ABB
ASEA BROWN BOVERI

February 18, 1992
LD-92-021

Docket No. 52-002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Response to NRC Requests for Additional Information

Reference: A) Letter, Performance and Quality Evaluation Branch RAIs, T. V. Wambach (NRC) to E. H. Kennedy (C-E), dated August 6, 1991

B) Letter, Performance and Quality Evaluation Branch RAIs, T. V. Wambach (NRC) to E. H. Kennedy (C-E), dated October 10, 1991

Dear Sirs:

References (A) and (B) requested additional information for the NRC staff review of the Combustion Engineering Standard Safety Analysis Report - Design Certification (CESSAR-DC). Enclosure I to this letter provides our responses to a number of these questions including corresponding revisions to CESSAR-DC.

Should you have any questions on the enclosed material, please contact me or Mr. Stan Ritterbusch of my staff at (203) 285-5206.

Very truly yours,

COMBUSTION ENGINEERING, INC.

C. B. Brinkman

C. B. Brinkman
Acting Director
Nuclear Systems Licensing

vs/lw
Enclosures: As Stated
cc: J. Trotter (EPRI)
T. Wambach (NRC)

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ABB Combustion Engineering Nuclear Power

Combustion Engineering, Inc.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500
Telephone (203) 688-1911
Fax (203) 285-9512
Telex 99297 COMBEN WSOR

Enclosure I to
LD-92-021

RESPONSE TO NRC REQUESTS FOR ADDITIONAL INFORMATION PERFORMANCE AND QUALITY EVALUATION BRANCH

Question 260.23

The commitment to Regulatory Guides concerning QA should be revised in Section 1.8 of the SAR to agree with the commitment in Section III.2.1 of Revision 6 of CENPD-210-A.

Response 260.23

Section 1.8 of CESSAR-DC will be revised to reflect the commitment to Section III.2.1 of CENPD-210-A, Revision 6, as shown in the enclosed markup of Table 1.8-1.

TABLE 1.8-1 (Cont'd)

(Sheet 3 of 19)

REGULATORY GUIDES

Document/Title GDC References	Original or Revision Issue Date	Reference CESSAR Section
Reg. Guide 1.20 - Vibration Measurements on Reactor Internals	Revision 2 5/76	3.9.2.4
Reg. Guide 1.21 - Measuring and Reporting of Effluents from Nuclear Power Plants		Not Applicable
Reg. Guide 1.22 - Periodic Testing of Protection Systems Actuation Functions -	2/72	7.1.2.17, 8.1.4.2
Reg. Guide 1.23 - Onsite Meteorological Programs		Not Applicable
Reg. Guide 1.24 Assumptions Used for Evaluating the Potential Radiological Consequences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure	3/72	15.7
Reg. Guide 1.25 - Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors	3/72	15.7
Reg. Guide 1.26 - Quality Group Classifications and Standards	Revision 3 2/76	3.2.2, 10.4
Reg. Guide 1.27 - Ultimate Heat Sink	Revision 2 1/76	9.2.5
Reg. Guide 1.28 - Quality Assurance Program Requirements	Revision 3 8/85	17 and report CENPD-210-A, Revision 6 (Section III.2.1)

E

Question 260.24

SSAR Amendment I added the following sentence to Chapter 17: "The list of specific equipment covered by this (QA) Program is contained in Table 3.2-1 of CESSAR-DC." Page 3.2-4 of the SAR states that Quality Class 1 items are "Designed and manufactured under a rigorous quality assurance program reflecting the requirements of Appendix B," as described in Chapter 17 of the SAR. It goes on to state that Quality Class 2 items will be "designed and manufactured or procured in accordance with the pertinent requirements of the Quality Assurance Program as given in Chapter 17 (of the SAR)."

a) Specify the Quality Class or describe the QA program for the structures listed on sheet 14 of Table 3.2-1.

b) Clarify whether Quality Class 2 items will have a quality assurance program applied which is equal to normal industry practice, better than normal industry practice but less than a rigorous quality assurance program reflecting the requirements of Appendix B, or a rigorous quality assurance program reflecting the requirements of Appendix B.

c) The note on sheet 15 of Table 3.2-2 states that all containment isolation valves and their operators are subject to the pertinent requirements of the Quality Assurance Program as given in Chapter 17 of the SAR. Clarify whether these valves and their operators are Quality Class 1 or Quality Class 2. Consider referencing this table in SAR Chapter 17.

d) Clarify whether the instrumentation, controls, mechanical supports, and associated equipment such as pipes and valves of the systems listed in Table 3.2-1 of the SAR are the same quality class as listed in the table for the other components of the system. For systems with both Quality Class 1 and Quality Class 2 components (such as the Chemical and Volume Control System), where and how is the quality class specified, for example, for instrumentation, controls, mechanical supports, and associated equipment such as pipes and valves? Consider referencing Tables 1.7-1 and 1.7-3 in SAR Chapter 17.

e) Specify the Quality Class of items listed in SAR Table 3.11-1 and Appendix 3.11B. Consider referencing this table and appendix in SAR Chapter 17.

Response 260.24

a) Sheet 14 of CESSAR-DC Table 3.2-1 will be revised to include the quality assurance requirements for structures. Depending on the structure, the quality assurance requirements in CESSAR-DC Table 3.2-1 will be designated as follows:

   Q = The quality assurance requirements of 10CFR50, Appendix B are applicable

   N = The quality assurance requirements of 10CFR50, Appendix B are not applicable

b) Quality Class 2 items are those that designated as Non-Nuclear Safety (NNS) in accordance with ANSI 51.1. Quality Assurance Program implementation will be consistent with the requirements specified for NNS items in ANSI 51.1.

c) The containment isolation valves and their operators are designated Safety Class 2 and comply with the quality assurance requirements of 10CFR50, Appendix B. The note on sheet 15 of Table 3.2-2 will be revised to indicate the quality assurance requirements of these valves and their operators.

d) CESSAR-DC Table 3.2-1, "Classification of Structures, Components, and Systems", will be revised to include major components such as piping and valves, instrumentation and controls, and electrical systems. Table 3.2-1 and CESSAR-DC Sections 3.2.1 and 3.2.2 contain the required information to properly identify and classify structures, systems, and components important to safety. The system P&IDs will also be revised to include safety class designations and to indicate changes in safety class (see response to RAIs 210.1, 210.3, and 210.10).

e) CESSAR-DC Table 3.2-1 and CESSAR-DC Sections 3.2.1 and 3.2.2 contain the required information to properly identify and classify structures, systems, and components. Therefore, it is not necessary to revise the referenced CESSAR-DC tables to include the Quality Class of the items listed since the quality assurance requirements are listed in CESSAR-DC Table 3.2-1. Quality Class is not relevant to CESSAR-DC Table 3.11-1 since this table refers to areas or rooms of the plant. The ventilation equipment servicing the listed areas is classified in CESSAR-DC Table 3.2-1.

Response 260.24 (Cont'd)

NOTES: CESSAR-DC Table 3.2-1 has been extensively revised in response to NRC RAI 210.1. The required changes to Table 3.2-1, resulting from RAI 260.24, are indicated in the mark-up of the table which is included in the response to NRC RAI 210.1.

