified limits.~~ LIMITS AS DEFINED IN:

4.1.1 PLANT PROCEDURE 2010.1
4.1.2 PLANT PROCEDURE 2020.1
4.1.3 B&W WATER CHEMISTRY REQUIREMENTS - SPECIFICATION NO: 2050-02/0278

*Portions of this test will be performed at various points of the startup test program, ~~as specified conditions become available.~~

0003195

14A.3.4 OTSG CHEMISTRY TEST*

1. Purpose

To verify proper water chemistry for the OTSG and feedwater systems during the startup test phase

2. Prerequisites

OTSG chemistry laboratory facilities available

3. Test Method

3.1 Sample the water to be used for filling

3.2 Sample the condensate and feedwater systems and OTSGs during and upon completion of filling and at ~~specified conditions~~ through layup periods and post-core load HFT {DEFINED FREQUENCIES PER B&W SPEC. 05-1122763-00

4. Acceptance Criteria

Concentrations measured are maintained within the specified limits PER B&W SPECIFICATION 05-1122763-00.

* Portions of this test will be performed at various points of the startup test program as specified conditions become available.

0003195

14A.3.5 RADIOCHEMISTRY TESTS*

1. Purpose

To monitor activity buildup in various plant systems during the startup test program

2. Prerequisites

2.1 Radiochemistry laboratory operational

2.2 All systems from which samples are to be taken are functional to permit sample collection.

2.3 Baseline activity levels have been established for specified systems.

3. Test Method

3.1 Obtain samples from specified systems at designated times during the startup test program.

3.2 Perform specified analyses.

3.3 Plot activity level versus time to determine buildup.

4. Acceptance Criteria

Nuclides found and buildups observed are documented, TO BE WITHIN THOSE QUANTITATIVE BOUNDS ESTABLISHED IN B&W TEST GUIDE TS-180 AND SECTIONS 11.1.2.2 AND 11.1.4.2 OF CHAPTER 11 OF THE FSAR.

* Portions of this test will be performed at various points of the startup test program as ~~specified conditions~~ CONDITIONS SPECIFIED BY TS-0180 become available.

14A.3.6 BIOLOGICAL SHIELD SURVEY TEST* | 19

1. Purpose

To detect any significant deficiencies in the as-built biological shielding prior to higher power operation. | 32

2. Prerequisites

2.1 Radiation survey instruments calibrated

2.2 Background radiation levels measured in designated locations prior to initial criticality | 19

2.3 Reactor critical at specified power levels

3. Test Method

Measure gamma and neutron dose rates at designated locations during the power physics tests. | 33

4. Acceptance Criteria

Radiation levels ~~are acceptable for unit operation.~~ Shall be within the limits specified in Sections 12.4 & 12.5. | 19

* Portions of this test will be performed at various points of the startup test program as specified conditions become available.

14A.4.1 BIOLOGICAL SHIELD SURVEY TEST*

1. Purpose

To measure radiation in accessible locations of the plant outside of the biological shield and to obtain baseline levels for comparison with future measurements of radiation level buildup with operation.

2. Prerequisites

2.1 Radiation survey instruments calibrated

2.2 Background radiation levels measured in designated locations prior to initial criticality

2.3 Reactor critical at specified power levels

3. Test Method

Measure gamma and neutron dose rates at designated locations during the power physics tests and at specified power plateaus during power ascension testing

4. Acceptance Criteria

Radiation levels ~~are acceptable for unit operation.~~ shall be within the limits specified in Sections 12.4 and 12.5

* Due to the necessity for special plant conditions, portions of the test may be performed separately as the required conditions become available.

0003195

14A.4.3 CORE POWER DISTRIBUTION

1. Purpose

To measure core power distributions at selected power levels and rod configurations, AND TO EVALUATE CORE SYMMETRY AT 15% RATED THERMAL POWER.

2. Conditions Prior to Test

2.1 Power level at selected value and stable

2.2 Equilibrium xenon established

2.3 Online plant computer is operational

3. Test Method

Computer generated outputs of incore neutron detector signals, core thermal conditions, and three-dimensional power map will be obtained and compared to acceptance criteria.

4. Acceptance Criteria

Core thermal and hydraulic parameters are within technical specification limits. CORE SYMMETRY IS ACCEPTABLE IF THE COMPUTER CALCULATED QUADRANT POWER TILTS ARE LESS THAN THE ERROR ADJUSTED QUADRANT POWER TILT ALARM LIMIT.

