ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Friday, February 26, 2010 3:27 PM
To: Tesfaye, Getachew
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); PANNELL George L (AREVA NP INC); BRYAN Martin (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch 7, Supplement 4
Attachments: RAI 285 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 4 of the 20 questions of RAI No. 285 on November 11, 2009. AREVA NP submitted Supplement 1 to the response on December 17, 2009 to address 6 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on January 22, 2010 to provide a revised schedule for the remaining questions. AREVA NP submitted Supplement 3 to the response on February 19, 2010 which provided responses to 7 of the 10 remaining questions. The attached file, "RAI 285 Supplement 4 Response US EPR DC.pdf," provides a technically correct and complete response to 1 of the remaining 3 questions.

The following table indicates the respective pages in the response document, "RAI 285 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 285 — 07.03-25	2	3

The schedule for technically correct and complete responses to questions is unchanged and provided below.

Question #	Response Date
RAI 285 — 07.01-15	March5, 2010
RAI 285 — 07.03-21	April 16, 2010

Sincerely,

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company
Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Friday, February 19, 2010 4:57 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch 7, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 4 of the 20 questions of RAI No. 285 on November 11, 2009. AREVA NP submitted Supplement 1 to the response on December 17, 2009 to address 6 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on January 22, 2010 to provide a revised schedule for the remaining questions. The attached file, "RAI 285 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 7 of the remaining 10 questions. The schedule for a technically correct and complete response to question 07.03-25 remains unchanged, and the schedule for technically correct and complete responses to questions 07.01-15 and 07.03-21 has been changed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 285 Supplement 3 Questions 07.01-16, 07.03-27, 07.04-11, and 07.04-13.

The following table indicates the respective pages in the response document, "RAI 285 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 285 — 07.01-13	2	3
RAI 285 — 07.01-16	4	5
RAI 285 — 07.01-17	6	8
RAI 285 — 07.03-26	9	11
RAI 285 — 07.03-27	12	13
RAI 285 — 07.04-11	14	14
RAI 285 — 07.04-13	15	17

The schedule for a technically correct and complete response to question 07.03-25 remains unchanged and provided below. The schedule for technically correct and complete responses to questions 07.01-15 and 07.03-21 has been changed and is provided below.

Question #	Response Date
RAI 285 — 07.01-15	March 5, 2010
RAI 285 — 07.03-21	April 16, 2010
RAI 285 — 07.03-25	February 26, 2010

Sincerely,

Les Duncan
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Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Friday, January 22, 2010 6:27 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch 7, Supplement 2

Getachew,

AREVA NP Inc. provided responses to 4 of the 20 questions of RAI No. 285 on November 11, 2009. AREVA NP submitted Supplement 1 to the response on December 17, 2009 to address 6 of the remaining 16 questions.

AREVA NP is unable to provide a response to the 9 RAI No. 285 questions with a commitment date of January 22, 2010. The commitment date for these nine questions has been changed to February 19, 2010 to allow time to incorporate comments and feedback from the upcoming 1/25/10-1/26/10 meeting with the NRC related to U.S. EPR FSAR Chapter 7.

The schedule for a technically correct and complete response to RAI 285 Question 07.03-25 is unchanged and provided below. The schedule for technically correct and complete responses to the other nine RAI questions has been changed and is provided below:

Question #	Response Date
RAI 285 — 07.01-13	February 19, 2010
RAI 285 — 07.01-15	February 19, 2010
RAI 285 — 07.01-16	February 19, 2010
RAI 285 — 07.01-17	February 19, 2010
RAI 285 — 07.03-21	February 19, 2010
RAI 285 — 07.03-25	February 26, 2010
RAI 285 — 07.03-26	February 19, 2010
RAI 285 — 07.03-27	February 19, 2010
RAI 285 — 07.04-11	February 19, 2010
RAI 285 — 07.04-13	February 19, 2010

Sincerely,

Les Duncan
Licensing Engineer
AREVA NP Inc.
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Leslie.Duncan@areva.com

From: WELLS Russell D (AREVA NP INC)
Sent: Thursday, December 17, 2009 1:26 PM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch 7, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 4 of the 20 questions of RAI No. 285 on November 11, 2009. The attached file, "RAI 285 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 6 of the remaining 16 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 285 Questions 07.02-31 and 07.03-23.

The following table indicates the respective pages in the response document, "RAI 285 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page

RAI 285 — 07.01-12	2	2
RAI 285 — 07.02-31	3	3
RAI 285 — 07.03-22	4	5
RAI 285 — 07.03-23	6	6
RAI 285 — 07.03-24	7	8
RAI 285 — 07.05-9	9	9

The schedule for a technically correct and complete response to the remaining questions is unchanged and provided below.