TABLE 3.2-2 (Cont'd)

(Sheet 15 of 15)

SAFETY CLASS 1, 2 & 3 VALVES

NOTE: (1) All containment isolation valves and their operators, including manual valves, check valves, and relief valves which also serve as isolation valves, ~~are subject to the pertinent requirements of the Quality Assurance Program as given in Chapter 17.~~ I

are Safety Class 2 and comply with the quality assurance requirements of 10CFR50, Appendix B.

Question 260.25

The material incorporated into the SAR by reference should be updated to reflect Revision 6 of CENPD-210 (page 1.6-5, Amendment E).

Response 260.25

Combustion Engineering agrees and page 1.6-5, Amendment E, will be revised to reflect CENPD-210-A, Revision 6, as shown in the enclosed markup.

REPORT NO.	TITLE	DATE ISSUED	CESSAR CHAPTER	
CENPD-207-P	Combustion Engineering, Inc. "Critical Heat Flux Correlation for C-E Fuel Assemblies with Standard Spacer Grids, Part 2, Non-Uniform Axial Power Distributions"	June 1976	4.	B
CENPD-210-A Rev. 6	Quality Assurance Program A Description of the ~~C-E~~ Nuclear ~~Steam Supply System~~ Power Businesses Quality Assurance Program	June 1991 ~~July 1977~~ ~~January 1987~~ ~~September 1988~~	17	E
CENPD-213 Suppl. #1	Combustion Engineering, Inc. "Application of FLECHT Reflood Heat Transfer Coefficients to Combustion Engineering 16 x 16 Fuel Bundles"	January 1976 March 1976	1.5	E
CEN-214(A)-P	CETOP-D Code Structure and Modeling Methods for Arkansas Nuclear One-Unit 2	July 1982	15.	
CENPD-221	Joint C-E/EPRI Fuel Performance Evaluation Program, Task C, Evaluation of Fuel Rod Performance on Maine-Yankee Core I	December 1975	4.	B
CENPD-225-P	Combustion Engineering, Inc. "Fuel and Poison Rod Bowing"	October 1976	4.	B
Suppl. #1 Suppl. #2 Suppl. #3		February 1977 June 1978 July 1979		
CENPD-254	"Post-LOCA Long Term Cooling Evaluation Model"	June 1977	6.	
CENPD-255-A	"Qualification of Combustion Engineering Class 1E Instrumentation"	October 1985	3.	
CENPD-266-P-A	The ROCS and DIT Computer Codes for Nuclear Design	April 1983	4.	B
CENPD-269-P	Extended Burnup Operation of Combustion Engineering PWR Fuel	July 1984	4.	B

Question 260.26

The category of GSI 75 (ATWS) was changed to 1d by SAR Amendment I (Sheet 9 of Table A1-1), indicating the issue is not relevant to the System 80+ Standard Design. Conversely, the EPRI Utility Requirements Document for ALWRs indicates the issue is relevant (Section 3.10.1, page B.3-61/64, Volume 2, Chapter 1, Appendix B). Clarify the ABB CE position in this regard. Also, in this regard, clarify the ABB CE position regarding Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment That Is Not Safety Related."

Response 260.26

GSI 75 (ATWS) was classified as not applicable to the design of System 80+ because the summary of the issue in NUREG-0933 and the related bulletins and generic letters are clearly oriented towards plant operations and maintenance, not plant design. The System 80+ design does, however, address the issues of testing and data collection (indicated in the EPRI "tility Requirements Document) as part of the development of the NUPLEX 80+ Advanced Control Complex.
Maintenance requirements are specified by the supplier of specific equipment when that equipment is procured. Such maintenance requirements would be implemented in detailed owner/operator maintenance procedures and would be consistent with the operators Reliability Assurance Program.

With respect to Generic Letter 85-06, normal industry programs and procedures for the "quality assurance" of control grade equipment are adequate and no special program or requirements are necessary.

Question 260.27

The ALWR Resolution Summary for TMI-2 item I.F.1 (Expanded QA List) states:

(1) The designer shall identify any structures, systems, or components (items) that are not safety related but for which provisions beyond normal industry practice are judged to be needed to provide desired reliability and availability.

(2) At the same time, specific surveillance, maintenance provisions (appropriate for specific item and desired reliability and availability shall be identified for those items.

The NRC evaluation is that ALWRs should have a Reliability Program to ensure that the facility is operated and maintained within enveloping PRA assumptions throughout its life. The NRC anticipates that these new (Reliability Program) requirements will effectively subsume the I.F.1 issue and this issue can be considered resolved.

The CESSAR System 80+ SAR categorization of TMI-2 item I.F.1 as not relevant to the System 80+ Standard Design (Sheet 41 of Table A1-1) does not address these assessments. Clarify.

Response 260.27

(1) As described in the response to RAI 270.1, Combustion Engineering believes that all structures, systems and components which are not safety-related (i.e., non-nuclear safety) are covered via ANSI 51.1.

(2) Combustion Engineering has provided a Reliability Assurance Program description (C-E letter LD-[illegible]-010, dated January 31, 1992).

Since Combustion Engineering believes that an expanded QA list is not necessary, as indicated in item (1) above, item I.F.1 is considered not applicable to the System 80+ design.

Question 260.28

Subparts 2, 3, 6, and 9 of TMI-2 issue I.F.2 have been characterized by the NRC as issues to be addressed in evolutionary LWR design reviews. ABB CE has characterized these issues as not relevant to the System 80+ Standard Design. Clarify.

Response 260.28

Subparts 2,3,6, and 9 were judged to be not applicable to the System 80+ design because they deal with QA staffing for activities within the scope and responsibility of the owner/operator. One portion of subpart 3 (inclusion of QA personnel in design activities) is covered by the quality assurance program for the System 80+ design, which is described in Chapter 17 of CESSAR-DC and report CENPD-210-A.

Question 640.1

Section 14.2.5, "Review, Evaluation, and Approval of Phases I through IV Tests Results," states that it is intended that Phase I (preoperational) testing be completed prior to commencing initial fuel loading. This section should be modified to state that completion of Phase I testing (including the review and approval of the test results) is required prior to fuel loading and, if portions of any preoperational tests are intended to be conducted, or their results approved, after fuel loading, to require the applicant referencing the CESSAR-DC to:

(1) List each test

(2) State which portions of each test will be delayed until after fuel loading.

(3) Provide technical justification for delaying these portions.

(4) State the power levels where each test will be completed.

Response 640.1

Section 14.2.2.8 addresses this request. Further definition will be provided in Section 14.2.5 as requested. See the draft CESSAR-DC addition below and insert as shown on next page.

"A listing will be provided in the Phase 1 Test Results Report stating which tests or portions of a test will be delayed until after fuel loading. A technical justification will be provided along with the anticipated power level/mode the test will be performed. This will be approved by the plant review board as stated previously in Section 14.2.2.8."

14.2.5 REVIEW, EVALUATION, AND APPROVAL OF PHASES I THROUGH IV TEST RESULTS

Individual test results will be reviewed and approved as provided in the site-specific administrative procedures. Completed procedures and test reports will be reviewed for acceptance. The specific acceptance criteria for determining the success or failure of the test will be included as part of the procedure and will be used during the review.

