

Vogle PEmails

From: Redd, Jason P. <JPREDD@southernco.com>
Sent: Monday, July 18, 2016 12:57 PM
To: Patel, Chandu
Subject: [External_Sender] SNC responses to Staff clarification questions re: LAR-16-009R1
Attachments: Responses to NRC Comments on LAR-90 R1 20160715 FINAL.pdf

Chandu,

SNC is pleased to provide the attached answers to the Staff's clarifying questions regarding our recent submittal of LAR-16-009R1 (SNC Letter ND-16-1024 dated July 1, 2016). Please share these responses with the interested Technical Staff for their consideration. This response does not contain any Proprietary or SRI content that should be withheld from access by the public.

SNC continues to work with our contractor Westinghouse to prepare a further revision to LAR-16-009R1 which will incorporate the changes described by the attached. SNC does not have a firm planned revision submittal date yet, but expects to submit such revision by the end of August 2016. If you have any questions, please contact me. Thank you.

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Responses to NRC Comments on Revised Request for License Amendment Regarding Structural Design of Auxiliary Building Floors (LAR-16-009R1)

NRC Comment #1:

Define in text and in a reviewer's aid graphic to clarify the scope of License Amendment Request (LAR) 16-009R1, such as top of concrete (or liner) elevation for each room number, location by referencing bounding wall lines (grid), and clarify that the hallway North of room number 12262 is part of the LAR. The reviewer's aid graphic is for reference only and won't be part of UFSAR markups.

Response to NRC Comment #1:

Changes are proposed in LAR-16-009R1 (SNC Letter ND-16-1024 dated July 1, 2016) to the Updated Final Safety Analysis Report (UFSAR) descriptions and figures to add clarifying information to the structural design of selected floors in the auxiliary building. No design changes are introduced. The changes apply to selected floors located in the CA20 structural module, in the south end of the auxiliary building. These selected floors include the following rooms: Piping/Valve Room (Room number 12262, top of concrete at elevation 82'-6", enclosed by wall lines 2 and 4, and J-1 and J-2), Pipe Chase (Room number 12269, top of concrete at elevation 92'-6", enclosed by wall lines 2 and 4, and J-1 and J-2), Cask Loading Pit (Room number 12463, top of steel liner at elevation 90'-3", enclosed by wall lines 2 and 3, and J-2 and K-2), Spent Fuel Storage Pit (Room number 12563, top of steel liner at elevation 92'-8½", enclosed by wall lines 2 and 4, and K-2 and L-2), and Waste Monitor Tank Room B (Room number 12365, top of concrete at elevation 92'-6", enclosed by wall lines 3 and 4, and J-2 and K-2). The selected floors are highlighted in yellow in Reviewer's Aid Graphics 1-1 and 1-2 shown below. Note that these reviewer's aid graphics are for reference only, and will not be used as part of UFSAR figures.

