Vogtle PEmails

From: Gleaves, Bill
Sent: Monday, July 15, 2019 6:50 AM
To: Vogtle PEmails
Subject: FW: Draft Letter for 7/25/19 Pre-Submittal Meeting
Attachments: LAR-19-014_PSM_Draft.pdf

I am forwarding the email below and the attachment to ADAMS for capture.

Billy Gleaves

From: Henderson, Ryan Donald <RDHENDER@SOUTHERNCO.COM>
Sent: Friday, July 12, 2019 9:46 AM
To: Gleaves, Bill <Bill.Gleaves@nrc.gov>
Cc: Patel, Chandu <Chandu.Patel@nrc.gov>; Rankin, Jennivine <Jennivine.Rankin@nrc.gov>; Arafeh, Yasmeen N. <YNARAFEH@southernco.com>; Chamberlain, Amy Christine <ACCHAMBE@southernco.com>; Aughtman, Amy G. <AGAUGHTM@SOUTHERNCO.COM>
Subject: [External_Sender] Draft Letter for 7/25/19 Pre-Submittal Meeting

Billy,

The attached document is provided for the Public Meeting on Thursday, July 25, 2019. Please send to the reviewers and let me know if you have any questions prior to the meeting. We will also bring additional information for the Closed portion of the meeting.

Thanks,

Ryan Henderson
Licensing
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Hearing Identifier: Vogtle_COL_Docs_Public
Email Number: 461

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Southern Nuclear Operating Company

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Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment:

Tornado Missile Protection for Main Steam Vent Stacks and Wall 11 (LAR-19-014)

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(This Enclosure consists of 23 pages, including this cover page)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC, or the "Licensee") hereby requests an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

1. SUMMARY DESCRIPTION

The requested amendment proposes changes to the evaluation of the auxiliary building main steam safety valve (MSSV) vent stack openings and the auxiliary building Wall 11 openings for protection from tornado generated missiles. The changes include the evaluation of a horizontal automobile missile disabling the MSSV vent stack openings, the evaluation of a vertical missile targeting the MSSV vent stack openings, and the evaluation of an automobile missile targeting the auxiliary building Wall 11 openings. The evaluations demonstrate that the tornado missiles will not prevent safe shutdown and will not result in an offsite release exceeding the limits defined in 10 CFR 50.34.

The requested amendment requires changes to the licensing basis documents in the form of departures from the plant-specific Design Control Document (DCD) Tier 2 information (as incorporated into the UFSAR and detailed in Section 2). No change is made to Tier 1, Tier 2*, or COL information; however this change involves a revision to plant-specific Tier 2 information that meets the criteria for a license amendment under 10 CFR Part 52, Appendix D, Section VIII.B.5.b(8) in that it was determined that the proposed change would result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses, and thus requires NRC approval for the Tier 2 departures. This enclosure requests approval of the license amendment necessary to implement the change.

2. DETAILED DESCRIPTION and TECHNICAL EVALUATION

2.1 Change 1: Main Steam Safety Valve (MSSV) Vent Stacks

As described in UFSAR (plant-specific DCD) Subsection 3.5.2, systems required for safe shutdown are protected from the effects of missiles. These systems are identified in UFSAR Section 7.4. Protection from external missiles, including those generated by natural phenomena, is provided by the external walls and roof of the Seismic Category I nuclear island structures. The external walls and roofs are reinforced concrete. The structural design requirements for the shield building and auxiliary building are outlined in UFSAR Subsection 3.8.4. 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.

Where necessary, adjacent structures and/or missile barriers are used to protect openings in the nuclear island building structures. Building structures currently credited in this evaluation to protect openings in Seismic Category I nuclear island building structures are Seismic Category I or Seismic Category II. As identified in UFSAR 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,

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including missiles, in accordance with the loading combinations identified in UFSAR Table 3.8.4-2.

As described in UFSAR Subsection 3.2.1.1.2, the turbine building first bay building structure, including Wall 11.2, is a Seismic Category II structure as identified in UFSAR Table 3.2-2. The turbine building first bay building structure provides tornado missile protection for openings in Wall 11 as described in UFSAR Table 3.5-1.

As described in UFSAR Subsection 3.5.1.4, the following missiles are postulated:

- A massive high-kinetic-energy missile, which deforms on impact. It is assumed to be a 4000-lb automobile impacting the structure at normal incidence with a horizontal velocity of 105 mph or a vertical velocity of 74 mph. This missile is considered at all plant elevations up to 30 feet above grade. In addition, to consider automobiles parked within half a mile of the plant at higher elevations than the plant grade elevation, the evaluation of the automobile missile is considered at all plant elevations up to the junction of the outer wall of the Passive Containment Cooling Water Storage Tank (PCCWST) with the roof of the shield building. This evaluation is approximately 193 feet above grade. This evaluation bounds sites with automobiles parked within a half of a mile of the shield building and auxiliary building at elevation up to the equivalent of 163 feet above grade.
- A rigid missile of a size sufficient to test penetration resistance. It is assumed to be a 275 pound, eight inch armor-piercing artillery shell impacting the structure at normal incidence with a horizontal velocity of 105 mph or a vertical velocity of 74 mph.
- A small rigid missile of a size sufficient to just pass through any openings in protective barriers. It is assumed to be a one inch diameter solid steel sphere assumed to impinge upon barrier openings in the most damaging direction at a velocity of 105 mph.

In addition to the missile spectrum specified above, the impact of tornado-driven sheet metal siding on the shield building is evaluated. The evaluation considers siding representative of the siding used on the turbine building, radwaste building, diesel generator building, and portions of the annex building. The evaluation considers a flat steel sheet, which bounds the corrugated siding design used on the buildings adjacent to the nuclear island.

As described in UFSAR Subsection 10.1.2, MSSVs are provided on both main steam lines, in accordance with the ASME Code Section III. The pressure relief capacity of the MSSVs is such that the energy generated at the high-flux reactor trip setting can be dissipated through the system. The design capacity of the MSSVs equals or exceeds 105 percent of the nuclear steam supply system (NSSS) design steam flow at an accumulation pressure not exceeding 110 percent of the main steam system (MSS) design pressure. Overpressure protection of the main steam lines is a safety-related function. Additionally, MSS is not identified as a safe shutdown system in UFSAR Table 7.4-1 because of the passive features of the AP1000.

As described in UFSAR Subsection 10.3.2.2.2, MSSVs with sufficiently rated capacity are provided to prevent the steam pressure from exceeding 110 percent of the MSS design pressure:

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- Following a turbine trip without a reactor trip and with main feedwater flow maintained.
- Following a turbine trip with a delayed reactor trip and with the loss of main feedwater flow.