The responsible Startup Engineer will present the completed test procedure and test report with remarks and recommendations to the responsible reviewer. Following this review, the completed procedure and test report will be submitted to the Test Working Group or the Plant Review Board for final review, evaluation, and approval recommendation. If the as-built configuration of a system is not capable of demonstrating its ability to meet the acceptance criteria, an engineering evaluation will be performed.

Test results for each phase of the test program will be reviewed and verified as complete (as required) and satisfactory before testing in the next phase is started. Preoperational testing on a system will not normally be started until all applicable prerequisite tests have been completed, reviewed, and approved. Prior to initial fuel loading and the commencement of initial criticality, a comprehensive review of required completed preoperational procedures will be conducted by the Test Working Group. This review will provide assurance that required plant systems and structures will be capable of supporting the initial fuel loading and subsequent startup testing. E

It is intended that Phase I testing be completed prior to commencing initial fuel loading. If prerequisite and Phase I testing is incomplete at this time, provisions for carrying over testing will be planned and approved in accordance with the site-specific administrative procedures.

Insert New Paragraph →

The startup testing phases (Phases II, III, and IV) of the test program are subdivided into the following categories:

A. Initial fuel load

B. Post-core hot functional testing

C. Initial criticality

D. Low power physics testing

E. Power ascension testing. It ends with the completion of testing at 100% power.

Question 640.2

Section 14.2.7, "Conformance of Test Programs With Regulatory Guides," should be modified to address the following items:

a. Revise the exception to Regulatory Guide 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 2, Appendix A, Section 5.a to include testing at 20% and 80% power for the first-of-a-kind plant. For follow-on plants, reduced testing (50% and 100% power) is appropriate only if more stringent requirements are met for these conditions.

b. Include Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," in accordance with SRP Section 14.2.

c. Include Regulatory Guide 1.139, "Guidance for Residual Heat Removal," in accordance with SRP Section 14.2.

Response 640.2

a. With respect to the exception in CESSAR DC Section 14.2.7.1.4, the System 80+ design is designated as a "Follow-On" plant in regard to measurements of the power reactivity coefficient. The present wording of the section is consistent with this designation.

b. Combustion Engineering agrees with the request and will add Regulatory Guide 1.95 to Section 14.2.7 in the next revision to CESSAR-DC.

c. Combustion Engineering agrees with the request and will add Regulatory Guide 1.139 to Section 14.2.7 in the next revision to CESSAR-DC.

Question 640.3

Section 14.2.11, Test Program Schedule, states that not all individual startup test procedures will be available for NRC review 60 days prior to fuel load. This section should be modified to state that all startup procedures will be available for NRC review 60 days prior to the scheduled fuel loading date in accordance with Regulatory Guide 1.68, Appendix B.

Response 640.3

The wording of CESSAR DC Section 14.2.11 regarding availability of test procedures is intended to recognize that the Post Fuel Load test period may extend from six to nine months or more. It is unnecessary to require that test procedures that are required near the end of the test program be in their final form 60 days prior to fuel load. Regulatory Guide 1.68 Position C4 states "Approved test procedures for satisfying FSAR testing commitments should be made available to NRC staff personnel from the Office of Inspection and Enforcement approximately 60 days prior to their intended use. Availability for resident NRC review 60 days prior to use is more than adequate to accommodate comments and to revise, as necessary. Procedure preparation is an on-going process that must insure that experience gained during testing is incorporated into subsequent testing. The wording of Section 14.2.11 acknowledges this requirement.

Question 640.4

Section 14.2.12 test abstracts should be modified to address the following concerns:

a. Preoperational test prerequisites include the requirement that support systems required for system testing are complete and operational. This level of detail in the test abstracts is insufficient to determine conformance with Regulatory Guide 1.68, Position C.2. Section 14.2.12.1 should address generic support system requirements and the individual test abstracts should address specific support system requirements.

b. Several test abstracts include imprecise acceptance criteria (e.g., acceptable, allowable, anticipated, design, estimated, expected, manufacturers instructions, proper, selected, specified, within assumed uncertainties, within limits). Modify individual test abstracts to specify the bases for determining acceptable system and component performance. Acceptable criteria includes specific references to regulatory guides, Technical Specifications, assumptions used in the safety analysis, other CESSAR-DC sections, and applicable codes and standards.

Response 640.4

a. The test descriptions (scenarios) provided in Section 14.2.12.1 are test guides or abstracts which identify the scope of testing. They are not intended to provide detailed information on the conduct of each test. The test guidelines developed from these abstracts will provide the level of detail necessary to describe (idertify) more "specific" support system requirements. Detailed preoperational test procedures are developed from these guidelines by personnel with appropriate technical background and experience. The support systems are detailed in these procedures and reflect the "as-built" configuration. Therefore, support system wording will remain as is.

Those tests that do not address construction activities completely (to the degree that outstanding construction items could not be expected to affect the validity of test results) will be revised in the next CESSAR-DC Chapter 14 submittal in order to support Regulatory Guide 1.68 position C.2.

b. Preoperational test acceptance criteria has been reviewed and those identified in Section 14.2.12.1, 14.2.12.2, 14.2.12.3 and 14.2.12.4 requiring revisions will be revised in the next CESSAR-DC Chapter 14 submittal to reference test acceptance criteria compliance with regulatory guides, technical specifications, assumptions used in safety analysis, other CESSAR-DC sections or applicable codes and standards.

Question 640.5

Startup tests listed in Section 14.2.12.2 that are not essential to the demonstration of conformance with design requirements for structures, systems, components, and features which meet any of the following criteria should be identified:

* Those that will be used for safe shutdown and cooldown of the reactor under normal plant conditions and for maintaining the reactor in a safe condition for an extended shutdown period; or

* Those that will be used for safe shutdown and cooldown of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions; or

* Those that will be used for establishing conformance with safety limits or limiting conditions for operation that will be included in the facility technical specifications; or

* Those that are classified as engineered safety features or will be used to support or ensure the operations of engineered safety features within design limits; or

* Those that are assumed to function or for which credit is taken in the accident analysis for the facility, as described in the SSAR; or

* Those that will be used to process, store, control, or limit the release of radioactive materials.

Response 640.5

Startup test 14.2.12.2.1, Post Core Load Functional Test Controlling document is the only test that falls into the category. It is an administrative procedure used to direct the operation of the plant systems during the post-core load testing period.

Question 640.6

Review of the preoperational and startup test phase descriptions disclosed that the operability of several of the systems and components listed in Regulatory Guide 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 2, Appendix A, may not be demonstrated. Either expand your test descriptions to address the following items, insert cross-references in Section 14.2.12 if complete test descriptions for the following items are provided elsewhere in the CESSAR-DC as appropriate to provide technical justifications for any exception to Regulatory Guide 1.68, Rev. 2, for the following items:

(a) Preoperational Testing

1.h.(4) Hydrogen mitigation system (Section 14.2.12.1.112 this is to be provided later by CE).

Response CESSAR DC Section 14.2.12.1.112 and 14.2.12.1.113 will be revised as shown on the attached workup.

1.h.(5) Cold water interlocks (if applicable).

Response This item is not applicable.

1.h.(8) Holdup volume tank and cavity flooding system.

