ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Wednesday, January 27, 2010 11:13 AM
To: Tesfaye, Getachew
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); LENTZ Tony F (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 313, FSAR Ch 14, Supplement 1
Attachments: RAI 313 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to the 16 questions of RAI No. 313 on December 16, 2009. Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 313 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 16 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 support the response to RAI 313 Supplement 1, Questions 14.02-127, 14.02-128, 14.02-129, 14.02-130, 14.02-131, 14.02-132, 14.02-133, 14.02-134, 14.02-135, 14.02-136, 14.02-137, 14.02-139, 14.02-140, 14.02-141, and 14.02-142.

The following table indicates the respective pages in the response document, "RAI 313 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
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RAI 313 — 14.02-141	16	16
RAI 313 — 14.02-142	17	17

This concludes the formal AREVA NP response to RAI 313, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company

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

From: WELLS Russell D (AREVA NP INC)
Sent: Wednesday, December 16, 2009 4:51 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. 313, FSAR Ch 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 313 Response US EPR DC.pdf" provides a schedule since technically correct and complete responses to the 16 questions are not provided.

The following table indicates the respective pages in the response document, "RAI 313 Response US EPR DC.pdf" that contain AREVA NP's responses to the subject questions.

Question #	Start Page	End Page
RAI 313 — 14.02-127	2	2
RAI 313 — 14.02-128	3	3
RAI 313 — 14.02-129	4	4
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RAI 313 — 14.02-137	12	12
RAI 313 — 14.02-138	13	13
RAI 313 — 14.02-139	14	14
RAI 313 — 14.02-140	15	15
RAI 313 — 14.02-141	16	16
RAI 313 — 14.02-142	17	17

A complete answer is not provided for the 16 questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 313 — 14.02-127	March 11, 2010
RAI 313 — 14.02-128	March 11, 2010
RAI 313 — 14.02-129	January 28, 2010
RAI 313 — 14.02-130	March 11, 2010
RAI 313 — 14.02-131	March 11, 2010
RAI 313 — 14.02-132	March 11, 2010
RAI 313 — 14.02-133	March 11, 2010
RAI 313 — 14.02-134	March 11, 2010
RAI 313 — 14.02-135	March 11, 2010
RAI 313 — 14.02-136	January 28, 2010
RAI 313 — 14.02-137	March 11, 2010

RAI 313 — 14.02-138	January 28, 2010
RAI 313 — 14.02-139	January 28, 2010
RAI 313 — 14.02-140	January 28, 2010
RAI 313 — 14.02-141	January 28, 2010
RAI 313 — 14.02-142	January 28, 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.
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, November 16, 2009 7:36 AM
To: ZZ-DL-A-USEPR-DL
Cc: Tomon, John; Crane, Samantha; Peralta, Juan; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 313 (3807), FSARCh. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 21, 2009, and discussed with your staff on November 10, 2009. No changes were made to the draft RAI 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: 1109

Mail Envelope Properties (F322AA625A7A7443A9C390B0567503A10188161F)

Subject: Response to U.S. EPR Design Certification Application RAI No. 313, FSAR Ch 14, Supplement 1
Sent Date: 1/27/2010 11:12:37 AM
Received Date: 1/27/2010 11:13:11 AM
From: DUNCAN Leslie E (AREVA NP INC)

Created By: Leslie.Duncan@areva.com

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Files	Size	Date & Time
MESSAGE	5613	1/27/2010 11:13:11 AM
RAI 313 Supplement 1 Response US EPR DC.pdf	221681	

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

Response to

Request for Additional Information No. 313 (3807), Supplement 1

11/16/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants

Application Section: Section 14.02

QUESTIONS for Quality and Vendor Branch 1 (AP1000/EPR Projects) (CQVP)

Question 14.02-127:

In AREVA's response to RAI #150 (ML091350078) question 12.03-12.04-4, the applicant stated the following about the Aeroball Measurement System (AMS):

"During commissioning, two ball stacks will be activated so that they reach saturation. Their activity will then be measured to establish time dependence and decay constants of the material components."

Test abstracts #127 (preoperational testing of the AMS), #206, #207 and #208 (Power Ascension testing of AMS) do not include this activation process of the AMS ball stacks as part of the test methods or acceptance criteria. Therefore, the NRC staff requests that the applicant identify which test abstract(s) of the Initial Test Program (ITP) will include the saturation activation of the AMS ball stacks as part of the test abstract.

Response to Question 14.02-127:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #206 is the appropriate test to perform the saturation activation of the AMS ball stacks that was described in the Response to RAI 150, Supplement 1, Question 12.03-12.04-4. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #206 will be revised to include a normal sequence reading of the activated AMS ball stacks and a reverse order reading of the AMS ball stacks to establish time dependence and decay constants of material components.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #206 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-128:

The NRC staff requests that the applicant to revise U.S. EPR FSAR Section 14.2.12.7.13, "Secondary Sampling System (Test #071)," as follows:

a. Revise prerequisite item 2.3 to state: Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in table 9.3.2-2 of the U.S. EPR FSAR.

b. Revise the prerequisite section to include an item that requires that all portions of the sampling system be flushed with de-ionized water to ensure that residues of chemical agents used during post-construction cleaning phases have been flushed out.

c. The acceptance criteria section of test abstract #071 does not define acceptable criteria commensurate with process measurements listed in FSAR section 9.3.2. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 9.3.2 accordingly.

Response to Question 14.02-128:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #071 will be revised as follows:

   2.4 Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in Table 9.3.2-2.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #071 will be revised as follows:

   2.2 The secondary sampling system has been flushed with demineralized water to remove residues of chemical agents used during construction cleaning phases.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #071 will be revised to provide acceptance criteria commensurate with process measurements listed in U.S. EPR FSAR Tier 2, Section 9.3.2.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #071 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-129:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.7.14, "Steam Generator Blowdown Demineralizing System (Test #072)," as follows:

a. Revise prerequisite item 2.3 to state: Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in table 9.3.2-2 of the U.S. EPR FSAR.

b. Revise the prerequisite section to include an item that ensures the Steam Generator Blowdown System's demineralizers and filters have been loaded with and verified to contain the proper types and amounts of ion exchange resins and filter media.

c. Revise acceptance criteria item 5.1 to state "The SGB demineralizing system meets design requirements (refer to section 10.4.8, 11.5.4.3 and 11.2)".

Response to Question 14.02-129:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #072 will be revised as follows:

2.3 Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in Table 9.3.2-2.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #072 will be revised as follows:

2.6 Verify that steam generator blowdown system demineralizers are loaded with the proper type and amount of ion exchange resins.

2.7 Verify that steam generator blowdown system filters are loaded with the proper filter media.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #072 will be revised as follows:

5.1 The SGB demineralizing system meets design requirements (refer to Sections 10.4.8, 11.2, and 11.5.4.3).

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #072 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-130:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.8.18, "Plant Laboratory Equipment (Test #090)," as follows:

a. Revise prerequisite item 2.5 to state: The laboratory equipment area radiological controls (such as postings, shielding, radioactive work permits, operation of ventilated hoods, interim storage of incoming and archived radioactive samples, and the availability of radwaste containers as interim means to store/hold within the laboratory radioactive wastes) have been implemented or are capable of being implemented.

b. Revise prerequisite section to include an item that confirms the availability of proper radioactive standards and check sources. This prerequisite should state: Airborne and liquid radioactivity monitoring and sampling equipment, portable radiation survey equipment and all radio-analytical equipment installed in the laboratory are calibrated in accordance with RG 1.21 and RG 4.15.

c. The acceptance criteria section of test abstract #090 does not specify the operational programs and regulatory requirements identified in FSAR Sections 11.5 and 13.4 in analyzing and reporting sample results in demonstrating compliance with NRC regulations. The NRC staff requests that the applicant revise the acceptance criteria of test abstract #090 to include FSAR Sections 11.5 and 13.4.