Question #	Response Date
RAI 285 — 07.01-13	January 22, 2010
RAI 285 — 07.01-15	January 22, 2010
RAI 285 — 07.01-16	January 22, 2010
RAI 285 — 07.01-17	January 22, 2010
RAI 285 — 07.03-21	January 22, 2010
RAI 285 — 07.03-25	February 26, 2010
RAI 285 — 07.03-26	January 22, 2010
RAI 285 — 07.03-27	January 22, 2010
RAI 285 — 07.04-11	January 22, 2010
RAI 285 — 07.04-13	January 22, 2010

Sincerely,

(Russ Wells on behalf of)
Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
New Plants Deployment
AREVA NP, Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, November 11, 2009 6:11 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information RAI 285. The attached file, "RAI 285 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the 20 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 285 Questions 07.01-14 and 07.04-12.

The following table indicates the respective page(s) in the response document, "RAI 285 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 285 — 07.01-12	2	2
RAI 285 — 07.01-13	3	3
RAI 285 — 07.01-14	4	4
RAI 285 — 07.01-15	5	5
RAI 285 — 07.01-16	6	6
RAI 285 — 07.01-17	7	8
RAI 285 — 07.02-30	9	10
RAI 285 — 07.02-31	11	11
RAI 285 — 07.03-21	12	12
RAI 285 — 07.03-22	13	13
RAI 285 — 07.03-23	14	14
RAI 285 — 07.03-24	15	15
RAI 285 — 07.03-25	16	16
RAI 285 — 07.03-26	17	17
RAI 285 — 07.03-27	18	18
RAI 285 — 07.04-10	19	19
RAI 285 — 07.04-11	20	20
RAI 285 — 07.04-12	21	21
RAI 285 — 07.04-13	22	23
RAI 285 — 07.05-9	24	24

A complete answer is not provided for 16 of the 20 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 285 — 07.01-12	December 18, 2009
RAI 285 — 07.01-13	January 22, 2010
RAI 285 — 07.01-15	January 22, 2010
RAI 285 — 07.01-16	January 22, 2010
RAI 285 — 07.01-17	January 22, 2010
RAI 285 — 07.02-31	December 18, 2009
RAI 285 — 07.03-21	January 22, 2010
RAI 285 — 07.03-22	December 18, 2009
RAI 285 — 07.03-23	December 18, 2009
RAI 285 — 07.03-24	December 18, 2009
RAI 285 — 07.03-25	February 26, 2010
RAI 285 — 07.03-26	January 22, 2010
RAI 285 — 07.03-27	January 22, 2010
RAI 285 — 07.04-11	January 22, 2010
RAI 285 — 07.04-13	January 22, 2010
RAI 285 — 07.05-9	December 18, 2009

Sincerely,

Ronda Pederson
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, October 13, 2009 4:49 PM
To: ZZ-DL-A-USEPR-DL
Cc: Spaulding, Deirdre; Truong, Tung; Morton, Wendell; Cheung, Calvin; Jackson, Terry; Canova, Michael; Guardiola, Maria; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 285(3560,3507,3552,3564,3565), FSAR Ch. 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 25, 2009, and discussed with your staff on September 3, 2009. Draft RAI Question 07-01-13 was modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1191

Mail Envelope Properties (F322AA625A7A7443A9C390B0567503A1019C7170)

Subject: Response to U.S. EPR Design Certification Application RAI No. 285, FSAR Ch 7, Supplement 4
Sent Date: 2/26/2010 3:27:14 PM
Received Date: 2/26/2010 3:27:18 PM
From: DUNCAN Leslie E (AREVA NP INC)

Created By: Leslie.Duncan@areva.com

Recipients:
"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>
Tracking Status: None
"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA NP INC)" <Judy.Romine@areva.com>
Tracking Status: None
"PANNELL George L (AREVA NP INC)" <George.Pannell@areva.com>
Tracking Status: None
"BRYAN Martin (EXT)" <Martin.Bryan.ext@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX01.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	11832	2/26/2010 3:27:18 PM
RAI 285 Supplement 4 Response US EPR DC.pdf	143954	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 285, Supplement 4 (3560, 3507, 3552, 3564, 3565), Revision 1

10/13/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.01 - Instrumentation and Controls - Introduction
SRP Section: 07.02 - Reactor Trip System
SRP Section: 07.03 - Engineered Safety Features Systems
SRP Section: 07.04 - Safe Shutdown Systems
SRP Section: 07.05 - Information Systems Important to Safety

