



April Rice
Manager
Nuclear Licensing

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U.S. Nuclear Regulatory Commission
Document Control Desk
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Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3
Combined License Nos. NPF-93 and NPF-94
Docket Nos. 52-027 & 52-028

Subject: LAR 13-09 R1 S1 License Amendment and Exemption Request: Annex and Radwaste Building Changes

1. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment and Exemption: Annex and Radwaste Building Changes February 27, 2014 (NND-14-0048) (ML14065A022).
2. Letter from Ravindra G. Joshi (NRC) to Ronald Jones (SCE&G), Virgil C. Summer Nuclear Station Units 2 and 3: Request for Additional Information Letter No. 01 Related to Exemption and License Amendment Request (LAR) 13-09, for the Virgil C. Summer Nuclear Station Units 2 and 3: Annex and Radwaste Building Changes (ML14125A297)
3. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment and Exemption S1: Annex and Radwaste Building Changes July 09, 2014 (NND-14-0383) (ML14192A036)
4. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment and Exemption LAR 13-09 S2: Annex and Radwaste Building Changes September 25, 2014 (NND-14-0572) (ML14268A544)
5. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment and Exemption LAR 13-09 S3: Annex and Radwaste Building Changes August 20, 2015 (NND-15-0490) (ML15236A100)
6. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment and Exemption LAR 13-09 R1: Annex and Radwaste Building Changes December 17, 2015 (NND-15-0664) (ML15351A428)

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 combined licenses (COLs) numbers NPF-93 and NPF-94, respectively. The proposed amendment would depart from VCSNS Units 2 and 3 plant-specific Design Control Document (DCD) Tier 1 and Tier 2 material contained within the Updated Final Safety Analysis Report (UFSAR), as well as COL Appendix C material, to modify the annex and radwaste buildings.

On February 1 and 3, 2016, SCE&G received by email, a follow-up set of RAI questions from the NRC staff following their review of Reference 6. The questions were discussed in a Public Meeting with the NRC on February 3, 2016. As a result, SCE&G is providing this letter, which includes a response to the RAI questions as well as updates to previous RAI responses as applicable. This supplement also includes updates to the LAR and UFSAR text consistent with the RAI response.

Enclosure 16 of this LAR responds to the new NRC RAI questions and updates previous RAI responses where necessary. Enclosure 17 contains the updated description and technical evaluation for the proposed changes in the License Amendment Request (LAR). Editorial changes were also implemented as necessary. Enclosure 18 contains a minor editorial revision incorporated in the associated exemption request. Enclosure 19 contains the updated proposed markups depicting the requested changes to publicly available information. **Enclosure 15 of reference 6 contains the SUNSI information relevant to this LAR. Given that the information has not been changed, it was not duplicated in this supplement.**

The supplemental information provided in this letter does not impact the scope of the requested amendment, which was further clarified based on the RAI response, nor the conclusions of the regulatory evaluation. This includes the significant hazards consideration determination and the environmental considerations, which is not changed or affected by this supplement.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the license amendment by August 18, 2016. Approval by this date will allow sufficient time to implement the licensing basis changes prior to affected construction activities. SCE&G expects to implement the proposed amendment within 30 days of approval.

This letter contains no regulatory commitments.

In accordance with 10 CFR 50.91, SCE&G is notifying the State of South Carolina of this LAR by transmitting a copy of this letter and enclosures to the designated State Official.

Should you have any questions, please contact Mr. Nicholas Kellenberger by telephone at (803) 941-9834, or by email at NICHOLAS.R.KELLENBERGER@scana.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 1st day of June, 2016.

Sincerely,



April Rice
Manager
Nuclear Licensing

MMD/ARR/mmd

Enclosures 1-4:	Provided via reference 1 (revised by Enclosures 12-15)
Enclosures 5-8:	Provided via reference 3 (updated by Enclosure 16)
Enclosure 9:	Provided via reference 4 (updated by Enclosure 16)
Enclosure 10:	Provided via reference 5 (updated by Enclosure 11 & Enclosure 16)
Enclosure 11:	Provided via reference 6 (updated by Enclosure 16)
Enclosure 12-14:	Provided via reference 6 (updated by Enclosure 17-19)
Enclosure 15:	Provided via reference 6 (SUNSI information unchanged)
Enclosure 16:	Virgil C. Summer Nuclear Station Units 2 and 3 – SCE&G Response to Supplemental NRC RAI Question (LAR-13-09 R1 S1)
Enclosure 17:	Virgil C. Summer Nuclear Station Units 2 and 3 – Supplemental License Amendment Request: Annex and Radwaste Building Changes (LAR 13-09 R1 S1)
Enclosure 18:	Virgil C. Summer Nuclear Station Units 2 and 3 – Supplemental Exemption Request: Annex and Radwaste Building Changes (LAR 13-09 R1 S1)
Enclosure 19:	Virgil C. Summer Nuclear Station Units 2 and 3 – Updated Proposed Changes (Public Information) (LAR 13-09 R1 S1)

Copy (with enclosures):

Billy Gleaves

Ruth Reyes

Chandu Patel

Paul Kallan

DCRM-EDMS@SCANA.COM

Susan E. Jenkins

Tom Fredette

Tomy Nazario

Catherine Haney

Jim Reece

Stephen A. Byrne

Jeffrey B. Archie

Ronald A. Jones

Alvis J. Bynum

Kathryn M. Sutton

April Rice

Justin Bouknight

Nicholas Kellenberger

Matt Kunkle

Mory Diané

Bryan Barwick

Dean Kersey

Matthew Presson

Margaret Felkel

Cynthia Lanier

Kristin Seibert

Amanda Pugh

Neil Haggerty

Carl Churchman

Pat Young

Zach Harper

Brian McIntyre

Brian Bedford

Joseph Cole

Chuck Baucom

Lisa Alberghini

Curt Castell

Jeff Hawkins

Susan E. Jenkins

William M. Cherry

Rhonda O'Banion

Amanda Pugh, SNC

VCSummerMail@westinghouse.com

VCSummer2&3project@westinghouse.com

VCSNNDCorrespondence@scana.com

**South Carolina Electric and Gas Company
Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3**

NND-16-0129

Enclosure 16

**SCE&G Response to Supplemental NRC RAI Question
(LAR 13-09 R1 S1)**

(This Enclosure consists of 10 pages, including this cover page.)

The purpose of this supplement is to address NRC follow-up questions received on February 1 and 3, 2016 via email. As the questions were not numbered, South Carolina Electric & Gas Company (SCE&G) assigned numbers 9 to 12 so they can be sequential with previous RAI questions 1 through 8.

With this supplement, SCE&G has also updated previous response to RAI Question General, 1a,2b,3a, 6 submitted in Enclosure 9, 5, 5, 9, and 10/11 respectively (see cover page 3 of 4).

RAI Question 9:

In Section 2.2 of Enclosure 12 of Revision 1 to LAR 13-09 (second and third sentences), the LAR states,

“A range of potential radiation levels inside the radwaste building was analyzed and the amount of shielding required to maintain adjacent areas at Zone 1 radiation levels was determined. It was identified that a small amount of moderate activity waste would require a concrete slab too thick for the current structural design of the building to maintain adjacent areas at Zone I radiation levels.”

During the staff’s telecom with the applicant on August 14, 2014, the staff asked the licensee to verify that the “concrete slab” referenced refers to the concrete slab used as the roof of the radwaste building.

The licensee replied that the concrete slab referenced in this LAR does refer to the roof slab.

The staff then asked the licensee, that if the concrete does refer to the roof of the radwaste building, to explain how varying the thickness of the concrete roof slab could affect the radiation levels in the adjacent Zone I areas (i.e., the HVAC Equipment Room, the Electrical/Mechanical Equipment Room, and the hallway on the north end of the Radwaste Building).

The staff’s notes on this telecom show that, instead of explaining how varying the thickness of the concrete roof slab could affect the radiation levels in the adjacent Zone I areas, the licensee described how, in the current configuration of the RWB, the storage of radwaste containers in the RWB could potentially result in the radiation zones on the roof of the RWB exceeding Zone II levels.

The staff would like the licensee to verify that how the thickness of the concrete roof slab could affect the radiation levels in the adjacent Zone I areas.

SCE&G Response to RAI Question 9:

The statement referring to the thickness of the concrete slab for the radwaste building roof was based on preliminary shielding calculations. The final calculations have confirmed the concrete roof slab to be adequate in providing shielding to maintain the radiation levels at the roof, in the worker occupied areas in the radwaste building, and in the adjacent plant yard areas, as Zone I to Zone IV. The statement discussing the thickness of the roof slab is revised in VCS Units 2 and 3 LAR 13-09 Revision 1 Supplement 1 to clearly identify the relationship between the preliminary and final shielding calculations performed. The concrete slab for the radwaste building roof, in conjunction with the removable steel shield bunker roof plates, are described further in the Response to RAI Question 10.

Other design features described in the LAR provide shielding to maintain radiation levels for worker occupied areas in the radwaste building, and in the adjacent plant yard areas, as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14). The specified radiation zones in these areas are not impacted by the thickness of the radwaste building roof, or by the use of the removable steel shield bunker roof plates and removable steel

shield bunker door plates that are provided for ALARA considerations only and maximum operational flexibility. This includes the following:

1. Electrical/Mechanical Equipment Room – Zone I.
2. HVAC Equipment Room – Zone I.
3. Monitor Tanks Room – Zone II.
4. Waste Accumulation Room – Zone IV.
5. Mobile Systems Facility – Zone II.
6. Truck Staging Area – Zone II.
7. Adjacent plant yard areas – Zone I.

This response supersedes SCE&G Response to the General Question previously provided in LAR 13-09 Supplement 2 NND-14-0572 (ML14268A544).

For changes to the LAR, see Enclosure 17.

RAI Question 10:

There appear to be several inconsistencies between wording in the LAR and some of the licensee's responses to staff questions regarding the function of the temporary shielding provided for the proposed bunkers.

In the licensee's follow-up response to RAI Question 3 (p. 4 of 9, lines 6-11) in Supplement 2 of LAR 13-09, the licensee states,

"Acknowledgement of the removable or temporary nature of these plates is included in the shielding calculation which demonstrates that the Radwaste Building roof is a Zone II area without crediting any attenuation that these plates may offer. Zone II dose rates are maintained by crediting only radiation transport, the limited shielding from the building roof, and the distance between the waste storage location and the roof elevation."

However, in Section 3.2 (second sentence) of Enclosure 12 and in Section 4 (second sentence of the fourth paragraph) of Enclosure 13 of Revision 1 to LAR 13-09, the LAR states,

"These proposed changes are made...to allow temporary shielding to maintain acceptable radiation levels on the radwaste building roof..."

The wording in Revision 1 to the LAR imply that temporary shielding (in the form of the removable steel shielding plates) must be used to maintain acceptable radiation levels on the radwaste building roof and this is contradictory to the follow-up response to RAI Question 3. The statements in Sections 3.2 and 4 of Revision 1 to LAR 13-09 are only true if they are revised to state (see additional words in italics),

"These proposed changes are made...to allow temporary shielding to maintain acceptable radiation levels on the radwaste building roof *when high level waste is being stored in the bunkers*"

This statement that temporary shielding may be needed when high level waste is being stored in the bunkers is based on the licensee's response to RAI Question 1 a) (p. 2 of 4, 2nd sentence) in Supplement 1 of LAR 13-09, which states:

"The bunkers may also be used for storage of high activity packaged or unpackaged waste with the implementation of portable shielding on the top and the open sides of the bunkers in accordance with SCE&G's ALARA program."

SCE&G Response to RAI Question 10:

The design descriptions and purposes of the removable steel shield bunker roof plate above each bunker for providing vertical shielding of the normally unoccupied and access-controlled radwaste building roof area, and the removable steel shield bunker door plates in front of each bunker for horizontal shielding of the worker occupied areas in the radwaste building and in the adjacent plant yard areas, are revised to be consistent and clarified in VCS Units 2 and 3 LAR 13-09 Revision 1 Supplement 1. Based on the final shielding analysis, the radwaste building configuration is proposed to be modified to add the three bunkers for storage of moderate and high activity waste. The design gives the licensee operational flexibility to add one or two stacked 6" thick removable steel shield bunker roof plates above each bunker, and multiple

layered 1" thick removable steel shield bunker door plates in front of each bunker. The bunkers are structurally designed to allow two of the removable steel shield bunker roof plates to be placed and stored on top of each bunker, which would provide 12" thick steel shielding in the vertical direction.

The proposed minimum concrete wall thickness of 1'-8" for the back and side concrete shield walls surrounding the three bunkers provide adequate shielding to maintain the radiation levels in the worker occupied areas in the radwaste building, and in the adjacent plant yard areas, as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14), without the additional vertical shielding from the removable steel shield bunker roof plates and horizontal shielding from the removable steel shield bunker door plates. Therefore, for normally occupied areas, the removable steel shield bunker roof plates and removable steel shield bunker door plates are provided for ALARA considerations only and for maximum operational flexibility.