Response to Question 14.02-130:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #090 will be revised as follows:

   2.5 The laboratory equipment area radiological controls (such as postings, shielding, radioactive work permits, operation of ventilated hoods, interim storage of incoming and archived radioactive samples, and the availability of radwaste containers as interim means to store/hold laboratory radioactive wastes) have been implemented or are capable of being implemented.

b. U.S. EPR FSAR Tier 2, Table 1.9-2 will be revised to reference U.S. EPR FSAR Tier 2, Section 14.2.12. U.S. EPR FSAR Tier 2, Table 14.2-1 will be revised to reference Regulatory Guide 1.21 and Regulatory Guide 4.15. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #090 will be revised as follows:

   2.6 Verify the availability of proper radioactive standards and check sources as well as non-radioactive standards.

   2.7 Airborne and liquid radioactivity monitoring and sampling equipment, portable radiation survey equipment and radio-analytical equipment installed in the laboratory are calibrated in accordance with RG 1.21 and RG 4.15.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #090 will be revised to include reference to U.S. EPR FSAR Tier 2, Section 11.5 and Section 13.4.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 1.9-2, Section 14.2.12, Test #090, and Table 14.2-1 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-131:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.9.2, "Sampling Activity Monitoring System (Test #092)," as follows:

a. Revise prerequisite item 2.5 to state: Calibration check sources are available in appropriate forms (gaseous, solutions or plated sources) for the analyses referenced in table 11.5-1 of the U.S. EPR FSAR.

b. Revise test method item 3.4 to state: Using radioactive calibration check sources, initiate a high radiation signal to the appropriate radiation monitors to verify that control actuations meet design requirements.

c. Revise test method item 3.6 to state: Using radioactive calibration check sources, initiate a high radiation signal to the radiation monitors to verify that alarm actuations function as designed.

d. The acceptance criteria section of test abstract #092 does not define acceptable criteria commensurate with process measurements listed in FSAR section 11.5. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 11.5 accordingly.

Response to Question 14.02-131:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #092 will be revised as follows:

   2.5 Calibration check sources are available in the appropriate forms (gaseous, solutions, or plated sources) for the analyses referenced in Table 11.5-1.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #092 will be revised to provide guidance for generating a high radiation signal to verify that control actuations meet design requirements.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #092 will be revised to provide guidance for generating a high radiation signal to verify that alarm actuations function as designed.

d. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #092 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #092 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-132:

The NRC staff noted that the test method section of U.S. EPR FSAR Section 14.2.12.9.3, "Solid Waste Storage System (Test #093)," does not address testing all of the design features of the system, as described in FSAR Section 11.4.2.3.1. The NRC staff requests that the applicant revise the test methods section of test abstract #093 to include testing of all of the components described in U.S. EPR FSAR Section 11.4.2.3.1. Additionally, the staff requests that the applicant include a test method item that verifies the design features of supporting systems (i.e. process ventilation, drainage, and sampling systems).

Response to Question 14.02-132:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #093 will be revised to include the subsystems described in U.S. EPR FSAR Tier 2, Section 11.4.2.3.1.

The solid waste storage support systems are tested in the following tests:

- Test #080, "Radioactive Waste Building Ventilation System."
- Test #094, "Radioactive Concentrates Processing System – Solid Waste."
- Test #098, "Equipment and Floor Drainage System."
- Test #129, "Process Information and Control System."
- Test #193, "Low Power Biological Shield Survey."

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #093 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-133:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.9.4, "Radioactive Concentrates Processing System (Test #094)," as follows:

a. The NRC staff noted that the test method section does not address testing all of the design features of the system, as described in FSAR Section 11.4.2.3.2. The NRC staff requests that the applicant revise the test methods section of test abstract #094 to include testing of all of the components described in U.S. EPR FSAR Section 11.4.2.3.2. Additionally, the staff requests that the applicant include a test method item that verifies the design features of supporting systems (i.e. process ventilation, drainage, and sampling systems).

b. Revise test method item 3.1 to state: Using radioactive calibration check sources, initiate interlock signals from interfacing equipment and observe radioactive concentrates processing system response, including observation of alarms.

c. The acceptance criteria section of test abstract #094 does not define acceptable criteria commensurate with process and effluent measurements listed in FSAR Sections 11.5, 11.2.2 and 11.4. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria are located in the FSAR, or otherwise revise FSAR Sections 11.5, 11.2.2 and 11.4 accordingly.

Response to Question 14.02-133:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #094 will be revised to include the subsystems described in U.S. EPR FSAR Tier 2, Section 11.4.2.3.2.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #094 will be revised to provide guidance for generating a high radiation signal to verify system response (control and alarm actuation).

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #094 will be revised to provide acceptance criteria for process and effluent measurements listed in U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #094 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-134:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.9.5, "Liquid Waste Processing System (Test #095)," as follows:

a. Revise the prerequisite section to include an item that ensures the Liquid Waste Processing System's demineralizers and ultra filtration system have been loaded with and verified to contain the proper types and amounts of ion exchange resins and filtration media.

b. The NRC staff noted that the test method section does not address testing all of the design features of the system, as described in FSAR Section 11.2.2.4.2. The NRC staff requests that the applicant revise the test methods section of test abstract #095 to include testing of all of the components described in U.S. EPR FSAR Section 11.2.2.4.2.

c. Revise test method item 3.7 to state: Using radioactive calibration check sources, initiate a high radiation signal to the liquid waste processing system discharge radiation monitor and demonstrate that discharge isolation features and other system controls function as designed.

d. Revise test method item 3.9 to state: Using radioactive calibration check sources, initiate a high radiation signal to the liquid waste processing system discharge radiation monitor and verify response.

e. The acceptance criteria section of test abstract #095 does not define acceptable criteria commensurate with process measurements listed in FSAR Sections 11.2 and 11.5. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Sections 11.2 and 11.5 accordingly.

Response to Question 14.02-134:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised as follows:

   2.2 Verify that the liquid waste processing system's demineralizers and ultra filtration are loaded with the proper types and amounts of ion exchange resins and filtration media.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised to include the subsystems described in U.S. EPR FSAR Tier 2, Section 11.2.2.4.2.1, Section 11.2.2.4.2.2, and Section 11.2.2.4.2.3.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised to provide guidance for generating a radiation signal to verify system response (control and alarm actuation).

d. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised to provide guidance for generating a high radiation signal to verify system response (isolation actuation).

e. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #095 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-135:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.9.9, "Gaseous Waste Processing System (Test #099)," as follows:

a. Revise the prerequisite section to include an item that ensures the Gaseous Waste Processing System's charcoal beds and gel driers have been loaded with and verified to contain the proper types and amounts of charcoal and desiccant.

b. Revise test method item 3.3 to state: Using radioactive calibration check sources, initiate a high radiation signal to the GWPS discharge radiation monitor.

c. Revise test method item 3.5 to state: Using radioactive calibration check sources, initiate a high radiation signal to the GWPS discharge radiation monitor and verify alarm actuation as designed.

d. Revise test method item 3.9 to state: Demonstrate the operation of the gas analyzers to detect O_2 and H_2 in concentrations ranges as specified by plant technical specification.

e. The acceptance criteria section of test abstract #099 does not define acceptable criteria commensurate with process measurements listed in FSAR Sections 11.5 and 11.3. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Sections 11.5 and 11.3.

Response to Question 14.02-135:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised as follows:

2.5 Verify that the GWPS charcoal beds and gel driers are loaded with the proper types and amounts of charcoal and desiccant.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised to provide guidance for generating a high radiation signal to verify system response (control and alarm actuation).

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised as follows:

3.5 Verify that the GWPS discharge radiation monitor and alarm actuation function as designed.

d. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised as follows:

3.9 Demonstrate the operation of the gas analyzers to detect concentrations of O_2 and H_2 specified in the plant Technical Specifications, Section 5.5.11, "Gaseous Waste Processing System Radioactivity Monitoring Program."

e. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #099 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-136:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.11.21, "Process and Effluent Radiological Monitoring System (Test #144)," as follows:

a. Revise prerequisite item 2.5 to state: Calibration check sources are available~~.~~ in appropriate forms (gaseous, solutions or plated sources) for the analyses referenced in table 11.5-1 of the U.S. EPR FSAR.

b. Revise test method item 3.4 to state: Using radioactive calibration check sources, initiate a high radiation signal to the appropriate radiation monitors to verify as designed control actuations.

c. The acceptance criteria section of test abstract #144 does not define acceptable criteria commensurate with process measurements listed in FSAR Section 11.5. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 11.5 accordingly.

Response to Question 14.02-136:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #144 will be revised as follows:

   2.5 Calibration check sources are available in appropriate forms (gaseous, solutions, or plated sources) for the analyses referenced in Table 11.5-1.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #144 will be revised to provide guidance for generating a high radiation signal to verify system response (control and alarm actuation).