A total MSSV rated capacity as indicated in UFSAR Table 10.3.2-2 meets this requirement. At the same time, the individual safety valves are limited to the maximum allowable steam relief valve capacity as indicated in UFSAR Table 10.3.2-2 for a system pressure equal to main steam design pressure plus 10 percent overpressure. This value sufficiently limits potential uncontrolled blowdown flow and the ensuing reactor transient should a single safety valve inadvertently fail or stick in the open position.

Six safety valves are provided per main steam line. UFSAR Table 10.3.2-2 lists the performance data and set pressures for the MSSVs.

The MSSVs are located in the safety-related portion of the main steam piping upstream of the Main Steam Isolation Valves and outside the containment in the auxiliary building. Adequate provision is made in the steam piping for the installation and support of the valves. Consideration is given to the static and dynamic loads when operating or when subjected to seismic events. As shown in UFSAR Table 3.2-3, the MSSVs are AP1000 Class B, Seismic Category I, and ASME III-2.

Each safety valve is connected to vent stacks by an open umbrella-type transition piece schematically depicted in Detail A of UFSAR Figure 10.3.2-1. There are a total of 24 vent stacks (12 per main steam line) that are 24-inch diameter and extend approximately 9 feet above the roof of the Auxiliary Building. The vent stacks are designed to:

- Direct the relieved steam away from adjoining structures.
- Prevent backflow of relieved steam through the umbrella-type transition section.
- Draw a small quantity of ambient air through the umbrella-type transition section and mix with the total steam flow which leaves the vent stack outlet.
- Minimize the backpressure on the valve outlet so that it does not restrict the valve's rated capacity.

The vent stacks are structurally designed to withstand safe-shutdown earthquake loads. The vent stacks are AP1000 Class C and Seismic Category I.

As described in UFSAR Subsection 6.2.3.1.1, each line that penetrates the containment, that is neither part of the reactor coolant pressure boundary nor connected directly to the atmosphere of the containment, and that satisfies the requirements of a closed system is provided with a containment isolation valve according to General Design Criterion (GDC) 57. The closed system is protected against missiles. The main steam line is part of the closed system and is therefore evaluated on a case-by-case basis to provide confidence that a missile would not prevent safe shutdown and would not result in an offsite release exceeding the limits defined in 10 CFR 50.34, as described in UFSAR Subsection 3.5.2.

The main steam vent stacks are currently identified as components required to mitigate consequences of an accident and to establish and maintain safe shutdown conditions following a design basis tornado or hurricane event, thus requiring protection from tornado

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and hurricane-generated missiles in accordance with 10 CFR Part 50, Appendix A, Criterion 4 and Regulatory Guide 1.117, Revision 1.

An evaluation has been performed for the Main Steam Isolation Valve (MSIV) Upper Compartments (Rooms 12504 and 12506) which have 24 MSSV vent stack openings in the roof (12 per main steam line). The details of the evaluation for each tornado missile spectra on the MSSV vent stack or through the vent stack opening, as applicable, is described below. The results of the evaluation demonstrate that a tornado missile impact on or through the MSSV vent stacks does not affect safe shutdown and is not required to be protected from tornado and hurricane-generated missiles based on evaluation of the vent stacks, VEGP Units 3&4 site topography, and arrangement of surrounding buildings.

2.1.1 MSSV Vent Stacks – Impact from 1" Steel Sphere

2.1.1.1 Horizontal Impact

A 1" steel sphere horizontal missile could impact the sides of the main steam vent stacks. Analysis shows that 0.0214 inch is the minimum steel thickness to prevent perforation from the impact of a 1" steel sphere traveling at 105 mph. The MSSV vent stack is 0.375 inch thick (nominally) which exceeds the required minimum perforation thickness of 0.0214 in. The 1" steel sphere may create a small dent on the MSSV vent stacks but will not impact the flow discharge area. Therefore, full operability of the MSSV vent stack is maintained after vertical impact from the 1" steel sphere.

2.1.1.2 Vertical Impact

A 1" steel sphere vertical missile could enter through the top of the main steam vent stacks, travel down the stacks, and impact the MSSV discharge elbow (cactus arm) or drip pan. Analysis shows that 0.0214 inch is the minimum steel thickness to prevent perforation from the impact of a 1" steel sphere traveling at 105 mph. The cactus arm is 0.365-inch thick steel and the drip pan is 0.25-inch thick steel which exceeds the required minimum perforation thickness of 0.0214 in. Therefore, full operability of the MSSV vent stack is maintained after vertical impact from the 1" steel sphere.

Additional analysis shows that ASME piping stress limits are not exceeded if a 51 lbm missile drops from the top of the vent stack with an initial velocity of 0 ft/s and impacts the pipe elbow at the bottom of the vent stack (32 feet below) at a velocity of 45.38 ft/s. A missile of this mass would correlate to a 7-inch diameter steel sphere. This missile is representative of small debris that may hit the top of the vent stacks and fall down the vent stack.

2.1.2 MSSV Vent Stacks – Impact from 275-pound, 8" armor-piercing artillery shell

2.1.2.1 Horizontal Impact

An 8" shell horizontal missile could strike the main steam vent stacks. Impact from the missile of the main steam vent stacks could cause deformation, create an opening, or crimp the stack. This may affect one or two localized stacks without adversely affecting

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the potential secondary side steam release required to prevent over-pressurization of the main steam line.

Analysis shows that even if the main steam vent stacks became damaged enough to crimp them all, an alternative steam discharge path exists. This alternative discharge path ensures the safety-related function to relieve the main steam pressure can be accomplished without requiring the main steam vent stacks to be open. This alternative steam discharge path utilizes the opening between the main steam vent stack and the stack drip pan. The steam would fill the MSIV compartments before discharging through the MSIV door openings (between Rooms 12504/12506 and the Turbine Building First Bay), the Valve/Piping Penetration Room door opening (between Room 12306 and the Turbine Building First Bay) and MSIV pressure relief/flood panel. The steam discharge then is distributed into the Turbine Building First Bay.

Analysis demonstrates the alternative steam relief pathway does not challenge the structural integrity of the MSIV compartment walls relative to sub-compartment pressurization. The steam release sub-compartment pressure increase results in 5.6 psid (from room to outside environment). This is below the designed delta pressure of 6.5 psid, and is therefore acceptable.

2.1.2.2 Vertical Impact

An 8" shell vertical missile could strike the main steam vent stacks. Two vertical impact locations at the opening of the main steam vent stacks are considered: the centerline and the farthest edge relative to the MSSV. The centerline location presents the least amount of material to interfere with the missile's trajectory. The edge location maximizes the moment applied at the MSSV flange.

Analysis demonstrates that in the event that the missile clears the edges of the stack and continues down the centerline of the stack, the missile will puncture the vent arm material and exit with a low vertical velocity (8 mph) and moderate horizontal velocity (27 mph). The kinetic energy of the missile is reduced 85% and vertical velocity is reduced 90%. The missile could enter into the MSIV room, however the kinetic energy is reduced significantly and the missile is assumed to fall on the floor.