UFSAR Chapter 12, including UFSAR Figure 12.3-1 (Sheet 14), does not specify a radiation zone for the radwaste building roof, as it is normally unoccupied and is access-controlled. However, the radwaste building is maintained as Zone I to Zone IV. Therefore, the radiation levels on the radwaste building roof could conceivably be as high as Zone IV during storage of moderate and high activity waste in the bunkers. For ALARA considerations, the shielding calculations assume a single 4-1/2" thick steel shield over each bunker, versus the actual as-designed 6" thick removable steel shield bunker roof plates that may be used individually or stacked to create a 12" thick steel shield. The shielding calculations credit the assumed 4-1/2" thick steel shield, radiation transport, the limited shielding from the building roof, and the distance between the waste storage location and the roof elevation, in order to maintain maximum radiation levels for the radwaste building roof as Zone II to Zone III. Therefore, if access to the normally unoccupied radwaste building roof is required during storage of moderate and high activity waste in the bunkers, the use of a single 6" thick removable steel shield bunker roof plate above each bunker is adequate to maintain Zone II to Zone III radiation levels or less for ALARA considerations only and for maximum operational flexibility.

UFSAR Subsection 11.4.2.5.2 is proposed to be revised to add a description of the removable steel shield bunker roof plates and removable steel shield bunker door plates referring to UFSAR Subsection 12.3.2.2.5 for a description of their design functions.

UFSAR Subsection 12.3.2.2.5 is proposed to be revised to add a description of the design functions for the removable steel shield bunker roof plates that may be installed to provide vertical shielding during storage of moderate and high activity waste to maintain the radiation levels as Zone II to Zone III on the normally unoccupied and access-controlled radwaste building roof, and to add a description of the design functions for the removable steel shield bunker door plates that may also be installed to provide horizontal shielding to maintain the radiation levels in the worker occupied areas in the radwaste building, and in the adjacent plant yard areas, for ALARA considerations only and for maximum operational flexibility.

The previous Response to RAI Question 3 as quoted above is superseded by the content of this response.

The previous Response to RAI Question 1.a as quoted above is supplemented by the content of this response.

For changes to the LAR, see Enclosure 17 and 19.

RAI Question 11:

The first two statements below are contradictory with third statement:

1) Response to Question 2a) (p. 3 of 14, lines 2-7) in Supplement 1 of LAR 13-09 states,

“The results of an analysis show that the Waste Accumulation Room can be maintained as a radiation Zone IV, assuming the surface dose rate limit of 100 mrem/hr (high level waste)...is maintained for wastes along with implementation of an ALARA program by SCE&G.”

2) Response to Question 2a) (p. 3 of 14, lines 9-11) in Supplement 1 of LAR 13-09 states,

“As noted in the response to Item b of this RAI question, the removable shield plates on the front openings of the bunker are provided for ALARA purposes only and are not credited to maintain the radiation zoning of the facility.”

3) Response to Question 2b) (p. 4 of 14, lines 1-2) in Supplement 1 of LAR 13-09 states,

“The removable shielding plates for the front opening of the bunkers are not required for the storage of moderate activity waste and were not credited in the shielding analysis.”

By not including reference to the storage of “high activity waste” in this response, this sentence implies that removable shielding plates ARE REQUIRED for the front opening of the bunkers.

SCE&G Response to RAI Question 11:

The design descriptions and purposes of the removable steel shield bunker door plates in front of each bunker are revised to be consistent and clarified in VCS Units 2 and 3 LAR 13-09 Revision 1 Supplement 1 as described in the Response to RAI Question 10. The proposed minimum concrete wall thickness of 1'-8" for the back and side concrete shield walls surrounding the three bunkers provide adequate shielding to maintain the radiation levels in the worker occupied areas in the radwaste building, and in the adjacent plant yard areas, as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14). This shielding is adequate to maintain the radiation levels for these areas as the specified radiation zones without the additional shielding from the removable steel shield bunker door plates during storage of moderate and high activity waste in the bunkers. This was clarified by the changes implemented in the LAR.

Furthermore, the above quoted statement from Response to RAI Question 2.b is revised as follows to include high activity wastes in addition to moderate activity wastes:

“The removable steel shield bunker door plates in front of each bunker are not required for storage of moderate and high activity waste, and were not credited in the shielding analysis.”

For changes to the LAR, see Enclosure 17.

RAI Question 12:

SECY 94-198, Generic Letter 81-39, and SRP 11.4-A, state that gas generation rates should be evaluated to ensure that the facility design precludes potentially explosive conditions. While in LAR 13-09, Revision 1, the licensee indicates that the quantities of material in the Radwaste Building are not increasing, the LAR adds shielded bunkers, which were not included in the initial AP1000 design. In the 2014 phone calls with the licensee to discuss this issue, the licensee indicated that resins would not be stored in the Radwaste Building and that the bunkers have openings to allow gas to escape the bunkers (the waste form which is the predominant concern for explosive gas buildup is ion exchange resin). The licensee indicated that a statement would be added to the UFSAR indicating that resins will not be stored in the Radwaste Building.

However, in reviewing Revision 1 of the LAR and associated RAI responses, the LAR and associated RAI responses do not provide any information regarding what types of waste are being stored in the bunkers (or what is excluded from the bunkers) and therefore, it is unclear if the possibility for potential explosive gas buildup exists within the bunkers. In addition, the LAR and associated RAI responses are unclear if gas generated will escape the bunkers, to the general Radwaste Building atmosphere, which will normally be ventilated and which was within the scope of the initial AP1000 plant review.

The staff recommends that the licensee do one or a combination of the following, in order to resolve this issue: 1) Update the UFSAR to provide information indicating that there will be spacing or openings in the bunkers or some other method to allow potential explosive gases to vent to the general Radwaste Building atmosphere. So that there will not be a potential continual buildup of explosive gases within the enclosed bunkers; 2) Update the UFSAR to specify that ion exchange resins will not be stored within the bunkers, or; 3) Provide a detailed analysis showing that if the bunkers are filled with the highest activity resins, that there is no possibility of explosive conditions within the bunkers.

SCE&G Response to RAI Question 12:

As described in VCS Units 2 and 3 LAR 13-09 Revision 1 Supplement 1, moderate and high activity waste may be stored in the new bunkers. This might include solid wet waste such as radioactive condensate polishing system and/or steam generator blowdown system electrodeionization resin. Therefore, an evaluation of the temporary storage of resin in the bunkers was performed as further described in the LAR. Given the evaluation assumptions also discussed in the LAR, there is no potential for creation of a hazard from radiolytic hydrogen gas generation. In addition, the administrative controls that limit the total cumulative radioactive inventory of unpackaged wastes located in the radwaste building to prevent exceeding the Regulatory Guide 1.143, Revision 2, unmitigated radiological release criteria, and 10 CFR Part 20.1301 dose limit, effectively prevent storage of the maximum amount of resins consistent with UFSAR Table 11.4-1. Changes are proposed in the LAR to UFSAR Subsection 11.4.2.5.2 to discuss the analysis and controls established in order to prevent the potential for creation of a hazard from radiolytic hydrogen gas generation.

This response supersedes previous responses to RAI Question 6b initially provided in LAR 13-09 Supplement 3.

For changes to the LAR, see Enclosure 17 and 19.

The calculation containing the details of the evaluation of the temporary storage of resin in the bunkers is available to the NRC for an audit.

**South Carolina Electric and Gas Company
Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3**

NND-16-0129

Enclosure 17

**Supplemental License Amendment Request:
Annex and Radwaste Building Changes**

(LAR 13-09 R1 S1)

(This Enclosure consists of 23 pages, including this cover page. All updates are depicted with a change bar)

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1. SUMMARY DESCRIPTION

The proposed changes would revise the Combined Licenses (COLs) in regard to the AP1000 annex building and radwaste building structures and layout by:

1. **Revising** the Annex Building column line designations on affected Tier 1 Figures and Tier 2 Figure 3.7.2-19.
2. Revising the radwaste building configuration including the shielding design and radiation area monitoring.

The proposed changes require revision of Updated Final Safety Analysis Report (UFSAR) Tier 2 information, some of which also involve changes to the standard and site-specific UFSAR as well as plant-specific DCD Tier 1 information and corresponding material incorporated into Appendix C of the COL (**as detailed** in Section 2). This enclosure requests approval of the license amendment necessary to implement these changes.

2. DETAILED DESCRIPTION

2.1 Annex Building Column Line Changes

The annex building column lines on UFSAR Tier 2 Figure 3.7.2-19 (Sheets 2, 3, 5, 6, 7, and 8) (SUNSI) are proposed to be changed from 10 to 10.05 to resolve inconsistencies in the column line designation between the annex building and the auxiliary building figures in the UFSAR. The column line 10 designation for the auxiliary building figures corresponds to North Coordinate 1089'-0" whereas the column line 10 designation for the annex building figures corresponds to North Coordinate 1092'-0". This **change** is proposed to align column line 10 between the annex and auxiliary buildings.

The annex building column line on UFSAR Tier 2 Figure 3.7.2-19 (Sheet 8) (SUNSI) is proposed to be changed from 12 to 11.15 for consistency with the column line designations in Figure 3.7.2-19 Sheets 1, 2, 3, 5, 6, and 7 (SUNSI).

Because the column line changes in Tier 2 are also included in Tier 1, plant-specific DCD Tier 1 Figures 3.3-11A (SUNSI), 3.3-12 (SUNSI) and 3.3-13 (SUNSI) are proposed to be changed to remove column line designations for columns 6, 8, 10, 11.15, 13.2, 13.3, 14.1, 15.1, 15.2, A, B, C and D. The changes to the Tier 1 Annex Building figures are being made because none of the column lines proposed to be removed are referred to in any Tier 1 tables or text.

The proposed changes to the licensing basis are described below. Figures that contain sensitive unclassified non-safeguards information (SUNSI), also known as Security-Related Information (SRI), are identified as such and requested to be withheld under 10 CFR 2.390(d).

Tier 2 Changes:

- UFSAR Figure 3.7.2-19 (Sheets 2, 3, 5, 6, 7, and 8) (SUNSI) – Column Line 10 designation is changed to 10.05.
- UFSAR Figure 3.7.2-19 (Sheet 8) (SUNSI) – Column Line 12 designation is changed to 11.15.

Associated Tier 1 Changes:

- Plant-specific DCD Tier 1 Figures 3.3-11A (SUNSI), 3.3-12 (SUNSI), and 3.3-13 (SUNSI) – Column Line designations for Column Lines 6, 8, 10, 11.15, 13.2, 13.3, 14.1, 15.1, 15.2, A, B, C and D are deleted. There are also corresponding changes to COL Appendix C Figures 3.3-11A (SUNSI), 3.3-12 (SUNSI), and 3.3-13 (SUNSI).

2.2 Radwaste Building Configuration Changes

Based on a range of source terms, potential radiation levels inside the radwaste building were analyzed, with the intent of determining required shielding while minimizing any required structural changes to the existing radwaste building design, including exterior walls and roof. This analysis determined the amount of shielding required to maintain radiation levels for worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV levels as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14), and as Zone II to Zone III levels on the normally unoccupied and access-controlled radwaste building roof for ALARA considerations. Based on this preliminary analysis, the configuration inside the radwaste building was modified, including changes to internal shield walls and addition of bunkers. A final analysis determined the potential radiation levels, which form the basis for the proposed changes to the radwaste building configuration and radiation zones further described below.

Based on the final shielding analysis, the radwaste building configuration is proposed to be modified to add three bunkers for storage of moderate and high activity waste. Three bunkers, with a 6" thick removable steel shield bunker roof plate above each bunker, and multiple layered 1" thick removable steel shield bunker door plates in front of each bunker, are proposed to be added for maintaining radiation levels ALARA and for maximum operational flexibility. The bunkers are structurally designed to allow two of the removable steel shield bunker roof plates to be placed and stored on top of each bunker. The back and side concrete shield walls surrounding the three bunkers are proposed to have a minimum concrete wall thickness of 1'-8", with the interior walls between each bunker having a minimum concrete wall thickness of 8".

In addition to the change to add the three bunkers, the radwaste building configuration is also proposed to be changed to incorporate the Waste Accumulation Room and the Packaged Waste Storage Room into one room called the Waste Accumulation Room. Because waste before and after packaging may contain moderate or high activity, the new bunkers would be required in both the Packaged Waste Storage Room and the Waste Accumulation Room. However, if the two rooms are combined as proposed in this amendment, greater operational flexibility is achieved with the larger bunker size, and the number of new bunkers required is reduced. As part of the merging of the two rooms, the

minimum shield wall thickness for the walls associated with the original Packaged Waste Storage Room is changed from 2' to 1'-4".

Administrative controls will limit the total cumulative radioactive inventory of unpackaged wastes located in the radwaste building to meet the unmitigated radiological release criteria of Regulatory Guide 1.143, Revision 2.

Due to the rooms merging, one of the two radiation monitors previously located in the two separate rooms (RMS-JE-RE014B) is proposed to be deleted, and the remaining radiation monitor for the Waste Accumulation Room (RMS-JE-RE014A) is renamed to RMS-JE-RE014 and relocated in the newly incorporated room.