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #144 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #144 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-137:

The acceptance criteria section of U.S. EPR FSAR section 14.2.12.12.9, 'Post-Accident Monitoring Instrumentation (Test #155)", does not define acceptable criteria commensurate with process measurements listed in FSAR Section 9.3.2. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 9.3.2 accordingly.

Response to Question 14.02-137:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #155 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 9.3.2-2.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #155 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-138:

US EPR FSAR section 14.2.12.13.12 “Pre-Core Primary System Leak Rate Measurement (Test #172),” acceptance criteria item 5.1 identifies Section 16.3.4.12 as the reference for RCS Operational Leakage; however, Section 16.3.4.14 describes the bases for the RCS leakage detection instrumentation. The NRC staff requests that the applicant revise the acceptance criteria of test abstract #172 to identify TS 16.3.4.14 as an applicable criterion, or refer to the appropriate test abstract for the associated instrumentation that would address the operational requirements for the RCS Leakage Detection Instrumentation.

Response to Question 14.02-138:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #172 was reviewed and the relationship to Technical Specification (TS) 3.4.12 and 3.4.14 were examined. Plants typically perform a test periodically to meet the surveillance requirements described in TS 3.4.12 and rely on the instrumentation described in TS 3.4.14 to monitor signs of reactor coolant system (RCS) leakage between TS 3.4.12 surveillances. During hot functional (pre-core) testing, there are no radiological restrictions on personnel monitoring of the RCS pressure boundary, and the instrumentation described in TS 3.4.14 is not applicable.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 14.02-139:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.12.5, "Sampling Primary and Secondary Systems (Test #204)," as follows:

a. Revise prerequisite item 2.2 to state: Required sampling systems are functional and analysis instrumentation are calibrated using calibration gases and solutions as referenced in the radioactive and non-radioactive analyses of table 9.3.2-2 of the U.S. EPR FSAR.

b. The acceptance criteria section of test abstract #204 does not define acceptable criteria commensurate with process measurements listed in FSAR Section 9.3.2. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 9.3.2 accordingly.

Response to Question 14.02-139:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #204 will be revised as follows:

   2.2 Required sampling systems are functional and analysis instrumentation are calibrated using calibration gases and solutions as referenced in the radioactive and non-radioactive analyses of Table 9.3.2-2.

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #204 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 9.3.2-2 and U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #204 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-140:

The NRC staff requests that the applicant revise U.S. EPR FSAR Section 14.2.12.18.6, "Failed Fuel Detection (Test #205)," as follows:

a. Revise objective item 1.1.4 to state: Radioisotopic concentration data of the radioactive elements (e.g. cesium, iodine, strontium, barium, cerium, and noble gases).

b. Revise prerequisite section to include an item that states "Calibrating gases and solutions are available for radioactive and non-radioactive analyses referenced in table 9.3.2-2 of the U.S. EPR FSAR."

c. The acceptance criteria section of test abstract #205 does not define acceptable criteria commensurate with process measurements listed in FSAR Section 9.3.2. Therefore, the NRC staff requests that the applicant identify where such acceptance criteria is located in the FSAR, or otherwise revise FSAR Section 9.3.2 accordingly.

Response to Question 14.02-140:

a. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #205 will be revised as follows:

1.1.4 Radioisotopic concentration data of the radioactive elements (e.g., cesium, iodine, strontium, barium, cerium, and noble gases).

b. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #205 will be revised as follows:

2.3 Calibrating gases and solutions are available for radioactive and non-radioactive analyses referenced in Table 9.3.2-2.

c. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #205 will be revised to provide acceptance criteria for process measurements listed in U.S. EPR FSAR Tier 2, Table 9.3.2-2 and U.S. EPR FSAR Tier 2, Table 11.5-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #205 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-141:

The NRC staff requests that the applicant revise the acceptance criteria item 5.1 of U.S. EPR FSAR Section 14.2.12.20.1, “Liquid Waste Storage and Processing Systems (Test #215),” to state “The LWPS processes radioactive effluents as designed (refer to Sections 11.2, 11.5 and 13.4).”

Response to Question 14.02-141:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #215 will be revised as follows:

5.1 The LWPS processes radioactive effluents as designed (refer to Section 11.2, 11.5 and 13.4).

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #215 will be revised as described in the response and indicated on the enclosed markup.

Question 14.02-142:

The NRC staff requests that the applicant revise the acceptance criteria item 5.1 of U.S. EPR FSAR Section 14.2.12.20.2, “Gaseous Waste Processing Systems (Test #215),” to state: The GWPS processes radioactive and potentially flammable gases effluent as designed (refer to Sections 11.2, 11.5 and 13.4).

Response to Question 14.02-142:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #216 will be revised as follows:

5.1 The GWPS processes radioactive and potentially flammable gases effluent as designed (refer to Section 11.2, 11.5, and 13.4).

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #216 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 1.9-2—U.S. EPR Conformance with Regulatory Guides
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RG / Rev	Description	U.S. EPR Assessment	FSAR Section(s)
1.16, R4	Reporting of Operating Information -- Appendix A Technical Specifications	N/A-COL	N/A
1.20, R3	Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing	Y	3.9.2.3 and 3.9.2.4
			14.2.12
		EXCEPTION (Vibration testing of SG internals and condensate system)	3.9.2.3 and 3.9.2.4
			14.2.12
1.21, R1	Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants	Y 14.02-130 →	11.5.1 and 14.2.12
1.22, 02/1972	Periodic Testing of Protection System Actuation Functions	Y	7.1.2.2.2
1.23, R1	Meteorological Monitoring Programs for Nuclear Power Plants	Y	2.3
1.24, 03/1972	Assumptions Used for Evaluating the Potential Radiological Consequences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure	N/A-SUP (Refer to RG 1.145)	N/A
1.25, 03/1972	Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors	N/A-SUP (Refer to RG 1.145 and RG 1.183)	N/A
1.26, R4	Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants	Y	3.2.2
1.27, R2	Ultimate Heat Sink for Nuclear Power Plants	Y	3.5
			9.2.5
1.28, R3	Quality Assurance Program Requirements (Design and Construction)	Y	14.2.6
		Y (Per AREVA Topical Report ANP-10266-A	17.5

Table 1.9-2—U.S. EPR Conformance with Regulatory Guides
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RG / Rev	Description	U.S. EPR Assessment	FSAR Section(s)
4.2S1, 09/2002	Supplement 1 to Regulatory Guide 4.2, Preparation of Supplemental Environmental Reports for Applications To Renew Nuclear Power Plant Operating Licenses	N/A-COL	N/A
4.4, 05/1974	Reporting Procedure for Mathematical Models Selected To Predict Heated Effluent Dispersion in Natural Water Bodies	N/A-COL	N/A
4.7, R2	General Site Suitability Criteria for Nuclear Power Stations	N/A-COL	N/A
4.8, 12/1975	Environmental Technical Specifications for Nuclear Power Plants	N/A-COL	N/A
4.11, R1	Terrestrial Environmental Studies for Nuclear Power Stations	N/A-COL	N/A
4.15, R2	Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) -- Effluent Streams and the Environment	Y 14.02-130	11.5.1 and 14.2.12
Division 5 Regulatory Guides			
5.7, R1	Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas	N/A-COL	N/A
5.12, 11/1973	General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials	N/A-COL	N/A
5.44, R3	Perimeter Intrusion Alarm Systems	N/A-COL	N/A
5.54, 03/1978	Standard Format and Content of Safeguards Contingency Plans for Nuclear Power Plants	N/A-COL	N/A
5.65, 09/1986	Vital Area Access Controls, Protection of Physical Security Equipment, and Key and Lock Controls	N/A-COL	N/A
5.66, 06/1991	Access Authorization Program for Nuclear Power Plants	N/A-COL	N/A
5.68, 08/1994	Protection Against Malevolent Use of Vehicles at Nuclear Power Plants	N/A-COL	N/A
Division 8 Regulatory Guides			
8.2, 02/1973	Guide for Administrative Practices in Radiation Monitoring	N/A-COL	N/A
8.4, 02/1973	Direct-Reading and Indirect-Reading Pocket Dosimeters	N/A-COL	N/A
8.5, R1	Criticality and Other Interior Evacuation Signals	N/A-COL	N/A

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested have been completed.

