

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

NND-16-0056

Updated Enclosure 2

Supplement to Proposed Changes to Licensing Basis Documents
(LAR 14-02 S2)

(This Enclosure consists of 19 pages, including this cover page. All updates are depicted with a change bar)

Part 1A Associated Licensing Basis Changes related to auxiliary building Wall 11 design Changes

UFSAR Subsection 3.8.4.6.3, Special Construction Techniques - Revise to include additional information in a new final paragraph shown below.

Where out-of-plane shear reinforcement is provided within the radial/circumferential reinforcement pattern for the main steam line anchor in auxiliary building Wall 11 (Figure 3H.5-5), tolerance on shear reinforcement is specified to maintain the maximum spacing requirements of ACI 349-01, and the minimum spacing requirements of ACI 318-11 for headed reinforcement.

UFSAR Subsection 3H.5.1.4, Wall at Column Line 11 - Revise information in the first, fourth, and sixth paragraphs in the locations shown below.

[The north wall of the MSIV east compartment, at column line 11 (Wall 11) between elevation 117'-6" and elevation 153'-0", has been identified as a critical section.

The segment of the wall between elevation 117'-6" and elevation 135'-3" is 4 feet thick, and several pipes such as the main steam line, main feed water line, and the start-up feed water line are anchored to this wall at the interface with the turbine building.

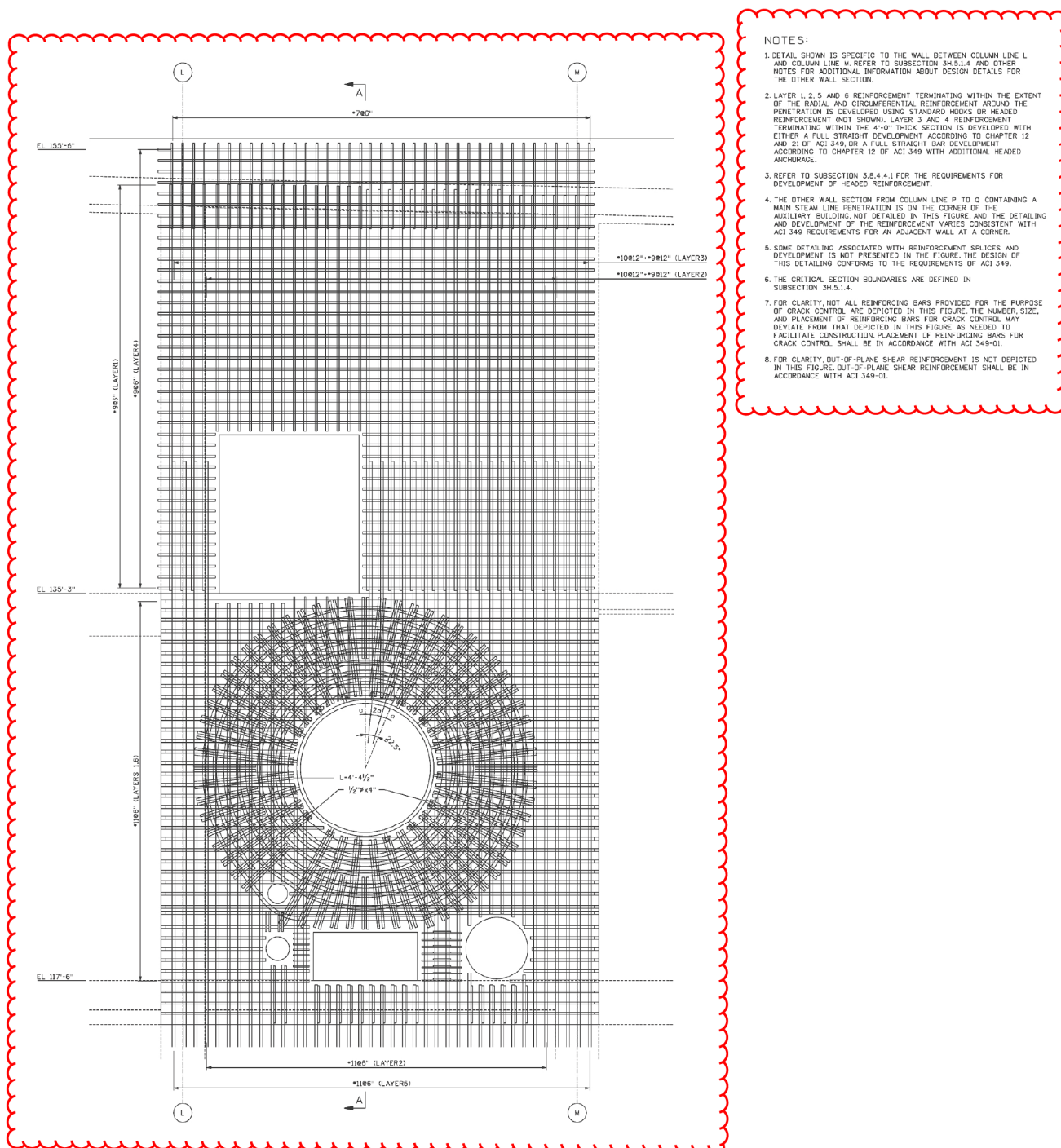
The wall segment from elevation 135'-3" to elevation 153'-0" does not provide support to any high energy lines, and is 2 feet thick. This portion does not have to withstand reactions from high energy line breaks.

The wall (Wall 11) is designed to withstand loads such as the dead load, live load, seismic load and the thermal load. The MSIV ~~compartments are room is a~~ break exclusion area~~s~~, but the design also considered the compartment pressurization loads associated with a one square foot pipe rupture in the MSIV ~~compartments. room, such as compartment pressurization,~~ Wall 11 in the east MSIV compartment is also designed to withstand the jet loads, and the reactions at the pipe anchors for main steam and main feedwater line breaks assumed to occur in the east MSIV compartment. Additionally, the Wall 11 design for both MSIV compartments considers loads from postulated breaks in the turbine building, which include turbine building first bay pressurization, jet loads, reactions at the Wall 11 pipe anchors, and pipe whip. ~~The loads on the pipe anchor include pipe rupture loads for breaks in the turbine building.~~