The licensing basis document proposed changes are described below:

Tier 2 Proposed Changes:

- UFSAR Figure 1.2-22 (SUNSI) – Modified to depict the incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room and the addition of the three bunkers.
- UFSAR Section 9.4.8 – Removed Packaged Waste Storage Room from the list of rooms served by the radwaste building HVAC system.
- UFSAR Figure 9.4.8-1 – Removed Packaged Waste Storage Room from the list of areas served by the radwaste building HVAC system.
- UFSAR Section 9A.3.5.1 – Removed fire zone 5031 AF 50352, Packaged Waste Storage Room (two places).
- UFSAR Table 9A-3 (Sheets 23 and 24) – Revised the fire protection summary to reflect the incorporation of the Packaged Waste Storage Room (50352) into the Waste Accumulation Room (50351).
- UFSAR Figure 9A-4 (SUNSI) – Modified to depict the incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room and the addition of the three bunkers.

Note: The Tier 2* information contained in the Section 9A figure is the fire area boundaries. The illustration of fire zones and background detail is not Tier 2* information. Fire area boundaries are not changed by combining the Packaged Waste Storage Room with the Waste Accumulation Room or adding the three new bunkers. The activity modifies fire zones only. Therefore, Tier 2* information is not proposed to be changed as part of this request.

- UFSAR Subsection 11.4.2.1 – Changed the room title from Packaged Waste Storage Room to Waste Accumulation Room. Add clarification in several areas that waste is packaged waste.
- UFSAR Subsection 11.4.2.3.2 – Changed the room title from Packaged Waste Storage Room to Waste Accumulation Room.
- UFSAR Subsection 11.4.2.3.3 – Changed the room title from Packaged Waste Storage Room to Waste Accumulation Room.

- UFSAR Subsection 11.4.2.5.2 – Modified the description of the radwaste building to 1) remove the Packaged Waste Storage Room and revise the description of the Waste Accumulation Room, 2) add a description of the newly added bunkers, 3) add a description of the removable steel shield bunker roof plates and removable steel shield bunker door plates referring to UFSAR Subsection 12.3.2.2.5 for a description of their design functions, and 4) describe the controls established for temporary storage of resin in a single unventilated bunker in order to prevent the potential for creation of a hazard from radiolytic hydrogen gas generation.
- UFSAR Table 11.5-2 – Deleted radiation monitor RMS-JE-RE014B and renamed RMS-JE-RE014A to RMS-JE-RE014. Renamed “Liquid and Gaseous Radwaste Area 1” to “Liquid and Gaseous Radwaste Area”.
- UFSAR Subsection 12.3.2.2.5 – Modified the description of the radwaste building shielding design to 1) remove the Packaged Waste Storage Room 2) add a description of the newly added bunkers, 3) add a description of the design functions for the removable steel shield bunker roof plates that may be installed to provide vertical shielding during storage of moderate and high activity waste to maintain the radiation levels as Zone II to Zone III on the normally unoccupied and access-controlled radwaste building roof for ALARA considerations, and 4) add a description of the design functions for the removable steel shield bunker door plates that may be installed for ALARA considerations.
- UFSAR Figure 12.3-1 (sheet 14) (SUNSI) – Modified to depict the incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room and the three added bunkers. Added a note to state access control requirements and traffic patterns are shown in Figure 12.3-3 sheet 14 and added notes regarding zone dose rate limits.
- UFSAR Figure 12.3-2 (sheet 14) (SUNSI) – Modified to depict the incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room and the three added bunkers.
- UFSAR Figure 12.3-3 (sheet 14) (SUNSI) – Modified to depict the incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room and the three added bunkers.

Associated Standard and Site-Specific Licensing Basis Changes:

- UFSAR Subsection 11.2.1.2.5.2 is revised to specify that the operating procedures discussed in Subsection 13.5.2.2.5 include administrative controls to limit the total cumulative radioactive inventory of unpackaged wastes located in the Radwaste Building to prevent exceeding the Regulatory Guide 1.143, Revision 2, unmitigated radiological release criteria, and 10 CFR Part 20.1301 dose limit. In addition, the changes include: 1) specifying the types of unpackaged wastes to consider, 2) specifying the applicable radionuclide inventory limits, 3) describing the controls over transfer or packaging of spent media from a mobile radwaste processing system, and 4) specifying that the unmitigated, unshielded worker dose is calculated at 11 feet from the source and the design limitations required as a result to maintain worker dose within limit.

- UFSAR Subsection 13.5.2.2.5 is revised to clarify the requirement for operating procedures to be developed, implemented, and maintained prior to initial fuel load for the administrative controls added to UFSAR Subsection 11.2.1.2.5.2, including applicable radionuclide inventory limits.

Associated Tier 1 Proposed Changes:

- Plant-specific DCD Tier 1 Sections 3.3(4c) and 3.3(6b) – Removed description of the walls used for shielding outside of the Packaged Waste Storage Room. Changed the room title from Packaged Waste Storage Room to Waste Accumulation Room. Changed the minimum waste storage volume from 1293 cubic feet to 1417 cubic feet as a result of the merging of the Packaged Waste Storage and Waste Accumulation Rooms and to be consistent with Tier 2, Subsection 11.4.2.1 and Table 11.4-1.
- Plant-specific DCD Tier 1 Table 3.3-6 (Items 4c and 6b) – Removed description of the walls used for shielding outside of the Packaged Waste Storage Room. Changed the room title from Packaged Waste Storage Room to Waste Accumulation Room. Changed the minimum waste storage volume from 1293 cubic feet to 1417 cubic feet because of the merging of the Packaged Waste Storage and Waste Accumulation Rooms and to be consistent with Tier 2, Subsection 11.4.2.1 and Table 11.4-1.
- Plant-specific DCD Tier 1 Table 3.3-6 (Item 4b) – Revised the Acceptance Criteria by adding the following underlined text: “A report exists and concludes that the shield walls of the Waste Accumulation Room in the Radwaste Building except for designed openings or penetrations are consistent with the minimum concrete wall thicknesses of 1'-4", and a minimum concrete wall thickness of 1'-8" near the radwaste bunkers.”
- Plant-specific DCD Tier 1 Table 3.5-5 – Removed note regarding the use of multiple detectors for the Liquid and Gaseous Radwaste Area monitor.

(These Tier 1 changes also involve corresponding changes to COL Appendix C Section 3.3, Table 3.3-6, and Table 3.5-5.)

3. TECHNICAL EVALUATION

3.1 Annex Building Column Line Changes

This activity includes a proposed change for consistency between the annex building and auxiliary building figures in the UFSAR and modifies the description of the facility/design in the plant-specific DCD Tier 1. Plant-specific DCD Tier 1 Section 1.1 identifies that the design function of a column line is to provide a designation on the plant reference grid which is used to define the location of building walls and columns. The lines are used for clarifying the location of specific walls or sections. This proposed change does not adversely affect the design function of the column line because:

- The plant-specific DCD Tier 1 text, tables and figures continue to communicate the structural design of the annex building. The purpose of the column line designations in the aforementioned Tier 1 figures is to indicate the location of building walls and columns previously discussed in Tier 1. The column lines being removed are considered to be background

information and therefore not pertinent to the location of any walls or columns previously discussed in Tier 1 text or tables and would be in conflict with Tier 2 if not revised following the proposed changes. Column lines indicating the location of walls or columns discussed in Tier 1 text or tables will remain in the aforementioned figures.

- The proposed changes to the UFSAR Tier 2 column line designations resolve inconsistencies between the auxiliary building and annex building column lines. With this change, the UFSAR Tier 2 column lines perform their function of accurately locating the annex building column lines.

Because these proposed changes are only being made to the annex building figure to be consistent with the auxiliary building figure, they do not adversely affect any design function described in the UFSAR. The proposed changes do not involve an adverse change to any method of evaluation for establishing design bases or safety analyses. They do not represent any change to a design feature credited in the ex-vessel severe accident assessment. Tests, experiments, and procedures described in the licensing basis are unchanged by this activity. The changes do not affect the aircraft impact assessment, because the column line change is being made only for consistency, and therefore, they do not affect any key design features credited in the Aircraft Impact Assessment, as described in UFSAR Subsection 19F. The activity does not increase the probability or consequences of an accident previously evaluated, because it does not affect the operation of any systems or equipment that could initiate or mitigate an analyzed accident. No accident source term parameter or fission product barrier is impacted by this activity. The activity does not create the possibility of a new or different kind of accident from any accident previously evaluated, because it does not change the design function of the annex building or of any of the systems or equipment contained therein or in any other Nuclear Island structures. The activity does not involve a significant reduction in a margin of safety, because there is no change to the codes and standards and analysis methods applied to the annex building design. The activity has no effect on off-site dose analysis for analyzed accidents.

The proposed activity has no impact on emergency plans or physical security plans. The changes to the column line indicators are being made only for consistency. The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation.

The fire protection analysis is performed for each fire area using the methodology described in UFSAR Tier 2 Section 9A.2. This methodology follows the guidance of Branch Technical Position (BTP) CMEB 9.5-1. The results of the analysis are provided in UFSAR Tier 2 Section 9A.3. This activity does not change the fire protection analysis conclusions.

Because the changes to the annex building column lines are only for consistency with the auxiliary building figures and involve removing column line designations considered to be background information and therefore not pertinent to Tier 1 text or tables, there are no impacts to any regulatory requirements or criteria.

3.2 Radwaste Building Configuration Changes

The proposed changes to the radwaste building involve the following:

1. The addition of three bunkers for storage of moderate and high activity waste with 1'-8" concrete shield walls around the bunkers to maintain radiation levels for worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14), and with removable steel shield bunker roof plates to maintain radiation levels as Zone II to Zone III on the normally unoccupied and access-controlled radwaste building roof and removable steel shield bunker door plates for as low as is reasonably achievable (ALARA) considerations;
2. Merging of the Waste Accumulation Room and the Packaged Waste Storage Room into one room;
3. Deletion of radiation monitor RMS-JE-RE014B, and renaming RMS-JE-RE014B as RMS-JE-RE014 due to the merging of the rooms;
4. Addition of a partial labyrinth wall to shield the door entrance to the Waste Accumulation Room inside of the Radwaste Building;
5. Changing access to the Monitor Tank Room by routing through the Waste Accumulation Room, addition of a shield labyrinth to the Waste Accumulation Room, and addition of a north wall to the Monitor Tank Room;
6. Changing the normal operations radiation zones for the Monitor Tanks Room from Zone III to Zone II, and the HVAC Equipment Room from Zone III to Zone I; and
7. Decreasing the minimum thickness of the shield walls in the new Waste Accumulation Room corresponding to the walls of the original Packaged Waste Storage Room from 2' to 1'-4".

These proposed changes are made to provide for greater operational flexibility in handling waste before and after packaging, to minimize the number of shielded bunkers required for storage of moderate and high activity waste, to maintain radiation levels for worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14), and to maintain radiation levels as Zone II to Zone III on the normally unoccupied and access-controlled radwaste building roof for ALARA considerations.

Addition of Radwaste Bunkers and Merging of Waste Accumulation Room and Packaged Waste Storage Room

The proposed changes to add three bunkers allow the moderate or high activity waste to be segregated from the remainder of the lower activity waste. This separation reduces operational exposure within the radwaste building while workers handle the lower activity waste.

Based on the shielding analysis, the removable steel shield bunker door plates are not required to be installed to maintain radiation levels in the worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14), and are provided for ALARA considerations only. Therefore, a partial labyrinth wall is added to shield the door entrance so that when the bunker door plates are not installed the bunkers are not visible.

The removable steel shield bunker roof plates may be installed as vertical shielding to maintain the radiation levels as Zone II to Zone III on the normally unoccupied and access-controlled radwaste building roof for ALARA considerations, but only based on the activity and distribution of wastes stored in the Waste Accumulation Room and in the bunkers. As an example, during normal operations, and based on storing a maximum of Zone III waste on the floor of the combined Waste Accumulation Room and storing higher activity (up to Zone IV) dry waste in the bunkers, the removable steel shield bunker roof plates provide additional shielding in the vertical direction to maintain the radwaste building roof as Zone II to Zone III. The removable steel shield bunker roof plates are not required to be installed to maintain radiation levels in the worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14).

The proposed minimum concrete wall thickness of 1'-8" for the back and side concrete shield walls surrounding the three bunkers provide adequate shielding to maintain the radiation levels in the worker occupied areas in the radwaste building and in the adjacent plant yard areas as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14). This shielding is adequate to maintain the radiation levels for these areas to the specified radiation zones without the additional shielding from the removable steel shield bunker roof plates and bunker door plates, as previously described.

The proposed changes to merge the Waste Accumulation Room and the Packaged Waste Storage Room into one room and add three bunkers maintain normally occupied, radiologically restricted area portions of the radwaste building as Zone I to Zone IV as defined in the proposed revision to UFSAR Figure 12.3-1 (Sheet 14). Exceptions for the peak source scenario, including moderate and high activity waste storage, are addressed by the addition of notes to UFSAR Figure 12.3-1 (Sheet 14) describing potential maximum radiation levels. These notes provide information necessary to support ALARA considerations when handling and storing moderate and high activity waste in the radwaste building. In addition, the proposed changes maintain the adjacent plant yard areas that have unrestricted worker access as Zone I.