0003195

INFO ONLY

14A.4.4 INTEGRATED CONTROL SYSTEM TESTS

1. Purpose

1.1 Steady-State

To verify the ability of the ICS to control the NSSS under steady-state conditions at various power levels.

1.2 Transient

To verify the capability of the ICS to control OTSG feedwater flow, steam generator level, main steam pressure, and control rod position under the following:

a. Response to normal load demand changes (load swings)

b. Response when a RC pump is stopped or started

c. Response during the loss of a feedwater pump

2. Prerequisites

2.1 Steady-State

Steady-state conditions established at each power level

2.2 Transient

NSSS operating at specified power and steady-state testing for that power level has been completed.

3. Test Method

3.1 Steady-State

a. Measure NSSS power by heat balance

b. Predict trend of NSSS parameters for next selected power level

c. Repeat test at next selected power level

3.2 Transient

a. Perform load reduction followed by load increase at selected power levels

b. At selected power levels, initiate power runbacks from specified conditions (loss of

reactor coolant or feedwater pump) and monitor data until stable conditions have been established. | 19

4. Acceptance Criteria

4.1 Steady-State

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

b. ~~Results of measurements at each power level predict adequate performance at the next power level~~

b. The ICS responds as specified in B&W test specification 62-1003516

4.2 Transient

a. ~~The ICS will follow specified step and ramp load changes under automatic control while holding NSSS parameters within design limits~~ | 19

b. ~~The ICS runs power back to a predetermined value in response to specified runback conditions without tripping the reactor~~

The ICS responds as specified in B&W test specification 62-1003516 (Reference TS-2100)

14A.4.5 UNIT ACCEPTANCE TEST

1. Purpose

To verify that the NSSS output energy meets or exceeds contract warranty output.

2. Prerequisites

2.1 Scheduled start-up testing completed

2.2 Temporary instrumentation calibrated and installed as necessary

3. Test Method

While maintaining steady-state power conditions as specified, heat balance will be determined at periodic intervals for a total specified run time.

4. Acceptance Criteria

* ~~The NSSS will perform at thermal output levels equal or greater than the guaranteed rating for a period of continuous operation as required by contract.~~

* THE NSSS WILL PERFORM AT THERMAL OUTPUT LEVELS EQUAL TO OR GREATER THAN THE GUARANTEED RATING (PER B&W TEST SPECIFICATION TS-0985) FOR A PERIOD OF CONTINUOUS OPERATION OF 100 HOURS.

0003195

14A.4.6 POWER IMBALANCE DETECTOR CORRELATION TEST

1. Purpose

To determine the relationship between the axial power imbalance indicated by out-of-core detectors and that indicated by the incore detectors.

2. Prerequisites

2.1 Incore monitoring system and plant computer operational

2.2 Out-of-core nuclear instrumentation calibrated

2.3 Integrated control system in automatic

3. Test Method

CONTROL ROD GROUP 8 WILL BE USED TO MANEUVER THE PLANT TO VARIOUS CORE POWER IMBALANCE CONDITIONS AND incore power imbalance measurements will be made. ~~at prescribed conditions.~~ The results will be used to determine the correlation between incore and out-of-core detectors and to determine the adequacy of the out-of-core detectors to predict the core power imbalance.

4. Acceptance Criteria

~~Out-of-core imbalances can be adjusted to within the specified limits of the incore imbalance.~~

4.1 FOLLOWING FINAL ADJUSTMENT, CORE POWER IMBALANCE AS MEASURED BY THE OUT-OF-CORE DETECTORS FALLS WITHIN THE ACCEPTANCE CRITERIA SPECIFIED IN B&W TECHNICAL DOCUMENT, TS 7383, OFFSET CORRELATION TESTS.

4.2 FOR TESTING AT THE 75% RTP TEST PLATEAU CORE POWER IMBALANCE AS MEASURED BY THE BACKUP INCORE ~~SYSTEM~~ DETECTOR SYSTEM FALLS WITHIN THE ACCEPTANCE CRITERIA SPECIFIED IN B&W TECHNICAL DOCUMENT, TS 7383, OFFSET CORRELATION TESTS.