Response CESSAR DC Section 14.2.12.1.42 will be revised as shown on the attached workup.

1.i.(2) Containment isolation valve functional and closure timing.

Response CESSAR DC Section 14.2.12.1 will be revised to add new test description as shown on the attached workup.

1.i.(8) Primary and secondary containment isolation initiation logic.

Response Containment isolation actuation testing is performed as part of the Engineered Safety Features - Component Control System (ESF-CCS) Test, 14.2.12.1.25.

1.i.(20) Containment penetration cooling system (if applicable).

Response This item is not applicable.

1.j.(7) Leak detection systems used to detect failures in ECCS and containment recirculating spray systems located outside a containment.

<u>Response</u> This test is included as part of 14.2.12.1.84, Equipment and Floor Drainage System Test. This will be revised as shown on the attached workup.

1.j.(12) Failed fuel detection system.

<u>Response</u> The failed fuel detection systems tests are included in the Letdown Process Radiation Monitor Subsystem Test 14.2.12.1.19, and Airborne and Area Radiation Monitoring System Test 14.2.12.1.118. These tests will be revised as shown on the attached markup.

1.j.(20) Instrumentation used to detect external and internal flooding conditions.

<u>Response</u> This test is included as part of 14.2.12.1.84, Equipment and Floor Drainage System Test. This will be revised as shown on the attached workup.

1.j.(22) Instrumentation that can be used to track the course of postulated accidents.

<u>Response</u> This response will be incorporated into CESSAR DC Section 14.2.12.2 in the next amendment. A markup of this section is attached for NRC review.

1.k.(2) Personnel monitors and radiation survey instruments (this can be an interface requirement of the applicant).

<u>Response</u> This item is a site specific item to be addressed by the applicant.

1.m.(4) Fuel handling equipment operability at 100% load.

<u>Response</u> CESSAR DC Section 14.2.12.1.99 will be revised as shown on the attached markup.

1.n.(8) Seal water systems.

Response: The RCP seal injection system is included as part of the CVCS charging subsystem and testing is included in CESSAR DC Section 14.2.12.1.8. There are no other seal water systems in the present System 80+ design.

1.n.(15) Shield cooling systems (if applicable).

Response: This item is not applicable to the System 80+.

1.o.(1) Reactor component handling equipment operability at 100% load.

Response: CESSAR DC Section 14.2.12.1.98 will be revised as shown on the attached markup.

(b) Initial Fuel Loading and Precritical Tests

2.c Final functional testing of the reactor protection system to demonstrate proper trip points, logic, and operability of scram breakers and valves. Operability of manual scram functions.

Response: A new pre-op, Post-core Plant Protection System (PPS) Test, 14.2.12.2.11, will be added to CESSAR DC in a future revision to Chapter 14.

2.g Final calibration and proper operation of associated alarms and protective functions of source and intermediate range neutron flux monitors.

(c) Lower Power Testing

4.i Cperability of the control rod withdrawal and insertion sequencer and control rod withdrawal inhibit or block functions over the reactor power level range during which such features must be operable.

Response These features are not operable at low power, therefore no testing is performed.

4.t Natural circulation tests of the reactor coolant system (Presently included in Table 14.2-5 but not in Section 14.2.12).

Response This test will be included in Section 14.2.12.4.23 as shown on the attached markup.

(d) Power Ascension Tests

5.q Operation of failed fuel detection systems.

Response Operation of the failed fuel detection systems is included in Section 14.2.12.4 Reactor Coolant and Secondary Chemistry and Radio Chemistry Test.

5.w Demonstration that concrete temperature surrounding hot penetrations do not exceed design limits with the minimum design capability of cooling system components available.

Response This response will be incorporate into CESSAR DC Section 14.2.12.4.21, Penetration Temperature Survey,in the next amendment. A markup of this section is attached for NRC review.

5.x Auxiliary systems required to support operation of engineered safety feature adequately perform under limiting accident conditions.

Response This will be demonstrated as part of the Ventilation Capability, 14.2.12.4.22. A markup of this test abstract is included for NRC review and will be included in CESSAR DC as part of the next amendment.

5.c.c	Gaseous and liquid radioactive waste processing, storage, and release systems.
<u>Response</u>	Operability of these systems is verified in pre-ops 14.2.12.1.114, Liquid Waste Management System Test, and 14.2.12.1.116, Gaseous Waste Management System Test.
5.f.f	Ventilation and air-conditioning systems.
<u>Response</u>	A new Pre-op, 14.2.12.4.22, Ventilation Capability will be added as shown on the attached markup.

640.6 I.h.(4)

14.2.12.1.112 HYDROGEN MITIGATION SYSTEM (HMS) TEST

1.0 OBJECTIVES

1.1 To demonstrate the proper operation of the Hydrogen Mitigation System.

2.0 PREREQUISITES

2.1 Construction activities on the Hydrogen Mitigation System have been completed.

2.2 Hydrogen Instrumentation has been calibrated.

2.3 Electrical power systems required for the Hydrogen Mitigation System are available.

2.4 Test instrumentation is available and calibrated.

3.0 TEST METHOD

3.1 Verify HMS ignitor control logic and indication.

3.2 Demonstrate each ignitor reaches proper operating temperature.

3.3 Demonstrate current draw for each group of ignitors is within tolerance.

4.0 DATA REQUIRED

4.1 Current draw of each ignitor group.

4.2 Ignitor temperatures.

5.0 ACCEPTANCE CRITERIA

5.1 The Hydrogen Mitigation System operates as described in Section 6.2.5.

14.2.12.1.113 Containment Hydrogen Recombiner System (CHRS) Test

1.0 OBJECTIVE

1.1 To demonstrate that the Hydrogen Recombiners can be properly installed and are operable.

2.0 PREREQUISITES

2.1 Construction activities on the Hydrogen Recombiner System have been completed.

2.2 Hydrogen Recombiner System instrumentation has been calibrated.

2.3 Support systems required for operation of the Hydrogen Recombiner System are completed and operational.

2.4 Test instrumentation is available and calibrated.

2.5 Manufacturer Hydrogen Recombiner tests completed and approved.

3.0 TEST METHOD

3.1 Install the CHRS in the specified location and connect the Instrumentation, H_2 Test Connection, Power supply and Piping

3.2 Verify the proper operation of the Hydrogen Sensors, Instrumentation, controls and alarms

3.3 Verify flow paths from containment to the CHRS and return

4.0 DATA REQUIRED

4.1 Setpoints at which alarms, interlocks and controls occur.

4.2 Flow data to and from containment.

5.0 ACCEPTANCE CRITERIA

5.1 The Hydrogen Recombiners operate as described in Section 6.2.5.

H

640.6 1.h.(8)

14.2.12.1.42 In-containment ~~Refueling~~ Water Storage ~~Tank (IRWST) Subsystem~~ System Test

1.0 OBJECTIVE

1.1 To demonstrate the proper operation of the In-containment Refueling Water Storage Tank (IRWST) ~~Subsystem.~~, the Holdup Volume Tank (HVT) and Cavity Flooding System (CFS)

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested are complete.