Evaluation of Radwaste Building Design Function Impacts

These proposed changes do not adversely affect the design function of the radwaste building, which is a non-seismic structure whose function is to provide for handling and storage of low, moderate, or high activity waste and which contains no safety-related structures, systems or components. These proposed changes do not adversely affect any operations within the radwaste building. The combined Waste Accumulation Room is capable of fulfilling the design functions of the Packaged Waste Storage Room in addition to its own. The radwaste building continues to minimize releases of radioactivity from the solid, liquid, and gaseous material. The solid radwaste system (WSS) continues to collect and store radioactive wastes and provide shielding to maintain radiation exposure to plant operation and maintenance personnel ALARA. The radwaste building continues to support the WSS by functioning to store at least 1417 cubic feet per year dry waste. The useful storage volume in the radwaste building, which accommodates more than one full offsite waste shipment using a tractor-trailer truck, is unchanged by this activity. Liquid radwaste processing areas within the radwaste building continue to function to contain any liquid spills. The radwaste building continues to include facilities for segregated storage of various

categories of waste prior to processing, for processing by mobile systems, and for storing processed waste in shipping and disposal containers.

Radiation Monitor Changes

With respect to Packaged Waste Storage Room and Waste Accumulation Room, the original radwaste building design consisted of one area radiation monitor per room, both of which functioned to monitor area radiation levels in each room and to alarm and alert operators in the event of high radiation. With the removal of the separating wall and the combining of those two rooms into one, the function of monitoring and alarming radiation levels can be accomplished by use of a single area radiation monitor. This monitor is of the same type and design requirements as the existing monitors, and will be relocated to a central location in the newly combined room to ensure all areas of the combined room are detectable, as they were with the separate rooms. The criteria for locating this area monitor (as provided in UFSAR Tier 2 Subsection 11.5.6.1) are not changed by this activity and will continue to be applied for this single monitor.

Changes to Wall Thickness

The proposed change in the wall thickness for the walls associated with the original Packaged Waste Storage Room from 2' to 1'-4" and the change in wall thickness for the walls associated with the original Waste Accumulation Room in the bunker area from 1'-4" to 1' 8", are possible due to the additional shielding provided by the newly added bunkers. The shielding calculations including these revised wall thicknesses demonstrate that [radiation levels for the adjacent plant yard areas that have unrestricted worker access are maintained as Zone I](#).

Activity Limits

The amount of activity in the Radwaste Building is limited by two criteria. First, the activity in the Radwaste Building and systems and components in the Radwaste Building containing radioactive materials are limited and maintained within applicable A₂ quantity limits specified in Appendix A to 10 CFR Part 71 to conform with Regulatory Guide 1.143, Revision 2. Second, the source term (activity) within these systems and components is limited by applicable limits on potential unmitigated exposures to personnel and the general public.

The Radwaste Building is classified and designed as an RW-IIc structure in accordance with Regulatory Guide 1.143, Revision 2. Therefore, the systems and components within the Radwaste Building that contain radioactive materials are classified and designed as RW-IIc systems and components in accordance with Regulatory Guide 1.143, Revision 2, and include three (3) radwaste monitor tanks, up to three (3) mobile radwaste processing systems, and any additional equipment located in the Radwaste Building including unpackaged radioactive wastes stored in the Waste Accumulation Room. Conformance with classification RW-IIc limits the activity for radioactive sources, other than packaged waste, within each of these systems and components containing radioactive materials to less than one A₂ quantity. This provides an activity limit for each system and component, and, in effect, drives a cumulative activity limit for the Radwaste Building. Each of the applicable systems and components within the Radwaste Building is expected to contain a mixture of radionuclides, and so the total A₂ quantity that [may](#) be present in each system or component is determined in accordance with guidance provided in Section IV(e) of 10 CFR 71, Appendix A:

$$A_2 = \frac{1}{\sum_i \frac{f(i)}{A_2(i)}}$$

Where:

- A_2 = A_2 quantity for the activity in the system or component,
- $f(i)$ = Fraction of activity of the i th radionuclide in the system or component,
- $A_2(i)$ = Appropriate A_2 quantity for the i th radionuclide from 10 CFR 71, Appendix A, Table A-1, and
- \sum_i = Indicates the summation is performed for all radionuclides in the system or component.

To meet the unmitigated radiological release criteria of Regulatory Guide 1.143, Revision 2, the activity within the Radwaste Building must be controlled and limited to ensure radiation protection for workers inside the protected area and for members of the public beyond the protected area boundary. Specifically, sources of activity within the building, other than from packaged waste, must be shown to produce exposures that do not exceed unmitigated radiological release criteria of 5 rem to workers within the protected area, and the 10 CFR Part 20.1301 dose limit of 100 millirem for members of the public located at the protected area boundary. An analysis has been performed to ensure these criteria are met. This analysis considers the current design basis activity limits and locations of activity in the Radwaste Building, including within the applicable systems and components, and demonstrates conformance with the Regulatory Guide 1.143, Revision 2, acceptance criteria with margin to the regulatory limits.

Administrative Controls to Maintain Activity and Doses Within Limits

Administrative controls in the form of operating procedures will be developed prior to fuel load to maintain the activity within the Radwaste Building, and systems and components, within applicable A_2 quantity limits. These administrative controls will employ various methods to monitor and inventory the amount of radioactive materials transferred to and from the Radwaste Building, and between systems and components.

In addition to maintaining activity within limits, the administrative controls will require monitoring of the source term from all unpackaged wastes, including liquid waste, wet waste, solid waste, gaseous waste, activated or contaminated metals and components, and contaminated waste, and from the mobile radwaste processing systems. Limiting the total cumulative source term of the Radwaste Building meets the guidance in Regulatory Guide 1.143, Revision 2, for unmitigated radiological release criteria and 10 CFR Part 20.1301 dose limit.

Evaluation of Potential for Radiolytic Hydrogen Gas Generation in the Bunkers

Because moderate and high activity waste may be stored in the new bunkers, there is the potential for radiolytic hydrogen gas generation if moderate to high activity ion exchange resins are stored in the bunkers for an extended period of time. As discussed in: 1) NRC Policy Issue SECY 94-198, Review of Existing Guidance Concerning the Extended Storage of Low-level Radioactive Waste; 2) NRC Generic Letter 81-38, Storage of Low-level Radioactive Wastes at Power Reactor Sites; and 3) NUREG-0800, Standard Review Plant, Section 11.4, Solid Waste Management System, the potential for radiolytic gas generation should be evaluated with respect to creating flammable/explosive conditions.

To address the potential for creation of a hazard from radiolytic hydrogen gas generation in the bunkers, an evaluation of the temporary storage of resin in the bunkers was performed. The evaluation considered storage of the two highest activity resins anticipated to be stored in the bunkers, including the following:

- Condensate polishing system (CPS) resin, which is used to remove corrosion products and ionic impurities from the condensate system during plant startup, hot standby, power operation with abnormal secondary cycle chemistry, safe shutdown, and cold shutdown operations, as described in UFSAR Subsection 10.4.6; and
- Steam generator blowdown system (BDS) electrodeionization (EDI) module resin, which is used for steam generator blowdown filtration as described in UFSAR Subsection 10.4.8.2.1.

The CPS includes mixed bed ion exchanger vessels for purification of the condensate as described in subsection 10.4.6. Should the resins become radioactive, the resins are transferred from the CPS vessel directly to a temporary processing unit or to the temporary processing unit via the spent resin tank. The processing unit, located outside of the turbine building, dewateres and processes the resins as required for offsite disposal. Radioactive CPS resin typically has very low activity, and is packaged in containers for disposal as permitted by DOT regulations. After packaging, the resins may be stored in the radwaste building. Based on a typical CPS operation of 30 days per 18-month refueling cycle with design basis radioactive leakage from the primary (reactor coolant system) to secondary (main steam system) side of the steam generators, the volume of radioactively contaminated resin is estimated to be 206 ft³ per year (one 309 ft³ bed per 18-month refueling cycle).

The BDS includes two EDI units, with each containing six parallel EDI modules as described in UFSAR Subsection 10.4.8. Each EDI module consists of alternating pairs of cation and anion membranes, ion-exchange resins, polymeric flow channel spacers, and electrodes. After prolonged use, the EDI module membranes and resin become ineffective in removal of impurities. If an EDI module is not radioactively contaminated, no special packaging is required and the module may be disposed of as clean solid waste in accordance with Department of Transportation (DOT) regulations. Contaminated EDI modules are dewatered, the nozzles blocked, and transported from the turbine building to the radwaste building for further decontamination, packaging, storage, and eventual transport to an offsite disposal facility as permitted by DOT regulations. A conservative estimate of contaminated solid wet waste includes material within the contaminated EDI modules, based on continuous operation with design basis radioactive leakage from the primary to secondary side of the steam generators. The volume of radioactively contaminated material from this source is estimated to be 540 ft³ per year.

The radiolytic hydrogen gas generation evaluation assumes plant operation with the design basis reactor coolant source term corresponding to 0.25% fuel defects, and with coincident design basis radioactive leakage from the primary to secondary side of the steam generators of 300 gallons/day, for one 18-month refueling cycle. The calculation accounts for the bunker volume occupied by the packaged CPS resin and EDI resins and membranes, and remaining available free space in the bunker without ventilation or other operator action. Each bunker has a total volume of approximately 1000 ft³. The acceptance criteria for the evaluation is a calculated hydrogen concentration in the radwaste building bunker air space less than 5 volume percent hydrogen in air provided in NUREG/CR-6673, "Hydrogen Generation in TRU [Transuranic] Waste Transportation Packages."

This evaluation included the following cases:

- Case 1: Resins from two CPS demineralizers (496 ft³), and resins and membranes from two BDS electrodeionization modules (11 ft³), are stored in a bunker for 12 months. This results in a maximum hydrogen concentration of approximately 3.8 volume percent hydrogen in air.
- Case 2: One year of CPS resins (206 ft³), and one year of EDI resins and membranes (540 ft³), are stored in a bunker for six months. This results in a maximum hydrogen concentration of approximately 4.7 volume percent hydrogen in air.
- Case 3: One year of EDI resins and membranes (540 ft³), are stored in a bunker for 12 months. This results in a maximum hydrogen concentration of approximately 3.8 volume percent hydrogen in air.

Based on the limiting Case 2, it is concluded that CPS resins and EDI resins and membranes can safely be stored for up to six months in a bunker without any risk of radiolytic hydrogen gas generation that could result in the creation of a flammable/explosive hazard.

An additional Case 4 was evaluated to identify the minimum volume of free air space in a bunker required to store CPS resins and EDI resins and membranes from an 18-month refueling cycle for 12 months without exceeding 5 volume percent hydrogen in air. Case 4 determined that a minimum volume of free air space of 335 ft³ (of the total 1000 ft³ volume of a bunker) is required.

Controls to Prevent Excess Radiolytic Hydrogen Gas Generation in the Bunkers

To address the results of this evaluation, changes are proposed to UFSAR Subsection 11.4.2.5.2 to describe the controls established in order to prevent the potential for creation of a hazard from radiolytic hydrogen gas generation. These controls are based on the conservative limiting Case 2 that assumes storage of the maximum amount of CPS and EDI resins that could be generated over one year of operation consistent with UFSAR Table 11.4-1 and then stored in a single unventilated bunker for six months. In addition, changes are proposed to UFSAR Subsection 11.4.2.5.2 to refer to the administrative controls described in UFSAR Subsections 11.2.1.2.5.2 and 13.5.2.2.5 that limit the total cumulative radioactive inventory of unpackaged wastes located in the radwaste building to prevent exceeding the Regulatory Guide 1.143, Revision 2, unmitigated radiological release criteria, and 10 CFR Part 20.1301 dose limit. These other administrative controls effectively prevent storage of the maximum amount of CPS and EDI resins assumed in the conservative limiting Case 2. Should there be a need to store resins with total volume or activity higher than that of the evaluated resins, or for a longer storage period, a new evaluation would be needed to confirm the risk associated with potential hydrogen gas generation by

demonstrating that the hydrogen concentration in the bunker air space will not exceed 5 volume percent hydrogen in air per NUREG/CR-6673.

Additional Supporting Technical Evaluation

This proposed activity does not involve a change to procedures or a method of control and does not change any method of evaluation or use an alternate method of evaluation from those described in the UFSAR that is used in establishing design bases or in the safety analysis. The activity does not involve a test or experiment which exceeds the reference bounds of the design basis. The proposed activity does not adversely impact any design feature credited in the severe accident analysis. There is no impact on the aircraft impact assessment, because the number of barriers and the thickness of those barriers, as prescribed by NEI 07-13, Revision 7 are unchanged by this activity. The activity does not increase the probability or consequences of an accident previously evaluated, because it does not affect the operation of any systems or equipment that could initiate or mitigate an analyzed accident. No accident source term parameter or fission product barrier is impacted by this activity. The activity does not create the possibility of a new or different kind of accident from any accident previously evaluated, because it does not change the design function of the radwaste building or of any of the systems or equipment contained therein or in any other Nuclear Island structures. The activity does not involve a significant reduction in a margin of safety, because there is no change to the codes and standards and analysis methods applied to the radwaste building design. The activity has no effect on off-site dose analysis for analyzed accidents.