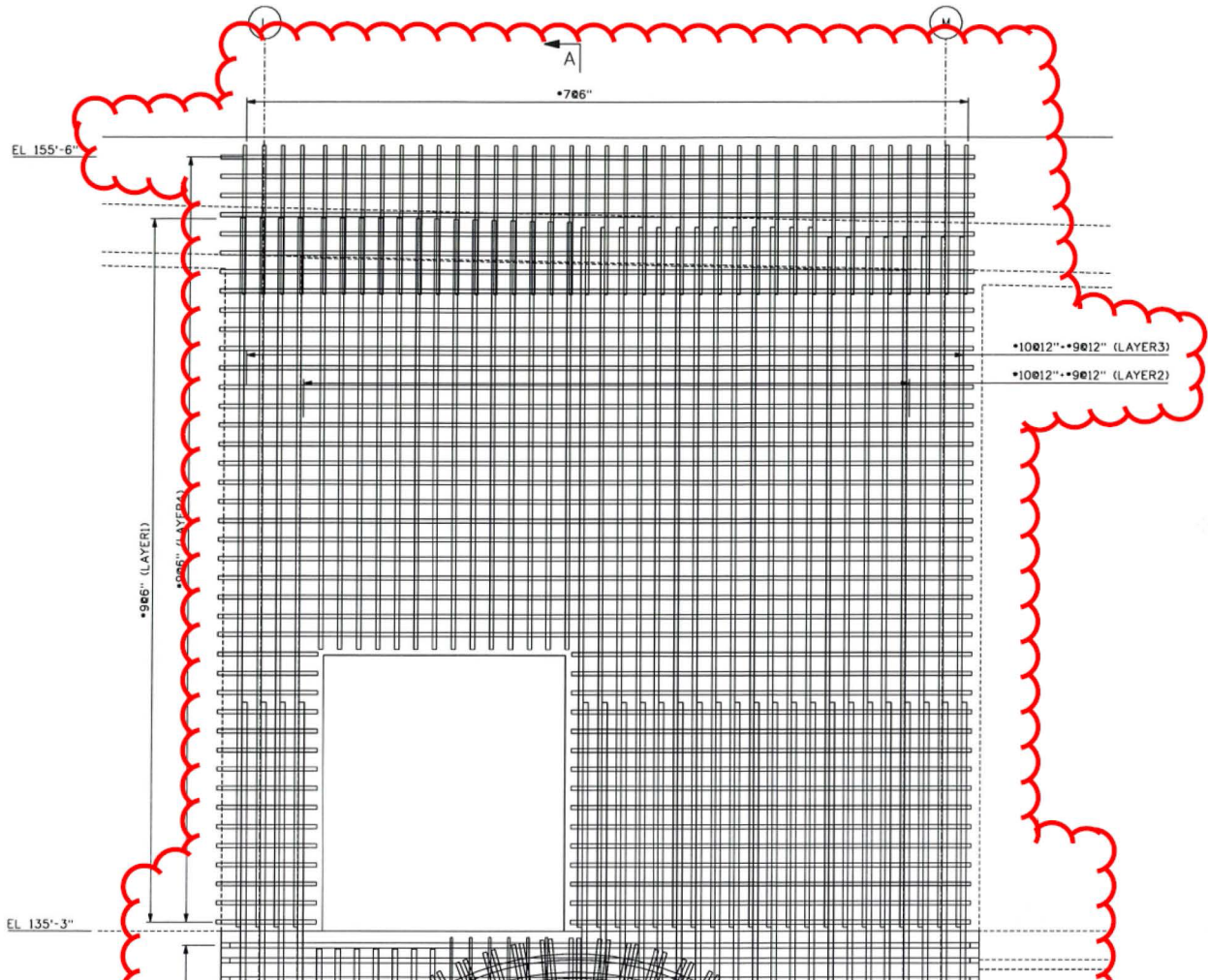
The wall structure is analyzed using three dimensional finite element analyses supplemented by hand calculations. Analyses are performed for individual loads, and design loads are determined for applicable load combinations from Table 3.8.4-2.

*Typical wWall reinforcement for this location is shown in Figure 3H.5-5 illustrating conformance with ACI 349-01 requirements. The reinforcement design associated with some detailing and development for the wall of the MSIV west compartment varies because the compartment is in the corner of the auxiliary building and the adjacent wall on column line Q (Wall Q) is oriented at 90 degrees to Wall 11.]**

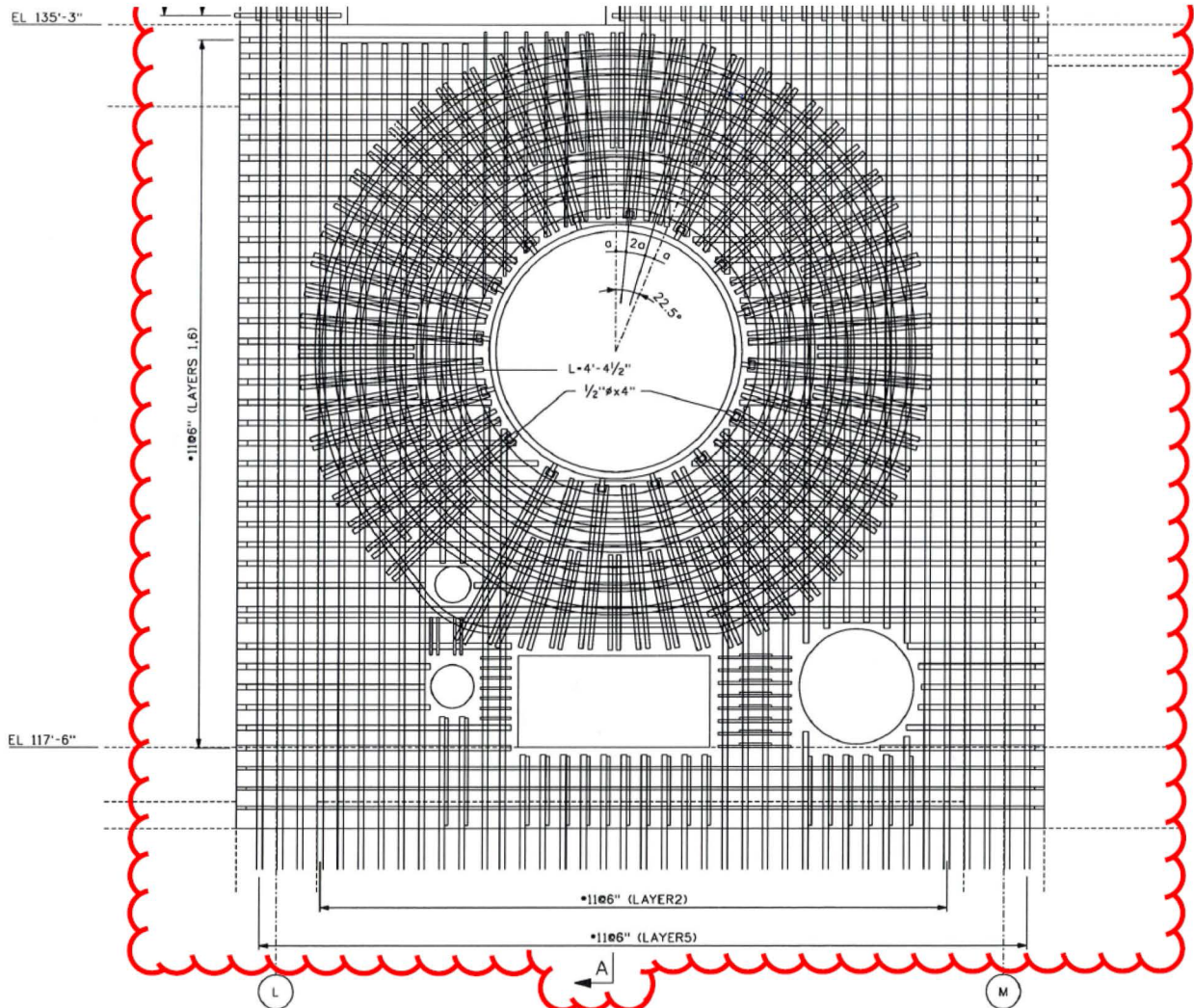
**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 1 of 3 [Concrete Reinforcement in Wa/111]* -
Revise information for the figure as shown below (complete figure).**



**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 1 of 3 [*Concrete Reinforcement in Wall 11*]* -
Detailed view of the revised information for the upper portion of reinforcement.**



UFSAR Appendix 3H, Figure 3H.5-5, Sheet 1 of 3 [Concrete Reinforcement in Wall 11]* - Detailed view of the revised information for the lower portion of reinforcement.