2.2 Plant systems required to support testing are operable or temporary systems are installed and operable.

2.3 Permanently installed instrumentation is operable and calibrated.

2.4 Test instrumentation is available and calibrated.

3.0 TEST METHOD

3.1 Operate control valves from all appropriate control positions. Observe valve operation, position indication and, ~~where required,~~ measure opening and closing times. E

3.2 Simulate failed conditions and observe valve response.

3.3 Fill the IRWST with reactor makeup water and record volume versus indicated level. Observe level alarms.

3.4 Simulate IRWST temperature and observe alarms.

3.5 Verify design flow path from IRWST to the HVT and reactor cavity.

add 3.6, 3.7 per attached sheet

4.0 DATA REQUIRED

4.1 Valve position indications.

4.2 Valve opening and closing time, where required.

4.3 Response of valves to simulated failed conditions.

4.4 Setpoint at which alarms occur.

RAI 640.6

5.0 ACCEPTANCE CRITERIA

5.1 The ~~IRWST Subsystem~~ In-Containment Water Storage System performs as described in Section ~~6.3~~. 6.8 | E

3.6 Verify the level alarms and indications of the HVT and reactor cavity

3.7 Verify the operation and setpoints of the IRWST relief valves and vacuum breakers

640.6 1.i (2)

14.2.12.1.140 CONTAINMENT ISOLATION VALVES

1.0 OBJECTIVES

1.1 Demonstrate that containment isolation valves can be operated manually and operate in response to automatic actuation.

1.2 Verify that upon loss of actuating power, the valves fail as designed.

1.3 Verify that all valves operate in less than the time specified in the plant technical specification.

2.0 PREREQUISITES

2.1 Construction activities on the containment isolation valves have been completed.

2.2 Support system required to operate the containment isolation valves are operable.

2.3 Test instrumentation is available and calibrated.

3.0 TEST METHOD

3.1 Operate containment isolation valves from all appropriate control positions. Verify position indication, and measure opening and closing times, including at rated flow and no flow conditions.

3.2 Simulate failed conditions and observe valve response.

3.3 Initiate the following simulated activation signals and verify the appropriate valves go to the design positions.

CIAS	Containment Isolation Actuation Signal
CSAS	Containment Spray Actuation Signal
MSIS	Main Steam Isolation Signal
EFAS	Emergency Feedwater Actuation Signal
AFAS	Alternate Feedwater Actuation Signal
HRAS	High Radiation Circulation Signal
HHAS	High Humidity Actuation Signal
SIAS	Safety Injection Actuation Signal
CCWLLSTAS	Component Cooling Water Low-Low Surge Tank Actuation Signal

RAI 640.6

4.0 DATA REQUIRED

4.1 Valve opening and closing times under rated flow and no flow conditions as applicable.

4.2 Valve position indications.

4.3 Valve response to simulated failed conditions.

4.4 Valve response to a simulated actuation signal.

5.1 ACCEPTANCE CRITERIA

5.1 The Containment Isolation Valve. operate as described in Section 6.2.4.

14.2.12.1.84 **Equipment and Floor Drainage System Test**

1.0 OBJECTIVE

1.1 To demonstrate that the drain lines are correctly routed to their respective sumps.

1.2 To demonstrate the sump pumps operate per design including alarms and interlocks.

1.3 To demonstrate the waste tanks operate per design including alarms and interlocks.

add. 1.4, 1.5 per attached sheet

2.0 PREREQUISITES

2.1 Construction activities on the Equipment and Floor Drainage System have been completed.

2.2 Equipment and Floor Drainage System instrumentation has been calibrated.

2.3 Support systems required for operation of the Equipment and Floor Drainage System are complete and operational.

2.4 Water is available for flow paths to be checked.

3.0 TEST METHOD

3.1 Verify the operation of alarms and interlocks.

3.2 Verify sump levels as required to demonstrate proper operation of the sump pumps.

3.3 Flow water in each drain path to verify that the drains discharge to their designated sump and that system segregation is maintained

4.0 DATA REQUIRED

4.1 Sump pump operating data.

4.2 Setpoints at which alarms and interlocks occur.

4.3 Discharge points of each drain.

5.0 ACCEPTANCE CRITERIA

5.1 The Equipment and Floor Drainage System operates as described in Section 9.3.3.

H

1.4 To demonstrate the sump level instrumentation operates per design including alarms and indications

1.5 To demonstrate system segregation

640.6 1.j.(12)

14.2.12.1.19 **Letdown Process Radiation Monitor Test**

1.0 OBJECTIVE

1.1 To demonstrate proper operation of the Letdown Process Radiation Monitor of the Process Sampling System

2.0 PREREQUISITES

2.1 The Process Radiation Monitor has been installed, all interconnections have been completed, and the sample chamber has been filled with reactor makeup water.

2.2 The Process Radiation Monitor has been calibrated.

2.3 A check source is available.

2.4 Support systems required for operation of the Process Radiation Monitor ~~Subsystem~~ are complete and operational.

3.0 TEST METHOD

3.1 Utilizing the built-in test features, observe process monitor indications, outputs to interface equipment, and alarm operation.

3.2 Utilizing the check source, verify calibration of the process monitor.

4.0 DATA REQUIRED

4.1 Check source data.

4.2 Process monitor operating data.

4.3 Process monitor response to the check source.

4.4 Value of parameters required to actuate alarms.

5.0 ACCEPTANCE CRITERIA

5.1 The Letdown Process Radiation Monitor of the Process Sampling System performs as described in Subsection 9.3.2

14.2.12.1.118 Airborne and Area Radiation Monitoring System Test

1.0 OBJECTIVE

1.1 To verify the functional performance of the Airborne and Area Radiation Monitoring System.

2.0 PREREQUISITES

2.1 Construction activities on the Airborne and Area Radiation Monitoring System have been completed.

2.2 Airborne and Area Radiation Monitoring System instrumentation has been calibrated.

2.3 Support systems required for operation of the Airborne and Area Radiation Monitoring System are completed and operational.

2.4 Test Instrumentation is available and calibrated.

2.5 Calibration check source is available. H

3.0 TEST METHOD

3.1 Utilizing a check source and external test equipment, verify the calibration and operation of the monitor.

3.2 Check the self-testing feature of the monitor.

3.3 Compare local and remote indications.

3.4 Verify proper local and remote alarm actuations.

4.0 DATA REQUIRED

4.1 Monitor response to a check source.

4.2 Technical data associated with the source.

4.3 Local and remote responses to test signals.

4.4 Signals levels necessary to cause alarm actuation.

5.0 ACCEPTANCE CRITERIA

5.1 The Airborne and Area Radiation Monitors will perform as described in Section 11.5

640.6 1.j.(22)

14.2.12.1.141 POST ACCIDENT MONITORING INSTRUMENTATION TEST

1.0 OBJECTIVE

1.1 To verify that the Post Accident Monitor Instrumentation (PAMI) is installed properly, responds correctly to external inputs and provides proper outputs to the distributed display and recording equipment.

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested are complete.

2.2 Applicable operating manuals are available.

2.3 Required software is installed and operable.

2.4 External test equipment and instrumentation is available and calibrated.

2.5 Plant systems required to support testing are operable to the extent necessary to perform the testing or suitable simulation of this system is used.