The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation.

The fire protection analysis is performed for each fire area using the methodology described in UFSAR Tier 2 Section 9A.2. This methodology follows the guidance of Branch Technical Position (BTP) CMEB 9.5-1. The results of the analysis for the radwaste building are provided in UFSAR Tier 2 Subsection 9A.3.5. This activity does not change the fire protection analysis conclusions provided in that subsection of the UFSAR. None of the combustible material loading listed in UFSAR Table 9A-3, nor any fire detection and suppression features described in UFSAR Subsection 9A.3.5 is affected by these changes. Because the radwaste building, itself, is one Fire Area (5031 AF 01) and the overall radwaste building envelope is not changing, this activity does not change any fire area boundary. The radwaste building fire area is separated from the safety related areas of the nuclear island by a 3-hour fire barrier wall, which is unchanged by this activity.

10 CFR 20.1101 (b) states that “the licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is **reasonable achievable (ALARA)**.” The radwaste building configuration changes to add shielded bunkers for storage of moderate and high activity waste **reduces** the exposure of workers in the Waste Accumulation Room when they are working with lower activity waste. **In addition, the cumulative configuration and shielding design changes maintain radiation levels for worker occupied areas in the radwaste building as Zone I to Zone IV, and for the adjacent plant yard areas that have unrestricted access as Zone I, as defined in the**

proposed revision to UFSAR Figure 12.3-1 (Sheet 14), and at radiation levels in compliance with the ALARA requirement in 10 CFR 20, including on the normally unoccupied and access-controlled radwaste building roof. The proposed administrative controls to maintain the activity within the Radwaste Building, and systems and components, within applicable A_2 quantity limits, and to require monitoring of the source term from all unpackaged wastes, including liquid waste, wet waste, solid waste, gaseous waste, activated or contaminated metals and components, and contaminated waste, and from the mobile radwaste processing systems, prevents the exposures for any unmitigated radiological release in the Radwaste Building, occurring over a two hour exposure period, from exceeding the Regulatory Guide 1.143, Revision 2, unmitigated radiological release criteria and 10 CFR Part 20.1301 dose limit.

Subsection 3.7.2.8.2 of NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," provides the results of the NRC evaluation of the interaction of the radwaste building with Nuclear Island (NI) structures following a seismic event. Based on the clearance between the radwaste building and NI structures, the seismic design criteria for the radwaste building, and the methods used to demonstrate that a potential radwaste building impact on NI structures during a seismic event would not impair the NI structural integrity, it was concluded that the collapse of the radwaste building would not damage NI structures. The changes identified for this activity do not change any of these clearances, design criteria, or methods and consequently, the NRC conclusions identified in Subsection 3.7.2.8.2 are still valid.

Combining the Packaged Waste Storage Room and Waste Accumulation Room does not affect compliance with GDC 3, because it does not change the fire protection analysis conclusions provided in UFSAR Tier 2 Section 9A.2. None of the combustible material loading listed in UFSAR Table 9A-3, nor any fire detection and suppression features described in UFSAR Subsection 9A.3.5 is affected by these changes. Because the radwaste building, itself, is one Fire Area (5031 AF 01) and the overall radwaste building envelope is not changing, this activity does not change any fire area boundary. The radwaste building fire area is separated from the safety related areas of the nuclear island by a 3-hour fire barrier wall, which is unchanged by this activity.

The changes to add three bunkers for storage of moderate and high activity waste, incorporate the Packaged Waste Storage and Waste Accumulation Rooms in the radwaste building, revise shield wall thickness, and eliminate an area radiation monitor that is no longer needed have no effect on environmental releases. The quantities of solid and liquid radioactive material being processed in the radwaste building and the method of control for processes used to treat that material are unchanged by this activity. The potential for creation of a hazard from radiolytic hydrogen gas generation during storage of the two highest activity ion exchange resins anticipated to be stored in the bunkers has been evaluated, and controls are defined for the maximum volume or activity of resins that may be stored for a given period of time in a single unventilated bunker to prevent the potential for creation of a hazard from radiolytic hydrogen gas generation. Therefore, it is concluded that there is no risk involved for the potential of an accidental release of radioactive materials from the radwaste building. No potential release paths for radioactive material or holdup capacity are affected by this activity. Consequently, these changes do not affect compliance with GDC 60.

These changes as described above have no adverse impact on radiation monitoring capability. One area radiation monitor is being eliminated following incorporation of the Packaged Waste Storage Room into the Waste Accumulation Room. The eliminated

monitor is therefore no longer needed to provide detection in this area. The remaining monitor is being relocated to a central location in the room to provide the necessary detection to the newly combined room. Consequently, all areas within the radwaste building previously monitored are continuing to be monitored with this activity. Safety actions to be performed in response to excessive radiation levels are not affected by this activity. Consequently, these changes do not affect compliance with GDC 63.

The radwaste building changes do not affect any effluent release path or radiation monitoring capability for effluent releases to the environment. Consequently, these changes do not affect compliance with GDC 64.

Physical Security Evaluation (Annex and Radwaste Building Changes)

A review of the Physical Security Plan and the Physical Security ITAAC was completed regarding the changes identified in this amendment request. (Note that the Physical Security Plan is classified as Safeguards Information (SGI) and is not available to the public.) The review confirmed that the proposed changes do not adversely affect the Physical Security Plan, because:

- The proposed changes have no effect on any pathways or barriers credited by the Physical Security Plan.
- No addition, change or deletion of a security position is requested.
- No lighting change is requested.
- The proposed changes do not involve the responses to the external fighting positions.
- The column line changes have no effect on either response or adversary timelines.

Furthermore, the review confirmed that the proposed changes do not affect any of the existing ITAAC related to physical security.

Summary

The proposed changes would revise the COL in regard to the AP1000 annex building and radwaste building configurations by:

1. Updating the Annex Building column line designations on affected Tier 1 Figures and Tier 2 Figure 3.7.2-19.
2. Revising the radwaste building configuration including the shielding design and radiation area monitoring.

These proposed changes do not adversely affect any design function. The changes do not involve an adverse change to any method of evaluation for establishing design bases or safety analyses. They do not represent a change to a design feature credited in the ex-vessel severe accident assessment. Tests, experiments, and procedures described in the licensing basis are unchanged by this activity.

4. REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

10 CFR 52, Appendix D, Section VIII.B.5.a requires that an applicant or licensee who references this appendix may depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the TS, or requires a license amendment under paragraphs B.5.b or B.5.c of this section. When evaluating the proposed departure, an applicant or licensee shall consider all matters described in the plant-specific DCD Tier 1. This license amendment requests to depart from UFSAR Tier 2 Sections 9.4.8, 9A.3.5, 11.4.2, and 12.3.2, Tables 9A-3 and 11.5-2, and Figures 1.2-22 (SUNSI), 3.7.2-19 (Sheets 2, 3, 5, 6, 7, and 8) (SUNSI), 9.4.8-1, 9A-4 (SUNSI), 12.3-1 (Sheet 14) (SUNSI), 12.3-2 (Sheet 14) (SUNSI), and 12.3-3 (Sheet 14) (SUNSI). These UFSAR Tier 2 changes involve changes to Tier 1 Section 3.3(4c) and 3.3(6b), Tables 3.3-6 and 3.5-5, and Figures 3.3-11A (SUNSI), 3.3-12 (SUNSI), and 3.3-13 (SUNSI) and thus, require NRC approval. Compliance for each of the building changes with applicable regulatory requirements is provided below.

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves departure from plant-specific DCD Tier 1 information, and corresponding changes to COL Appendix C, Inspections, Tests, Analyses and Acceptance Criteria information; therefore, this activity requires a proposed amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this license amendment request.

4.1.1 Annex Building Column Line Changes

Because the changes to the annex building column lines are made for consistency with the auxiliary building figures and to remove column line designations considered to be background information and therefore not considered pertinent to the scope of Tier 1 information, there are no impacts to any regulatory requirements or criteria.

4.1.2 Radwaste Building Configuration Changes

10 CFR 50, Appendix A, General Design Criterion (GDC) 3, *Fire protection*, requires structures, systems, and components important to safety to be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Combining the Packaged Waste Storage Room and Waste Accumulation Room does not affect compliance with GDC 3, because it does not change the fire protection analysis conclusions provided in UFSAR Tier 2 Section 9A.2. None of the combustible material loading listed in UFSAR Table 9A-3, nor any fire detection and suppression features described in UFSAR Subsection 9A.3.5 are affected by these changes. Because the radwaste building, itself, is one Fire Area (5031 AF 01) and the overall radwaste building envelope is not changing, this activity does not change any fire area boundary. The radwaste building fire area is separated from the safety related areas of the nuclear island by a 3-hour fire barrier wall, which is unchanged by this activity.

10 CFR 50, Appendix A, General Design Criterion (GDC) 60, *Control of releases of radioactive materials to the environment*, requires the nuclear power unit design shall include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal

reactor operation, including anticipated operational occurrences. Sufficient holdup capacity shall be provided for retention of gaseous and liquid effluents containing radioactive materials. The changes to add three bunkers for storage of moderate and high activity waste, incorporate the Packaged Waste Storage and Waste Accumulation rooms in the radwaste building, revise shield wall thicknesses, and eliminate an area radiation monitor that is no longer needed have no effect on environmental releases. The quantities of solid and liquid radioactive material being processed in the radwaste building and the method of control for processes for treating that material are unchanged by this activity. No potential release paths for radioactive material or holdup capacity are affected by this activity. Consequently, these changes do not affect compliance with GDC 60.

10 CFR 50, Appendix A, General Design Criterion (GDC) 63, *Monitoring fuel and waste storage*, requires that appropriate systems shall be provided in fuel storage and radioactive waste systems and associated handling areas (1) to detect conditions that may result in loss of residual heat removal capability and excessive radiation levels and (2) to initiate appropriate safety actions. The changes to add three bunkers, incorporate the Packaged Waste Storage and Waste Accumulation Rooms in the radwaste building, revise shield wall thicknesses, and eliminate an area radiation monitor that is no longer needed have no adverse effect on radiation monitoring capability. One area radiation monitor is being eliminated, because there is now only one room instead of two for processing of waste before and after packaging. The eliminated monitor is therefore no longer needed. The remaining monitor is being relocated to a central location to support the new combined room. Consequently, all areas within the radwaste building previously monitored continue to be monitored with this activity. Safety actions to be performed in response to excessive radiation levels are not affected by this activity. Consequently, these changes do not affect compliance with GDC 63.

10 CFR 50, Appendix A, General Design Criterion (GDC) 64, *Monitoring radioactivity releases*, requires that means shall be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents. The radwaste building changes do not affect any effluent release path or radiation monitoring capability for effluent releases to the environment. Consequently, these changes do not affect compliance with GDC 64.

4.2 PRECEDENT

No precedent is identified.

4.3 SIGNIFICANT HAZARDS CONSIDERATION

The proposed changes would revise the Combined Licenses (COLs) with regard to Tier 1 information and associated COL Appendix C information by revising the annex and radwaste buildings by:

1. Updating the Annex Building column line designations on affected Tier 1 Figures and Tier 2 Figure 3.7.2-19.
2. Revising the Radwaste Building configuration including the shielding design and radiation area monitoring.

This activity involves changes to UFSAR Tier 2 text, tables, and figures and a change from plant-specific DCD Tier 1 information. The Tier 1 change also involves a proposed amendment to corresponding information in Appendix C of the COLs.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed annex building changes updating column line designations and the radwaste building change to add three bunkers for storage of moderate and high activity waste, incorporate the Waste Accumulation Room and the Packaged Waste Storage Room, revise shield wall thicknesses, and eliminate a radiation monitor no longer needed do not alter the assumed initiators to any analyzed event. These proposed changes do not affect the operation of any systems or equipment that could initiate an analyzed accident. The proposed changes to the annex building column line designations update the annex building column line designations in the UFSAR figures to make them consistent with the UFSAR figure for the auxiliary building. The radwaste building proposed changes do not affect any accident initiators, because there is no accident initiator located within that building. Based on the above, the probability of an accident previously evaluated will not be increased by these proposed changes.

The proposed annex and radwaste building configuration changes do not affect any radiological dose consequence analysis for UFSAR Chapter 15. No accident source term parameter or fission product barrier is impacted by these changes. Structures, systems, and components (SSCs) required for mitigation of analyzed accidents are not affected by these changes, and the functions of these buildings are not adversely affected by these changes. Consequently, this activity will not increase the consequences of any analyzed accident, including the main steam line limiting break.

Therefore, the proposed activity does not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed annex building changes updating column line designations and the radwaste building change to add three bunkers for storage of moderate and high activity waste, incorporate the Waste Accumulation Room and the Packaged Waste Storage Room, revise shield wall thicknesses, and eliminate a radiation monitor no longer needed do not change the design function of the either of these buildings or any of the systems or equipment contained therein or in any other Nuclear Island structures. These proposed changes do not adversely affect any system design functions or methods of operation. These changes do not introduce any new equipment or components or change the operation of any existing systems or equipment in a manner that would result in a new failure mode, malfunction, or sequence of events that could affect safety-related or nonsafety-related equipment or result in a radioactive material release. This activity does not allow for a new radioactive material release path or result in a new radioactive material barrier failure mode.