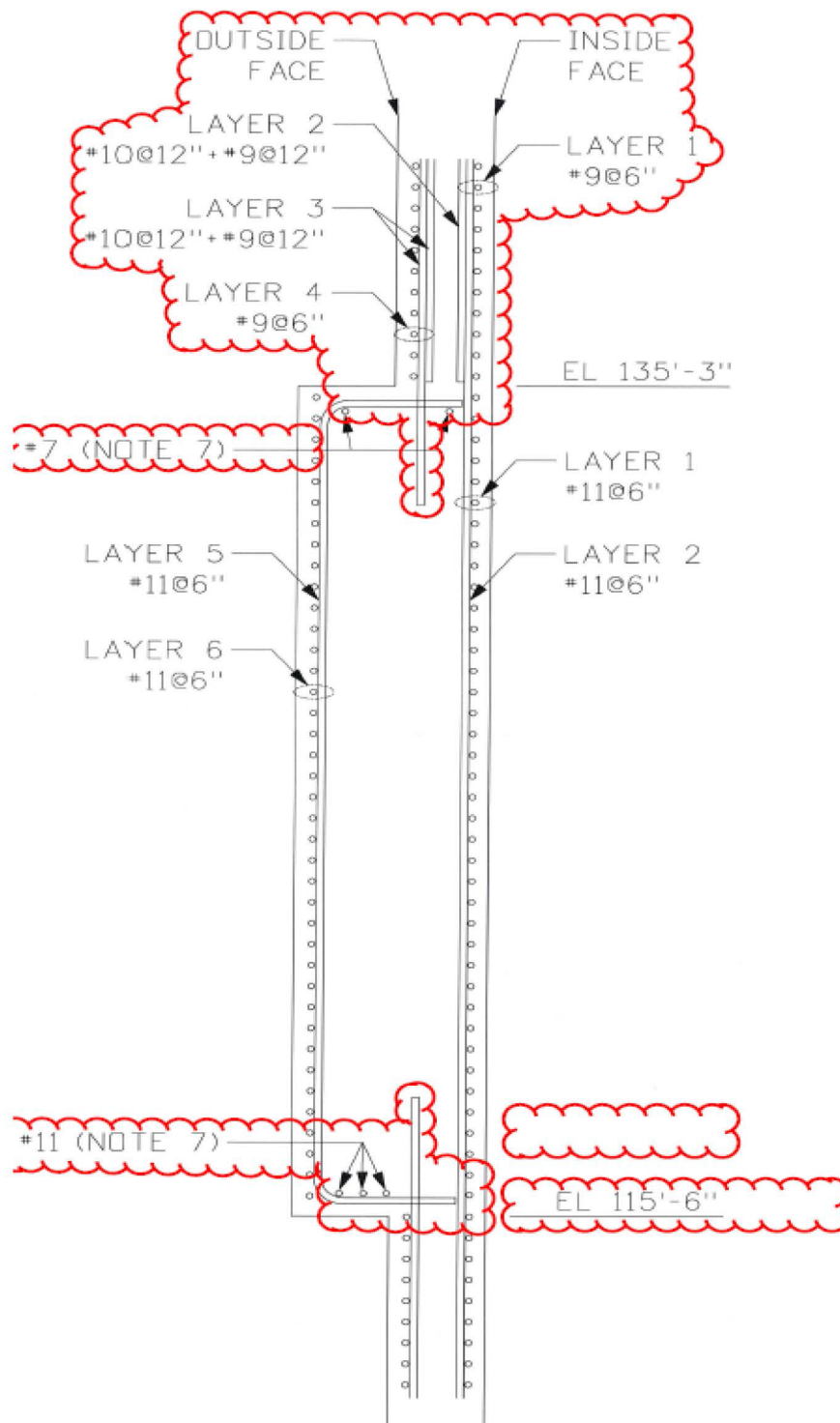


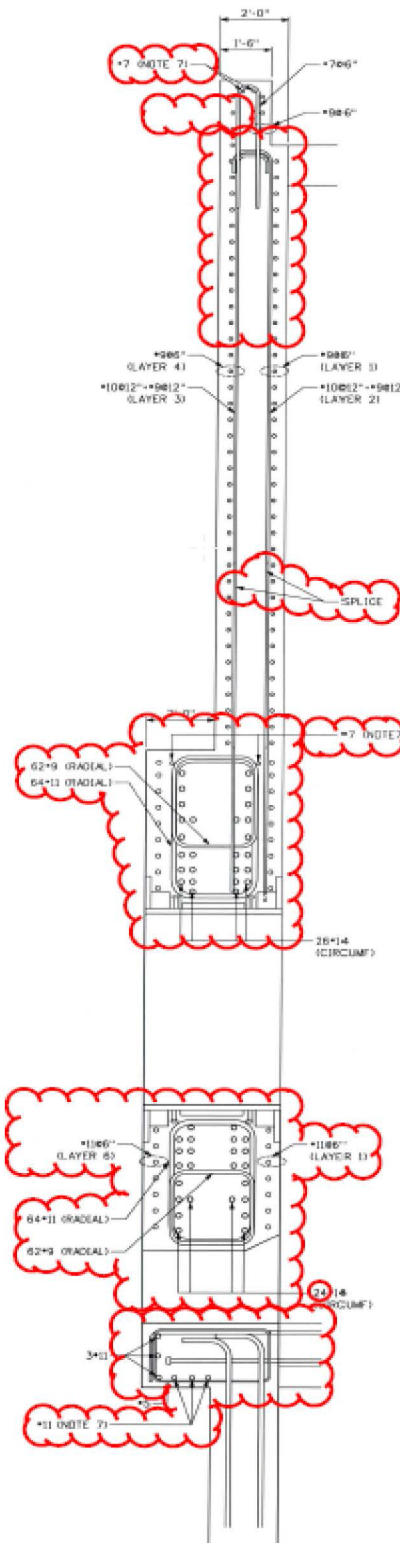
**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 1 of 3 [*Concrete Reinforcement in Wall 11*]* -
Revise the figure to add notes as shown below.**

NOTES:

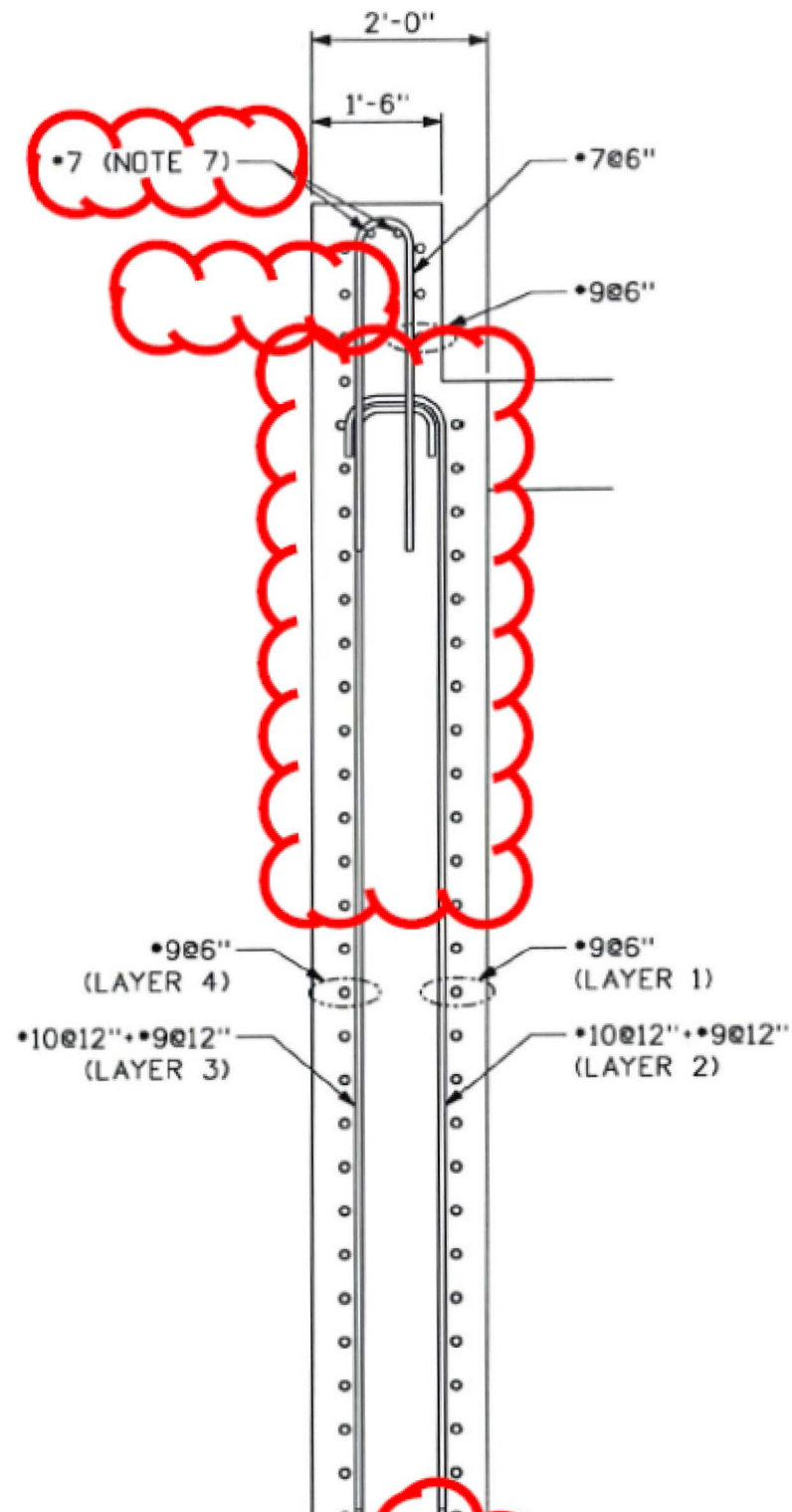
1. DETAIL SHOWN IS SPECIFIC TO THE WALL BETWEEN COLUMN LINE L AND COLUMN LINE M. REFER TO SUBSECTION 3H.5.1.4 AND OTHER NOTES FOR ADDITIONAL INFORMATION ABOUT DESIGN DETAILS FOR THE OTHER WALL SECTION.
2. LAYER 1, 2, 5 AND 6 REINFORCEMENT TERMINATING WITHIN THE EXTENT OF THE RADIAL AND CIRCUMFERENTIAL REINFORCEMENT AROUND THE PENETRATION IS DEVELOPED USING STANDARD HOOKS OR HEADED REINFORCEMENT (NOT SHOWN). LAYER 3 AND 4 REINFORCEMENT TERMINATING WITHIN THE 4'-0" THICK SECTION IS DEVELOPED WITH EITHER A FULL STRAIGHT DEVELOPMENT ACCORDING TO CHAPTER 12 AND 21 OF ACI 349, OR A FULL STRAIGHT BAR DEVELOPMENT ACCORDING TO CHAPTER 12 OF ACI 349 WITH ADDITIONAL HEADED ANCHORAGE.
3. REFER TO SUBSECTION 3.8.4.4.1 FOR THE REQUIREMENTS FOR DEVELOPMENT OF HEADED REINFORCEMENT.
4. THE OTHER WALL SECTION FROM COLUMN LINE P TO Q CONTAINING A MAIN STEAM LINE PENETRATION IS ON THE CORNER OF THE AUXILIARY BUILDING, NOT DETAILED IN THIS FIGURE, AND THE DETAILING AND DEVELOPMENT OF THE REINFORCEMENT VARIES CONSISTENT WITH ACI 349 REQUIREMENTS FOR AN ADJACENT WALL AT A CORNER.
5. SOME DETAILING ASSOCIATED WITH REINFORCEMENT SPLICES AND DEVELOPMENT IS NOT PRESENTED IN THE FIGURE. THE DESIGN OF THIS DETAILING CONFORMS TO THE REQUIREMENTS OF ACI 349.
6. THE CRITICAL SECTION BOUNDARIES ARE DEFINED IN SUBSECTION 3H.5.1.4.
7. FOR CLARITY, NOT ALL REINFORCING BARS PROVIDED FOR THE PURPOSE OF CRACK CONTROL ARE DEPICTED IN THIS FIGURE. THE NUMBER, SIZE, AND PLACEMENT OF REINFORCING BARS FOR CRACK CONTROL MAY DEVIATE FROM THAT DEPICTED IN THIS FIGURE AS NEEDED TO FACILITATE CONSTRUCTION. PLACEMENT OF REINFORCING BARS FOR CRACK CONTROL SHALL BE IN ACCORDANCE WITH ACI 349-01.
8. FOR CLARITY, OUT-OF-PLANE SHEAR REINFORCEMENT IS NOT DEPICTED IN THIS FIGURE. OUT-OF-PLANE SHEAR REINFORCEMENT SHALL BE IN ACCORDANCE WITH ACI 349-01.

UFSAR Appendix 3H, Figure 3H.5-5, Sheet 2 of 3 [Concrete Reinforcement Layers in Wall 11 (Looking East)]* - Revise information for the figure as shown below.