Application Section: FSAR Ch. 7

QUESTIONS for Instrumentation, Controls and Electrical Engineering 1 (AP1000/EPR Projects) (ICE1)

Question 07.03-25:

Follow-up to RAI Question 07.03-11

Provide clarification on the differences in U.S. EPR DC-FSAR, Section 14.2.12.12.10, Revisions 0 and 1. Per guidance from Standard Review Plan, Section 7.1-C-4, IEEE Std. 603-1991, Clause 4.4, requires the identification of system response times and accuracies. AREVA NP stated in their original response to RAI Question 07.03-11 that, "Protection System response times will be tested and verified as outlined in U.S. EPR FSAR Tier 2, Section 14.2.12.12.10 *Protection (Test #146)"*. U.S. EPR DC-FSAR, Section 14.2.12.12.10, Test 146 only states that the reactor protection system response times are tested. This is stated in Rev. 0 of the DC-FSAR. Rev. 1 of this section is not the same test. In fact, it states it is now Test#156 for Pressurizer Pressure and Level and Control.

1. When AREVA states 'RPS' in Revision 0 of U.S. EPR DC-FSAR, Section 14.2.12.12.10, does AREVA NP intend that to mean both the reactor trip function and engineered safety features actuation system or just the reactor trip function alone?
2. Are the Revision 0 and 1 versions of U.S. EPR DC-FSAR, Section 14.2.12.12.10 intended to match identical tests? Also, for the Revision 0 test, there is no specific testing for engineered safety features functions in U.S. EPR DC-FSAR, Section 14.2.12.12.10. The testing revolves around verification of reactor trip function. Explain what test will verify this.
3. For Revision 1, where is the test for the Protection System? And will the engineered safety features actuation system time delays and response times be tested as AREVA NP stated in this RAI question's original response?

Does AREVA plan to create an ITAAC for the purposes of verifying system response times of the PS (i.e. to verify compliance with 10 CFR Part 50, Appendix A, General Design Criteria 20)? If not, then explain why it is not necessary to provide pre-fuel load testing when the response times of PS and its instrument channels will be affected by the new equipment being installed which may differ from the calculated response times provided in Chapter 15?

Response to Question 07.03-25:

U.S. EPR FSAR Tier 2, Section 14.2.12.11.22, "Protection System (Test #146)" will be revised to specify testing of both reactor trip (RT) and engineered safety feature actuation system (ESFAS) functions. Within this revised section, Test Objective 1.3, Test Method 3.9, Data Required 4.7, and Acceptance Criteria 5.8 specifically address response time testing for RT and ESFAS functions.

U.S. EPR FSAR Tier 1, Section 2.4.1, Item 4.24 and associated ITAAC will be added to verify that PS response times for RT and ESFAS functions support the U.S. EPR FSAR Tier 2, Chapter 15 safety analysis assumptions.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.4.1, Item 4.24 and associated ITAAC will be added as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR, Tier 2, Section 14.2.12.11.22 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

4.17 Communications independence is provided between PS equipment and non-Class 1E equipment.

4.18 The PS is designed so that safety-related functions required for design basis events (DBE) are performed in the presence of the following:

- Single detectable failures within the PS concurrent with identifiable but non-detectable failures.
- Failures caused by the single failure.
- Failures and spurious system actions that cause or are caused by the DBE requiring the safety function.

4.19 The equipment for each PS division is distinctly identified and distinguishable from other identifying markings placed on the equipment, and the identifications do not require frequent use of reference material.

4.20 Locking mechanisms are provided on the PS cabinet doors. Opened PS cabinet doors are indicated in the MCR.

4.21 Key lock switches are provided at the PS cabinets to restrict modifications to the PS software.

4.22 The operational availability of each input variable can be confirmed during reactor operation including post-accident periods.

4.23 The PS hardware and software are designed to conform to the key TELEPERM XS principles, features, and quality methods.

4.24 The PS response time for RT and ESF signals is less than the value required to satisfy the design basis safety analysis response time assumptions.

07.03-25

5.0 Electrical Power Design Features

5.1 ~~The~~ Class 1E PS components ~~identified as Class1E in Table 2.4.1-1~~ are powered from ~~the~~ a Class 1E division ~~as listed in Table 2.4.1-1~~ in a normal or alternate feed condition.

6.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.1-7~~9~~ lists the PS ITAAC.