In the event that the missile strikes the farthest stack edge relative to the MSSV, the missile will be stopped by the vent material and remain at the top end of the vent arm. The kinetic energy of the missile is reduced 98% and the vertical velocity is reduced 100%.

For both scenarios, the main steam line remains intact.

2.1.3 MSSV Stacks – Impact from large deformable debris (represented by 4000-lb automobile)

NUREG 0800 Section 3.5.1.4 states that the automobile missile should be considered at all elevations up to 30 feet above all grade levels within 0.5 mile of the facility structures. This is consistent with UFSAR Subsection 3.5.1.4.

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Additionally, UFSAR Subsection 3.5.1.4 states that for automobiles parked within half a mile of the plant at higher elevations than the plant grade elevation, the evaluation of the automobile missile is considered at all plant elevations up to the junction of the outer wall of the passive containment cooling water storage tank with the roof of the shield building. This elevation is approximately 193 feet above grade. This requirement was added to the DCD during certification to address the V.C. Summer parking lot elevations above grade.

As shown in UFSAR Table 2.0-201, Vogtle Electric Generating Plant (VEGP) Units 3 and 4 plant grade elevation 220' corresponds to DCD site elevation 100'. Within 0.5 mile of the VEGP Units 3 & 4, the highest grade elevation that automobiles would normally be parked is 247', which is located near office building 301 south east of the plants. Evaluating for an automobile 30' above this elevation results in an elevation of 277'. Figure 1-1 in Enclosure 3 shows a topography map of the VEGP Units 3 & 4 with 0.5-mile radius shown with dashed line. There are elevations above 247' within 0.5 mile of VEGP Units 3&4, however these locations would not contain automobiles or other large equipment.

Based on the Vogtle site specific topography and site layout, there is a limited line of sight to the main steam vent stacks. As shown in Figure 1-2, the Annex Building, Containment Building (Shield Building), Turbine Building First Bay, and Passive Containment Cooling Ancillary Water Storage Tank (PCCAWST) surround the Auxiliary Building roof where the main steam vent stacks are located. As shown in Table 1-1, the surrounding structures exceed the elevation of the Auxiliary Building roof low point and will provide protection to the main steam vent stacks. The Annex Building (Column 2 to 9), Shield Building, Turbine Building First Bay, and PCCAWST are above the elevation required to be evaluated for automobile missiles and will prevent an automobile from hitting the main steam vent stacks. The Annex Building (Column 9 to 13) elevation is below the max elevation evaluated for automobile missiles by 18". Due to the size of large debris (16.4' x 6.6' x 4.2'), part of the debris would hit the Annex Building (Column 9 to 13) wall and cause a ricochet. Therefore, there is no line of sight for automobile missiles if these buildings are in the missile path.

The Shield Building is Seismic Category I. The Turbine Building First Bay, Annex Building (portion credited), and PCCAWST are Seismic Category II as shown in UFSAR Table 3.2-2 and Table 3.2-3. As described in UFSAR Subsection 3.3.2 and 3.5.2, Seismic Category I and Seismic Category II structures are designed to withstand the design basis tornado loads, including missiles. Therefore, the structures will stop the automobile missile from reaching the main steam vent stacks.

Based on the elevation of the vent stacks, Vogtle site topography, and arrangement of surrounding building, an automobile missile is not a credible impact on the vent stacks.

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Figure 1-2: AP1000 Plant Building Arrangement

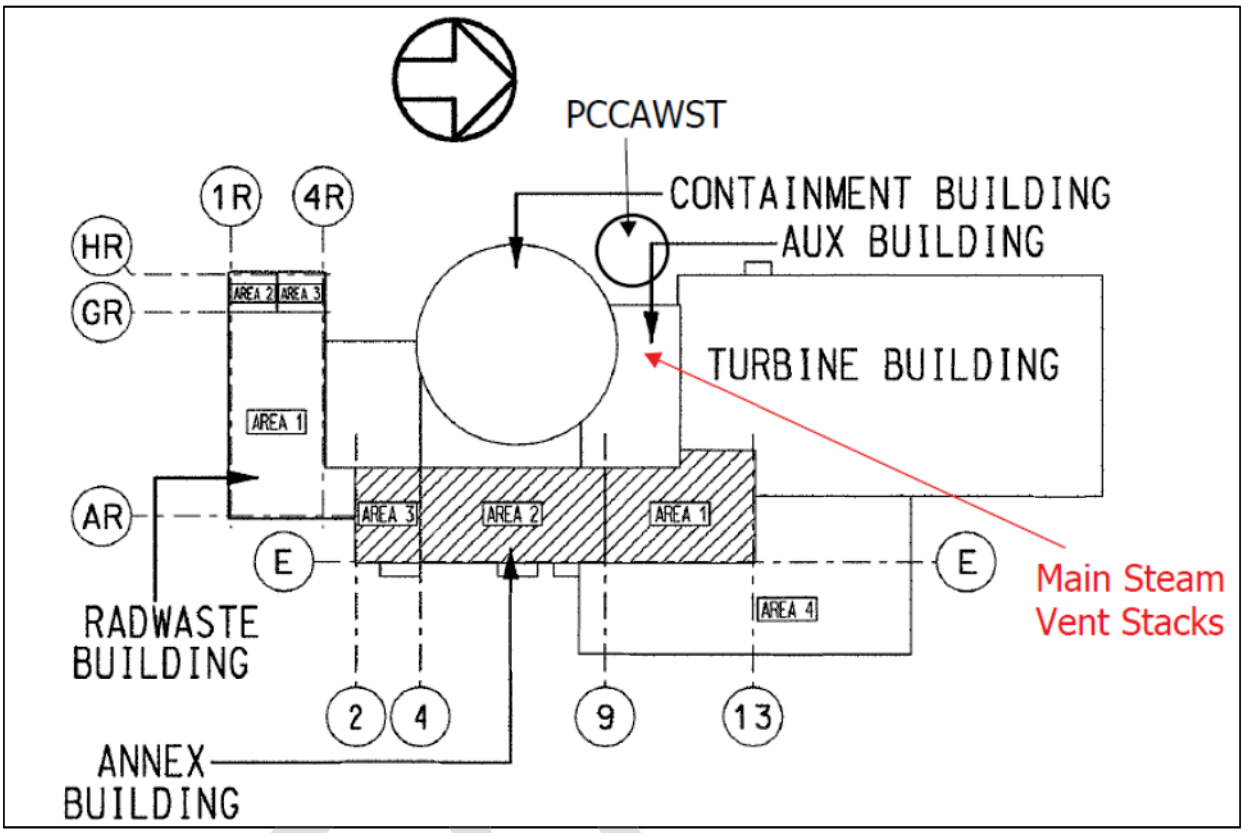

Table 1-1: Site Grade and Structure Elevations

	Standard Plant Elevation	**VEGP 3 & 4 Elevation**
Max Grade Level with 0.5 Mile of Plants	N/A	247'-0"
Max Elevation evaluated for Automobile Missiles	N/A	277'-0"
Auxiliary Building – Low Point	153'-0"	273'-0"
Annex Building – Column 2 to 9	183'-0 ¼"	303'-0 ¼"
Annex Building – Column 9 to 13	155'-6"	275'-6" (1)
Containment Building (Shield Building) - junction of the outer wall of the passive containment cooling water storage tank with the roof of the shield building.	293'-9"	413'-9"
Turbine Building First Bay	168'-3"	288'-3"
PCCAWST – High Point	157'-0"	277'-0"

Note 1: This elevation is below the max elevation evaluated for automobile missiles by 18". Due to the size of large debris (16.4' x 6.6' x 4.2'), part of the debris would hit the Annex Building wall and cause a ricochet.