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2.2 The secondary sampling system has been flushed with demineralized water to remove residues of chemical agents used during construction cleaning phases.

2.3 Systems being sampled are at or near normal operating pressure and temperature.

2.4 Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in Table 9.3.2-2.~~.~~

2.5 Test instrumentation is available and calibrated.

2.6 SECSS instrumentation has been calibrated and is functional for performance of the following test.

3.0 TEST METHOD

3.1 Withdraw fluid at each sample point, verifying adequate sample flow.

3.2 Verify that operation of alarms and interlocks meets design requirements.

3.3 Verify that operation of pump and heat exchangers in normal operation using normal flow paths meets design requirements.

3.4 Verify the analytical instrumentation provides indication and response that meet the design requirements.

~~3.5 Calculate the holdup times using the as-built piping lengths, piping volume and measured flow rate for the following:~~

~~3.5.1 SG samples.~~

~~3.5.2 Blowdown demineralizer samples.~~

3.5 ~~Operate control~~Activate power-operated valves remotely while:

a. Observing each valve operation and position indication.

b. Measuring valve performance data (e.g., thrust, opening and closing times).

3.6 Verify power-operated valves fail upon loss of motive power as designed (refer to Section 9.3.2).

3.7 Verify that ~~operation of~~ continuous monitors and sample ~~verify~~ flow rate meets design requirements.

3.8 Check electrical independence and redundancy of power supplies for safety-related functions by selectively removing power and determining loss of function.

4.0 DATA REQUIRED

4.1 Setpoints at which alarms and interlocks occur.

4.2 Sampling flow rate from each sample point.

4.3 Analytical instrument data.

4.4 Valve performance data, where required.

4.5 Valve position indication.

4.6 Position response of valves to loss of motive power.

5.0 ACCEPTANCE CRITERIA

5.1 The SECSS meets design requirements (refer to Section 9.3.2):

5.1.1 SECSS alarms, interlocks, and controls (manual and automatic) function as designed.

5.1.2 SECSS valves perform as designed (i.e., opening times, closing times, and pressure/temperature controls).

5.1.3 SECSS ~~holdup times~~ meet design requirements for representative samples.

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5.1.4 Continuous and chemistry lab instrumentation used to analyze SECSS parameters described in Table 9.3.2-2 will meet the design requirements for the measurements. This includes, but is not limited to, the following (that could adversely impact the ability to accurately measure the parameters described in Table 9.3.2-2):

- Range.
- Response time.
- Sensitivity.
- Maximum anticipated drift between calibrations.

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

14.2.12.7.14 Steam Generator Blowdown Demineralizing System (Test #072)

1.0 OBJECTIVE

1.1 To verify the ability of ~~SG~~the steam generator blowdown (SGB) demineralizing system ~~(SGBDMS)~~ to clean the SG blowdown by a combination of filtration and ion exchange.

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested have been completed.

2.2 Systems being sampled are at or near normal operating pressure and temperature.

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2.3 Calibrating gases and solutions are available for radioactive and non-radioactive analyses as referenced in Table 9.3.2-2.~~.~~

2.4 Test instrumentation is available and calibrated.

2.5 Secondary sampling system instrumentation has been calibrated and is functional for performance of the following test.

2.6 Verify that steam generator blowdown system demineralizers are loaded with the proper type and amount of ion exchange resins.

2.7 Verify that steam generator blowdown system filters are loaded with the proper filter media.

3.0 TEST METHOD

3.1 Verify by physical inspection that the filter housing is constructed and assembled in a manner that doesn't permit bypass flow paths.

3.2 Verify that operation of alarms and interlocks meet design requirements.

3.3 Verify the analytical instrumentation provides indication and response that meets design requirements of ion exchanger outlet chemistry.

3.4 ~~Operate control~~Activate power-operated valves remotely while:

a. Observing each valve operation and position indication.

b. Measuring valve performance data (e.g., thrust, opening and closing times).

3.5 Verify power-operated valves fail upon loss of motive power as designed (refer to Section 10.4.8).

4.0 DATA REQUIRED

4.1 Setpoints at which alarms and interlocks occur.

4.2 Valve performance data, where required.

4.3 Valve position indication.

4.4 Position response of valves to loss of motive power.

5.0 ACCEPTANCE CRITERIA

5.1 The SGB~~DMS~~ demineralizing system meets design requirements (refer to Section 10.4.8, 11.2, and 11.5.4.3):

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5.1.1 ~~SGBDMS~~SGB demineralizing system alarms, interlocks, and controls (manual and automatic) function as designed.

5.1.2 ~~SGBDMS~~SGB demineralizing system valves perform as designed (i.e., opening times, closing times~~, and ability to control feedwater heater levels~~).

1.0 OBJECTIVE

1.1 To demonstrate proper operation of laboratory equipment used to analyze or measure radiation levels.

1.2 To demonstrate proper operation of laborator equipment used to analyze or measure isotopic concentrations (such as a mass spectrometer) of radioactive samples.

2.0 PREREQUISITES

2.1 Construction activities on laboratory equipment support systems used to analyze or measure radiation levels are complete.

2.2 Construction activities on laboratory equipment support systems used to analyze or measure isotopic concentrations of radioactive samples are complete.

2.3 Construction activities related to the installation of vendor supplied laboratory equipment used to analyze or measure radiation levels are complete. The laboratory equipment has been installed per manufacture's recommendations.

2.4 Construction activities related to the installation of vendor supplied laboratory equipment used to analyze or measure isotopic concentrations of radioactive samples are complete. The laboratory equipment has been installed per manufacture's recommendations.

2.5 The laboratory equipment area radiological controls (such as postings, shielding, radioactive work permits, operation of ventilated hoods, interim storage of incoming and archived radioactive samples, and the availability of radwaste containers as interim means to store/hold laboratory radioactive wastes) have been implemented or are capable of being implemented.

14.02-130

2.6 Verify the availability of proper radioactive standards and check sources as well as non-radioactive standards.

2.7 Airborne and liquid radioactivity monitoring and sampling equipment, portable radiation survey equipment and radio-analytical equipment installed in the laboratory are calibrated in accordance with RG 1.21 and RG 4.15.

3.0 TEST METHOD

3.1 Confirm that all drains from laboratory equipment that analyze or measure radiation levels are routed correctly and verifying that drains discharge as designed. This could be performed by pouring a liquid down the drain colored with food dye or by some other suitable means and confirm the presence of the food dye in the receiving tank.

3.2 Confirm that all drains from laboratory equipment that analyze or measure isotopic concentrations of radioactive samples are routed correctly and verifying that drains discharge as designed. This could

be performed by pouring a liquid down the drain colored with food dye or by some other suitable means, and confirm the presence of the food dye in the receiving tank.

3.3 Confirm that ventilation hoods and other engineered radioactive containment devices are vented as designed. This could be accomplished by tracer gas or some other suitable means.

3.4 Measure the ventilation hood discharge flow rates for engineered devices.

3.5 Perform vendor supplied startup checks and calibrations for all laboratory equipment that analyze or measure radiation levels.

3.6 Perform vendor supplied startup checks and calibrations for all laboratory equipment that analyze or measure isotopic concentrations of radioactive samples.

4.0 DATA REQUIRED

4.1 Inspection report from verification of laboratory equipment drains.

4.2 Inspection report from verification of ventilation hood flow and routing.

4.3 Completed vendor specified laboratory equipment startup procedures.

5.0 ACCEPTANCE CRITERIA

5.1 The laboratory equipment drain interface with the plant systems performs as designed.

5.2 The laboratory equipment ventilation hood interface with the plant systems performs as designed.

5.3 The laboratory equipment checkout and calibration procedures meet design requirements as described in Sections 11.5 and 13.4.

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14.2.12.8.19 Access Building Ventilation System (Test #224)

1.0 OBJECTIVE

1.1 To verify the access building ventilation system (ABVS) can maintain the space temperature as required.

1.2 To verify that radiological control features route the building exhaust to the plant stack.

2.0 PREREQUISITES

2.1 Construction activities on the ABVS have been completed.

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

2.3 Support systems required for operation of the ABVS are complete and functional.

14.02-131

2.5 Calibration check sources are available in the appropriate forms (gaseous, solutions, or plated sources) for the analyses referenced in Table 11.5-1.~~is available.~~

3.0 TEST METHOD

3.1 Verify operation of the radiation monitor by utilizing the check source and external test equipment.

3.2 Check the self-testing feature of the monitor.

3.3 Verify control actuation by the monitor and record the response time meet design requirements.

14.02-131

3.4 Initiate a high radiation signal to the appropriate radiation monitors to verify that system response (control actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:~~Simulate a high radiation signal to the appropriate radiation monitors to verify that control actuations meet design requirements.~~

3.4.1 Internal check source (verify that check source strength is capable of generating desired actuations).

3.4.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.4.3 Simulated high radiation signal at the radiation detector.