3.0 TEST METHOD

3.1 Verify power sources to all related equipment.

3.2 Validate that external inputs are received and processed correctly by the appropriate system devices.

3.3 Verify that alarms and indication displays respond correctly to actual or simulated inputs.

3.4 Verify the operability of required software application programs.

3.5 Verify the correct operation of data output devices and displays at applicable work stations and terminals.

3.6 Evaluate processing system loading under actual or simulated operating conditions.

4.0 DATA REQUIRED

4.1 Computer generated summaries of external input data, data processing, analysis functions, displayed information and permanent data records.

RAI 640.6

5.0 ACCEPTANCE CRITERIA

5.1 The PAMI performs as described in Section 7.5.

14.2.12.1.98 **Containment Polar Crane Test**

1.0 OBJECTIVE

To demonstrate the functional performanc of the Containment Polar Crane.

2.0 PREREQUISITES

2.1 Electric power available.

2.2 Containment Polar Crane Instrumentation has been calibrated.

2.3 Construction activities on the crane and associated equipment has been completed.

3.0 TEST METHOD

3.1 Verify operability of trolley, bridge, and hoist. H

3.2 Check hoist and trolley speeds.

3.3 Check capability of crane to position over all required Containment Building equipment.

3.4 Perform 125% Static load capacity test

4.0 DATA REQUIRED

4.1 Hoist and trolley speeds.

4.2 Verification of proper operation of interlocks.

4.3 Load capacity data.

5.0 ACCEPTANCE CRITERIA

5.1 The Containment Polar Crane performs as described in Section 9.1.4.

3.5 Perform an Operational Test of the Polar Crane at 100% of rated load

3.6 Verify the operation of protective and Safety devices

14.2.12.1.99 Fuel Building Cranes Test

1.0 OBJECTIVE

To demonstrate the functional performance of the Cask Handling and Fuel Handling Cranes.

2.0 PREREQUISITES

2.1 Electric power available.

2.2 Fuel Building cranes instrumentation has been calibrated.

2.3 Construction activities on the crane and associated equipment have been completed.

3.0 TEST METHOD

3.1 Verify operability of trolley, bridge, and hoist for each crane.

3.2 Check hoist and trolley speeds. H

3.3 Check capability of cask handling and fuel handling crane to position over all required fuel building equipment.

3.4 Perform 125% static load capacity test of the cask handling crane.

4.0 DATA REQUIRED

4.1 Hoist, and trolley speeds.

4.2 Verification of proper operation of interlocks.

4.3 Load capacity data.

5.0 ACCEPTANCE CRITERIA

5.1 The Cask Handling and Fuel Handling Cranes performs as described in Section 9.1.4.

3.5 Perform an Operational Test of the Cranes at 100% of rated load.

3.6 Verify the operation of protective and safety devices

640.6 2.9

14.2.12.2.12 POST-CORE EX-CORE NUCLEAR INSTRUMENTATION SYSTEM TEST

1.0 OBJECTIVE

1.1 To verify the proper functional performance of the Ex-core Nuclear Instrumentation System.

1.2 Verify the proper performance of audio and visual indicators.

2.0 PREREQUISITES

2.1 Construction activities on the Ex-core Nuclear Instrumentation System have been completed.

2.2 Ex-core Nuclear Instrumentation System instrumentation has been calibrated.

2.3 External test equipment has been calibrated and is operational.

2.4 Support systems required for operation of the Ex-core Nuclear Instrumentation System are operational.

2.5 Check source is available.

3.0 TEST METHOD

3.1 Utilizing appropriate test instrumentation, simulate and vary input signals to the startup, safety and control channels of the Ex-core Nuclear Instrumentation System.

3.2 Monitor and record all output signals as a function of variable inputs provided by test instrumentation.

3.3 Record the performance of audio and visual indicators in response to changing input signals.

3.4 Utilizing a check source, verify calibration of the startup, safety and control channels.

4.0 DATA REQUIRED

4.1 Values of input and output signals for correlation purposes, as required.

4.2 Values of all output signals triggering audio and visual alarms.

4.3 Channel response to the check source.

RAI 640.6

5.0 ACCEPTANCE CRITERIA

5.1 The Ex-core Nuclear Instrumentation System performs as described in Sections 7.2.1 and 7.7.1.

RAI 640.6

14.2.12.4.21 PENETRATION TEMPERATURE SURVEY

1.0 OBJECTIVE

1.1 To verify concrete temperatures surrounding hot penetrations do not exceed design allowable temperatures.

2.0 PREREQUISITES

2.1 Plant is stable at the applicable power level.

3.0 TEST METHOD

3.1 Collect data at the applicable power levels.

4.0 DATA REQUIRED

4.1 Penetration sleeve temperature adjacent to shield building concrete.

5.0 ACCEPTANCE CRITERIA

5.1 Concrete temperature does not exceed allowable temperature per ANSI/ACT 349-85 Code Requirements for Nuclear Safety Related Concrete Structures.

RAJ 640.6

14.2.12.4.22 VENTILATION CAPABILITY

1.0 OBJECTIVE

1.1 To verify that various heating, ventilating, and air conditioning (HVAC) systems for the containment, control building, subsphere building, nuclear annex and areas housing engineered safety systems continue to maintain design temperatures.

2.0 PREREQUISITES

2.1 The plant is operating at or near the desired power.

3.0 TEST METHOD

3.1 Record temperature readings in specified areas while operating with normal ventilation lineups.

3.2 Record temperature readings in specified areas while operating the designed minimum number of HVAC components consistent with existing plant conditions.

3.3 Record temperature readings in specified areas during the loss of offsite power test.

4.0 DATA REQUIRED

4.1 Power levels.

4.2 Temperature data at designated locations.

4.3 Equipment operating data.

5.0 ACCEPTANCE CRITERIA

5.1 Temperature conditions are maintained in the containment, control building, subsphere building, nuclear annex and ESF areas in accordance with Section 9.4.

RAI 640.6

14.2.12.4.23 NATURAL CIRCULATION

1.0 OBJECTIVE

1.1 To evaluate natural circulation flow conditions.

1.2 To determine that adequate boron mixing can be achieved under natural circulation conditions.

1.3 To demonstrate the ability to perform natural circulation heat removal.

2.0 PREREQUISITES

2.1 The reactor is operating so as to provide a satisfactory heat source after a trip.

3.0 TEST METHOD

3.1 All reactor coolant pumps are secured essentially simultaneously.

3.2 The plant is tripped.

3.3 Reactor Coolant System (RCS) temperatures, pressurizer pressure and level, and steam generator levels and pressures are continuously recorded.

3.4 Natural circulation flow is verified by stabilized or gradually decreasing hot leg temperatures.

3.5 The natural circulation power-to-flow ratio is calculated.

3.6 The plant is borated in accordance with operating procedures. Periodic samples are taken to verify that acceptable mixing of borated water is achieved under natural circulation conditions at hot standby and to identify delay time associated with such mixing.

3.7 Following boration, heat removal of the RCS is accomplished in accordance with applicable station operating procedures.