2.1.3.1 Horizontal Impact

While an automobile missile is not deemed credible to impact the main steam vent stacks as discussed above, an analysis is completed to evaluate the results of such an impact to demonstrate the layers of protection provided by the plant design. Analysis shows that even if the main steam vent stacks became damaged enough to crimp them all, an alternative steam discharge path exists. This alternative discharge path ensures the safety-related function to relieve the main steam pressure can be accomplished without requiring the main steam vent stacks to be open. This alternative steam discharge path utilizes the opening between the main steam vent stack and the stack drip pan. The steam would fill the MSIV compartments before discharging through the MSIV door openings (between Rooms 12504/12506 and the Turbine Building First Bay), the Valve/Piping Penetration Room door opening (between Room 12306 and the Turbine Building First Bay) and MSIV pressure relief/flood panel. The steam discharge then is distributed into the Turbine Building First Bay.

Analysis demonstrates the alternative steam relief pathway does not challenge the structural integrity of the MSIV compartment walls relative to sub-compartment pressurization. The steam release sub-compartment pressure increase results in 5.6 psid (from room to outside environment). This is below the designed delta pressure of 6.5 psid, and is therefore acceptable.

While the limiting case for reaching safe-shutdown following a horizontal tornado missile strike to the MSSV stacks is to assume all MSSV stacks are crimped thus causing increased backpressure on the MSSV's, consideration has been given to scenarios where only a subset of the stacks is damaged by the tornado missile. Of these scenarios the limiting case would be crimping off one row of six MSSV stacks while the opposite row of six remains free flowing. Though unlikely due to the orientation of the stacks and the size and trajectory of the automobile missile; if this case were to occur there is a potential for imbalance loads on the main steam line piping when the MSSVs actuate as one side of the MSSV would vent normally and the other would pressurize within the stack and vent around the drip pan. The load from the pressure on the drip pan would be transferred to the cactus arm and ultimately to the MSSV connection to the steam line. The limiting stress location for loads applied to the MSSV cactus arm is the branch connection from the MSSV to the main steam line. Assuming failure of the main steam line branch connection to the MSSVs would be the worst case for this event. There is no risk of exceeding allowable secondary side pressures as the MSSVs would actuate as anticipated and begin venting. Pressure would build on one side of the MSSV until the branch connection ultimately failed, providing a larger vent area. This could be assumed to happen to each MSSV. Regardless of available vent area, the steam flow from a single main steam line cannot exceed the 1.4 ft^2 flow area analyzed in the UFSAR Subsection 15.1.5 safety analysis due to the flow restrictor at the SG outlet. This ensures that even in this scenario safe shutdown can be achieved within the assumptions of the Chapter 15 analysis. There is no impact to equipment qualification because the temperature and pressure are bounded by a main steam line break.

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The alternate vent path through the doors in Rooms 12306, 12504, and 12506 do not affect fire zones or fire barriers because severe natural phenomena are not assumed to occur concurrent to a fire as described in UFSAR Subsection 9A.2.7.1.

2.1.3.2 Vertical Impact

The tops of the main steam vent stacks are at elevation 164' (Vogtle Elevation 284'). This elevation is 7' above the maximum elevation required to be evaluated for automobile missiles. Therefore, a directly downward vertical automobile missile is considered not-credible and will not be considered specifically for the vent stacks.

2.1.4 Backpressure on MSSV

For missiles that may crimp the main steam vent stacks, an assessment was completed to determine whether the MSSV can maintain its function of steam line over-pressure protection in the event that the vent stack is blocked (crimped). The assessment required that a flow path of steam through the vent stack drip pan be evaluated to show that its resistance to flow does not generate excessive MSSV backpressure. The flow areas through the drip pan flow path are analyzed to determine the backpressure on the MSSV. Results from the assessment state that the expected maximum MSSV backpressure with an as-procured valve could be as high as 275 psia.

Vendor literature was consulted in order to evaluate whether an increased backpressure of the magnitude shown above would have adverse consequences. The vendor literature indicates that valve capacity is not affected until backpressure is on the order of 50% inlet pressure. Even at a backpressure of 275 psia, the MSSVs are not encroaching on this value.

2.1.5 Addition of First Bay Missile Barrier

A steel missile barrier is proposed to be added in the Turbine Building First Bay at Elevation 100'-0" in front of the Wall 11 door to Room 12306 to eliminate the line of sight into Room 12306 and prevent sphere and artillery missiles from penetration. The missile barrier is designed in accordance with AISC N690-1994 and meets UFSAR Subsection 3.5.3 requirements.

The missile barrier is a solid steel plate with a steel support frame permanently anchored to the floor. The thickness of the steel plate prevents penetration of the 1-inch sphere missile and 8-inch artillery shell while meeting the barrier ductility requirements contained in UFSAR Subsection 3.5.3.1. The missile barrier framing and supports are sufficient to prevent bending or overturning of the barrier plate under missile impact loadings. The missile barrier anchors meet the anchorage requirements in UFSAR Subsection 3.8.4.5.1. Design and construction of fastening to concrete is in accordance with ACI 349-01, Appendix B. The material is specified to be as follows or steel with equal or better material properties:

- Barrier plate (ASTM A240)
- Barrier support frame (ASTM A500, Gr. B)

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- Anchors (ASTM A325 or ASTM A490, and ASTM F1554, Gr. 105 as required)

The missile barrier design drawings allow for the barrier plate to be ASTM A240 or ASTM A572, Gr. 50. ASTM A572, Gr. 50 is not listed as a material of construction in UFSAR Table 3.5-1 Note 3, but has equal or better material properties to ASTM A240 as allowed by the note. ASTM A572, Gr. 50 has a yield strength of 50 ksi which is better than ASTM A240 yield strength of 25 ksi.