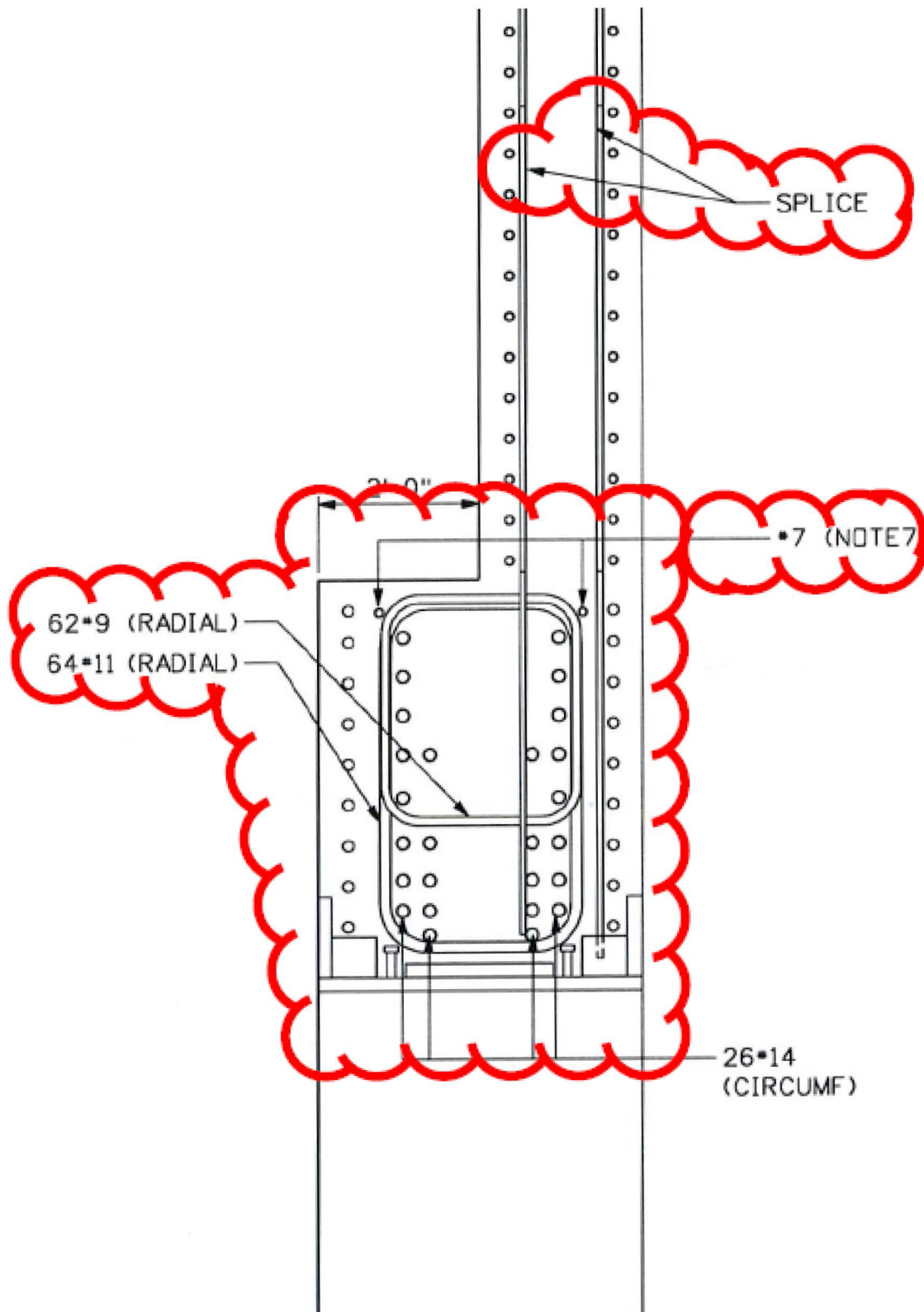




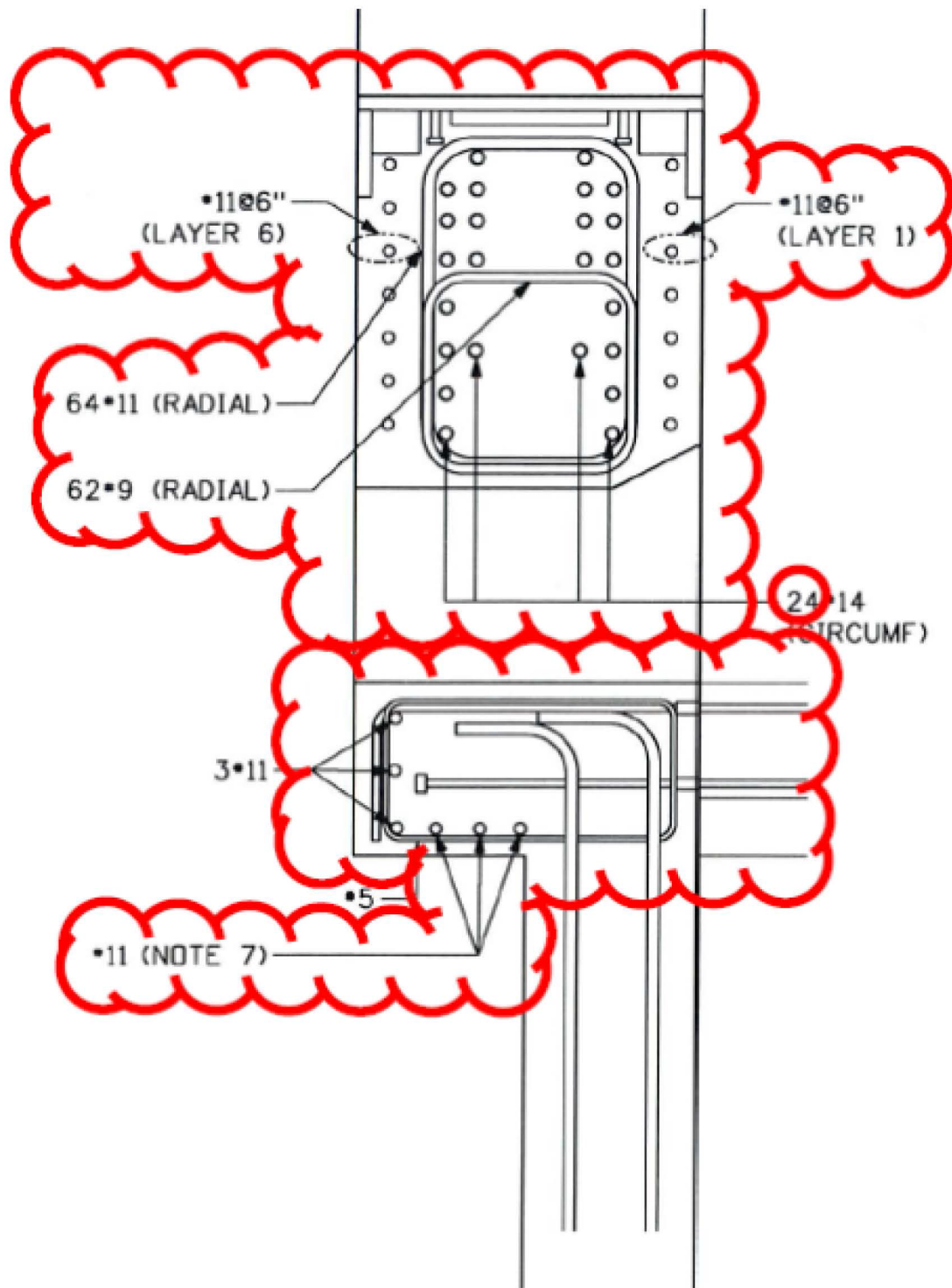
**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 3 of 3 [Wall 11 at Main Steamline Anchor
Section A-A]* - Detailed view of the revised information for the upper portion of the figure.**



**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 3 of 3 [Wall 11 at Main Steamline Anchor
Section A-A]* - Detailed view of the revised information for the middle portion of the figure.**



**UFSAR Appendix 3H, Figure 3H.5-5, Sheet 3 of 3 [Wall 11 at Main Steamline Anchor
Section A-A]* - Detailed view of the revised information for the lower portion of the figure.**



Part 1B Associated Licensing Basis Changes related to use and classification of seismic category II structures providing a protective function for nonseismic events

UFSAR Subsection 3.2.1.1.1, Seismic Category I (C-I) - Revise cross reference in first paragraph as shown below (and fix editorial punctuation at the end of the first sentence).

Seismic Category I applies to, in general, safety-related structures, systems, and components.⁵⁷

Seismic Category I also applies to...

... (See Subsection 3.2.2.~~53~~.)

UFSAR Subsection 3.2.1.1.2, Seismic Category II (C-II) - Revise first, third and last paragraphs to include new sentences in the locations shown below.

Seismic Category II applies to plant structures, systems, and components which perform no safety-related function, and the continued function of which is not required. Seismic Category II applies to structures, systems, and components designed to prevent their collapse under the safe shutdown earthquake. Structures, systems and components are classified as seismic Category II to preclude their structural failure during a safe shutdown earthquake or interaction with seismic Category I items which could degrade the functioning of a safety-related structure, system, or component to an unacceptable level, or could result in incapacitating injury to occupants of the main control room. The turbine building first bay building structure, including Wall 11.2, is a seismic Category II structure as identified in Table 3.2-2. The turbine building first bay building structure provides tornado missile protection for openings in Wall 11 as described in Table 3.5-1. Wall 11.2 also protects Wall 11 from the dynamic effects of pipe failure events in the nonseismic portion of the turbine building.

Seismic Category II structures, systems, and components are designed so that the safe shutdown earthquake does not cause unacceptable structural failure of or interaction with seismic Category I items. Seismic Category II fluid systems require an appropriate level of pressure boundary integrity if located near sensitive equipment.

The criteria used for the design of seismic Category II structures, systems, and components are discussed in Section 3.7. As identified in Subsection 3.7.2, seismic Category II building structures are designed for the safe shutdown earthquake using the same methods and design stress limits as are used for seismic Category I structures. Seismic Category II building structures are also designed to withstand the design basis tornado loads, including missiles, in accordance with the loading combinations identified in Table 3.8.4-2.

Pertinent portions of 10 CFR 50, Appendix B apply to the analysis and design of seismic Category II structures, systems, and components. The quality assurance requirements for the analysis and design of seismic Category II structures, systems, and components are performed in accordance with the Westinghouse AP1000 quality plan as described in Section 17.3 and are sufficient to provide that these components will meet the requirement to not cause unacceptable structural failure of or interaction with seismic Category I items. See Section 17.7 for the Combined License applicant quality assurance program requirement. These quality requirements are applicable to the seismic Category II turbine building first bay building structure.

UFSAR Subsection 3.2.2.5, Equipment Class C - Revise the ninth bullet of the fourth paragraph to include new information in the locations shown below.

Provide structures ~~and buildings~~ to protect Class A, B, and C structures, systems, and components from events such as internal/external missiles, seismic, ~~and~~ flooding, and the dynamic and environmental effects of pipe failures. Structures protecting equipment from nonseismic events are not required to be seismic Category I. An exception to this equipment Class C criterion is the equipment Class D barriers described in Table 3.5-1 that provide tornado missile protection. The seismic Category II turbine building first bay building structure also provides tornado missile protection for openings in Wall 11 as described in Table 3.5-1, and turbine first bay building structure Wall 11.2 provides protection of Wall 11 from HELB loads resulting from postulated ruptures in main stream and main feedwater piping north of the turbine building first bay.

UFSAR Subsection 3.2.2.6, Equipment Class D - Revise the eighth paragraph to include new information in the locations shown below.

...The systems and components are not designed for seismic loads. However, when Class D structures, systems, and components are located near a Class A, B, or C structure, system, or component, the requirements for seismic Category II may apply. The tornado missile barriers in the turbine building first bay building structure identified in Table 3.5-1 are seismic Category II, equipment Class D.