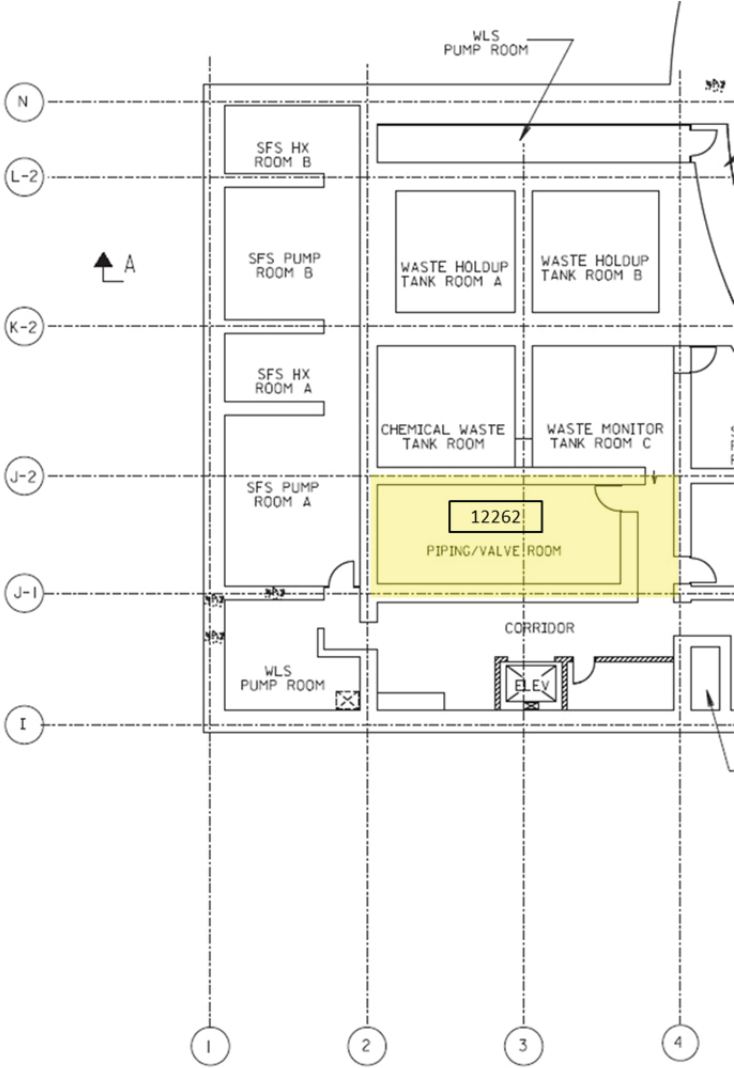
Note that these floors are identified on page 3 of 17 of LAR-16-009R1 Enclosure 3, and are shown in UFSAR Figures 1.2-5, 1.2-6, and 3.7.2-12 (Sheets 2, 3, 10, and 11 of 12) as identified below.

82'-6" – Room 12262 (including hallway to immediate north of room doorway) – Figure 1.2-5 and Figure 3.7.2-12 (Sheet 2 of 12), Column Lines (CLs) J-1 to J-2, and 2 to 4.

92'-6" - Figure 1.2-6 for Room numbers as identified at El. 96'-6" Plan View

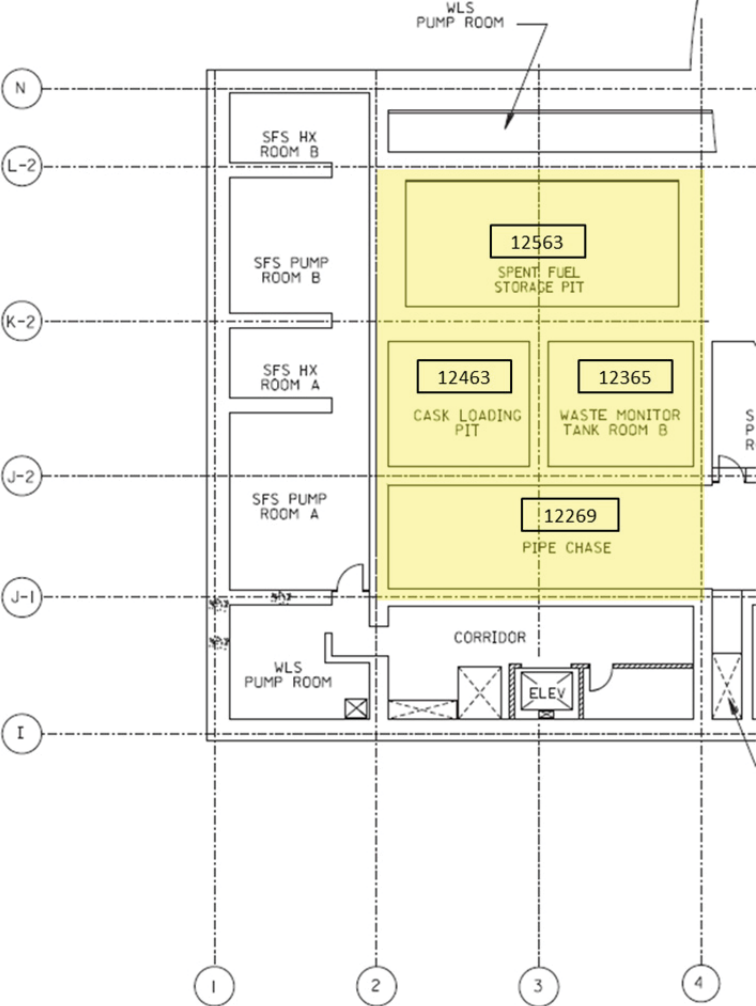
- Room 12269 – 92'-6" - Figure 3.7.2-12 (Sheet 11 of 12), CL 2 to 4.
- Room 12463 – 90'-3" - Figure 3.7.2-12 (Sheet 3 of 12), CLs J-2 to K-2, and 2 to 3, Figure 3.7.2-12 (Sheet 10 of 12), Section H-H.
- Room 12563 – 92'-8½" - Figure 3.7.2-12 (Sheet 3 of 12), CLs K-2 to L-2, and 2 to 4, Figure 3.7.2-12 (Sheet 10 of 12), Section H-H.
- Room 12365 – 92'-6" – Figure 3.7.2-12 (Sheet 3 of 12), CLs J-2 to K-2, and 3 to 4.