The missile barrier is proposed to be classified as seismic Category II, equipment Class D since

1) This classification aligns with the philosophy outlined in NRC Generic Letter 84-01, which indicates that a classification of nonsafety-related, but “important to safety” is appropriate for this protective function;
2) The level of quality applied to equipment Class D SSCs, which although non-safety related, contains additional requirements on procurement, inspection, or monitoring, which is in line with the level of quality expected for nonsafety-related, but “important to safety,” functions; and
3) The level of quality applied to equipment Class D SSCs corresponds with the level of quality applied to seismic Category II structures, such as the turbine building first bay building structure, and thus commensurate with the level of quality of the structure to which they are mounted and structurally supported by (turbine building first bay building structure).

The proposed missile barrier does not affect airflow, venting, or personnel access. The proposed barrier is a solid design that eliminates line of sight to the Wall 11 door to room 12306. Personnel are still able to walk around the barrier and access room 12306. The barrier will allow clearance for the door to open and allow venting of room 12306 in the event that the main stream vent stacks are crimped.

The Turbine Building First Bay does not have any designated fire barriers, thus the addition of missile barrier to the Turbine Building First Bay does not affect any required fire rating in the Turbine Building, nor adversely impact the fire ratings of barriers in close proximity to the Turbine Building First Bay. The alternate vent path through the doors in Rooms 12306, 12504, and 12506 do not affect fire zones or fire barriers because severe natural phenomena are not assumed to occur concurrent to a fire as described in UFSAR Subsection 9A.2.7.1.

The proposed missile barrier does not adversely impact radiologically controlled zones. The proposed missile barriers are not credited as radiological shielding.

The proposed missile barrier does not adversely impact emergency plans because there are no changes to the external configuration of the roof, walls, doors, or access to the Nuclear Island.

The proposed missile barrier does not interface with or affect safety-related equipment or a fission product barrier. No system or design function or equipment qualification would be adversely affected by the proposed changes. The proposed changes do not affect the operation of any systems or equipment. The proposed changes do not result

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in a new failure mode, malfunction or sequence of events that could adversely affect a radioactive material barrier or safety-related equipment.

For the doors between Rooms 12504/12506 and the Turbine Building First Bay which may open to vent, a line of sight evaluation shows that the Turbine Building First Bay structure prevents a missile from entering the Turbine Building First Bay at Elevation 135'-3" and 148'-0" except for three large openings. There is no line of sight to safe shutdown equipment if the doors are open due to geometry. Due to the angle of the missile paths from the large openings to the doors, the missile could hit the door frame but would not enter into Rooms 12504/12506. The Turbine Building First Bay building structure is sufficient to protect safe shutdown equipment. Therefore, no barrier is required between Rooms 12504/12506 and the Turbine Building First Bay. (See Change 2 for more discussion and for discussion of protection from an automobile missile.)

2.2 Change 2: Removal of Turbine Building First Bay Barriers

As described in UFSAR (plant-specific DCD) Subsection 3.5.2, systems required for safe shutdown are protected from the effects of missiles. These systems are identified in UFSAR Section 7.4. Protection from external missiles, including those generated by natural phenomena, is provided by the external walls and roof of the Seismic Category I nuclear island structures. The external walls and roofs are reinforced concrete. The structural design requirements for the shield building and auxiliary building are outlined in UFSAR Subsection 3.8.4. 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.

Where necessary, adjacent structures and/or missile barriers are used to protect openings in the nuclear island building structures. Building structures currently credited in this evaluation to protect openings in Seismic Category I nuclear island building structures are Seismic Category I or Seismic Category II. As identified in UFSAR 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 UFSAR Table 3.8.4-2.

As described in UFSAR Subsection 3.2.1.1.2, the turbine building first bay building structure, including Wall 11.2, is a Seismic Category II structure as identified in UFSAR Table 3.2-2. The turbine building first bay building structure provides tornado missile protection for openings in Wall 11 as described in UFSAR Table 3.5-1.

As described in UFSAR Subsection 3.5.1.4, the following missiles are postulated:

- A massive high-kinetic-energy missile, which deforms on impact. It is assumed to be a 4000-lb automobile impacting the structure at normal incidence with a horizontal velocity of 105 mph or a vertical velocity of 74 mph. This missile is considered at all

plant elevations up to 30 feet above grade. In addition, to consider automobiles parked within a half of a mile of the plant at higher elevations than the plant grade elevation, the evaluation of the automobile missile is considered at all plant elevation up to the junction of the outer wall of the Passive Containment Cooling Water Storage Tank (PCCWST) with the roof of the shield building. This evaluation is approximately 193 feet above grade. This evaluation bounds sites with automobiles parked with half a mile of the shield building and auxiliary building at elevation up to the equivalent of 163 feet above grade.

- A rigid missile of a size sufficient to test penetration resistance. It is assumed to be a 275 pound, eight inch armor-piercing artillery shell impacting the structure at normal incidence with a horizontal velocity of 105 mph or a vertical velocity of 74 mph.
- A small rigid missile of a size sufficient to just pass through any openings in protective barriers. It is assumed to be a one inch diameter solid steel sphere assumed to impinge upon barrier openings in the most damaging direction at a velocity of 105 mph.

In addition to the missile spectrum specified above, the impact of tornado-driven sheet metal siding on the shield building is evaluated. The evaluation considers siding representative of the siding used on the turbine building, radwaste building, diesel generator building, and portions of the annex building. The evaluation considers a flat steel sheet, which bounds the corrugated siding design used on the buildings adjacent to the nuclear island.

SNC LAR-15-021 (Amendment No. 51 – ML16201A298) requested approval for crediting Turbine Building First Bay Seismic Category II structures, including missile barriers in front of First Bay large openings in Wall 11.2 and Wall R, to protect the Auxiliary Building Wall 11 openings. The primary design function of the large opening missile barriers was to protect openings in Wall 11 from the automobile missile described in UFSAR Subsection 3.5.1.4. Based on further review of the First Bay large opening missile barriers, it has been determined that their protection function is no longer needed based on the trajectory not being credible. Therefore, it is proposed that the First Bay barriers be removed from the design, and instead credit is being taken for the structures, equipment, and components in the Turbine Building and Annex Building to dissipate the kinetic energy of the automobile missile below the kinetic energy for the 1-inch steel sphere and artillery shell, either by breaking it up into smaller pieces or by slowing it down enough.

Additionally, it has been determined that there is no line of sight for a shell or sphere missile to pass through Wall 11.2 or Wall R large openings and impact safe shutdown equipment. Therefore, it is proposed to revise UFSAR Table 3.5-1 to remove credit for the large opening missile barriers for the shell and sphere missiles, and instead credit is being taken for Turbine Building First Bay building structures preventing a line of sight to safe shutdown equipment.

UFSAR Table 3.5-1 was added in LAR-15-021 to identify the Wall 11 openings and locations, and the protection provided for each opening, by tornado missile type. The conclusions from LAR-15-021 for the sphere and artillery shell missiles remain unchanged.