UFSAR Table 3.2-1, Comparison of Safety Classification Requirements - Revise the AP1000 Code Letter C entry for the column labeled “RG 1.29 Seismic Design Reqmnts” to add a new Note 14 designation and add new Note 14 to the Notes under the table in the locations shown below.

C	SC-3	I(14)	3	1E	GROUP C	YES	YES(7)	(8)
D	NNS(2)	NA(9)(14)	NA(10)	(10)	GROUP D	NO(10)	YES(11)	(11)

14. The seismic Category II tornado missile barriers located on or within the turbine building first bay and identified in Subsections 3.2.2.5 and 3.2.2.6, and in Table 3.5-1 provide tornado missile protection for openings in auxiliary building Wall 11.

Part 1C Associated Licensing Basis Changes related to use of turbine building first bay Wall 11.2 as a HELB Barrier

UFSAR Subsection 3.6.1.1, Design Basis - Revise information in item J to include additional information in the location shown below.

- J. Safety-related systems and components are used to mitigate the effects of postulated pipe ruptures. However, the seismic Category II wall separating the first bay of the turbine building from the main area of the turbine building (Wall 11.2) is credited with protecting the north wall of the auxiliary building (Wall 11) from high energy line break (HELB) loads resulting from postulated ruptures in main steam and main feedwater piping north of the turbine building first bay. In addition, the turbine control and stop, moisture separator reheater 2nd stage steam isolation, and turbine bypass (steam dump) valves (which are not safety-related) are credited in single failure analyses to mitigate postulated steam line ruptures.

UFSAR Subsection 3.6.1.3.2, Protection Mechanisms - Revise to include additional information in the Barriers and Shields discussion as a new third paragraph shown below.

Outside the containment, the wall separating the first bay of the turbine building from the main area of the turbine building (Wall 11.2) is credited with protecting the north wall of the auxiliary building (Wall 11) from pipe whip effects HELB loads resulting from postulated ruptures in main steam and main feedwater piping north of the turbine building first bay. The wall is designed and analyzed for the loadings associated with the effects of postulated pipe ruptures in high energy lines north of the turbine building first bay in conjunction with the required load combinations identified in Subsection 3.8.4, and determined to meet the acceptance criteria contained in ACI 349-01 and AISC N690-1994.

COL Condition 2.D(12)(a) is also revised (since it references AP1000 DCD Rev. 19, Section 3.6.1.3.2) - Revise to include additional information as shown below. (The appropriate amendment number will need to be inserted upon approval and issuance of the amendment.)

- (a) Before commencing installation of individual piping segments and connected components in their final locations, SCE&G shall complete the as-designed pipe rupture hazards analysis for compartments (rooms) containing those segments in accordance with the criteria outlined in the AP1000 DCD, Rev. 19, Sections 3.6.1.3.2 (as revised by Amendment No. ##) and 3.6.2.5, and shall inform the Director of NRO, or the Director's designee, in writing, upon the completion of this analysis and the availability of the as-designed pipe rupture hazards analysis reports.

Part 1D Associated Licensing Basis Changes related to use of the turbine building first bay as a protective structure for tornado missiles

UFSAR Subsection 3.5.2, Protection from Externally Generated Missiles - Revise to include additional information as three new paragraphs in the location shown below.

... Openings through these walls are evaluated on a case-by-case basis to provide confidence that a missile passing through the opening would not prevent safe shutdown and would not result in an offsite release exceeding the limits defined in 10 CFR 50.34. ~~The evaluation of site-specific hazards for external events that may produce missiles more energetic than tornado missiles is discussed in Subsection 2.2.1.~~

Where necessary, adjacent structures and/or missile barriers are used to protect openings in the nuclear island building structures. Building structures credited in this evaluation to protect openings in seismic Category I nuclear island building structures are seismic Category I or seismic Category II (see Subsection 3.2.1.1.2). As identified in Subsection 3.7.2, seismic Category II building structures are designed for the safe shutdown earthquake using the same methods and design stress limits as are used for seismic Category I structures. Seismic Category II building structures are also designed to withstand the design basis tornado loads, including missiles, in accordance with the loading combinations identified in Table 3.8.4-2.

Evaluation of the openings in the north wall of the auxiliary building (Wall 11) considered the protection provided by the seismic Category II turbine building first bay building structure and associated missile barriers, consistent with the provisions in Subsections 3.2.1.1.1, 3.2.1.1.2, 3.2.2.5, and 3.2.2.6. The seismic Category II turbine building first bay building structure and the missile barriers provided over the turbine building first bay large openings (seven openings in Wall 11.2; three openings in Wall R) are designed and analyzed to protect the openings in the north wall of the auxiliary building from the automobile missile described in Subsection 3.5.1.4. The turbine building first bay large opening missile barriers are located as follows:

1. First bay compartment elevation 100'-0"
 - Four large opening missile barriers on Wall 11.2
2. First bay compartment elevation 117'-6"
 - Two large opening missile barriers on Wall 11.2
 - One large opening missile barrier on Wall R
3. First bay compartment elevation 135'-3"
 - One large opening missile barrier on Wall 11.2
 - One large opening missile barrier on Wall R
4. First bay compartment elevation 148'-10"
 - One large opening missile barrier on Wall R

In accordance with the missile identification and protection criteria provided in Section 3.5, a realistic assessment of potential missile paths was conducted. Where the line of sight of a missile passing through a turbine building first bay building structure opening could potentially result in missile impact upon a Wall 11 opening, the missile was considered credible, and additional protection was provided or additional evaluation performed. As a result of this analysis, a missile barrier designed to stop the 8-inch artillery shell and 1-inch sphere missiles is provided within the interior of the turbine building first bay building structure, at elevation 117'-6", northeast of MSIV Compartment B. Where the 1-inch diameter solid steel sphere or 8-inch artillery shell missiles were determined to have a line of sight to a Wall 11 penetration, analysis was performed to

confirm that there was no line of sight through the penetration, the contents of the penetration would prevent the missile from passing through Wall 11, or equipment required to achieve safe shutdown could not be adversely affected.

The steel tornado missile barriers located on or within the turbine building first bay, identified in Table 3.5-1, are designed and analyzed in accordance with the barrier design procedures and ductility requirements contained in Subsection 3.5.3 and applicable AISC N690 requirements. The missile barriers are permanently anchored to the turbine first bay or auxiliary building as applicable. Where anchored to concrete, the anchors conform with the anchorage requirements contained in Subsection 3.8.4.5.1. The configuration of the barriers is based on the lines of sight to be eliminated and the missile sizes pertinent to those lines of sight. The configuration also provides for functional requirements such as airflow, venting, and personnel access. Steel barrier designs are provided in both solid and grating-type configurations to address the required missile protection and functional requirements on a case-by-case basis. The missile protection provided for Wall 11 openings and penetrations is tabulated in Table 3.5-1. Protection of Wall 11 openings from external missiles is provided by the seismic Category II turbine building first bay building structure, the seismic Category II missile barriers located on or within the turbine building first bay building structure, and the seismic Category I Wall 11 doors, and the seismic Category I Wall 11 penetrations and spare penetration covers within missile lines of sight. For some missile paths, lines of sight are eliminated for the 8-inch artillery shell and 1-inch sphere missiles due to the depth of the grating-type barrier design.

The evaluation of site-specific hazards for external events that may produce missiles more energetic than tornado missiles is discussed in Subsection 2.2.1. Evaluation of turbine missiles is provided in Subsection 3.5.1.3. Evaluation of tornado missiles is provided in Subsection 3.5.1.4. Conformance with regulatory guide recommendations is provided in Appendix 1A.

UFSAR Subsection 3.5 - Revise to include new Table 3.5-1 as shown below.