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Reviewer's Aid Graphic 1-1: LAR-90 Rev.1 Scope - CA20 Floor at Elevation 82'-6"

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Reviewer's Aid Graphic 1-2: LAR-90 Rev.1 Scope - CA20 Floors at Elevations 90'-3", 92'-6", and 92'-8½"

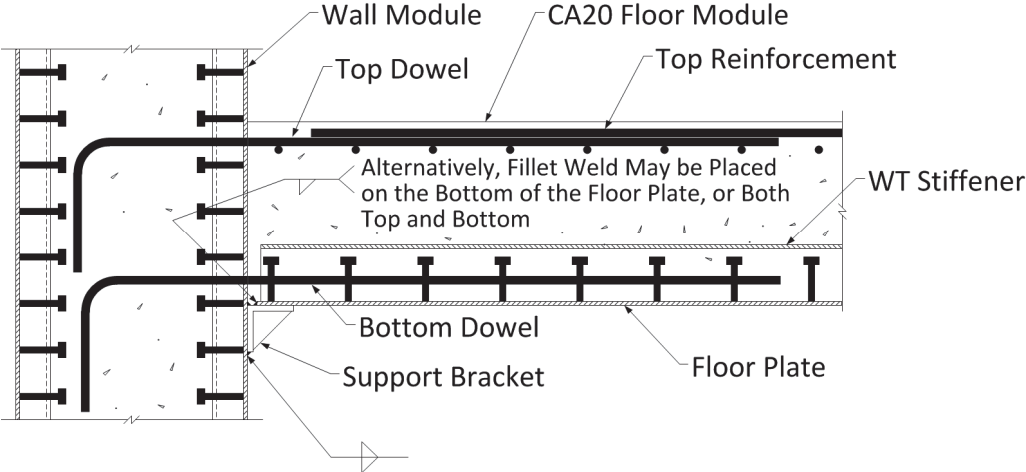
Responses to NRC Comments on Revised Request for License Amendment Regarding Structural Design of Auxiliary Building Floors (LAR-16-009R1)

NRC Comment #2:

Provide a reviewer's aid graphic of the CA20 floor to wall configuration, to include information such as WT-shapes welded to the bottom plate and brackets (ledger angles). The reviewer's aid graphic is for reference only, won't be part of UFSAR markups, and may be considered proprietary information (still under consideration).

Response to NRC Comment #2:

The CA20 floor to wall configuration graphic is provided in Reviewer's Aid Graphic 2 below. This graphic is for reference only, and will not be used as part of an UFSAR figure. This graphic does not contain Proprietary information.