0003195

14A.4.7 INCORE MONITORING SYSTEM TESTS

1. Purpose

   1.1 To verify the proper operation of the incore monitoring system, including the minimum operational requirements as shown in technical specifications

   1.2 To verify the ability to calibrate the backup incore recorders

2. Conditions Prior to Test

   2.1 Plant operating at a steady-state power level

   2.2 All data recording systems are operational

3. Test Method

   3.1 Incore detector readings will be examined at low power for failed or questionable detectors.

   3.2 Assemblies with similar predicted flux shapes will be compared to identify questionable detector outputs.

   3.3 Minimum operational requirements will be verified without using questionable detectors.

   3.4 The ~~backup~~ incore detector system will be ~~calibrated.~~ CALIBRATED AND USED TO CALCULATE AXIAL POWER IMBALANCE (API) AND QUADRANT POWER TILT (QPT).

4. Acceptance Criteria

   4.1 All detector outputs are consistent and reasonable, PER B&W TECHNICAL DOCUMENT TS 2482, INCORE MONITORING SYSTEM TESTS

   4.2 Operational requirements of technical specifications ~~are met~~ 16.3.3.3.2 SHALL BE MET.

   4.3 Backup recorders are calibrated AND THE API AND QPT CALCULATED USING THE RECORDERS ARE WITHIN THE ACCEPTANCE CRITERIA SPECIFIED IN B&W TECHNICAL DOCUMENT TS 2482, INCORE MONITORING SYSTEM TESTS.

14A.4.8 LOSS OF OFFSITE POWER TEST

0003195

1. Purpose

To demonstrate that the reactor can be placed and maintained in a HOT STANDBY conditon using only the emergency power sources

2. Prerequisites

2.1 Reactor power ~~10%~~ 15% maintained by dumping steam to the condensor via the turbine bypass valves

2.2 Station power supplied through startup sources with normal in-plant electrical alignment

2.3 Source of backup power provided to protect selected plant equipment not related to safety (if required)

2.4 Test instrumentation installed to monitor and record specified parameters during the transient. Recorders powered from non-Class 1E preferred source of power

3. Test Method

3.1 Startup source breakers are tripped to initiate a loss of offsite power.

3.2 The plant is brought to and maintained in HOT STANDBY for a period of approximately 30 minutes using emergency power sources.

3.3 Power may be restored to the non-Class 1E buses following initiation of loss of offsite power to control and protect nonsafety-related equipment. Operations utilizing this power are logged to verify that they have no effect on the test results.

4. Acceptance Criteria

The ability to shut down and maintain the reactor in HOT STANDBY using only emergency power sources.

14A.4.9 RADIOCHEMISTRY TESTS*

1. Purpose

   To monitor activity buildup in various plant systems during the startup test program.

2. Prerequisites

   2.1 Radiochemistry laboratory operational

   2.2 All systems from which samples are to be taken are functional to permit sample collection

   2.3 Baseline activity levels have been established for specified systems

3. Test Method

   3.1 Obtain samples from specified systems at designated times during the startup test program

   3.2 Perform specified analysis

   3.3 Plot activity level versus time to determine buildup

4. Acceptance Criteria

   Nuclides found and buildups observed are documented to be within those quantitative bounds established in B&W Test Guide TS-180 and sections 11.1.2.2 and 11.1.4.2 of Chapter 11 ~~of the FSAR~~.

* Portions of this test will be performed at various points of the startup test program as ~~specified conditions~~ conditions specified by TS-0180 become available.

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14A.4.10 PSEUDO DROPPED ROD TEST

1. Purpose

   1.1 Verify the ability of the NSS instrumentation to detect a dropped control rod assembly

   1.2 To measure the asymmetry resulting from a partially or fully inserted control rod assembly

SEE ATTACHED Isert A
1.3

2. Prerequisites

   2.1 Reactor is established at a predetermined power level below the asymmetric rod runback power level

   2.2 Plant computer is operational

   2.3 Xenon is at equilibrium

3. Test Method

   3.1 Drive the selected control rod into the core while maintaining criticality by withdrawing a compensating control rod group. Check the ICS detection capability of the asymmetric rod condition.