3.5 Verify that alarm actuation in the control room meet design requirements.

3.6 Initiate a high radiation signal to the appropriate radiation monitors to verify that system response (alarm actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:

3.6.1 Internal check source (verify that check source strength is capable of generating desired actuations).

3.6.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.6.3 Simulated high radiation signal at the radiation detector. ~~Simulate a high radiation signal to the radiation monitors to verify that alarm actuations in the MCR or locally,as designed.~~

4.0 DATA REQUIRED

4.1 The monitor response to check source.

4.2 Technical data associated with the source.

4.3 Signal levels necessary to cause alarm actuation.

4.4 Response time of the monitor to perform control functions.

5.0 ACCEPTANCE CRITERIA

5.1 The SAMS operates as designed (refer to Section 11.5).

14.02-131

5.2 Radiation monitoring instrumentation used to monitor the sampling activity at the vent and stack release point that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.2.1 Range.

5.2.2 Response time.

5.2.3 Sensitivity.

5.2.4 Maximum anticipated drift between calibrations.

14.2.12.9.3 Solid Waste Storage System (Test #093)

1.0 OBJECTIVE

1.1 To demonstrate the functionality of the solid waste storage system to collect and package solid wastes for shipment.

2.0 PREREQUISITES

2.1 Construction activities on the solid waste management system have been completed.

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

2.3 Support systems required for operation of the solid waste management system are completed and functional.

2.4 Test instrumentation is available and calibrated.

3.0 TEST METHOD

~~3.1 Verify the operation of the solid waste transfer system.~~

3.1 Verify the radioactive waste processing building crane can reach design points.

14.02-132

3.2 Solid radioactive waste processing and storage components (dry active wastes) function as designed.

3.2.1 Sorting box (shredder and in-drum compactor).

3.2.2 Drum transport carts.

3.2.3 Shielding casks.

3.2.4 Vehicle entrance area crane.

3.2.5 Drum store crane.

3.2.6 Drum store.

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3.2.7 Tubular shaft store.

~~3.2 Verify expended resin beds from the LWPS can be sluiced to the solid waste storage system.~~

3.3 Verify that operation of alarms, controls and interlocks meets design requirements.

3.4 Verify system design flow paths.

4.0 DATA REQUIRED

4.1 Setpoints at which alarms and interlocks occur.

4.2 Solid waste transfer system operating data.

4.3 Radioactive waste processing building crane data.

4.4 System flow path data.

5.0 ACCEPTANCE CRITERIA

5.1 The solid waste management system operates as designed (refer to Section 11.4).

14.2.12.9.4 Radioactive Concentrates Processing System - Solid Waste (Test #094)

1.0 OBJECTIVE

1.1 To verify the performance of the radioactive concentrates processing system.

2.0 PREREQUISITES

2.1 Construction activities have been completed on the radioactive concentrates processing system.

2.2 Support systems required for operation of the radioactive concentrates processing evaporator are complete and functional.

2.3 Radioactive concentrates processing system instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

3.0 TEST METHOD

14.02-133

~~3.1 Operate radioactive concentrates processing evaporator control valves from appropriate control positions and observe valve operation and position indication.~~

3.1 Radioactive concentrates processing system components (wet solid wastes) function as designed.

3.1.1 Vacuum unit.

3.1.2 High pressure cleaning device.

3.1.3 Condensate collection pump.

14.02-133

3.1.4 Resin proportioning tank.

3.1.5 Concentrate buffer tank.

3.1.6 Condensate collection tank.

3.1.7 Scrubber tank.

3.1.8 Resin traps.

3.1.9 Condenser drying unit.

3.1.10 Condensate counter.

3.1.11 Condensate buffer sluice.

3.1.12 Transfer station.

3.1.13 Measuring glass.

3.1.14 Drum drying stations.

3.1.15 Drum transfer device.

3.1.16 High integrity container.

3.1.17 Sampling box.

3.1.18 Drum capping device.

3.1.19 Sampling device for dried waste.

3.1.20 Drum handling device.

3.2 Initiate a high radiation signal to the appropriate radiation monitors to verify that system response (control and alarm actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:~~Simulate interlock signals from interfacing equipment and observe radioactive concentrates processing system response, including observation of alarms.~~

3.2.1 Internal check source (verify that check source strength is capable of generating desired actuations).

3.2.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.2.3 Simulated high radiation signal at the radiation detector.

3.3 Line up the radioactive concentrates processing system to interfacing systems and, using appropriate operating modes and indications, establish flow paths to these systems.

3.4 Verify that expended resin beds from the LWPS can be sluiced to the radioactive concentrates processing system.

4.0 DATA REQUIRED

4.1 Valve position indication.

4.2 Radioactive concentrates processing system response to simulated interlocks.

4.3 Setpoints at which alarms interlock and automatic actuations occur.

4.4 Flow indications.

5.0 ACCEPTANCE CRITERIA

5.1 The radioactive concentrates processing system performs as described in Sections 11.2.2 ~~and~~ , 11.4, and 11.5.

14.02-133

5.2 Radiation monitoring instrumentation used to monitor the radioactive concentrations activity prior to entry of the solid radwaste system that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.2.1 Range.

5.2.2 Response time.

5.2.3 Sensitivity.

5.2.4 Maximum anticipated drift between calibrations.

14.2.12.9.5 Liquid Waste Processing System (Test #095)

1.0 OBJECTIVE

1.1 To demonstrate the functionality of the liquid waste processing system (LWPS) for collection, processing and recycling of liquid wastes and for preparation of liquid waste for release to the environment.

2.0 PREREQUISITES

2.1 Construction activities on the liquid waste processing system have been completed.

14.02-134

2.2 Verify that the liquid waste processing system's demineralizers and ultra filtration are loaded with the proper types and amounts of ion exchange resins and filtration media.

2.3 Liquid waste processing system instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.4 Support systems required for operation of the liquid waste processing system are completed and functional.

2.5 Test instrumentation is available and calibrated.

3.0 TEST METHOD

14.02-134

3.1 Evaporator system components function as designed.

3.1.1 Evaporator feed pumps.

3.1.2 Pre-heater.

3.1.3 Forced recirculation pump.

3.1.4 Evaporator.

3.1.5 Vapor compressor.

3.1.6 Distillate tank.

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3.1.7 Distillate pump.

3.1.8 Distillate cooler.

3.1.9 Compressor injection cooler.

3.1.10 Electric heater.

3.1.11 Vent gas cooler.

3.1.12 Control valves.

3.1.13 Sealing liquids.

3.2 Centrifuge system components function as designed.

3.2.1 Centrifuge feed pump.

3.2.2 Decanter.

3.2.3 Separator.

3.2.4 Sludge tank.

3.2.5 Decanter feed pump.

3.2.6 Control valves.

3.3 Demineralizer system components function as designed.

3.3.1 Prefilter.

3.3.2 Demineralizer.

3.3.3 Ultrafilter.

3.3.4 Spent resin dryer.

3.3.5 Resin trap.

3.3.6 Solids collection.

3.3.7 Demineralizer booster pump.

3.4 ~~Operate control valves remotely while~~Operate radioactive concentrates processing evaporator control valves from appropriate control positions:

a. Observing each valve operation and position indication.

b. Measuring valve performance data (e.g. thrust, opening and closing times).

3.5 Verify power-operated valves fail upon loss of motive power as designed (refer to Section 11.2).

3.6 Verify that operation of the tank level alarms and interlocks meets design requirements.

3.7 Verify that operation of system pumps meet design requirements.

3.8 Verify that operation of high differential pressure alarms for the process vessel meet design requirements.

3.9 Verify that operation of the tank mixers meet design requirements.

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3.10 Initiate a high radiation signal to the liquid waste processing discharge radiation monitors to verify that system response (control and alarm actuations) meet design requirements. The source of initiation of the

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signal, listed in order of preference, should be one of the following:~~Simulate a high radiation signal to the liquid waste processing system discharge radiation monitor and demonstrate that discharge isolation features and other system controls function as designed.~~

3.10.1 Internal check source (verify that check source strength is capable of generating desired control actuations).

3.10.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.10.3 Simulated high radiation signal at the radiation detector.