Table 2.4.1-~~7~~9—Protection System ITAAC (~~5~~ 12 Sheets)

07.03-25

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.24	The PS response time for RT and ESF signals is less than the value required to satisfy the design basis safety analysis response time assumptions.	a. Analyses will be performed to determine the required response time from sensor to ALU output, including sensor delay, which supports the safety analysis response time assumptions for the RT signals listed in Table 2.4.1-2 and ESF signals listed in Table 2.4.1-3.	a. A report exists and identifies the required response time from sensor to ALU output which supports the safety analysis response time assumptions for the RT signals listed in Table 2.4.1-2 and ESF signals listed in Table 2.4.1-3.
		b. Tests, analyses, or a combination of tests and analyses will be performed on the PS equipment that contributes to RT and ESF signal response times.	b. A report exists and concludes that PS response times from sensor to ALU output support the safety analysis response time assumptions for the RT signals listed in Table 2.4.1-2 and ESF signals listed in Table 2.4.1-3.
5.1	~~The~~ Class1E PS components ~~identified as Class1E in Table 2.4.1-1~~ are powered from ~~the~~ a Class 1E division ~~as listed in Table 2.4.1-1~~ in a normal or alternate feed condition.	a. Testing will be performed for components identified as Class 1E in Table 2.4.1-1 by providing a test signal in each normally aligned division.	a. The test signal provided in the normally aligned division is present at the respective Class 1E components identified in Table 2.4.1-1.
		b. Testing will be performed for components identified as Class 1E in Table 2.4.1-1 by providing a test signal in each division with the alternate feed aligned to the divisional pair.	b. The test signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E components identified in Table 2.4.1-1.

Next File

5.2 The low range HMS signal processing unit is located in Safeguard Building 1 and is powered from the Class 1E electrical power supply.

5.3 Verify that safety-related components meet electrical independence and redundancy requirements.

5.4 The HMS functions as described in Section 6.2.5.

14.2.12.11.22 Protection System (Test #146)

07.03-25

1.0 OBJECTIVE

1.1 To demonstrate the proper operation of the safety-related protection system (PS).

1.2 To ~~determine~~verify the PS response times.

1.3 To demonstrate electrical independence and redundancy of safety-related power supplies.

1.4 Verify operation of PS interlocks.

2.0 PREREQUISITES

2.1 Construction activities on the ~~trip circuit breaker~~reactor trip breakers, reactor trip contactors, and PS have been completed.

2.2 PS system instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 External test instrumentation is available and calibrated.

2.4 ~~Verify that f~~Factory acceptance testing has been completed.

2.5 Support systems required for PS operation are functional and the plant is configured so that equipment damage or personnel injury will not occur. For example, pump breakers racked to test to prevent inadvertent pump start, or pump motors uncoupled.:

2.5.1 Reactor trip breakers.

2.5.2 Reactor trip contactors.

~~2.5.3 Transistors of CRDM operating coils.~~

~~2.5.4 Safety injection system (SIS) components are energized and positioned in a manner to respond to an actuation.~~

~~2.5.5 Emergency feedwater system (EFWS) components are energized and positioned in a manner to respond to an actuation.~~

2.5.3 Manual reactor trip (RT) ~~signals from~~controls on SICS.

2.5.4 Engineered Safety Features systems components are energized and positioned in a manner to respond to a PS actuation.

3.0 TEST METHOD

3.1 Energize power supplies and verify power supply output voltage.

~~3.2~~ ~~Simulate ground faults and observe operation of the ground fault detectors.~~

~~3.3~~ ~~Activate manual trips and monitor PS response.~~

3.2 Simulate combinations of the ~~two-out-of-four~~actuation voting trip logic for each of the actuation signals and observe actuation and associated alarms.

07.03-25 →

3.3 Simulate PS inputs described in Section 7.2 that would generate a reactor trip signal and trip each reactor trip breaker. Observe reactor trip breaker operation.

3.4 Simulate PS inputs described in Section 7.2 that would generate a reactor trip signal and trip each reactor trip contactor. Observe reactor trip contactor operation.

~~3.5~~ ~~Exercise the bi-stable comparators using internal and external test circuitry and observe the setpoints and operation of the appropriate logic. Simulate PS inputs that would generate a reactor trip signal and trip each CRDM operating coil transistor. Observe CRDM operating coil transistor discharge.~~

~~3.5~~ ~~Simulate PS inputs that would generate a SIS actuation signal and observe SIS response.~~

~~3.6~~ ~~Simulate PS inputs that would generate an EFWS actuation signal and observe EFWS response.~~

3.5 Initiate a manual reactor trip from SICS and observe the following:

3.5.1 Reactor trip breaker operation.

3.5.2 Reactor trip contactor operation.

3.5.3 CRDM operating coil transistor discharge.

3.6 Simulate PS inputs described in Section 7.3 that would generate an ESF actuation output. Observe ESF actuators response.