Therefore, this activity does not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The proposed changes do not affect any safety-related equipment, design code compliance, design function, design analysis, safety analysis input or result, or design/safety margin. The margin in the design of the annex and radwaste buildings is determined by the use of the current codes and standards and adherence to the assumptions used in the analyses of this structure and the events associated with this structure. The column line designations for the annex building in UFSAR Tier 2 figures are updated to make them consistent with the UFSAR figures for the auxiliary building. This change has no adverse impact on plant construction or operation. The design of the radwaste building, including the newly added bunkers for moderate and high activity waste, merging of the Waste Accumulation Room and the Packaged Waste Storage Room, will continue to be in accordance with the same codes and standards as stated in the UFSAR. The activity has no effect on off-site dose analysis for analyzed accidents.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

4.4 CONCLUSIONS

Based on the considerations discussed above,

- (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner,
- (2) such activities will be conducted in compliance with the Commission's regulations, and
- (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

The above evaluations demonstrate that the proposed changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the proposed change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATION

The details of the proposed changes are provided in Sections 2 and 3 of this licensing amendment request.

This review supports a request to amend the Combined Licenses (COLs) to allow departure from various elements of the certification information in Tier 1 of the generic AP1000 DCD and the corresponding elements in Appendix C of the COL. The plant-specific DCD Tier 1 elements for which a departure is requested include the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) and/or ITAAC supporting information referenced in individual ITAAC. The plant-specific DCD Tier 1 changes revise information regarding the annex and radwaste buildings configuration by:

1. Updating the Annex Building column line designations on affected Tier 1 Figures and Tier 2 Figure 3.7.2-19.
2. Revising the Radwaste Building configuration including the shielding design and radiation area monitoring.

The proposed changes from plant-specific DCD Tier 1 material reflect corresponding changes to UFSAR Tier 2 material.

This review has determined that the proposed change would require an amendment to the COL; however, a review of the anticipated construction and operational effects of the proposed amendment has determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

- (i) *There is no significant hazards consideration.*

As documented in Section 4.3, Significant Hazards Consideration, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration determined that (1) the proposed amendment does not involve a

significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the proposed amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

- (ii) *There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.*

The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the proposed amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

- (iii) *There is no significant increase in individual or cumulative occupational radiation exposure.*

The proposed changes to the annex and radwaste buildings do not adversely affect any plant radiation zones, and controls under 10 CFR PART 20 preclude a significant increase in occupational radiation exposure. Therefore, the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, it has been determined that anticipated construction and operational impacts of the proposed amendment do not involve:

- (i) a significant hazards consideration,
- (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or
- (iii) a significant increase in the individual or cumulative occupational radiation exposure.

Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption is not required.

6.0 REFERENCES

- 1.) Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 Updated Final Safety Analysis Report (UFSAR), Revision 3, July 2015.

**South Carolina Electric and Gas Company
Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3**

NND-16-0129

Enclosure 18

**Supplemental Exemption Request:
Annex and Radwaste Building Changes**

(LAR 13-09 R1 S1)

(This Enclosure consists of 10 pages, including this cover page. All updates are depicted with a change bar)

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- 8.0 Conclusion
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South Carolina Electric and Gas Company (SCE&G) requests an exemption from elements of the AP1000 certified (Tier 1) design information to allow changes to the annex and radwaste building structures and layout, as supported by corresponding changes to the following non-system based design descriptions and Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) figures and tables:

- Section 3.3, Buildings
 - Paragraph 4c
 - Paragraph 6b
- Table 3.3-6, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)
 - Item 4b
 - Item 4c
 - Item 6b
- Table 3.5-5, Area Radiation Monitors
- Figure 3.3-11A, Annex Building Plan View at Elevation 100'-0" (SUNSI)
- Figure 3.3-12, Annex Building Plan View at Elevation 117'-6" (SUNSI)
- Figure 3.3-13, Annex Building Plan View at Elevation 135'-3" (SUNSI)

This request for exemption provides the technical and regulatory basis to demonstrate that 10 CFR 52.63, §52.7, and §50.12 requirements are met.

SCE&G requests staff approval of the exemption by the date specified on the LAR and Exemption cover letter to support affected construction activities. Delayed approval of this exemption could result in a delay of these construction activities and subsequent dependent construction activities.

1.0 PURPOSE

SCE&G requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, "Design Certification Rule for the AP1000 Design, Scope and Contents," to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. Tier 1 includes ITAAC that must be satisfactorily performed prior to fuel load. The design details to be verified by these ITAAC are specified in the text, tables, and figures that are referenced in each individual ITAAC. The Tier 1 information for which a plant-specific departure and exemption is being requested includes non-system based design descriptions and other detailed information related to these design descriptions and the associated ITAAC, such as changes to concrete wall thicknesses, column line designations in the annex building, and interior configuration of the radwaste building.

This request for exemption will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow changes to Tier 1 information due to the following proposed changes to the non-system based design descriptions and ITAAC figures and tables:

- Section 3.3, Buildings

- Paragraph 4c – delete discussion of the packaged waste storage room, which is incorporated into the waste accumulation room
- Paragraph 6b – update the description and volume of the waste accumulation room per combination with the packaged waste storage room
- Table 3.3-6, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)
 - Item 4b – update acceptance criteria for concrete thickness in the walls of the waste accumulation room to specify minimum required thickness near the radwaste bunkers
 - Item 4c – delete ITAAC related to the packaged waste storage room, which is incorporated into the waste accumulation room
 - Item 6b - update the design commitment and acceptance criteria of the waste accumulation room following incorporation of the packaged waste storage room
- Table 3.5-5, Area Radiation Monitors – update table notes following merging of the rooms such that one monitor will serve the new combined space
- Figure 3.3-11A, Annex Building Plan View at Elevation 100'-0" (SUNSI) – remove column line designations for columns 6, 8, 10, 11.15, 13.2, 13.3, 14.1, 15.1, 15.2, A, B, C and D
- Figure 3.3-12, Annex Building Plan View at Elevation 117'-6" (SUNSI) – remove column line designations for columns 6, 8, 10, 11.15, 13.2, 13.3, 14.1, 15.1, 15.2, A, B, C and D
- Figure 3.3-13, Annex Building Plan View at Elevation 135'-3" (SUNSI) – remove column line designations for columns 6, 8, 10, 11.15, 13.2, 13.3, 14.1, 15.1, 15.2, A, B, C and D

This request will apply the requirements for granting exemptions from design certification information, as specified in 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR 52.63, §52.7, and §50.12.

2.0 BACKGROUND

South Carolina Electric and Gas Company (SCE&G) is the holder of Combined License Nos. NPF-93 and NPF-94, which authorize construction and operation of two Westinghouse Electric Company AP1000 nuclear plants, named Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, respectively. During the detailed design finalization of the annex and radwaste buildings, departures from plant-specific DCD Tier 2 information were determined necessary to finalize the layout of space envelopes, orientations, and/or piping runs that comprise the structure or the systems within this structure. This activity requests exemption from the generic DCD Tier 1 descriptions, tables and figures that are involved with the plant-specific DCD Tier 2 departures, and which support the associated COL Appendix C ITAAC.

This activity requests exemption from elements of the AP1000 (Tier 1) design information to allow a departure from annex building Layout Figures to remove column line details that are not discussed in the design descriptions or associated ITAAC. In addition, this activity requests exemption from elements of the AP1000 (Tier 1) design information to allow a departure from design descriptions, figures and associated ITAAC for the radwaste building. The proposed departure would incorporate the Waste Accumulation Room and the Packaged Waste Storage Room of the radwaste building into one room, change the shield wall thicknesses in the radwaste building, add three bunkers to the radwaste building for storage of moderate and high

activity waste and eliminate one radiation monitor due to the combination of the Waste Accumulation Room and the Packaged Waste Storage Room.

As discussed above, an exemption from elements of the AP1000 certified (Tier 1) design information is requested to allow plant-specific departures to be taken from non-system based design description and ITAAC Figures and Tables.

3.0 TECHNICAL JUSTIFICATION OF ACCEPTABILITY

An exemption is requested to depart from AP1000 generic Design Control Document (DCD) Tier 1 material by removing column line detail that is not discussed in the design descriptions or associated ITAAC from annex building Layout Figures. As discussed in Tier 1, Section 1.1, the design function of a column line is to provide a designation on the plant reference grid which is used to define the location of building walls and columns. The Tier 1 text, tables, and figures continue to communicate the structural design of the annex building. The proposed changes neither adversely impacts the ability to meet the design functions of the structures nor involve a significant decrease in the level of safety provided by the structure. Because the proposed changes are consistent with plant-specific DCD Tier 2 information and the design, the changes do not affect a structure, system or component. The proposed changes to the column line detail continue to provide the detail necessary to implement the corresponding ITAAC.

Additionally, the requested exemption would depart from the description of the radwaste building layout by merging the Packaged Waste Storage Room into the Waste Accumulation Room. The radwaste building is a non-seismic structure that has the non-safety-related design function of handling and storage of low and moderate or high activity wastes. The proposed modification of the radwaste building will continue to support that design function, while providing for greater flexibility in handling these wastes and maintaining dose rates as low as reasonably achievable (ALARA). The proposed layout changes and associated changes to add shielded bunkers and reconfigure radiation monitors will not adversely impact the design functions or significantly reduce the level of safety. The proposed changes to the radwaste building Structure and contained equipment continue to meet their required functionality.

Detailed technical justification supporting this request for exemption is provided in Section 3 of the associated License Amendment Request in Enclosure 17 of this letter.

4.0 JUSTIFICATION OF EXEMPTION

10 CFR 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Since SCE&G has identified changes to the Tier 1 information related to the annex and radwaste buildings' layout and structures as a result of design finalization activities, an exemption to the certified design information in Tier 1 is needed.

10 CFR 52, Appendix D, and 10 CFR 50.12, §52.7, and §52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)(ii)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.1].

The requested exemption to change the configuration and layout of the annex and radwaste buildings satisfies the criteria for granting specific exemptions, as described below.

1. This exemption is authorized by law

The NRC has authority under 10 CFR 52.63, §52.7, and §50.12 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR 50.12 and §52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific DCD Tier 1, to depart from the AP1000 certified (Tier 1) design information. The plant-specific DCD Tier 1 will continue to reflect the approved licensing basis for VCSNS Units 2 and 3, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected plant-specific DCD Tier 1 ITAAC will continue to serve its required purpose.

The changes to annex and radwaste buildings do not represent any adverse impact to their design functions or the systems, structures and components therein and will continue to protect the health and safety of the public in the same manner. The annex and radwaste building changes do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed changes would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in significant fuel cladding failures. Accordingly, these changes do not present an undue risk from any existing or proposed equipment or systems.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the annex and radwaste building layout and structures as presented in the non-system based design descriptions and ITAAC figures and tables in the plant-specific DCD Tier 1, thereby departing from the AP1000 certified (Tier 1) design information. The proposed exemption will enable performance of the ITAAC associated with these changed elements, by reflecting the current design information in the text, tables, and figures that are referenced in these ITAAC. The exemption does not alter or impede the design, function, or operation of any plant SSCs associated with the facility's physical or cyber security, and therefore does not adversely affect any plant equipment

that is necessary to maintain a safe and secure plant status. The proposed exemption has no adverse impact on plant security or safeguards.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR 50.12(a)(2) lists six “special circumstances” for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when “[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.”

The rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The VCSNS Units 2 and 3 COLs reference the AP1000 Design Certification Rule and incorporate by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D.

Changes are being made to resolve inconsistencies in the column line designation between the annex building and the auxiliary building figures in the UFSAR. The proposed changes to the annex building column line designations will facilitate plant layout and construction by improving the accuracy of the plant layout figures, with no impact on the ability of these structures to perform as designed.

Additional changes are being made because the analysis of the radwaste building identified that a small amount of moderate activity waste would require a concrete slab too thick for the current structural design of the building to maintain adjacent areas at Zone 1 radiation levels. The proposed changes to the radwaste building are made to provide for greater operator flexibility in handling of waste before and after packaging, to minimize the quantity of shielded bunkers required for storage of moderate and high activity waste to keep radiation doses to As Low As is Reasonably Achievable (ALARA) values, to allow temporary shielding to maintain acceptable radiation levels on the radwaste building roof, and to maintain portions of the radwaste building at radiation Zone I levels.