Reviewer's Aid Graphic 2: CA20 Floor to Wall Connection Configuration

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NRC Comment #3:

Provide additional information / clarification for the justification for NOT using the seismic detailing practice of opposing rebar hooks at the floor to wall connections.

Response to NRC Comment #3:

Because the CA20 module walls have a high probability of obstructing the dowel hook extensions with shear studs, wall truss components, overlay plate anchorages, and other items within the module walls, various orientations of the dowel hooks may be required.

Additional information will be added within the LAR text similar to the information shown below.

Revision to text in LAR-16-009R1 Enclosure 3, bottom of page 9 of 17 and top of page 10 of 17:

Revise UFSAR Subsection 3.8.4.4.1 to add information that the orientation of the standard hooks that provide development in the walls for the reinforcement dowels may vary and add reference to requirements for headed reinforcement. Floors that are connected to walls in the CA20 module on the south end of the auxiliary building use dowels developed in the wall with a standard hook or may use headed reinforcement. The standard hook details may differ from UFSAR Figure 3H.5-9, Sheet 2, because of potential interferences of the hook extension at the free end of the bar with shear studs, wall truss components, overlay plate anchorage, embedments, and other items within the wall. In ~~certain~~ some cases, the hook extensions may not be oriented toward each other as in typical beam-to-column connections. Justification of the hook orientation is based on the guidance in Regulatory Guide 1.142 and the behavior due to the design features of the CA20 module walls.

The demand-to-capacity ratios for the bending moments in the CA20 module walls do not exceed the criteria set forth in Position 3 of Regulatory Guide 1.142. Since the CA20 lateral force-resisting structures do not meet the threshold to be considered as flexural members, the ACI 349-01 Chapter 21 provisions for joints of frames are not applicable. Therefore, the tails of the top and bottom dowel hooks connecting the CA20 module walls to the adjacent floors can be orientated away from the center of the floor slab. In addition to being below the threshold to be classified as flexural members, various hook orientations are acceptable because increased concrete stress due to hook orientation with both hook extensions oriented downward, upward, or away from each other is resisted by the truss structure that provides structural integrity to the module walls. Because the module faceplate is welded to the truss structure, it provides additional confinement to the concrete and contributes to supporting the increased concrete stress. Further, the CA20 floors at or near the 82'-6" and 92'-6" design elevations in the south end of the auxiliary building do not see a significant load reversal under seismic demand because the upward acting forces do not overcome deadweight. The demand remains within elastic limits, and joint degradation due to cycling into the inelastic range is not a factor in the module floor to wall connection design. The connection configurations with hook orientations different than shown in UFSAR Figure 3H.5-9, Sheet 2, continue to satisfy ACI 349 code requirements. The provisions included in later editions of ACI 349 to place the hooks in an opposed orientation do not apply to the subject floor to wall connection. ~~The variation in hook orientation is acceptable in module walls because increased concrete stress due to hook orientation with both hook extensions oriented downward, upward, or away from each other is resisted by the truss structure that provides structural integrity to the module walls. Because the module faceplates are welded to the truss structure, they provide additional confinement to the concrete and contribute to supporting the increased concrete stress. In addition, the CA20 floors at or near the 82'-6" and 92'-6" design elevation in the south end of the auxiliary building do not see a significant load reversal under seismic demand because the upward acting forces do not overcome deadweight.~~

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NRC Comment #4:

Provide figures to demonstrate the development length calculation approach, this will help understand the current description included in the LAR package; the figure used during the pre-submittal meeting, including the text describing the behavior, will be acceptable for this purpose. The figures are for reference only and won't be part of UFSAR markups.

Response to NRC Comment #4:

The supplemental evaluation for a CA20 floor will be added within the LAR text similar to the information shown below.