   3.2 Measure differential worth of the compensating control rod group at periodic intervals.

   3.3 When the "dropped" rod reaches the fully inserted position, obtain power distribution data.

   3.4 Verify the asymmetry alarms occur at the specified limits.

   3.5 Return the rods to their original configuration.

SEE ATTACHED Insert #

4. Acceptance Criteria

   4.1 The asymmetric alarms are properly received.

   4.2 Worst case DNBR and linear heat rate parameters do not exceed the minimum DNBR or maximum linear heat rate limits for rated thermal power operation.

SEE ATTACHED Insert #

14A.4.10 PSEUDO DROPPED ROD TEST

1. PURPOSE

1.1 VERIFY THE ABILITY OF THE NSS INSTRUMENTATION TO DETECT A DROPPED CONTROL ROD ASSEMBLY

1.2 MEASURE THE ASYMMETRY RESULTING FROM A PARTIALLY OR FULLY INSERTED CONTROL ROD ASSEMBLY "AND VERIFY CORE LIMITS ARE NOT EXCEEDED."

1.3 DEMONSTRATE THE AUTOMATIC INTEGRATED CONTROL SYSTEM (ICS) REACTOR POWER RUNBACK AND AUTOMATIC CONTROL ROD WITHDRAWAL INHIBIT FUNCTION. WHEN A CONTROL ROD IS ASYMMETRIC.

INSERT

2. PREREQUISTES

2.1 REACTOR IS ESTABLISHED AT A PREDETERMINED POWER LEVEL BELOW THE ASYMMETRIC ROD RUNBACK POWER LEVEL

2.2 PLANT COMPUTER IS OPERATIONAL

2.3 XENON IS AT EQUILIBRIUM

3. TEST METHOD

3.1 DRIVE THE SELECTED CONTROL ROD INTO THE CORE WHILE MAINTAINING CRITICALITY BY WITHDRAWING A COMPENSATING CONTROL ROD GROUP. CHECK THE ICS, NSS AND PLANT COMPUTER DETECTION CAPABILITI FOR THE ASYMMETRIC ROD CONDITION

3.2 WHEN THE ROD IS FULLY INSERTED OBTAIN POWER DISTRIBUTION DATA.

3.3 REPEAT POWER DISTRIBUTION DATA COLLECTION WITH THE ROD AT 50% AND 100% WITHDRAWN POSITIONS.

Insert

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Insert Cont

3.4 ADJUST ICS SETPOINTS AND VERIFY AUTOMATIC REACTOR POWER RUNBACK AND AUTOMATIC CONTROL ROD WITHDRAWAL INHIBIT FUNCTIONS.

3.5 RETURN SETPOINTS AND CONTROL RODS TO NORMAL CONFIGURATION.

INSERT

4. ACCEPTANCE CRITERIA

THE ACCEPTANCE CRITERIA SPECIFIED IN B&W TECHNICAL DOCUMENT TS 7385, DROPPED ROD TEST SHALL BE SATISFIED.

14A.4.11 PSEUDO EJECTED ROD TEST

1. Purpose

To verify the rod worth used in the safety analysis for the ejected rod accident.

2. Prerequisites

2.1 Reactor established at a predetermined power level below the asymmetric rod runback power level

2.2 Xenon is at equilibrium

2.3 Plant computer is operational

3. Test Method

3.1 The control rod with the highest calculated ejected worth is withdrawn from the core while maintaining criticality by interchanging reactivity with a parameter of known reactivity worth.

3.2 Obtain power distribution data when the pseudo ejected rod is fully withdrawn.

3.3 Return the rods to their original configuration.

4. Acceptance Criteria

The measured worth of the ejected control rod is less than the value ~~allowed by technical specifications.~~ USED IN FSAR SUBSECTION 15.4.8, ROD EJECTION ACCIDENT ANALYSIS. AT 102% RTP.

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14A.4.12 SHUTDOWN FROM OUTSIDE THE CONTROL ROOM

1. Purpose

   Verify that the normal procedures for shutdown from outside the control room will place the reactor in a safe condition when access to the control room is lost.