RAI 640.6

4.0 DATA REQUIRED

4.1 RCS Temperature

4.2 Pressurizer pressure and level.

4.3 Steam generator levels and pressure.

4.4 RCS Boron Concentration

5.0 ACCEPTANCE CRITERIA

5.1 The natural circulation power to flow ratio is less than 1.0.

5.2 The RCS can be borated while in natural circulation.

5.3 RCS heat removal capability is demonstrated.

Question 640.7

Section 14.2.12.4.7, "Shutdown from Outside the Control Room Test," should be revised to address the following items in accordance with Regulatory Guide 1.68.2, "Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants:"

a. Specify that plant systems are in the normal configuration with the turbine-generator in operation.

b. Specify that the test is accomplished with the minimum shift crew complement.

Response 640.7

CESSAR DC Section 14.2.12.4.7 will be revised as shown on the attached page.

RAI 640.7

14.2.12.4.7 **Shutdown from Outside the Control Room Test**

1.0 OBJECTIVE

1.1 To demonstrate that the plant can be maintained in Hot Standby from outside the Control Room following a reactor trip.

2.0 PREREQUISITES

2.1 The reactor is operating at ≥ 10% of rated power with plant systems in their normal configuration with the turbine-generator in operation.

2.2 The capability to cool down the plant from the Remote Shutdown Panel has been demonstrated during pre- or post-core hot functional tests.

2.3 The Remote Shutdown Panel instrumentation is operating properly.

2.4 The Communications Systems between the Control Room and Remote Shutdown location has been demonstrated to be operational.

2.5 The Remote Shutdown instrumentation controls and systems have been preoperationally tested.

3.0 TEST METHOD

3.1 The operating crew evacuates the Control Room (standby crew remains in the control room).

3.2 The reactor is tripped from outside the Control Room.

3.3 The reactor is brought to Hot Standby by the minimum shift operating crew from outside the Control Room and is maintained in this condition for at least 30 minutes.

RAI 640.7

4.0 DATA REQUIRED

4.1 Time dependent data:

4.1.1 Pressurizer pressure and level

4.1.2 RCS temperatures

4.1.3 Steam generator pressure and level

4.1.4 CEA drop times

Question 640.8

Section 14.2.12.1.88, "Compressed Air System Test," should be revised to address the following items in accordance with Regulatory Guide 1.68.3, "Preoperational Testing of Instrument and Control Air Systems:"

a. Determination that the total air demand at normal steady state conditions, including leakage from the system, is in accordance with design (Position C.5).

b. Demonstration that the plant equipment designated by design to be supplied by the instrument air system is not degraded when supplied by the station air system which may have less restrictive air quality requirements (Position C.9).

Response 640.8

a. CESSAR-DC Section 14.2.12.1.88 will be revised to reflect the requirements of Regulatory Guide 1.68.3 Position C.5. This revision will be included in a future amendment to CESSAR-DC.

b. The System 80+ instrument air system has no interconnections with any other air system. Therefore, ingress of lesser quality air from other air systems is not possible in the instrument air system design.

3.12 Verify that the total air demand at normal steady state conditions, including leakage from the system, is in accordance with design.

3.8 Verify relief valve settings.

3.9 Verify appropriate differential pressures (e.g., delta P across prefilters and afterfilters).

3.10 While at system normal steady state conditions, if practicable, simultaneously operate those plant components requiring large quantities of instrument air, to verify pressure transients in the distribution system do not exceed acceptable values.

3.11 Functionally test instrument air system to ensure credible failures resulting in an increase in supply system pressure will not cause loss of operability.

4.0 DATA REQUIRED

4.1 Capacity data on compressors.

4.2 Cycle times and regeneration temperatures of air dryers.

4.3 Air dryer dew point temperatures.

4.4 Air quality measurements. (Dewpoint, hydrocarbons, particulates).

4.5 Valve opening and closing times, where required.

4.6 Valve position indication.

4.7 Response of valves to simulated failed conditions.

4.8 Setpoints at which alarms and interlocks occur.

4.9 Pressure, temperature, and flow rate readings at remote and control board indicators.

4.10 Cycle times for automatic moisture drain valves.

4.11 System response to the simultaneous operation of plant components requiring large quantities of instrument air.

4.12 System response to an increase in supply pressure.

H

Question 640.9

Section 14.2.12.1.22, "Safety Injection System Test," Section 14.2.12.1.23, "Safety Injection Tank Subsystem Test," Section 14.2.12.1.41, "Integrated Engineered Safety Feature/Loss of Power Test," Section 14.2.12.1.61, "Pre-core Safety Injection Check Valve Test," or other test abstracts as appropriate should be revised to address the following items in accordance with Regulatory Guide 1.79, "Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors:"

a. Safety injection pump flow test under hot operating conditions (Position C.1.a.(2)).

b. Safety injection tank isolation valve test under maximum differential pressure conditions (Position C.1.c.(2)). Section 14.2.7.2 addresses this testing but its conduct is not specified in a test abstract.

Response 640.9

a.) CESSAR DC Section 14.2.12.1.61 will be revised as shown on the attached workup.

b.) CESSAR DC Section 14.2.12.1.23 will be revised as shown on the attached workup.

RAI 640.9

14.2.12.1.23 **Safety Injection Tank Subsystem Test**

1.0 OBJECTIVE

1.1 To demonstrate the proper operation of the Safety Injection Tank Subsystem.

2.0 PREREQUISITES

2.1 Construction activities on the Safety Injection Tank Subsystem have been completed.

2.2 Support systems required for the operation of the Safety Injection Tank Subsystem are complete and operational.

2.3 Adequate supply of makeup water from the IRWST is available. E

2.4 The reactor vessel head and internals have been removed.

2.5 The reactor vessel is filled above the RV injection nozzles. E

2.6 Safety Injection Tank Subsystem instrumentation has been checked and calibrated.

3.0 TEST METHOD

3.1 Operate control valves from all appropriate control locations and observe valve operation and position indication. Where required, measure valve opening and closing times.

3.2 Simulate failed conditions and observe valve response.

3.3 Simulate a SIAS signal and observe valve interlock and alarm operation.

3.4 Fill the Safety Injection Tanks from the IRWST and observe level indication and alarm operation. E

3.5 Pressurize the Safety Injection Tanks and observe pressure indication and alarm operation.

3.6 Simulate a SIAS to each Safety Injection Tank and measure the time required for the Safety Injection Tanks to discharge their contents to the RCS.

add 3.7 per attached sheet

RAI 640.9

4.0 DATA REQUIRED

4.1 Valve position indications.

4.2 Valve opening and closing times, where required.

4.3 Response of valves to simulated failed conditions.

4.4 System response to SIAS.

4.5 Setpoints at which alarms and interlocks occur.

4.6 Times required for Safety Injection Tanks to discharge their contents to the RCS.

5.0 ACCEPTANCE CRITERIA

5.1 The Safety Injection Tank Subsystem performs as described in Section 6.3.2.

add 4.7 per attached sheet

RAI 640.9

14.2.12.1.61 **Pre-core Safety Injection Check Valve Test**

1.0 OBJECTIVE

1.1 To verify that the safety injection tank discharge check valve will pass flow with the RCS at hot, zero power conditions.