- 1-inch sphere
  - The turbine building first bay structure stops the 1-inch sphere missile.
  - Wall 11 doors are qualified to stop the 1-inch sphere missile.

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  - A missile barrier added to the interior of the turbine building first bay at elevation 117′-6″, northeast of the MSIV compartment B, protects the MSIV compartment B drain/vent located under the Wall 11 main steam line penetration from the 1-inch sphere missile passing through turbine building first bay openings.
  - The 1-inch sphere missile cannot pass through the steam vent opening in the MSIV compartment A due to the geometry of the path.
  - The 1-inch sphere missile cannot affect safe shutdown equipment via other Wall 11 penetrations due to one or more of the following:
    - No line of sight through penetration
    - Pipe sleeves and associated piping
    - Penetration contents
    - Covers provided on spare penetrations
    - Pipe analyzed for high energy pipe break
    - No safe shutdown equipment in the line of sight for missiles passing through penetration
- 8-inch artillery shell missile
  - The turbine building first bay building structure stops the 8-inch artillery shell missile.
  - Wall 11 doors are qualified to stop the 8-inch artillery shell missile.
  - A missile barrier added to the interior of the turbine building first bay at elevation 117′-6″, northeast of the MSIV compartment B, protects the MSIV compartment B drain/vent located under the Wall 11 main steam line penetration from the 8-inch artillery shell missile passing through turbine building first bay openings.
  - The 8-inch artillery shell missile cannot pass through the steam vent openings in the MSIV compartment A due to the geometry of the potential paths.
  - The 8-inch artillery shell missile cannot affect safe shutdown equipment via other Wall 11 penetrations due to one or more of the following:
    - No line of sight through penetration
    - Pipe sleeves and associated piping
    - Penetration contents
    - Covers provided on spare penetrations
    - Pipe analyzed for high energy pipe break
    - No safe shutdown equipment in the line of sight for missiles passing through penetration

This activity proposes to remove the Wall 11.2 and Wall R large opening missile barriers that were added in LAR-15-021 to protect Wall 11 openings from large debris (represented by automobile missiles). An evaluation shows that an automobile missile would have to travel a highly tortuous path through the Turbine Building and/or Annex Building in order for it to reach the Turbine Building First Bay and Auxiliary Building Wall 11 or would not have a line of sight. The Turbine Building and Annex Building are highly congested with structures, equipment, and components, therefore it is proposed that the Turbine Building and Annex Building structures, equipment, and components be credited as stopping the deformable automobile from entering the Turbine Building First Bay. The tortuous path is assumed to dissipate the kinetic energy of the automobile missile below the kinetic energy for the 1-inch steel sphere and artillery shell, either by breaking it up into smaller pieces or by slowing it down enough. Any pieces that break off would be bounded by the 1-inch steel sphere and artillery missile evaluations.

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A summary of the tornado missile mitigation features for each of the three missile types is shown in Table 2-1. See Figures 2-1 through 2-8 in Enclosure 3 to see the tornado missile paths. The term line of sight (LOS) is defined as clear view from an opening in the Turbine Building First Bay walls (Wall 11.2, Wall R, Wall I.2) through an opening (5 doors and 2 MSIV vent openings) or penetration (electrical, piping, HVAC) in Wall 11, and into the Auxiliary Building. Missiles cannot penetrate and pass through the Turbine Building First Bay concrete wall or the concrete roof, or the concrete Wall 11 of the Auxiliary Building. For this reason, these are not considered credible LOS. The structures, equipment, and components in the Turbine Building and Annex Building are credited for stopping automobile missiles before the missile reaches the Turbine Building First Bay, therefore these are not considered credible LOS. If the angle of the missile path through the Turbine Building First Bay walls to an opening/penetration in Wall 11 is such that the missile will not hit safe shutdown equipment, this path is not considered a credible LOS. Note that Table 2-1 includes some paths that have no credible LOS. Previous evaluations showed that these paths had a credible LOS, but upon re-evaluation there is no LOS. Those paths are included in the table to track the change.

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Table 2-1: Line of Sight Mitigation Features

	Mitigation Features		
Path Number	**1" Solid Steel Sphere Missile**	**8" Artillery Shell Missile**	**Automobile Missile**
1	First Bay Missile Barrier (proposed to be added in Change 1)	First Bay Missile Barrier (proposed to be added in Change 1)	No Credible LOS
2	First Bay Missile Barrier (proposed to be added in Change 1)	First Bay Missile Barrier (proposed to be added in Change 1)	No Credible LOS
3	First Bay Missile Barrier (proposed to be added in Change 1)	First Bay Missile Barrier (proposed to be added in Change 1)	No Credible LOS
4	First Bay Missile Barrier (proposed to be added in Change 1)	First Bay Missile Barrier (proposed to be added in Change 1)	No Credible LOS
5	First Bay Missile Barrier (proposed to be added in Change 1)	First Bay Missile Barrier (proposed to be added in Change 1)	No Credible LOS
6	Wall 11 Door	Wall 11 Door	No Credible LOS
7	Wall 11 Door	Wall 11 Door	No Credible LOS
8	No Credible LOS due to Annex Building and angle of the path	No Credible LOS due to Annex Building and angle of the path	No Credible LOS
9	Wall 11 Door	Wall 11 Door	No Credible LOS
10	Wall 11 Door	Wall 11 Door	No Credible LOS
11	Wall 11 Door	Wall 11 Door	No Credible LOS
12	No Credible LOS due to angle of the path	No Credible LOS due to angle of the path	No Credible LOS
13	No Credible LOS due to Annex Building and angle of the path	No Credible LOS due to Annex Building and angle of the path	No Credible LOS
14	No Credible LOS due to angle of the path	No Credible LOS due to angle of the path	No Credible LOS
15	Missile Barrier	Missile Barrier	No Credible LOS
16	No Credible LOS due to angle of the path	No Credible LOS due to angle of the path	No Credible LOS
17	Missile Barrier	Missile Barrier	No Credible LOS
18	No Credible LOS due to angle of the path	No Credible LOS due to angle of the path	No Credible LOS

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The Turbine Building First Bay does not have any designated fire barriers, thus the removal of missile barriers in the Turbine Building First Bay does not affect any required fire rating in the Turbine Building, nor adversely impact the fire ratings of barriers in close proximity to the Turbine Building First Bay.

The proposed changes do not adversely impact any functions associated with containing, controlling, channeling, monitoring, or processing radioactive or non-radioactive materials, nor do they diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. The types and quantities of expected plant effluents are not changed.

No effluent release path is impacted by this change. Therefore, neither radioactive nor non-radioactive material effluents are affected by this activity.