3.11 Verify alarms, indicating instruments, and status lights are functional.

3.12 Initiate a high radiation signal to the liquid waste processing discharge radiation monitors to verify that system response (isolation actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:

3.12.1 Internal check source (verify that check source strength is capable of generating desired control actuations).

3.12.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.12.3 Simulated high radiation signal at the radiation detector.~~Simulate a high radiation signal to the liquid waste processing system discharge radiation monitor and verify response.~~

4.0 DATA REQUIRED

4.1 Waste pump operating data.

4.2 Valve performance data, where required.

4.3 Valve position indication.

4.4 Position response of valves to loss of motive power.

4.5 Setpoints at which alarms and interlocks occur.

5.0 ACCEPTANCE CRITERIA

5.1 The LWPS operates as designed (refer to Section 11.2).

5.2 The LWPS discharge radiation monitor operates as designed (refer to Sections 7.3.1, 11.2, and 11.5).

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5.3 Radiation monitoring instrumentation used to monitor the liquid waste processing activity at the liquid radwaste release line that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.3.1 Range.

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5.3.2 Response time.

5.3.3 Sensitivity.

5.3.4 Maximum anticipated drift between calibrations.

14.2.12.9.6 Reactor Coolant Drain Tank (Test #096)

1.0 OBJECTIVE

1.1 To verify the proper performance of the reactor coolant drain tank (RCDT) subsystem.

2.0 PREREQUISITES

2.1 Construction activities on the RCDT subsystem have been completed.

2.2 The RCDT subsystem instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 ~~EDT~~Process drain tank subsystem is ready to accept water from the RCDT.

~~2.4 The plant nitrogen system is functional.~~

2.4 Support systems required for operation of the RCDT subsystem are functional.

3.0 TEST METHOD

3.1 Operate control valves remotely while:

3.1.1 Observing each valve operation and position indication.

3.1.2 Measuring valve performance data (e.g., thrust, opening and closing times).

3.2 Verify power-operated valves fail upon loss of motive power as designed (refer to Section 9.3.4).

3.3 Simulate a CIAS and observe isolation valve response.

3.4 Fill the RCDT from any convenient source and observe level and pressure indications and alarms.

3.5 Pressurize the RCDT, using ~~the nitrogen system~~simulated signals, to a full range of operating pressures and observe indications and alarms.

3.6 Line up the RCDT to the EDT and drain the RCDT using each RCDT pump.

3.7 Observe level and pressure indicators, alarms and interlocks.

3.8 Simulate RCDT full range of operating temperatures and observe indications and alarms.

4.0 DATA REQUIRED

4.1 Valve performance data, where required.

4.0 DATA REQUIRED

4.1 Sump pump operating data is available for review.

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 designed (refer to Section 9.3.3).

14.2.12.9.9 Gaseous Waste Processing System (Test #099)

1.0 OBJECTIVE

1.1 To demonstrate the ability of the gaseous waste ~~management~~processing system (GWPS) to collect and process radioactive and potentially flammable gases vented from plant equipment.

2.0 PREREQUISITES

2.1 Construction activities on the GWPS have been completed.

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

2.3 Support systems required for operation of the GWPS are completed and functional.

2.4 Test instrumentation is available and calibrated.

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2.5 Verify that the GWPS charcoal beds and gel driers are loaded with the proper types and amounts of charcoal and desiccant.

3.0 TEST METHOD

3.1 Verify flow paths.

3.2 Demonstrate that discharge isolation features and other system controls function as designed.

~~3.3 Simulate a high radiation signal to the GWPS discharge radiation monitor.~~

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3.3 Verify alarms, indicating instruments and status lights are functional.

3.4 Initiate a high radiation signal to the GWPS discharge radiation monitors to verify system response (control and alarm actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:

3.4.1 Internal check source (verify that check source strength is capable of generating desired actuations).

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3.4.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.4.3 Simulated high radiation signal at the radiation detector.

3.5 ~~Simulate a high radioactivity signal to~~ Verify that the GWPS discharge radiation monitor and ~~verify~~ alarm actuation function ~~in the MCR~~as designed.

3.6 Demonstrate the operation of the gas drying equipment.

3.7 Demonstrate that hold up time of gas through the charcoal ~~absorbers~~adsorber meet design requirements.

3.8 Demonstrate the operation of the gel dryer regeneration equipment (protects delay beds from moisture while operating in surge mode).

3.9 Demonstrate the operation of the ~~system~~ gas analyzers to detect concentrations of O_2 and H_2 specified in the plant Technical Specifications, Section 5.5.11, "Gaseous Waste Processing System Radioactivity Monitoring Program."~~.~~

3.10 Demonstrate the operation of the recombiner.

3.11 Operate control valves remotely while:

a. Observing each valve operation and position indication.

b. Measuring valve performance data (e.g., thrust, opening and closing times).

3.12 Verify power-operated valves fail upon loss of motive power as designed (refer to Section 11.3).

4.0 DATA REQUIRED

4.1 Setpoints of alarms, interlocks, and controls.

4.2 Gas dryer operating data.

4.3 Dryer regenerating equipment operating data.

4.4 Gas analyzer operating data.

4.5 Recombiner operating data.

4.6 Gas transport times.

4.7 Position response of valves to loss of motive power.

4.8 Valve performance data.

5.0 ACCEPTANCE CRITERIA

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5.1 The GWPS operates as designed (refer to Section 11.3 and 11.5).

5.2 The GWPS discharge radiation monitor operates as designed (refer to Section 7.3.1).

5.3 Radiation monitoring instrumentation used to monitor the gaseous waste processing activity upstream of the decay beds that is described

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in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.3.1 Range.

5.3.2 Response time.

5.3.3 Sensitivity.

5.3.4 Maximum anticipated drift between calibrations.

14.2.12.9.10 Nuclear Sampling System (Test #100)

1.0 OBJECTIVE

1.1 To verify the ability of nuclear sampling system (NSS) to collect and deliver representative samples of liquids and gases in various process systems to sample stations for chemical and radiological analysis during operation cooldown.

1.2 To verify the ability of the severe accident sampling system (SASS) to collect and deliver gaseous and liquid samples from inside the containment following a severe accident for the purpose of confirming whether the containment atmosphere contains airborne activity.

1.3 To demonstrate electrical independence and redundancy of power supplies.

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested have been completed.

2.2 Systems being sampled are at or near normal operating pressure and temperature.

2.3 Calibrating gases and solutions are available.

2.4 Test instrumentation is available and calibrated.

2.5 NSS and SASS instrumentation has been calibrated and is functional for performance of the following test.

3.0 TEST METHOD

3.1 Verify adequate flow from each sample location.

3.2 Verify that operation of alarms and interlocks meet design requirements.

3.3 Verify that operation of pump and heat exchangers in normal operating modes and flow paths meets design requirements.

3.4 Verify the analytical instrumentation provides indication and response as designed.

5.3 The radiation monitoring system (main steam line activity) generates a steam generator isolation signal as an input to the protection system, as designed.

5.4 The airborne and area radiation monitors function as described in Sections 7.1.1.5.5~~Sections 7.1.1~~, 7.3.1, 7.5.1, and 12.3.4. The airborne and area radiation monitors are listed in Table 11.5-1 and Table 12.3-3, respectively.

14.2.12.11.20 Process and Effluent Radiological Monitoring System (Test #144)

1.0 OBJECTIVE

1.1 To verify that the process and effluent radiological monitoring system can detect and record specific radiation levels, and to verify alarms and interlocks.

2.0 PREREQUISITES

2.1 Construction activities on the process and effluent radiological monitoring system have been completed.

2.2 Process and effluent radiological monitoring system instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 Support systems required for operation of the process and effluent radiological monitoring system is completed and functional.

2.4 Test instrumentation is available and calibrated.

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2.5 Calibration check sources are available in appropriate forms (gaseous, solutions, or plated sources) for the analyses referenced in Table 11.5-1. ~~is available.~~

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 Verify calibration and operation of the monitor using a check source and external test equipment, as necessary.