2. Prerequisites

   2.1 Generator load greater than or equal to 10%

   2.2 Observers stationed in the control room to monitor the test. They will not take control unless an emergency exists.

   2.3 Communications established between control room and remote shutdown locations

   2.4 Testing of plant instrumentation, controls, and systems to be used at remote shutdown locations have been completed. 21

3. Test Method

   3.1 All personnel participating in the test will leave the control room and proceed to their designated locations.

   3.2 Reactor will be tripped from outside the control room. 17

   3.3 Personnel will then place the reactor in a hot standby condition utilizing the instrumentation and controls provided by the shutdown panel of the local controls available at the equipment for at least 30 minutes. 21

Insert Q →

4. Acceptance Criteria

   The specified hot standby condition has been established and RCS temperature can be ~~controlled~~ without using any instrumentation or controls provided in the control room. 17

lowered, until a stable cooldown rate has been demonstrated,

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Insert Q

3.4 A cooldown of the RCS will be initiated from outside the control room and RCS temperature will be lowered a specified amount from the hot standby condition.

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14A.4.13 EFFLUENT MONITORING SYSTEMS TEST

1. Purpose

To demonstrate that the liquid and gas waste effluent monitoring system is capable of accurately reflecting actual effluent radiation levels.

2. Prerequisites

2.1 Liquid and gas effluent radiation monitors calibrated and operational

2.2 Quantities of radioactive liquid and gas waste with activities in excess of monitor sensitivity have been accumulated

3. Test Method

3.1 Activity levels of liquid and gaseous wastes are determined in the laboratory.

3.2 Liquid and gaseous wastes are released to the environment using normal operating procedures. Effluent monitoring readouts are recorded during the discharge.

4. Acceptance Criteria

Effluent monitor readout devices ~~compare with the laboratory analysis of samples.~~ Provide a Quantitive indication of Radioactivity, which is at Least as Large as those determined by Laboratory Analysis. The overall ~~effluent~~ monitoring system shall operate as specified in section 11.5 ~~of the FSAR.~~

14A.4.15 REACTOR COOLANT SYSTEM CHEMISTRY TEST*

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1. Purpose

To verify proper reactor coolant system water chemistry during the startup test phase and initial fuel load.

2. Prerequisites

2.1 Water chemistry laboratory facilities available

3. Test Method

3.1 Sample the reactor coolant system during specified conditions through the startup test program Per B&W Specification 62-1003741-01 (REFERENCE TS-5041)

3.2 Perform specified analysis on samples Per B&W Specification 62-1003741-01 (REFERENCE TS-5041)

4. Acceptance Criteria

Concentrations measured are maintained within specified limits Per B&W Specifications 62-1003741-01 (REFERENCE TS-5041)

* Portions of this test will be performed at various points of the startup test program as specified conditions become available.

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14A.4.16 OTSG CHEMISTRY TEST*

1. Purpose

To maintain proper water chemistry for the OTSG and feedwater systems during the startup test phase and initial fuel load.

2. Prerequisites

Water chemistry laboratory facilities available

3. Test Method

3.1 Sample the water to be used for filling

3.2 Sample the condensate and feedwater systems and OTSGs during and upon completion of filling, and at ~~specified conditions~~ through layup periods and post-core load HFT Desired Frequencies per B&W Spec 62-1003742-01 (REFERENCE TS-5560)

4. Acceptance Criteria

Concentrations measured are maintained within the specified limits per B&W Spec 62-1003742-01 (REFERENCE TS-5560

* Portions of this test will be performed at various points of the startup test program as specified conditions become available.

14A.4.17 ONLINE COMPUTER CHECKOUT 0003195

1. Purpose

To demonstrate that the computer properly performs specified software functions.

2. Prerequisites

2.1 Plant computer operational

2.2 ~~Unit operating~~ at specified steady-state power level

2.3 SIGNAL INPUTS HAVE BEEN VERIFIED AS ORIGINATING FROM THE CORRECT SOURCE DURING THE GENERIC CHECKOUT PROGRAM

3. Test Method

3.1 Demonstrate that the computer properly processes incore detector signals from uncorrected current to normalized power values

3.2 Demonstrate that the normalized power values are accurately processed to calculate nuclear, thermal and hydraulic parameters INCLUDING QUADRANT POWER TILT, IMBALANCE, WORST CASE MAXIMUM LINEAR HEAT RATE AND RADIAL POWER PEAKING.

3.3 Demonstrate that the computer properly calculates core thermal power using a heat balance method

4. Acceptance Criteria

11 Selected computer calculations agree with~~in specified limits of~~ hand calculated values* WITHIN ACCEPTANCE CRITERIA SPECIFIED BY B&W TECHNICAL DOCUMENT TS 2581, ONLINE COMPUTER CHECKOUT.