Table 3.5-1 (Sheet 1 of 2) EXTERNAL MISSILE PROTECTION PROVIDED FOR AUXILIARY BUILDING WALL 11 OPENINGS				
Wall 11 Opening	Protected Room	Elevation	Missile⁽¹⁾	Protection⁽²⁾⁽³⁾
Room 12306 doorway	Valve/Piping Penetration Room	100'-0"	Sphere	Room 12306 Wall 11 door
			Artillery Shell	Room 12306 Wall 11 door
			Automobile	First bay building structure Wall 11.2 large opening missile barriers
Room 12404 vent	Lower MSIV Compartment B	117'-6"	Sphere	First bay building structure Wall 11.2 large opening missile barriers First bay interior missile barrier
			Artillery Shell	First bay building structure Wall 11.2 large opening missile barriers First bay interior missile barrier
			Automobile	First bay building structure Wall 11.2 large opening missile barriers
Room 12405 doorway	Lower VBS B&D Equipment Room	117'-6"	Sphere	Room 12405 Wall 11 door
			Artillery Shell	Room 12405 Wall 11 door
			Automobile	First bay building structure Wall 11.2 large opening missile barriers Wall R large opening missile barrier

Table 3.5-1 (Sheet 2 of 2) EXTERNAL MISSILE PROTECTION PROVIDED FOR AUXILIARY BUILDING WALL 11 OPENINGS				
Wall 11 Opening	Protected Room	Elevation	Missile ⁽¹⁾	Protection ⁽²⁾⁽³⁾
Room 12406 vent	Lower MSIV Compartment A	117'-6"	Sphere	First bay building structure Wall 11.2 large opening missile barriers
			Artillery Shell	First bay building structure Wall 11.2 large opening missile barriers
			Automobile	First bay building structure Wall 11.2 large opening missile barriers Wall R large opening missile barrier
Room 12504 doorway	Upper MSIV Compartment B	135'-3"	Sphere	Room 12504 Wall 11 door
			Artillery Shell	Room 12504 Wall 11 door
			Automobile	First bay building structure Wall 11.2 large opening missile barrier
Room 12505 doorway	Upper VBS B&D Equipment Room	135'-3"	Sphere	Room 12505 Wall 11 door
			Artillery Shell	Room 12505 Wall 11 door
			Automobile	First bay building structure Wall 11.2 large opening missile barrier
Room 12506 doorway	Upper MSIV Compartment A	135'-3"	Sphere	Room 12506 Wall 11 door
			Artillery Shell	Room 12506 Wall 11 door
			Automobile	First bay building structure Wall R large opening missile barrier

Table 3.5-1 (Sheet 3 of 3) EXTERNAL MISSILE PROTECTION PROVIDED FOR AUXILIARY BUILDING WALL 11 OPENINGS				
Wall 11 Opening	Protected Room	Elevation	Missile ⁽¹⁾	Protection ⁽²⁾⁽³⁾
Wall 11 penetrations	Various	Various	Sphere	First bay building structure Pipe sleeves Penetration contents Spare penetration covers
			Artillery Shell	First bay building structure Pipe sleeves Penetration contents Spare penetration covers
			Automobile	First bay building structure Wall 11.2 large opening missile barriers Wall R large opening missile barriers

Notes:

1. Tornado missiles are defined in Subsection 3.5.1.4.
2. Turbine building first bay is a seismic Category II building structure. Wall 11 doors, Wall 11 penetration sleeves, and Wall 11 spare penetration covers that provide tornado missile protection are equipment Class C. Barriers in the turbine building first bay building structure that provide tornado missile protection are equipment Class D.
3. The materials of construction for the missile barriers installed on or within the turbine building first bay and on Wall 11 and shall be steel as specified below, or steel with equal or better material properties:
 - Wall 11.2 and Wall R large opening missile barriers
 - grating bar, baseplate - ASTM A240
 - perimeter frame - ASTM A36 or ASTM A992
 - anchors - ASTM F1554, Gr. 105
 - First bay interior missile barrier
 - barrier plate - ASTM A240
 - barrier support frame - ASTM A500, Gr. B
 - anchors - ASTM A325 or ASTM A490, and ASTM F1554, Gr. 105 as required
 - Wall 11 missile doors
 - door plate - ASTM A240
 - embed plates - ASTM A572, Gr. 50
 - anchors - ASTM A1064
 - Wall 11 spare penetration covers
 - ASTM A240
 - Pipe sleeves
 - material shall be as specified for their penetration function

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

NND-16-0056

Enclosure 3

**SCE&G Voluntary Response to NRC January 22 and February 25, 2016
Public Meeting Questions
(LAR 14-02 S2)**

(This Enclosure consists of 11 pages, including this cover page)

Point 1: The Auxiliary building is located on the Nuclear Island and houses some of the systems and components that are required to perform safety functions during different plant states. These safety related systems and components are protected from external hazards generated missiles by the exterior walls and roof of the Auxiliary building. The North wall of the Auxiliary Building is on grid line 11 and henceforth is identified as “Wall 11”. The License Amendment Request (LAR) LAR-14-02 in Section 2, para 3, describing the protective functions of Wall 11 identifies a series of loads that were considered in the structural design of Wall 11. Wall 11 also serves as the south wall of the Turbine Building located outside the nuclear island adjacent to the Auxiliary Building. The first bay of the Turbine building is between Wall 11 and the wall North of Wall 11. This wall is located on grid 11.2 and henceforth identified as “Wall 11.2.” The first bay of the Turbine building including Wall 11.2 and Wall R is designed as Seismic Category II. Both are designed to the same codes and load combinations as used for the design of Wall 11 which is designated as Seismic Category I. The design codes are specified in UFSAR section 3.8 and conform to relevant regulatory requirements.

The staff review requires a summary, using the format of Table 3.8.4-2, with the values of loads (lbs. / sq. ft.) used in each load combination case that was used in the design of Wall 11 and Wall 11.2

SCANA Response to Point 1:

The LAR was supplemented with a summary of how UFSAR Table 3.8.4-2 loads are used for Wall 11 and the turbine building first bay to help the NRC in confirming that all code requirements are met. The information was also summarized in 2 tables and added to the LAR.

Please note also that a few clarifications should be made where Point 1 discusses the first bay location and configuration. Wall 11 is not the south wall of the turbine building first bay. While Wall 11 “encloses” portions of the first bay, Wall 11 is not part of the first bay structure, which is independent from the auxiliary building. The second clarification should be that Wall 11.2 is part of (and the north) wall of the turbine building first bay.

For changes to the LAR, see **Enclosure 1 pages 17, 18, 19, 45 and 46.**

For a review of exact load values, the calculations containing the loads can be made available to the NRC for an audit.

Point 2: The LAR states that Wall 11, Wall 11.2 and Wall R are also evaluated to resist all design basis tornado missiles.

The staff review requires a summary of the missile impact evaluations that consider both two way and one way wall load dispersion per ACI 349 and show that the demand “wall thickness” was determined for the worst load combination, meeting ACI 349 requirements.

SCANA Response to Point 2:

The LAR was supplemented with the clarification that both one way and two way load dispersion was used in order to show that the demand for wall thickness was based on the worst load combination.

For changes to the LAR, see **Enclosure 1 pages 50 and 53.**

Point 3: To provide protection from missile entry through the openings on Wall 11 the applicant has used a number of barriers to prevent such an event. The doors on Wall 11 provide protection against all but the tumbling automobile missile.

The staff review requires a summary of the methodology used and the results of the calculations performed to establish that the doors provide acceptable protection against the design basis missiles.

Point 4: In addition for protections against tornado generated missiles the applicant has used missile barriers to prevent the influence of any potential missile impact beyond Wall 11.2 and Wall R.

The staff review requires the location of each of these barriers in the FSAR and a description of the critical characteristics of the barrier showing their location with respect to column lines. In addition, the review requires that the applicant should provide a summary of the barrier evaluation and resulting design details.

SCANA Response to Point 3 & 4:

The LAR was supplemented with additional information concerning the Wall 11 and the turbine building first bay barriers. The added information consists of the general barrier location, safety classification, material, general size, and specification. This additional information is also presented in a table, which summarizes the barrier characteristics, as well as four SUNSI barrier location figures.

For details on the methodology the LAR points to the barrier design procedures contained in UFSAR subsection 3.5.3 and the related calculations can be made available to the NRC via an audit.