3.2 Check the self-testing feature of the monitor.

3.3 Record the response time ~~and control actuation signals produced by~~of the monitor.

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3.4 Initiate a high radiation signal to the appropriate radiation monitors to verify system response (control and alarm actuations) meet design requirements. The source of initiation of the signal, listed in order of preference, should be one of the following:

3.4.1 Internal check source (verify that check source strength is capable of generating desired actuations).

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3.4.2 Radiation calibration check source (verify that check source does not generate a personnel hazard during the test).

3.4.3 Simulated high radiation signal at the radiation detector. ~~Simulate a high radiation signal to the appropriate radiation monitors to verify as designed control actuations.~~

~~3.5 Verify as designed alarm actuation in the MCR.~~

~~3.6 Simulate a high radiation signal to the radiation monitors.~~

3.5 Record alarm actuations ~~in the MCR or local control room~~at local and remote locations, as appropriate.

4.0 DATA REQUIRED

4.1 The monitor response to check source, as necessary.

4.2 Technical data associated with the source.

4.3 Signal levels necessary to cause alarm actuation.

4.4 Response time of the monitor ~~to perform control functions~~.

5.0 ACCEPTANCE CRITERIA

5.1 Verify that the process and effluent radiological monitoring system operates as follows:

5.1.1 Radiation monitors are installed on ~~all~~ effluent paths as shown on plant layout drawings.

5.1.2 The radiation monitors have been source checked to verify response.

5.1.3 Preliminary alarm setpoints have been established and calibrated in the equipment.

5.1.4 Upon activating the alarm setpoint, automatic actions (valve closure, pumps stopping, etc.) occur as designed.

5.1.5 Radiation monitors function as described in Section 11.5.1.

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5.2 Radiation monitoring instrumentation used to perform process and effluent monitoring that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.2.1 Range.

5.2.2 Response time.

5.2.3 Sensitivity.

5.2.4 Maximum anticipated drift between calibrations.

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

2.6 Verify preoperational Test #143 has been satisfactorily completed for radiation monitoring instrumentation.

3.0 TEST METHOD

3.1 Verify power sources to post accident 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 functionality of required software application programs.

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

4.0 DATA REQUIRED

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

5.0 ACCEPTANCE CRITERIA

5.1 The instruments that are designated as the post-accident monitoring instruments have been verified to include all of the instruments listed in the emergency operating procedures (Abnormal Operating Procedures, Emergency Operating Procedures, Severe Accident Mitigation Guidelines, etc.)

5.2 The PAM functions as described in Section 7.5.

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5.3 Radiation monitoring instrumentation used to perform post-accident monitoring that is described in Section 9.3.2 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Section 9.3.2):

5.3.1 Range.

5.3.2 Response time.

5.3.3 Sensitivity.

5.3.4 Maximum anticipated drift between calibrations.

14.2.12.12.10 Pressurizer Pressure and Level Control (Test #156)

1.0 OBJECTIVE

1.1 To verify the proper operation of the pressurizer pressure control (PPC) and pressurizer level control (PLC).

3.2 Record temperature values in rooms with safety-related components while operating with normal ventilation lineups.

3.3 Record temperature readings in specified areas during the LOOP test.

3.4 Verify that environmental temperatures meet design requirements.

4.0 DATA REQUIRED

4.1 Reactor power level.

4.2 Temperature data in designated locations (i.e., general area and adjacent to major heat loads).

4.3 Equipment operating data.

5.0 ACCEPTANCE CRITERIA

5.1 Temperature conditions are maintained within the operable limits in areas as designed (refer to Section 9.4).

14.2.12.18.5 Sampling Primary and Secondary Systems (Test #204)

1.0 OBJECTIVE

1.1 To collect chemistry samples of the RCS and secondary at various power levels to record the following:

1.1.1 Boron concentration and boron-10 isotopic abundance.

1.1.2 Concentration of non-radioactive elements and soluble particulates.

1.1.3 Measured pH of the fluids.

1.1.4 Radio isotopic concentration data of the radioactive elements (e.g., cesium, iodine, iron, cobalt).

1.2 To demonstrate performance of permanent plant sampling and analysis procedures, while confirming that primary and secondary chemistry requirements are being met.

1.3 To verify that the primary and secondary systems are operating within design limits. This procedure shall be performed at the following plateau:

1.3.1 25 percent reactor power in accordance with RG 1.68.

1.3.2 50 percent reactor power in accordance with RG 1.68.

1.3.3 75 percent reactor power in accordance with RG 1.68.

1.3.4 ≥98 percent reactor power in accordance with RG 1.68.

2.0 PREREQUISITES

2.1 The reactor is stable at the desired power level.

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2.2 Required sampling systems are functional and analysis instrumentation are calibrated using calibration gases and solutions as

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referenced in the radioactive and non-radioactive analyses of Table 9.3.2-2.

3.0 TEST METHOD

3.1 Samples shall be collected from the RCS and secondary system at various power levels and analyzed in the laboratory using applicable sampling and analysis procedures.

3.2 Collect samples at various process radiation monitors, perform analysis in the laboratory, and compare the samples with the process radiation monitor output.

3.3 Verify that primary and secondary sample results meet design limits.

4.0 DATA REQUIRED

4.1 Reactor power.

4.2 RCS and secondary temperature.

4.3 Boron concentration and boron-10 isotopic abundance.

4.4 Core average burnup.

4.5 Isotopic activities.

5.0 ACCEPTANCE CRITERIA

5.1 Measured activity levels are within their limits.

5.2 Laboratory analyses and process radiation monitors agree with the within measurement uncertainties as designed (refer to Section 9.3.2), or investigation of the discrepancies has been initiated.

5.3 Samples of RCS and secondary fluids can be obtained from design locations as designed (refer to Section 9.3.2 and 11.5).

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5.4 Continuous and chemistry lab instrumentation used to analyze primary and secondary sampling parameters described in Table 9.3.2-2 will meet the design requirements for the measurements. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 9.3.2-2):

5.4.1 Range.

5.4.2 Response time.

5.4.3 Sensitivity.

5.4.4 Maximum anticipated drift between calibrations.

5.5 Radiation monitoring instrumentation used to perform radiation monitoring that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

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5.5.1 Range.

5.5.2 Response time.

5.5.3 Sensitivity.

5.5.4 Maximum anticipated drift between calibrations.

14.2.12.18.6 Failed Fuel Detection (Test #205)

1.0 OBJECTIVE

1.1 To collect chemistry samples of the RCS and secondary at the specified power level to record the following:

1.1.1 Boron concentration and boron-10 isotopic abundance.

1.1.2 Concentration of non-radioactive elements and soluble particulates.

1.1.3 Measured pH of the fluids.

1.1.4 Radioisotopic concentration data of the radioactive elements (e.g., cesium, iodine, strontium, barium, cerium, and noble gases~~iron, cobalt~~).

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1.2 To demonstrate performance of permanent plant sampling and analysis procedures. There is typically some RCS activity from tramp, fuel dust that is on the outer surface of the cladding.

1.3 To perform a cross-check of the failed fuel monitor instrumentation.

1.4 This test shall be performed at the following power plateaus:

1.4.1 25 percent reactor power.

1.4.2 ≥98 percent reactor power.

2.0 PREREQUISITES

2.1 The reactor is stable at the desired power level.

2.2 Required sampling systems are functional.

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2.3 Calibrating gases and solutions are available for radioactive and non-radioactive analyses referenced in Table 9.3.2-2.

3.0 TEST METHOD

3.1 Samples shall be collected from the RCS and secondary system at various power levels and analyzed in the laboratory using applicable sampling and analysis procedures.

3.2 Collect samples at various process radiation monitors, perform analysis in the laboratory, and compare the samples with the process radiation monitor output.

4.0 DATA REQUIRED

4.1 Reactor power.

4.2 RCS and secondary temperature.

4.3 Boron concentration and boron-10 isotopic abundance.

4.4 Core average burnup.

4.5 Isotopic activities.

5.0 ACCEPTANCE CRITERIA

5.1 Measured activity levels are within their limits.

5.2 Laboratory analyses and process radiation monitors agree with the within measurement uncertainties as designed (refer to Section 9.3.2 or investigation of the discrepancies has been initiated.