14A.4.18 REACTOR TRIP TEST

1. Purpose

To demonstrate proper unit response following a reactor trip

2. Prerequisites

2.1 ~~Specified portions of the~~ integrated control system in automatic mode, steady-state and transient testing complete

2.2 Test instrumentation installed to monitor and record specified parameters during the transient 19

3. Test Method

3.1 Establish steady-state conditions at specified power level with integrated control system in automatic.

3.2 Manually trip the reactor.

3.3 Follow the applicable procedure for a reactor trip.

4. Acceptance Criteria

~~Specified parameters remain within specified limits following the reactor trip.~~

The unit responds as specified in B&W Test Specification 69-1005401-00 (REFERENCE EOS-0172).

14A.4.19 TURBINE TRIP TEST

1. Purpose

   To demonstrate proper unit response following a turbine trip

2. Prerequisites

   2.1 Specified portions of the integrated control system steady-state and transient testing complete 19

   2.2 Test instrumentation installed to monitor and record specified parameters during the transient

3. Test Method

   3.1 Establish steady-state conditions at specified power level specified at 100% in Table 14.2-4 with integrated control system in automatic. 30

   3.2 Manually trip the turbine.

   3.3 Follow the applicable procedure for a reactor trip. 19

4. Acceptance Criteria

   ~~Specified parameters remain within specified limits following the turbine trip.~~

   The dynamic response of the plant is in accordance with design requirements as detailed in B&W test specification 69-1005410 (Reference EOS 0171)

14A.4.20 GENERATOR TRIP TEST

1. Purpose

   To demonstrate proper unit response following a generator trip

2. Prerequisites

   2.1 Specified portions of the integrated control system steady-state and transient testing complete

   2.2 Test instrumentation installed to monitor and record specified parameters during the transient 19

3. Test Method

   3.1 Establish steady-state conditions at specified power level with the integrated control system in automatic.

   3.2 Manually trip the generator output breakers.

   3.3 Follow the applicable procedure for a generator trip.

4. Acceptance Criteria

   Specified parameters remain within specified limits following the generator trip.

The dynamic response of the plant is in accordance with
design requirements as detailed in B&W test Specification
62-1003516 (Reference TS-2100)

14A.4.21 TURBINE TESTING

1. Purpose

To demonstrate proper turbine response under load

2. Prerequisites

2.1 Specified portions of the integrated control system steady-state and transient testing complete

2.2 Test instrumentation installed to monitor and record specified parameters during the transient

3. Test Method 41

3.1 Verify turbine mechanical overspeed trips. This testing must be done at a load <25% and after 4 hours of turbine operation, unless alternative conditions are approved by the General Electric Company.

3.2 Verify turbine speed control under load.

3.3 Verify power load imbalance interlock.

3.4 Verify operability of turbine stop, intercept, and control valves.

4. Acceptance Criteria

~~Specified parameters remain within specified limits.~~

The main turbine operates as described in Section 10.2.

14A.4.22 Natural Circulation

1. PURPOSE

   To verify Natural Circulation as a means of removing reactor coolant system decay heat.

2. PREREQUISITES

   2.1 Reactor is critical at a predetermined power level

   2.2 Instrumentation is set up to record required data

XY

3. TEST METHOD

   Test will be performed per B&W direction provided at a later date via B&W Test Specification.

4. ACCEPTANCE CRITERIA

   4.1 Natural Circulation will remove core heat per the acceptance criteria provided in B&W Test Spec.

Blind Note
New Abstract

Revision XX
DATE

14A.4.23 Containment Concrete Temperature Survey

1. Purpose

   To measure the temperature of concrete surrounding hot containment penetrations without cooling systems. This will be limited to those penetrations not surveyed during hot functional testing due to insufficient temperature conditions (Prerequisite 2.2).

2. Prerequisites

   2.1 Penetration construction activities complete

   2.2 Process line at operating temperature and sufficient soak time elapsed

XX

3. Test Method

   3.1 Monitor concrete temperature at predetermined locations

4. Acceptance Criteria

   4.1 Measured concrete temperatures less than the maximum allowable specified by the architect-engineer

   4.2 Measured concrete temperatures within the temperature profile map provided by the architect-engineer.

   Note: Utilized whenmaximum expected concrete temperature locations are not available due to physical arrangement or limitations such as personnel safety, etc

Blind Note
New Abstract

Revision XX
Date