1.2 To verify that the safety injection loop check valves will pass flow with the RCS at hot, zero power conditions.

2.0 PREREQUISITES

2.1 RCS at hot, zero power conditions.

2.2 Safety injection tanks are filled and pressurized to their normal operating conditions.

2.3 CVCS is in operation.

3.0 TEST METHOD

CHANGE per attached sheet

3.1 ~~Verify flow through the safety injection loop check valves by lining up the CVCS charging pumps to discharge into the safety injection discharge header.~~

3.2 Verify flow through each safety injection tank discharge check valve by flowing back to the IRWST. E

4.0 TEST DATA

4.1 Safety injection tank level and pressure.

4.2 Safety injection discharge header pressure.

4.3 CVCS charging pump flow.

5.0 ACCEPTANCE CRITERIA

5.1 Verification that the loop check valves and safety injection tank discharge check valves will pass flow with the RCS at hot, zero power conditions.

RAI 640.9

3.1 Verify flow through the safety injection loop check valves. Reduce RCS pressure to below shut-off head for the SI pumps. Start each SI pump and open loop isolation valves and observe flow to the RCS on installed flow indicators.

3.7 Pressurize each Safety Injection Tank to its maximum operating pressure and verify each SIT discharge valve will open.

4.7 Safety Injection Tank pressure when stroking valves.

Question 640.10

Section 14.2.12.1.103, "Control Building Ventilation System Test," should be revised to address the concerns of Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against and Accidental Chlorine Release."

Response 640.10

This response will be incorporated into CESSAR-DC Section 14.2.12.1.103 in the next Chapter 14 submittal. A markup of this section is attached for NRC review.

RAI 640.10

3.8 Verify the isolation capability of the control room upon detection of chlorine gas at the intakes meets the requirements of Reg. Guide 1.95.

3.7 Verify that the system maintains the control room at positive pressure relative to the outside atmosphere during system operation in the pressurized mode as required by the Technical Specifications.

3.~~8~~9 Demonstrate the operation of the battery room exhaust fans.

3.~~9~~10 Demonstrate the operation of the Electrical Equipment Room Air Handling Subsystem.

3.~~10~~11 Demonstrate the operation of the Smoke Purge Fan.

4.0 DATA REQUIRED

4.1 Air balancing verification.

4.2 Fan and damper operating Data.

4.3 Temperature and humidity data in the Control Room envelope. H

4.4 Response to radioactivity, toxic gas, and products of combustion.

4.5 Setpoints of alarms, interlocks, and controls.

4.6 Pressurization data for the control room data.

4.7 Filter and carbon adsorber data.

5.0 ACCEPTANCE CRITERIA

5.1 The Control Building Ventilation System operates as described in Section 9.4.1.

Question 640.11

Section 14.2.12.1.94, "Diesel Generator Electrical System Test," or other test abstracts as appropriate should be revised to address the following items in accordance with Regulatory Guide 1.108, "Preoperational Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants:"

a. Design-accident-loading-sequence to design-load requirements capability verification at full-load temperature conditions (Position C.2.a.(5)).

b. Consecutive start demonstration (Position C.2.a.(9)).

Response 640.11

a.) CESSAR DC Section 14.2.12.1.94 will be revised as shown on the attached workup and included in the next Chapter 14 submittal.

b.) The consecutive start demonstration is performed in 14.2.12.1.94, Diesel Generator Mechanical System Test.

RAI 640.11

the required voltage and frequency within acceptable limits and time, and operates on standby for greater than or equal to 5 minutes.

3.4 Demonstrate by simulating a loss of offsite power in conjunction with SIAS that:

a. the emergency buses are deenergized and loads are shed from the emergency buses, and

b. the diesel generator starts on the auto-start signal from its standby conditions, attains the required voltage and frequency within acceptable limits and time, energizes auto-connected loads through the load sequencer, and operates while loaded with the auto-connected loads for greater than or equal to 5 minutes.

In addition, verify that the auto-connected loads do not exceed the 2-hour rating of the diesel generator.

3.5 Demonstrate the diesel generator capability to reject a loss of the largest single load and verify that the voltage and frequency requirements are met.

3.6 Demonstrate the diesel generator capability to reject a full short-time rating load and verify that the voltage requirements are met and that the unit will not trip on overspeed. (If the auto-connected loads do not exceed the continuous rating of the diesel generator, the load rejection test should be conducted at its continuous rating). H

3.7 Diesel generator endurance and margin test: demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 2 hours should be at a load equivalent to the 2-hour rating of the diesel generator and 22 hours at a load equivalent to the continuous rating of the diesel generator. Verify that voltage and frequency requirements are maintained. The test should also verify that the mechanical systems such as fuel, lubrication, and cooling function within design limits.

3.8 Demonstrate hot restart functional capability at full-load temperature conditions by verifying that the diesel generator starts on a manual or auto-start signal, attains the required voltage and frequency within acceptable limits and time, and operates for longer than 5 minutes.

CHANGE per attached sheet

RAT, 640.11

3.8 Demonstrate hot restart functional capability at full-load temperature condition by simulating a loss of all AC voltage and demonstrating the diesel generator starts, attains the required voltage and frequency, performs the design accident-loading sequence to design-load requirements, maintains voltage and frequency within the required limits, and operates longer than five (5) minutes. This testing is to occur immediately after the full load carrying capability demonstration.

Question 640.12

Section 14.2.12.1.21, "Shutdown Cooling System Test," should be revised to address the following items in accordance with Regulatory Guide 1.139, "Guidance for Residual Heat Removal:"

a. RHR system isolation (Position C.2).

b. RHR system Pressure relief (Position C.3).

Response 640.12

CESSAR DC Section 14.2.12.1.21, Shutdown Cooling System Test will be revised as shown on the attached workup and included in the next Chapter 14 submittal.

14.2.12.1.21 Shutdown Cooling System Test

1.0 OBJECTIVE

1.1 To demonstrate proper operation of Shutdown Cooling System and the Shutdown Cooling Pumps.

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested are complete.

2.2 Plant systems required to support testing are operable and temporary systems are installed and operable.

2.3 Permanently installed instrumentation is operable and calibrated.

2.4 Test instrumentation is available and calibrated.

2.5 All lines in the Shutdown Cooling System have been filled and vented.

3.0 TEST METHOD

3.1 Verify proper operation of each shutdown cooling pump with minimum flow established.

3.2 Verify pump performance including head and flow characteristics for all design flow paths.

3.3 Perform a full flow test of the shutdown cooling system.

3.4 ~~Verify, if possible, proper operation, failure mode, stroking speed, and position indication of control valves.~~ CHANGE per attached sheet

3.5 Verify the proper operation of the protective devices, controls, interlocks, and alarms using actual or simulated signals.

add steps 3.6 and 3.7 per attached sheet

4.0 DATA REQUIRED

4.1 Valve position indications.

4.2 Pump head versus flow.

4.3 Valve opening and closing times, where required.

add Steps 4.4 and 4.5 per attached sheet

5.0 ACCEPTANCE CRITERIA

5.1 The Shutdown Cooling System performs as described in Section 5.4.7. E

RAI 640.12

3.4 Verify proper operation, failure mode, stroking speed, position indication and response to interlock of control and isolation valves.

3.7 Verify setpoint of the LTOP relief valves.

3.6 Verify isolation valves can be opened against design differential pressure.

4.4 Setpoints of alarms and interlocks.

4.5 Set points of the LTOP relief valves.