Proposed changes do not adversely impact radiologically controlled zones. The Wall 11.2 and Wall R large opening missile barriers are an open grating type design which allows for flow between rooms, therefore the barriers are not credited as radiological shielding. The thickness of the walls and the density of the concrete are not changed; therefore, there is no adverse change to the shielding provided by the walls. Plant radiation zones, radiation controls established to satisfy 10 CFR Part 20 requirements, and expected amounts and types of radioactive materials are not affected by the proposed changes. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to normal operation or postulated accident conditions. Therefore, individual and cumulative radiation exposures do not change.

The proposed activity has no adverse effect on emergency plans or physical security plans. The removal of the Wall 11.2 and Wall R large opening missile barriers are internal to the Turbine Building external concrete walls and are not credited as a security barrier. See Insert 1 in Enclosure 3 for additional discussion. There is no change to any perimeter walls acting as a security barrier or other aspects of the structures that could impact physical security. The change activity has no adverse impact on the emergency plans or the physical security evaluation since there are no changes to the external configuration of the roof, walls, doors, or access to the Nuclear Island.

Licensing Basis Change Descriptions:

UFSAR Changes

- UFSAR Table 3.2-1 Note 14 is revised to remove the turbine building first bay large opening missile barriers.
- UFSAR Subsection 3.5.2 is revised to remove the turbine building first bay large opening missile barriers, add discussion that the turbine building and part of the annex building are credited to stop or break apart automobile missile and protect Wall 11 from automobile missiles, add Turbine Building First Bay internal missile barrier at elevation 100' [north of Valve/Piping Penetration room door], and add discussion that the main steam vent stacks are evaluated for tornado missiles in the horizontal and vertical directions, with conclusion that missile impact on vent stacks does not affect safe shutdown.

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- UFSAR Table 3.5-1 is revised to change the protection for the Room 12306, 12504, and 12506 doorway based on crediting the vent path and the revised line of sight; to remove Wall 11.2 and Wall R large opening missile barriers from the protection column and Note 3; and to add protection for automobile missiles from Wall 11 openings by structures, equipment, and components in turbine building and annex building.
- UFSAR Subsection 10.3.2.2.2 is revised to clarify that tornado missiles are not a design basis load on the vent stacks and to reference Section 3.5.2 for discussion on missile impact on vent stacks.

3. TECHNICAL EVALUATION (Incorporated into Section 2, above)

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to 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 Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. The proposed change involves a departure from Tier 2 information requiring a license amendment under paragraph B.5.b; specifically, the departure from Tier 2 would result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses. Therefore, NRC approval is required prior to making the change to Tier 2 information.

10 CFR Part 50, Appendix A General Design Criterion (GDC) 2, “Design bases for protection against natural phenomena,” requires, in part, that structures, system, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety function. The proposed changes demonstrate that SSCs important to safety continue to be designed and protected to withstand the effects of natural phenomena or are designed such that their response or failure will be in a safe condition. For protection from externally generated missiles, openings through walls are evaluated on a case-by-case basis to provide confidence that a missile passing through the opening would result in a safe condition (would not prevent safe shutdown and would not result in an offsite release exceeding the limits defined in 10 CFR 50.34). The evaluations performed for the proposed changes demonstrate that the systems required for safe shutdown will still be operable in the event of a tornado and overpressure protection of the main steam line is achieved by the alternate vent path. Therefore, the proposed changes comply with the requirements of GDC 2.

10 CFR Part 50, Appendix A GDC 4, “Environmental and dynamic effects design bases,” requires, in part, that structures, systems, and components important to safety be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems,

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and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. The proposed changes do not affect the conclusion that SSCs important to safety are designed to accommodate the effects of and are compatible with the environmental conditions associated normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant-accidents. The evaluations performed for the proposed changes demonstrate that the main steam isolation valve compartments will not over pressurize if the main steam line relieves into the room. Therefore, the proposed changes comply with the requirements of GDC 4.

Regulatory Guide (RG) 1.76, Revision 0, "Design Basis Tornado for Nuclear Power Plants," describes a design basis tornado acceptable to the NRC staff that a nuclear power plant should be designed to withstand without undue risk to the health and public safety. The design basis tornado and tornado missiles evaluated for the proposed change conform to RG 1.76, Rev. 0, with exception to C.1 as described in UFSAR Appendix 1A. Therefore, the design continues to conform to the RG requirements as described in the UFSAR.

RG 1.117, Revision 1, "Tornado Design Classification," describes the method acceptable to the NRC staff for identifying those SSCs that should be protected from the effects of the design basis tornado, including tornado missiles, and remain functional. The appendix identifies that the portions of the main steam line up to and including the outermost isolation valves are protected against tornadoes. With the proposed changes, the main steam line up to and including the outermost isolation valves are protected against tornadoes. The main steam pressure boundary remains intact under the impact of the 8-inch artillery shell and 1-inch sphere missile. The line of sight evaluations with the proposed changes to the treatment of automobile missiles demonstrate that the SSCs important to safety continue to be designed and protected to withstand the effects of natural phenomena. Therefore, the design continues to conform to the RG requirements.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The requested amendment proposes changes to the evaluation of the auxiliary building main steam safety valve (MSSV) vent stack openings and the auxiliary building Wall 11 openings for protection from tornado generated missiles.

An evaluation to determine whether 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:

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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 changes do not adversely affect the operation of any systems or equipment inside or outside the auxiliary building that could initiate or mitigate abnormal events, e.g., accidents, anticipated operational occurrences, earthquakes, floods, tornado missiles, and turbine missiles, or their safety or design analyses, evaluated in the UFSAR. The changes do not adversely affect any design function of the auxiliary building or the systems and equipment contained therein. The ability of the affected auxiliary building MSIV compartments to withstand the pressurization effects from the design basis pipe rupture is not adversely affected because the alternate relief paths are available. MSIV compartment temperature following the limiting pipe rupture remain acceptably within the envelope for environmental qualification of equipment in the compartments. The credit of the turbine building and annex building structures, equipment, and components to protect Wall 11 openings from the automobile tornado missile continues to provide adequate protection of structures, systems, and components (SSCs) required to safely shut down the plant. Case-by-case evaluations for the main steam vent stacks and Wall 11 openings for tornado generated missiles demonstrate that safe shutdown is accomplished.

Therefore, the proposed amendment 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 changes do not change the design function of the auxiliary building or of any of the systems or equipment in the auxiliary building or elsewhere within the Nuclear Island structure. These proposed changes do not introduce any new equipment or components that would result in a new failure mode, malfunction or sequence of events that could affect safety-related or nonsafety-related equipment. This activity will 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.

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

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

Response: No.