For changes to the LAR text, see **Enclosure 1 pages 25, 26, 48-56, 58, Enclosure 1A pages 2 and 3, Enclosure 2 page 13, 15, 17, 18 and 19.**

Point 5: On page 40, Part 1C of Updated Enclosure 1 – Supplement to License Amendment Request: Wall 11 Design Related Changes (LAR 14-02 S1), it states that, “In accordance with the pipe break criteria in UFSAR subsection 3.6.2.5, breaks are postulated at every fitting for piping that has not been seismically analyzed. For breaks in high energy piping postulated to occur in the nonseismic portion of the turbine building (north of Wall 11.2) with the potential for impacting Wall 11, bounding pipe whip and jet impingement loads are applied to Wall 11.2 as a result of the bounding postulated breaks.” The staff noted that Subsection 3.6.2.1.1.3 of AP1000 DCD states that terminal ends and intermediate fittings are postulated for piping that has been seismically analyzed.

The staff review requires clarification on whether terminal ends, if any, are considered in the determination of the bounding postulated breaks for those nonseismic piping. If not, clarification is necessary to justify why terminal ends are excluded from the consideration.

The staff review also requires the detailed information regarding how the bounding dynamic effects (i.e., pipe whip and jet impingement loads) resulting from the bounding postulated breaks are determined, demonstration that the pertinent DCD methodologies are appropriately implemented in determining the resulting bounding dynamic loads on the Wall 11.2.

SCANA Response to Point 5

The LAR was supplemented to provide the clarification that terminal ends are considered for the bounding of postulated breaks.

For changes to the LAR text, see **Enclosure 1 page 42**.

For a review of the analysis details associated with the bounding of postulated breaks, the PRHA calculation containing the information can be made available to the NRC for an audit.

Point 6: On page 15, Part 1D of Updated Enclosure 2 – Supplement to Proposed Changes to Licensing Basis Documents (LAR 14-02 S1), there are proposed changes to UFSAR Subsection 3.6.1.1 and 3.6.1.3.2 discussing pipe whip effects resulting from postulated ruptures in main steam and main feedwater piping, but no mention of jet impingement loads. What is the basis for excluding jet impingement loads?

SCANA Response to Point 6

The LAR was clarified with respect to the application of jet impingement loads, by clarifying that all HELB loads were taken into consideration, in a manner consistent with the methodology approved by the NRC during the AP1000 DCD certification.

For changes to the LAR text, see **Enclosure 1 pages 7, 23, 32, 39, 42, 43, 64, 67, Enclosure 2 page 14.**

SCANA Response to Additional NRC comments

In addition to the Points above discussed in the January 22 public meeting, NRC provided 11 comments during the public meeting on February 25, 2016, after review of draft LAR NND-16-0056 (ML16055A344). The comments were provided verbally and have been reiterated below:

1. With respect to the Wall 11 rebar, clearly differentiate design or detail design from rebar detailing:
 - Updates were made throughout the LAR to better outline changes related to the reinforcement detailing and development.
 - Note that the portions of the LAR describing the NRC approved AP1000 design and design basis requirements or loadings, requested changes to the main steam penetration anchorage design, requested removal of the Wall 11 upper vent openings, or reference made to Figure 3H.5-5 as a depiction of the critical section reinforcement design are not affected by these changes.

For changes to the LAR text, see **Enclosure 1 pages 2- 4, 6, 8-10, 12, 13, 15, 16, 17, 20-23, 26, 27, 37, 39, 61, 62, 64, 67- 69, Enclosure 2 pages 2, 3, and 6.**

2. The wording describing the Wall 11 design being contingent on the Wall 11.2 design need to be clarified:
 - Updates were made throughout the LAR to clarify that the credit of Wall 11.2 (for HELB) and the turbine building first bay (for tornado missiles) are the design changes proposed to protect Wall 11 openings from tornado missiles, and Wall 11 against postulated breaks in the turbine building north of Wall 11.2.

For changes to the LAR text, see **Enclosure 1 pages 3- 5, 14, 23, 25-27, 30, 37, 42, 43, 44, 47, 60, 64-69, Enclosure 2 page 13.**

3. The discussion of Tier 2 changes involving Tier 2* need to be clarified as to what the Tier 2 changes are:

- Updates were made where necessary in the LAR to point the reader to text providing the detail pertaining to the Tier 2 changes.
- Note that generally, LAR Enclosure 1, Parts 1B, 1C and 1D focus on the Tier 2 changes, while Part 1A focuses on the Tier 2* changes.

For changes to the LAR text, see **Enclosure 1 pages 4, 5, 26.**

4. The higher pressure of 6.5 psi listed in Enclosure 1 table 1 of the draft LAR appears to the NRC as though the LAR requests the new pressure to be approved, this should to be clarified or deleted if applicable:

- The mention of 6.5 psi has been removed, and the LAR does not request approval of this value.

For changes to the LAR text, see **Enclosure 1 page 19**

5. In the draft LAR the statement appearing after Enclosure 1 table 1 mentioning governing load combination “3 and 7” as well as “5 and 7” needs to be clarified or deleted if applicable:

- The LAR was updated to delete the identification of governing load combinations from both Table 1 (Wall 11 load definition table) and Table 2 (Wall 11.2 load definition table)

For changes to the LAR text, see **Enclosure 1 pages 46 and 19.**

6. The NRC would like the LAR to confirm and state if it is the case, that there is no impact to any VBS doors from HELB or Tornado loading.

- The LAR was updated to clarify that these doors are not impacted by HELB or tornado loading in Parts 1B and 1C

For changes to the LAR text, see **Enclosure 1 pages 44, 51 and 52.**

7. To help NRC assess the barrier's technical requirements such as ductility, the licensee is requested to:

a) Provide barrier/anchoring material with specific grade (i.e. ASTM material)

- The LAR was updated to clarify the ASTM material grade for the barriers in Part 1D and the UFSAR markups to Subsection 3.5.2.

For changes to the LAR text, see **Enclosure 1 pages 52- 56, Enclosure 2 pages 16 and 19.**

b) To clarify the permanent nature of the barrier permanent nature of the barriers, which would require a 50.59 evaluation if they are to be removed/repair/replaced during plant operation

- The LAR was updated to stress the permanent nature of the barriers in Part 1D and the UFSAR markups to Subsection 3.5.2.

For changes to the LAR text, see **Enclosure 1 pages 50, 54, Enclosure 2 page 16.**

8. Discuss applicable anchoring code in the LAR

- The LAR Part 1D and the UFSAR markups to Subsection 3.5.2, were updated to point to the anchorage requirements discussed in UFSAR 3.8.4.5.1.

For changes to the LAR text, see **Enclosure 1 pages 50, 54-56, Enclosure 2 page 16.**

9. Correct compartment A to B and west to east in Table 3 Row 4

- The corrections were made

For changes to the LAR text, see **Enclosure 1 page 56.**

10. Revise the word “proceedings” to “hearings” in the LAR.

- The change was made as follows, “proceedings” was changed to made “NRC..review” because the NRC “hearings” did not take place at the time of the mentioned 2010 RAI was addressed.

For changes to the LAR text, see **Enclosure 1 page 30.**

11. Revise “dynamic effects” to “dynamic and environmental effects” in the LAR

- Updates were made throughout the LAR to change “dynamic effects” to “dynamic and environmental effects” where the LAR discusses evaluation of Wall 11.2 as a HELB barrier, or the design of Wall 11.
- Note that select portions of the LAR did not require these changes. In particular portions of the LAR stating that Wall 11.2 is credited for protecting Wall 11 against HELB loads. This is because Wall 11.2 is not needed to protect Wall 11 from environmental effects of pipe ruptures postulated north of Wall 11.2 (pressure, temperature), given that Wall 11 is already evaluated for the more severe environmental conditions associated with postulated ruptures in the first bay.

For changes to the LAR text, see **Enclosure 1 pages 7, 11, 17, 20, 25, 42, 43, 44, Enclosure 2 page 13.**