Based on the above, each of the requested changes will facilitate plant construction and maintain or enhance future safe plant operation and maintenance, while providing greater operator flexibility and maintaining radiation doses as low as reasonably achievable. Accordingly, this change to the certified information will enable the licensee to safely construct, maintain, and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request would not serve

the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific DCD Tier 1 by departing from standard AP1000 certified (Tier 1) design information. This exemption would allow a change to a non-system based design description and ITAAC figures and tables. Based on the nature of the proposed changes to the generic Tier 1 information and the understanding that these changes were identified during the design finalization process for the AP1000, it is expected that this exemption will be requested by other AP1000 licensees and applicants. However, a review of the reduction in standardization resulting from the departure from the standard DCD determined that even if other AP1000 licensees and applicants do not request this same departure, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the annex and radwaste building structures associated with this request will continue to be maintained. Furthermore, the justification provided in the license amendment request and this exemption request and the associated mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

6. The design change will not result in a significant decrease in the level of safety.

The proposed exemption would allow changes to the annex and radwaste building structure and layouts as presented in non-system based design description and ITAAC figures and tables. The level of safety presented by plant structures is defined by the ability of the structures to protect the SSCs contained within these structures from hazards and to minimize the propagation of damage resulting from postulated events to the degree practical.

As a result of the limited-scope and nature of the proposed changes associated with this exemption request, no systems or equipment will be adversely impacted such that there are new failure modes introduced by these changes and the level of safety provided by the current annex and radwaste buildings and the systems and equipment contained therein will be maintained.

Because the proposed changes to the annex and radwaste building structure and layout will not adversely affect the ability of the buildings to perform their design functions and the level of safety provided by the annex and radwaste buildings and the systems and equipment contained therein is unchanged, it is concluded that the design change associated with proposed exemption will not result in a significant decrease in the level of safety.

5.0 RISK ASSESSMENT

A risk assessment was not determined to be applicable to address the acceptability of this proposal.

6.0 PRECEDENT EXEMPTIONS

None identified.

7.0 ENVIRONMENTAL CONSIDERATION

SCE&G requests a departure from elements of the certified information in Tier 1 of the generic AP1000 DCD. SCE&G has determined that the proposed departure would require a permanent exemption from the requirements of 10 CFR 52, Appendix D, Section III.B, “Design Certification Rule for the AP1000 Design, Scope and Contents” with respect to installation or use of facility components located within the restricted area, as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement; however, SCE&G evaluation of the proposed exemption has determined that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.25(c)(9).

Based on the above review of the proposed exemption, SCE&G has determined that the proposed activity does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption is not required.

Specific details of the environmental considerations supporting this request for exemption are provided in Section 5 of the associated License Amendment Request provided in Enclosure 17 of this letter.

8.0 CONCLUSION

SCE&G requests a permanent exemption for elements of AP1000 design certification information reflected in Tier 1. The proposed changes to Tier 1 are necessary to revise a non-system based design description and ITAAC figure and table in the plant-specific DCD Tier 1 to reflect proposed plant-specific design. The proposed exemption would allow departure from AP1000 generic Tier 1 DCD information by removing column line designations from Tier 1 figures to allow updated column line designations in the corresponding more-detailed Tier 2 figures of the annex building, revise the radwaste building layout to increase operator flexibility in handling waste before and after packaging, and modify the building structures and area radiation monitors of the affected area per the new layout. The exemption request meets the requirements of 10 CFR 52.63, “Finality of design certifications,” 10 CFR 52.7, “Specific exemptions,” 10 CFR 50.12, “Specific exemptions,” and 10 CFR 52 Appendix D, “Design Certification Rule for the AP1000.” Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security. Furthermore, approval of this request does not result in a significant decrease in the level of safety, satisfies the underlying purpose of the AP1000 Design Certification Rule, and does not present a significant decrease in safety as a result of a reduction in standardization.

9.0 REFERENCES

- 1.) Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 Updated Final Safety Analysis Report (UFSAR), Revision 3, July 2015.

**South Carolina Electric and Gas Company
Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3**

NND-16-0129

Enclosure 19

**Updated Proposed Changes
(Public Information)**

(LAR 13-09 R1 S1)

(This Enclosure consists of 14 pages, including this cover page. All updates are depicted with a change bar)

UFSAR changes are depicted via strikeout or underline (changes shown on latest UFSAR Rev. 3 text).

Tier 1, Section 3.3, *Buildings*

Paragraph (4c) is deleted.

~~c) —The walls on the outside of the packaged waste storage room in the radwaste building provide shielding from stored waste.~~

Paragraph (6b) is modified as shown below.

- b) The radwaste building ~~packaged~~ waste ~~storage~~ accumulation room has a volume greater than or equal to ~~1293~~ 1417 cubic feet.

Tier 1, Table 3.3-6, *Inspections, Tests, Analyses, and Acceptance Criteria*

(Excerpts from) Table 3.3-6 Inspections, Tests, Analyses, and Acceptance Criteria		
4.b) Walls of the waste accumulation room in the radwaste building except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built radwaste building wall thicknesses will be performed.	A report exists and concludes that the shield walls of the waste accumulation room in the radwaste building except for designed openings or penetrations are consistent with the minimum concrete wall thicknesses of 1'-4", <u>and a minimum concrete wall thickness of 1'-8" near the radwaste bunkers.</u>
4.c) Walls of the packaged waste storage room in the radwaste building except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built radwaste building wall thicknesses will be performed.	A report exists and concludes that the shield walls of the packaged waste storage room in the radwaste building except for the wall shared with the waste accumulation room and designed openings or penetrations are consistent with the minimum concrete wall thicknesses of 2'.
↕	↕	↕
6.b) The radwaste building package -waste storage <u>accumulation</u> room has a volume greater than or equal to 1293 <u>1417</u> cubic feet.	An inspection of the radwaste building packaged -waste storage <u>accumulation</u> room (50352 <u>50351</u>) is performed.	The volume of the radwaste building packaged -waste storage <u>accumulation</u> room (50352 <u>50351</u>) is greater than or equal to 1293 <u>1417</u> cubic feet.

Tier 1, Table 3.5-5, Area Radiation Monitors

Table 3.5-5 Area Radiation Monitors	
Primary Sampling Room	RMS-RE008
Containment Area – Personnel Hatch Operating Deck (135'-3" Elevation)	RMS-RE009
Main Control Room	RMS-RE010
Chemistry Laboratory	RMS-RE011
Fuel Handling Area 1	RMS-RE012
Rail Car Bay/Filter Storage Area (Auxiliary Building Loading Bay)	RMS-RE013
Liquid and Gaseous Radwaste Area ⁽¹⁾	RMS-RY014
Control Support Area	RMS-RE016
Radwaste Building Mobile Systems Facility	RMS-RE017
Hot Machine Shop	RMS-RE018
Annex Staging and Storage Area	RMS-RE019
Fuel Handling Area 2	RMS-RE020
Containment Area – Personnel Hatch Maintenance Level (100'-0" Elevation)	RMS-RE021

Note:

~~1. This monitor includes multiple detectors to monitor the areas of interest.~~

UFSAR, Subsection 9.4.8, *Radwaste Building HVAC System*

9.4.8 Radwaste Building HVAC System

The radwaste building HVAC system serves the radwaste building which includes the clean electrical/mechanical equipment room and the potentially contaminated HVAC equipment room, ~~the packaged waste storage room~~, the waste accumulation room, and the mobile systems facility.

UFSAR Figure 9.4.8-1, *Radwaste Building HVAC System* (Changes shown on latest Figure per UFSAR Rev. 3)

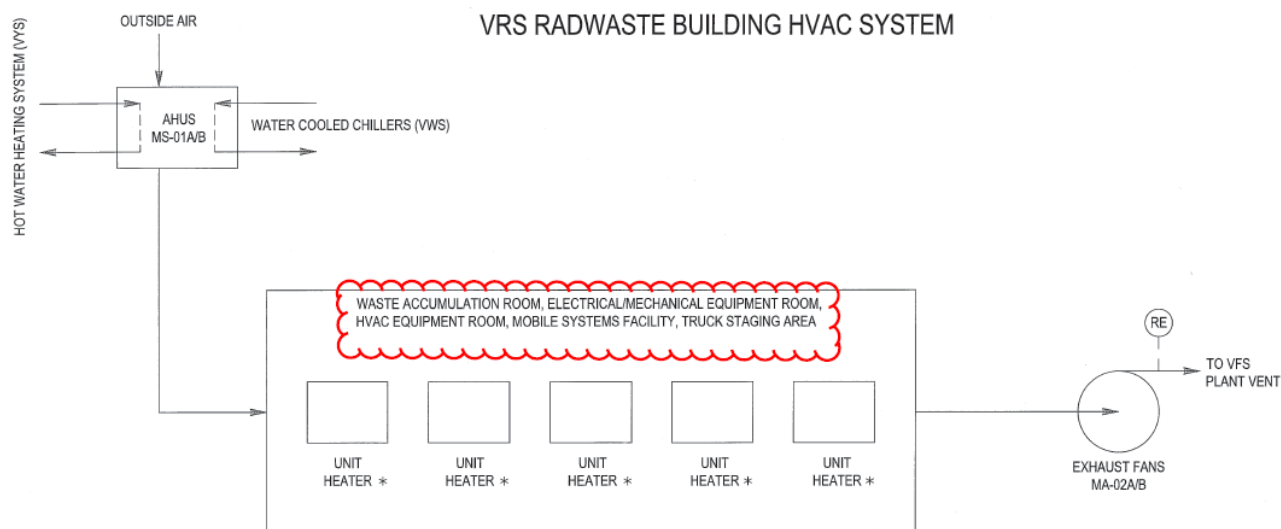


Figure 9.4.8-1

Radwaste Building HVAC System
(REF) VRS 001, 002, 003

UFSAR, Subsection 9A.3.5.1, Fire Area 5031 AF 01

9A.3.5.1 Fire Area 5031 AF 01

The fire area is subdivided into the following fire zones:

<u>Fire Zone</u>	<u>Room No.</u>	
• 5031 AF 50300	50300	Electrical/mechanical equipment room
• 5031 AF 50350	50350	Mobile systems facility
• 5031 AF 50351	50351	Waste accumulation room
• 5031 AF 50352	50352	Packaged waste storage room
<u>5031 AF 50353</u>	50353	HVAC equipment room
<u>5031 AF 50354</u>	50354	Truck staging area
<u>5031 AF 50355</u>	50355	Monitor tanks room

Various radwaste processing and packaging operations are performed utilizing the mobile system facilities. Moderate quantities of radioactive materials are present in the fire area during all modes of plant operation.

Fire Detection and Suppression Features

- Fire detectors
- Preaction sprinklers (fire zones 5031 AF 50350, and -50351, ~~and -50352~~)
- Hose station(s)
- Portable fire extinguishers

UFSAR, Table 9A-3, Fire Protection Summary

(Excerpt from)										
Table 9A-3										
FIRE PROTECTION SUMMARY										
Fire Area/ Zone ⁽¹⁾	Safety Area ? ⁽²⁾	Floor Area Sq Ft	Combust. Material ⁽³⁾	Fire Sev. Cat.	Amount	Heat Value (Btu)	Comb. Load, Btu/Sq Ft	Equiv. Boundary Dur. Fire Res ⁽⁴⁾ (Min) (Hours)	Detect. Cap.	Fixed Suppression Capability ⁽⁵⁾
5031 AF 50351 WASTE ACCUMULATION ROOM			LUBE OIL	E	300	4.5E+07			HEAT	PREACTION SPRINKLERS HOSE STATION
			CABLE INS	C	1500 <u>2000</u>	1.5E+07 <u>2.0E+07</u>				
			CLOTH	B	10000	8.0E+07				
			PAPER	C	2500	1.9E+07				
			TRASH	B	31000	2.4E+08				
			PLASTIC	D	500-550	6.6E+06 <u>7.3E+06</u>				
			WOOD	C	400-800	3.4E+06 <u>6.7E+06</u>				
			RUBBER	D	500	6.1E+06				
			VOLATILES	E	10	1.4E+06				
	1500 <u>2310</u>		NET CAT.	E	TOTAL:	4.2E+08 <u>4.3E+08</u>	277000 <u>184000</u>	208 <u>138</u>		
5031 AF 50352 PACKAGED WASTE STORAGE			CABLE INS	C	500	5.1E+06			HEAT	PREACTION
			PLASTIC	D	50	6.6E+05				SPRINKLERS
			WOOD	C	400	3.4E+06				HOSE STATION
	810		NET CAT.	D	TOTAL:	9.1E+06	11000	8		
5031 AF 50353 HVAC EQUIPMENT ROOM			CABLE INS	C	1100	1.1E+07			HEAT	HOSE STATION
			PLASTIC	D	20	2.6E+05				
			LUBE OIL	E	2	3.0E+05				
			VOLATILES	E	10	1.4E+06				
		840	NET CAT.	D	TOTAL:	1.3E+07	16000	11		
5031 AF 50354 TRUCK STAGING AREA			CABLE INS	C	400	4.1E+06			HEAT	PREACTION SPRINKLERS HOSE STATION
			PLASTIC	D	20	2.6E+05				
			LUBE OIL	E	2	3.0E+05				
			VOLATILES	E	10	1.4E+06				
			FUEL OIL	E	100	1.4E+07				
		792	NET CAT.	E	TOTAL:	2.0E+07	26000	19		
5031 AF 50355 MONITOR TANK ROOM			CABLE INS	C	1600	1.6E+07			NONE	HOSE STATION
			VOLATILES	E	40	5.4E+06				
			LUBE OIL	E	5	7.6E+05				
		1210	NET CAT.	E	TOTAL:	2.3E+07	18600	14		
FIRE AREA TOTAL:		12483	NET CAT.	E	TOTAL:	6.0E+08	47805 <u>48065</u>	36		

UFSAR, Subsection 11.4.2.1, *General Description*, seventh paragraph

The expected disposal volumes of wet and dry wastes are approximately 547 and 1417 cubic feet per year, respectively as shown in **Table 11.4-1**. The wet wastes shipping volumes include 510 cubic feet per year of spent ion exchange resins and deep bed filter activated carbon, 20 cubic feet of volume reduced liquid chemical wastes and 17 cubic feet of mixed liquid wastes. The spent resins and activated carbon are initially stored in the spent resin storage tanks located in the rail car bay of the auxiliary building. When a sufficient quantity has accumulated, the resin is sluiced into two 158 cubic feet high-integrity containers in anticipation of transport for offsite disposal. Liquid chemical wastes are reduced in volume and packaged into three 55-gallon drums per year (about 20 cubic feet) and are stored in the ~~packaged~~-waste ~~storage-accumulation~~ room of the radwaste building. The mixed liquid wastes fill less than three drums per year (about 17 cubic feet per year) and are stored on containment pallets in the waste accumulation room of the radwaste building until shipped offsite for processing.