The margin of safety of the design of the auxiliary building is maintained through continued use of the current codes and standards as stated in the UFSAR and adherence to the assumptions used in the analyses of this structure and the events associated with this structure. The auxiliary building will continue to maintain a seismic Category I rating which preserves the current structural safety margins. The 3-hour fire rating requirements for the impacted auxiliary building walls are maintained. The ability of the affected auxiliary building MSIV compartments to withstand the pressurization effects from the design basis pipe rupture is not adversely affected because the alternate relief paths are available. The credit of the turbine building and annex building structures, equipment, and components to protect Wall 11 openings from the automobile tornado missile continues to provide adequate protection of structures, systems, and components (SSCs) required to safely shut down the plant. Case-by-case evaluations for the main steam vent stacks and Wall 11 openings for tornado generated missiles demonstrate that safe shutdown is accomplished. Thus, the requested changes will not adversely affect any safety-related equipment, design code, function, design analysis, safety analysis input or result, or design/safety margin. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the requested change, thus no margin of safety is reduced.

Therefore, the proposed amendment 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.

5. ENVIRONMENTAL CONSIDERATIONS

The requested amendment proposes changes to the evaluation of the auxiliary building main steam safety valve vent (MSSV) stack openings and the auxiliary building Wall 11 openings for protection from tornado generated missiles.

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether 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 Determination determined that (1) the proposed amendment does not involve a

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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 form 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 requested amendment proposes changes to the evaluation of the auxiliary building MSSV vent stack openings and the auxiliary building Wall 11 openings for protection from tornado-generated missiles. 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 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 requested amendment proposes changes to the evaluation of the auxiliary building MSSV vent stack openings and the auxiliary building Wall 11 openings for protection from tornado-generated missiles. The proposed changes in the requested amendment do not affect or alter any walls, floors, or other structures that provide shielding. Plant radiation zones and controls under 10 CFR 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 effects 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 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), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6. REFRENCES

None.

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Southern Nuclear Operating Company

ND-19-0855

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to Licensing Basis Documents
(LAR-19-014)

Insertions Denoted by Blue Underline and Deletions by Red Strikethrough
Omitted text is identified by three asterisks (* * *)

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(This Enclosure consists of 9 pages, including this cover page)

Revise UFSAR Table 3.2-1, Comparison of Safety Classification Requirements, Note 14 as shown below:

14. The seismic Category II tornado missile barrier located ~~on or~~ within the turbine building first bay and identified in Subsection 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.

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Revise UFSAR Subsection 3.5.2, Protection from Externally Generated Missiles, as shown below:

* * *

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. Since the turbine building first bay is surrounded by a large amount of structures, equipment and components in the turbine building and adjacent annex building, large deformable missiles (represented by automobile) passing through turbine building and annex building into turbine building first bay is a highly tortuous path. The structures, equipment and components in the turbine building and part of the annex building are credited to stop or break apart an automobile missile and protect Wall 11 from an automobile missile. ~~The seismic Category II turbine building first bay building structure and the missile barriers provided over the turbine building first bay large openings 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:~~

- ~~First bay compartment elevation 100'-0"~~
  - ~~Four large opening missile barriers on Wall 11.2~~
- ~~First bay compartment elevation 117'-6"~~
  - ~~Two large opening missile barriers on Wall 11.2~~
  - ~~One large opening missile barrier on Wall R~~
- ~~First bay compartment elevation 135'-3"~~
  - ~~One large opening missile barrier on Wall 11.2~~
  - ~~One large opening missile barrier on Wall R~~
- ~~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, two missile barriers ~~a missile barrier~~ designed to stop the 8-inch artillery shell and 1-inch sphere missiles are ~~is~~ provided within the interior of the turbine building first bay building structure, at elevation 117'-6", northeast of MSIV Compartment B, and at elevation 100', north of Valve/Piping Penetration Room. 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 are designed and analyzed in accordance with the barrier design procedures contained in Subsection 3.5.3 and applicable AISC N690 requirements.

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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 building 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, 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 main steam safety valve (MSSV) vent stacks are evaluated for tornado missiles in the horizontal and vertical directions. Based on elevation of the vent stacks, site topography, and arrangement of surrounding buildings, large debris (represented by the automobile) does not have a line of sight to the MSSV vent stacks. For horizontal missile impact, it is analyzed and confirmed that the steam can be relieved through Wall 11 doors and vents into turbine building first bay without impacting the pressure limit in the MSIV rooms and Valve/Piping Penetration Room if a vent stack is crimped. For the vertical missile impact, it is evaluated and confirmed that 1) ASME limits are not exceeded under impact of small debris; 2) The main steam pressure boundary remains intact under the impact of the 8-inch artillery shell and 1-inch sphere missiles; 3) the passive safety features are not impacted. Therefore, the tornado missile impact on the MSSV vent stacks does not affect safe shutdown.

* * *

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Revise UFSAR Table 3.5-1, External Missile Protection Provided for Auxiliary Building Wall 11 Openings, as shown below:

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~~ First bay building structure First bay interior missile barrier
			Artillery Shell	~~Room 12306 Wall 11 door~~ First bay building structure First bay interior missile barrier
			Automobile	First bay building structure ~~Wall 11.2 large opening missile barriers~~ Structure, equipment, and components in turbine building and annex building
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~~ Structure, equipment, and components in turbine building and annex building

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Wall 11 Opening	Protected Room	Elevation	Missile[1]	Protection[2][3]
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~~ Structure, equipment, and components in turbine building and annex building
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~~ Structure, equipment, and components in turbine building and annex building
Room 12504 doorway	Upper MSIV Compartment B	135'-3"	Sphere	~~Room 12504 Wall 11 door~~ First bay building structure
			Artillery Shell	~~Room 12504 Wall 11 door~~ First bay building structure
			Automobile	First bay building structure ~~Wall 11.2 large opening missile barrier~~ Structure, equipment, and components in turbine building and annex building

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Wall 11 Opening	**Protected Room**	**Elevation**	**Missile[1]**	**Protection[2][3]**
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~~ Structure, equipment, and components in turbine building and annex building
Room 12506 doorway	Upper MSIV Compartment A	135'-3"	Sphere	~~Room 12506 Wall 11 door~~ First bay building structure
			Artillery Shell	~~Room 12506 Wall 11 door~~ First bay building structure
			Automobile	First bay building structure ~~Wall R large opening missile barrier~~ Structure, equipment, and components in turbine building and annex building
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~~ Structure, equipment, and components in turbine building and annex building

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Notes:

1. * * *
2. * * *
3. The materials of construction for the missile barriers installed ~~on or~~ within the turbine building first bay and on Wall 11 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 barriers
     - 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 A 1064
   - Wall 11 spare penetration covers
     - ASTM A240
   - Pipe sleeves
     - material shall be as specified for their penetration function

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Revise UFSAR Subsection 10.3.2.2.2, Main Steam Safety Valves, as shown below:

* * *

The vent stacks are structurally designed to withstand safe-shutdown earthquake loads. Tornado missiles are not a design basis load on the vent stacks. Missile impact on vent stacks is described in Section 3.5.2.

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