Revision to text in LAR-16-009R1 Enclosure 3, pages 10 and 11 of 17:

In this supplemental evaluation, the connection is considered to be divided into regions over the length of the reinforcing bar dowel. In the region adjacent to the wall, the reinforcing bar dowel is fully developed at both ends. The reinforcing bar dowels are sized based on the tension demand in the bottom plate from out-of-plane flexure and membrane tension. The reinforcing bar dowel development length within the module floor is at a minimum the Class B lap splice length in accordance with ACI 349. The reinforcing bar dowels are within the height of the shear studs connected to the module floor bottom plate. In the second region the bottom dowel transitions from fully developed to the end of the dowel away from the wall over a length determined by the ACI 349 requirements for development length. In this second region, the bottom plate is developed adequately to carry floor module demand in accordance with ACI 349 and AISC N690 requirements.

The supplemental evaluation for a CA20 floor is illustrated in Slide 35 of the Proprietary information used at the pre-submittal meeting of May 26, 2016. These slides can be found in ADAMS at ML16146A038. The public non-proprietary version of these slides can be found in ADAMS at ML16146A039.

The bottom plate is anchored to the concrete with the shear studs in the region adjacent to the wall. The stud spacing is determined based on AISC N690 requirements for developing composite action.....

Responses to NRC Comments on Revised Request for License Amendment Regarding Structural Design of Auxiliary Building Floors (LAR-16-009R1)

NRC Comment #5:

Add information to clarify that the welds in CA20 floors and finned floors need to use AISC N690 welding provisions instead of using American Welding Society (AWS) provisions as referenced in UFSAR. AISC N690-1994 includes non-destructive examination (NDE) requirements for welds that go beyond the NDE requirements included in AWS. The reviewer was concerned that in the past some of these supplementary requirements were missed and suggested adding a reminder that there are supplementary NDE requirements for welds.

Response to NRC Comment #5:

In UFSAR Subsection 3.8.4.2, the last paragraph states "Welding and inspection activities for seismic Category I structural steel, including building structures, structural modules, cable tray supports and heating, ventilating, and air conditioning duct supports are accomplished in accordance with written procedures and meet the requirements of the American Institute of Steel Construction (AISC N690)".

Thus, with both CA20 and finned floors covered by this statement in UFSAR Subsection 3.8.4, use of the AISC N690 weld requirements is already addressed within the UFSAR.

In addition, the construction drawings clearly specify the NDE requirements for the welds per AISC N690. These construction drawings are currently available at the Vogtle plant site for inspection by NRC Region II personnel and Resident Inspectors; such drawings can be made available in the Westinghouse Rockville office to additional NRC Staff upon request.

NRC Comment #6:

Adjust information in the markup to UFSAR Subsection 3.8.4.4.1 to make sure the information is not redundant or self-conflicting.

Response to NRC Comment #6:

The following sentence could be construed as redundant and will be removed in its entirety from the proposed markup of UFSAR Subsection 3.8.4.4.1 shown on page 2 of 5 of LAR-16-009R1 Enclosure 4 to avoid repeating information in the same section.

~~"The connection of the floor to the wall for the concrete on steel plate floors satisfies ACI 349 requirements in Sections 12.2, 12.15, and 21.5.4 for the development length and non-contact reinforcement bar splices."~~

In addition, the sentence following the sentence to be deleted will be revised to read "The design of the connection ~~meets~~ ~~satisfies~~ ACI 349, ~~Appendix B, requirements for shear stud strength~~ and AISC N690 requirements for shear stud capacity."

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NRC Comment #7:

Remove Note 1 in the markup of Figure 3H.5-9 (Sheet 1 of 3) shown in LAR-16-009R1 Enclosure 4.

Response to NRC Comment #7:

It is agreed that Note 1 on Figure 3H.5-9 (Sheet 1 of 3) shown on page 2 of 5 of LAR-16-009R1 Enclosure 4 is not needed for the scope of LAR-16-009R1 and it will be removed from the proposed markup of the UFSAR.

NRC Comment #8:

Eliminate the use of “satisfy” with regard to code and regulation compliance; instead use “meet” or “comply”.

Response to NRC Comment #8:

The descriptions in the LAR and the proposed markup statements with regard to Code and regulation compliance will be revised throughout to use “meet” or “comply” to replace “satisfy”.