UFSAR, Subsection 11.4.2.1, *General Description*, tenth and eleventh paragraphs

The dry solid radwaste includes 1383 cubic feet per year of compactible and non-compactible waste packed into about 14 boxes (90 cubic feet each) and ten drums per year. Drums are used for higher activity compactible and non-compactible wastes. Compactible waste includes HVAC exhaust filter, ground sheets, boot covers, hair nets, etc. Non-compactible waste includes about 60 cubic feet per year of dry activated carbon and other solids such as broken tools and wood. Solid mixed wastes will occupy 7.5 cubic feet per year (one drum). The low activity spent filter cartridges may be compacted to fill about 0.40 drums per year (3 ft³/year) and are stored in the ~~packaged~~-waste ~~storage~~ accumulation room. Compaction is performed by mobile equipment or is performed offsite. High activity filter cartridges fill three drums per year (22.5 cubic feet per year) and are stored in the filter storage area in the auxiliary building.

The total volume of packaged radwaste to be stored in the radwaste building ~~packaged~~ waste ~~storage~~-accumulation room is 1417 cubic feet per year at the expected rate and 2544 cubic feet per year at the maximum rate. The compactible and non-compactible dry wastes, packaged in drums or steel boxes, are stored with the mixed liquid and mixed solid, volume reduced liquid chemical wastes, and the lower activity filter cartridges. The quantities of packaged liquid radwaste stored in the ~~packaged~~-waste ~~storage~~-accumulation room of the radwaste building consist of 20 cubic feet of chemical waste and 17 cubic feet of mixed liquid waste. The available minimum useful storage volume for packaged waste in the ~~packaged~~-waste ~~storage~~-accumulation room is ~~approximately~~ 3900 cubic feet (10 feet deep, 30 feet long, and 13 feet high), which accommodates more than one full offsite waste shipment using a tractor-trailer truck. The ~~packaged~~-waste ~~storage~~-accumulation room provides storage for more than two years at the expected rate of generation and more than a year at the maximum rate of generation. One four-drum containment pallet provides more than 8 months of storage capacity for the liquid mixed wastes and the volume reduced liquid chemical wastes at the expected rate of generation and more than 4 months at the maximum rate.

UFSAR, Subsection 11.4.2.3.2, *Spent Filter Processing Operations*, seventh paragraph

The drum covers are manually installed, and the drums are smear surveyed, decontaminated by wiping, if required, weighed, stacked on pallets, and placed in the ~~packaged~~-waste ~~storage~~-accumulation room.

UFSAR, Subsection 11.4.2.3.3, *Dry Waste Processing Operations*, fifth paragraph

Moderate-activity wastes (5 mR/hr to 100 mR/hr) are expected to be sorted in a mobile system to remove reusable items such as protective clothing articles and tools, hazardous wastes, and larger noncompressible items. The remaining wastes are normally compacted by mobile equipment. The packaged wastes may be loaded directly onto a truck for shipment or may be stored in the ~~packaged~~-waste ~~storage~~-accumulation room until a truck load quantity accumulates.

UFSAR, Subsection 11.4.2.5.2, *Radwaste Building*

The radwaste building, described in [Section 1.2](#), houses the mobile systems facility. ~~It also includes and~~ the waste accumulation room ~~and the packaged waste storage room~~. These rooms are serviced by the mobile systems facility crane.

In the mobile systems facility, three truck bays provide for mobile or portable processing systems and for waste disposal container shipping and receiving. A shielded pipe trench to each of the truck bays is used to route liquid radwaste supply and return lines from the connections in the shielded pipe pit at the auxiliary building wall. Separate areas are reserved for empty (new) waste disposal container storage, container laydown, and forklift charging. An area is available near the door to the annex building for protective clothing dropoff and frisking.

The waste accumulation room (~~pre-processing~~) is divided as needed, using partitions and portable shielding to adjust the storage areas for different waste categories as needed to complement the radioactivity levels and volumes of generated wastes. The accumulation room also contains three 1000 cubicfeet (10 feet x 10 feet x 10 feet) bunkers with removable steel shield bunker roof plates and removable steel shield bunker door plates. The design functions of this removable shielding are described in subsection 12.3.2.2.5. The accumulation room has lockable doors to minimize unauthorized entry and inadvertent exposure.

The bunkers have been evaluated for hydrogen gas generation resulting from the temporary storage of resin, including condensate polishing system (CPS) resin and steam generator blowdown system electrodeionization (EDI) unit resin. The evaluation assumes storage of the maximum amount of CPS and EDI resins that could be generated over one year of operation consistent with Table 11.4-1, and then stored in a single unventilated bunker for six months. This evaluation results in a maximum hydrogen concentration of less than 5 volume percent hydrogen in air, and concludes that there is no risk of radiolytic hydrogen gas generation that could result in the creation of a hazard within the stated assumptions.

The existing administrative controls in subsections 11.2.1.2.5.2 and 13.5.2.2.5 limit the total cumulative radioactive inventory of unpackaged wastes allowed in the radwaste building and bunkers, and the existing radiation zoning and access requirements in subsection 12.3.1.2 further restrict the amount and activities of resins that are allowed to be stored in the bunker. Therefore, a new evaluation for hydrogen gas generation resulting from the temporary storage of resin would only be needed in the unlikely event that storage of resins with total volume or activity higher than that of the evaluated resins, or for a longer storage period, is desired. The new evaluation would be needed to confirm the risk associated with potential hydrogen gas generation by demonstrating that the hydrogen concentration in the bunker air space will not exceed 5 volume percent hydrogen in air per NUREG/CR-6673.

~~The packaged waste storage room may be separated into high- and low-activity areas, using portable shielding to minimize exposure while providing operational flexibility. A lockable door is provided to minimize unauthorized entry and radiation exposure.~~

The heating and ventilating system for the radwaste building is described in **Subsection 9.4.8.**

UFSAR Subsection 11.2.1.2.5.2, Use of Mobile and Temporary Equipment

Add after the fifth paragraph the following text (blue text denotes standard FSAR content and green text is site-specific FSAR content):

Operating procedures also discussed in **Section 13.5** include administrative controls to limit the total cumulative radioactive inventory of unpackaged wastes located in the radwaste building so that the Regulatory Guide 1.143 unmitigated radiological release criteria of 5 rem to site personnel, and the 10 CFR Part 20.1301 dose limits of 100 millirem at the protected area boundary for members of the public, are not exceeded. These unpackaged wastes include liquid waste, wet waste, solid waste, gaseous waste, activated or contaminated metals and components, and contaminated waste. These administrative controls limit the radionuclide inventory to less than the A2 limit specified in Appendix A to 10 CFR Part 71 in each of the three (3) radwaste monitor tanks, in each of up to three (3) mobile radwaste processing systems, and in any additional equipment located in the radwaste building. Transfer or packaging of spent media from a mobile radwaste processing system located in the radwaste building is procedurally controlled such that either spent media packaging for off-site shipment in process in the radwaste building is considered in the inventory with the operation of the mobile radwaste processing system, or the spent media is transferred to the seismic Category I auxiliary building for packaging. Once the packaging in the radwaste building is complete, the activity of the packaged spent media is no longer added to the applicable mobile radwaste processing system activity for comparison with the applicable A2 quantity limit. This results in preventing exposures from any unmitigated radiological release in the radwaste building, occurring over a two hour exposure period, from exceeding the Regulatory Guide 1.143 unmitigated radiological release criteria and 10 CFR Part 20.1301 dose limits to site

personnel and members of the public at the protected area boundary, respectively. The unmitigated, unshielded worker dose is calculated at 11 feet from the source. Unlimited worker occupancy workstations and low dose rate waiting areas are located no closer than 11 feet from a mobile radwaste processing system or a radwaste monitor tank.

UFSAR, Table 11.5-2, Area Radiation Monitor Detector Parameters

Table 11.5-2			
AREA RADIATION MONITOR DETECTOR PARAMETERS			
Detector	Type	Service	Nominal Range
PXS-JE-RE160	γ	Containment High Range (Note 3)	1.0E-0 to 1.0E+7 R/hr
PXS-JE-RE161	γ	Containment High Range (Note 3)	1.0E-0 to 1.0E+7 R/hr
PXS-JE-RE162	γ	Containment High Range (Note 3)	1.0E-0 to 1.0E+7 R/hr
PXS-JE-RE163	γ	Containment High Range (Note 3)	1.0E-0 to 1.0E+7 R/hr
RMS-JE-RE008	γ	Primary Sampling Room	1.0E-1 to 1.0E+7 mR/hr
RMS-JE-RE009	γ	Containment Area Personnel Hatch – Operating Deck – 135'-3" Elevation	1.0E-1 to 1.0E+4 mR/hr (Note 1)
RMS-JE-RE010	γ	Main Control Room	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE011	γ	Chemistry Laboratory Area	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE012	γ	Fuel Handling Area	1.0E-1 to 1.0E+4 mR/hr (Note 2)
RMS-JE-RE013	γ	Rail Car Bay/Filter Storage Area (Note 4)	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE014 ^A	γ	Liquid and Gaseous Radwaste Area ¹	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE014^B	γ	Liquid and Gaseous Radwaste Area²	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE016	γ	CSA Area	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE017	γ	Radwaste Bldg. Mobile Systems Facility (Note 4)	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE018	γ	Hot Machine Shop	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE019	γ	Annex Staging & Storage Area	1.0E-1 to 1.0E+4 mR/hr
RMS-JE-RE020	γ	Fuel Handling Area	1.0E-1 to 1.0E+4 mR/hr (Note 2)
RMS-JE-RE021	γ	Containment Area Personnel Hatch – Maintenance Level – 100'-0" Elevation	1.0E-1 to 1.0E+04 mR/hr (Note 1)

Notes:

1. Radiation levels are monitored by the permanent containment area radiation monitor and by a portable bridge monitor during refueling operations. The containment area radiation monitor is located to best measure the increase in exposure rates for this area and to provide an alarm locally and in the main control room.
2. Radiation levels are monitored by the permanent fuel handling area radiation monitors and by a portable bridge monitor during fuel handling operations. The fuel handling area radiation monitors are located to best measure the increase in exposure rates for this area and to provide an alarm locally and in the main control room.
3. Safety-related
4. Monitors areas used for storage of wet wastes (including processed and packaged spent resins) and dry wastes.

UFSAR Subsection 12.3.2.2.5, *Radwaste Building Shielding Design*

Shielding is provided as necessary for the waste storage areas in the radwaste building to meet the radiation zone and access requirements. Depending on the equipment in the compartments, the radiation zoning varies from Zone I through IV as shown on the radiation zone drawing of Figure 12.3-1. Temporary partitions and shield walls will be provided, as required, to supplement the permanent shield walls surrounding the waste accumulation ~~and packaged waste storage~~ rooms inside the radwaste building. The three bunkers described in subsection 11.4.2.5.2 include removable steel shield bunker roof plates that provide vertical shielding during storage of moderate and high activity waste to maintain radiation levels as Zone II to Zone III on the normally unoccupied and access controlled radwaste building roof, and removable steel shield bunker door plates, that may be installed for ALARA considerations.

UFSAR Subsection 13.5.2.2.5, *Radioactive Waste Management Procedures*

Add after the first paragraph the following text (blue text denotes standard FSAR content):

Operating procedures to limit the total cumulative radioactive inventory of unpackaged wastes located in the radwaste building will be developed, implemented, and maintained prior to initial fuel load. These operating procedures are based on monitoring and controlling the radioactive inventory of unpackaged wastes so that the Regulatory Guide 1.143 unmitigated radiological release criteria of 5 rem to site personnel, and the 10 CFR Part 20.1301 dose limits of 100 millirem at the protected area boundary for members of the public, are not exceeded. These administrative controls limit the radionuclide inventory to less than the A2 limit specified in Appendix A to 10 CFR Part 71 in the radwaste building. Further details regarding administrative controls of unpackaged radioactive waste located in the radwaste building are described in [Section 11.2.](#)