3.7 Initiate each manual ESF actuation from SICS while observing ESF system response.

3.8 Check the operation of bypass features including, where applicable, observation ~~of the setpoints at which the trip~~that operating bypasses are cancelled automatically.

3.9 Inject signals into appropriate sensors or sensor terminals and measure the elapsed time to achieve actuation of the field device (e.g., breaker, contactor). Trip or actuation paths may be tested in several segments.

3.10 Observe protection system operation over the design range using actual or simulated input signals.

3.11 Check electrical independence and redundancy of power supplies for safety-related functions by selectively removing from service (i.e., loss of power condition) ~~three of four~~ PS divisions and determining which functions are lost on the energized PS division and which overall PS functions are lost. Repeat test for all PS divisions.

3.12 Verify operation of PS interlocks described in Section 7.6 using actual or simulated inputs and verify corresponding interlock function.

4.0 DATA REQUIRED

07.03-25

4.1 Power supply voltages.

~~4.2 Resistance for ground fault detector operation.~~

4.2 Circuit breaker and indicator operational data.

4.3 PS functional logic diagrams.

4.4 ~~Point of actuation of bi-stable comparators~~PS activation values.

4.5 Reset margin and rate of setpoint change of variable setpoints.

4.6 Maximum and minimum values of variable setpoints.

4.7 PS ~~and trip and actuation path~~ response times described in the safety analyses.

4.8 ~~Local coincidence logic operation~~ESF system actuator operational data.

~~4.9 List of functional components when only one PS division is available.~~

5.0 ACCEPTANCE CRITERIA

~~5.1 Physical separation exists between the four divisions of the protection system (PS).~~

5.1 The PS generates automatic RT signals.

5.2 The PS generates automatically actuated engineered safety feature signals.

5.3 The PS provides the correct operating bypasses for reactor trip functions.

5.4 The PS provides the correct operating bypasses for the engineered safety features.

5.5 ~~Communication independence is provided in the inter-division communication paths within the PS~~Operating bypasses are automatically removed when required.

5.6 ~~Bypassed or inoperable PS channels status information is retrievable in the MCR~~Manual actuation of reactor trip and engineering safety features occurs when initiated.

~~5.7 Setpoints associated with the automatic reactor trips and engineered safety features are determined using a methodology that addresses the determination of applicable contributors to instrumentation loop errors, the method in which the errors are combined, and how the errors are applied to the design analytical limits.~~

~~5.8 The PS receives input signals as described in the equipment specification.~~

07.03-25

5.7 The PS provides ~~signals~~status information to the non-safety-related control systems ~~through electrical isolation devices~~.

~~5.8 Electrical isolation devices exist in the data communication paths between the PS and the non-safety-related displays and controls.~~

~~5.9 Controls exist in the MCR to allow manual actuation of reactor trip and engineered safety features.~~

~~5.10 Controls exist in the MCR and RSS to allow validation or inhibition of manual permissives.~~

~~5.11 The PS provides interlocks as described in the equipment specification.~~

5.8 The total response time of each PS trip or actuation path is verified to be conservative with respect to the times used in the safety analysis.

5.9 ~~Verify that safety-related components meet e~~Electrical independence and redundancy requirements are met.

5.10 The PS functions as described in Section 7.1.1.4.1, Section 7.2, Section 7.3, and Section 7.6.

14.2.12.11.23 Reactor Control, Surveillance and~~&~~ Limitation System (Test #147)

1.0 OBJECTIVE

1.1 To demonstrate the proper operation of the non-safety-related reactor control, surveillance and limitation system (RCSL).

1.2 To demonstrate electrical independence and redundancy of power supplies.

2.0 PREREQUISITES

2.1 Construction activities on the RCSL have been completed.

2.2 RCSL software is installed and instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 External test equipment has been calibrated and is functional.

2.4 Support systems required for operation of the RCSL are functional.

2.5 Cabling has been completed between the RCSL and interface equipment.

2.6 Verify that factory acceptance testing has been completed.

2.7 Verify proper operation of alarm, control and indication functions.

3.0 TEST METHOD

3.1 Simulate inputs to the RCSL; observe receipt of these signals at the RCSL and system response.

3.2 Verify that the RCSL operates over the design range using actual or simulated signals.