5.3 Samples of RCS and secondary fluids can be obtained from design locations as designed (refer to Sections 9.3.2 and 11.5).

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5.4 Chemistry lab instrumentation used to analyze primary sampling parameters described in Table 9.3.2-2 will meet the design requirements for the measurements. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 9.3.2-2):

5.4.1 Range.

5.4.2 Response time.

5.4.3 Sensitivity.

5.4.4 Maximum anticipated drift between calibrations.

5.5 Radiation monitoring instrumentation used to perform primary system monitoring that is described in Table 11.5-1 will meet the design requirements for the radiation monitor. This includes, but is not limited to, the following (that could adversely impact the ability to measure the parameters described in Table 11.5-1):

5.5.1 Range.

5.5.2 Response time.

5.5.3 Sensitivity.

5.5.4 Maximum anticipated drift between calibrations.

14.2.12.18.7 Self Powered Neutron Detector Calibration (Test #206)

1.0 OBJECTIVE

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1.1 To perform a test on the Aeroball Measurement System (AMS) to establish time dependence and decay constants of the material components.

1.2 ~~To perform a full core flux map using the movable incore detector (i.e., AMS).~~To perform a full core flux map using the following:

1.2.1 Moveable incore system - Aeroball measurement system (AMS).

1.2.2 Fixed incore system - Self powered neutron detectors (SPND).

1.3 Normalize the fixed incore detector system (SPND) to the ~~AMS~~ (~~using~~full core flux map produced by the POWERTRAX system) at the following power plateaus:

1.3.1 25 percent reactor power.

1.3.2 50 percent reactor power.

1.3.3 75 percent reactor power.

1.3.4 ≥98 percent reactor power.

2.0 PREREQUISITES\

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2.1 The reactor is at the specified power level ~~and equilibrium xenon conditions~~.

2.2 The reactor is at equilibrium xenon conditions prior to performing tests to meet 1.2 and 1.3.

2.3 The incore detector systems, related digital processing computers, and POWERTRAX are ~~operable~~functional.

3.0 TEST METHOD

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3.1 Calculate/measure the resident time in the core to achieve AMS vanadium ball stack saturation at the current reactor power (neutron fluence).~~Movable incore (i.e., AMS) signals are measured.~~

3.2 Verify that the AMS residence time exceeds the time to reach AMS vanadium ball stack saturation at the current power level.~~Full core flux map is processed.~~

3.3 Perform an AMS flux map with the measuring table sequence set in "normal" (A, B, C, and D sequence) and analyze the map using POWERTRAX.~~Normalization of fixed incore system is performed by POWERTRAX.~~

3.4 Perform an AMS flux map with the measuring table sequence set in "reverse from normal" (A, B, C, and D sequence) and analyze the map using POWERTRAX.

3.5 Compare the AMS flux maps generated by the "normal" and the "reverse from normal" sequence using POWERTRAX focusing on differences that could be attributed to change in sequence. If xenon equilibrium has not been achieved, the maps may not be identical. If this is the case, verify that differences are not due to sequence.~~Background detector signals are recorded.~~

3.6 Verify that the POWERTRAX AMS sequence flux maps are not used to calibrate the SPNDs unless equilibrium xenon conditions have been achieved.

3.7 Perform an AMS flux map with the measuring table sequence set in "normal" (A, B, C, and D sequence) once equilibrium xenon conditions have been achieved. If the previous AMS flux maps were not

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performed with equilibrium xenon conditions, analyze the map using POWERTRAX.

3.8 Calibrate the SPNDs using constants generated by POWERTRAX prior to increasing reactor power to the next power ascension plateau.

4.0 DATA REQUIRED

4.1 Reactor power as indicated by the secondary calorimetric.

4.2 Reactor power as indicated by the primary enthalpy calorimetric.

4.3 RCCA position.

4.4 Boron concentration and boron-10 isotopic abundance.

4.5 Incore detector system data.

5.0 ACCEPTANCE CRITERIA

5.1 The full core flux map data is available for determining SPND calibration constants from measured core power distributions, using POWERTRAX.

14.2.12.18.8 Steady-State Core Performance (Test #207)

1.0 OBJECTIVE

1.1 To demonstrate that the core has been assembled as designed.

1.2 To determine if the measured and predicted power distributions are consistent. This test indirectly confirms that the predicted reactivity coefficients are within design assumptions.

1.3 To perform calibrations of fixed incore and excore instrumentation based on a full core flux map performed with the movable incore flux mapping (i.e., Aeroball) system.

1.4 To determine core power distributions using the movable incore instrumentation. This procedure shall be repeated at the following plateaus:

1.4.1 25 percent reactor power in accordance with RG 1.68.

1.4.2 50 percent reactor power in accordance with RG 1.68.

1.4.3 75 percent reactor power in accordance with RG 1.68.

1.4.4 ≥98 percent reactor power in accordance with RG 1.68.

2.0 PREREQUISITES

2.1 The reactor is operating at the desired power level and the RCCA configuration is within the suggested limits proposed by the core designer.

2.2 The following data is available for updating the three dimensional nodal model (POWERTRAX):

5.0 ACCEPTANCE CRITERIA

5.1 The LWSPS processes radioactive effluents as designed (refer to Sections 11.2, 11.5, and 13.4).

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14.2.12.20.2 Gaseous Waste Processing System (Test #216)

1.0 OBJECTIVE

1.1 To demonstrate that the operation of the gaseous waste processing system (GWPS) for collection and processing of radioactive ~~gases~~and potentially flammable gases vented from plant equipment is performing satisfactorily.

1.2 To determine the ability of plant systems to process radioactive effluents. This procedure shall be performed at the following plateaus:

1.2.1 75 percent reactor power in accordance with RG 1.68.

1.2.2 ≥98 percent reactor power in accordance with RG 1.68.

2.0 PREREQUISITES

2.1 The gaseous waste processing equipment is functional.

3.0 TEST METHOD

3.1 Verify that the gaseous waste processing simultaneously collects and processes gaseous waste per design.

4.0 DATA REQUIRED

4.1 Conditions of Measurement:

4.1.1 Reactor power history and RCS radioactivity level.

4.1.2 Containment temperature and humidity.

4.1.3 Condenser operating data.

4.1.4 Effluent control monitor operating data.

4.1.5 Gas analyzer operating data.

4.1.6 Gas transport times.

4.1.7 Recombiner operating data

5.0 ACCEPTANCE CRITERIA

5.1 The GWPS processes radioactive and potentially flammable gases effluent as designed (refer to Section 11.3, 11.5, and 13.4).

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Table 14.2-1—List of Initial Tests for the U.S. EPR
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Test #	Test Name	FSAR or COLA Test	Applicable Section of RG 1.68, Revision 3	Other RG	ITAAC
085	Smoke Confinement System	FSAR	Appendix A, 1.n.(14)		
086	Switchgear Building Ventilation System	FSAR	Appendix A, 1.n.(14)		
087	Turbine Island Ventilation Systems	FSAR	Appendix A, 1.n.(14)		
088	Essential Service Water Pump Building Ventilation System	FSAR	Appendix A, 1.n.(14)		
089	Reserved				
090	~~Reserved~~Plant Laboratory Equipment	COLA	Appendix A, 1.k	1.21 and 4.15	
091	Leak-off System	FSAR	Appendix A, 1.n		
092	Sampling Activity Monitoring System	FSAR	Appendix A, 1.k.(1)		
093	Solid Waste Storage System	FSAR	Appendix A, 1.l.(3)		
094	Radioactive Concentrates Processing System – Solid Waste	FSAR	Appendix A, 1.l.(3)		
095	Liquid Waste Processing System	FSAR	Appendix A, 1.l.(1)		
096	Reactor Coolant Drain Tank	FSAR	Appendix A, 1.l.(7)		
097	~~Equipment~~Process Drain Tank	FSAR	Appendix A, 1.l.(7)		
098	Equipment and Floor Drainage System	FSAR	Appendix A, 1.l.(7)		
099	Gaseous Waste Processing System	FSAR	Appendix A, 1.l.(2)		
100	Nuclear Sampling System	FSAR	Appendix A, 1.l.(8)		
101	Station Blackout Diesel Generator ~~Set~~Mechanical	FSAR	Appendix A, 1.g.(1)		
102	Station Blackout Diesel Generator Electrical	FSAR	Appendix A, 1.g.(1)		

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