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February 9, 2018

Docket Nos.: 52-025
52-026

ND-18-0096
10 CFR 50.90
10 CFR 52.63

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Supplement to Request for License Amendment and Exemption Regarding Improvements to
Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, requested an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively, by SNC letter ND-17-1297, dated August 31, 2017 [ADAMS Accession Number ML17243A352]. The proposed amendment would revise the licensing basis information regarding the nuclear island non-radioactive ventilation system (VBS), the main control room emergency habitability system (VES), and post-accident operator dose analyses, to maintain compliance with 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19, which requires that main control room (MCR) personnel dose does not exceed 5 rem total effective dose equivalent (TEDE) for the duration of a design basis accident (DBA). Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule was also requested for the plant-specific DCD Tier 1 material departures.

Enclosures 1 through 6 were provided with the original LAR. Enclosure 7 to this letter supplements LAR-17-023 to address a Request for Additional Information (RAI) from the NRC Staff, which was transmitted by electronic mail (email) on January 30, 2018 [ADAMS Accession Number ML18030B069], to support review of LAR-17-023. In addition, Enclosure 7 provides the resolution to inconsistencies that were identified during the NRC Staff's review of LAR-17-023. The information in Enclosure 7 has been redacted such that it may be made available to the public. Enclosure 11 provides information discussed in Enclosure 7 that is identified as proprietary Sensitive Unclassified Non-Safeguards Information (SUNSI), and thus, is requested to be withheld from public disclosure under the provisions of 10 CFR 2.390(d).

Enclosure 8 contains revised licensing basis document markups to reflect the changes described in Enclosure 7.

An affidavit from SNC supporting withholding under 10 CFR 2.390 is provided as Enclosure 9. Enclosure 10 is Westinghouse's Proprietary Information Notice, Copyright Notice and CAW-18-4704, Application for Withholding Proprietary Information from Public Disclosure and Affidavit. The affidavit sets forth the basis upon which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-18-4704 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2 Suite 259, Cranberry Township, Pennsylvania 16066. Correspondence with respect to proprietary aspects of this letter and its enclosures should also be addressed to Brian H. Whitley at the contact information on the first page of this letter.

The supplemental information provided in this LAR supplement does not impact the scope, technical content, or conclusions of the Technical Evaluation, Regulatory Evaluation (including the Significant Hazards Consideration Determination), or Environmental Considerations of the original LAR provided in letter ND-17-1297, Enclosure 1.

This letter contains no regulatory commitments. This letter, including enclosures, has been reviewed and confirmed to not contain security-related information.

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia of this LAR supplement by transmitting a copy of this letter and enclosure to the designated State Official.

Should you have any questions, please contact Ms. Amy Chamberlain at (205) 992-6361.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 9th of February 2018.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "B. H. Whitley", is written over a horizontal line.

Brian H. Whitley
Director, Regulatory Affairs
Southern Nuclear Operating Company

- Enclosures: 1 - 6) (previously submitted with the original LAR, LAR-17-023, in SNC letter ND-17-1297)
- 7) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Response to NRC Request for Additional Information (RAI) and Supplemental Information Regarding the LAR-17-023 Review (Publicly Available Information) (LAR-17-023S1)
 - 8) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Revised Proposed Changes to the Licensing Basis Documents (LAR-17-023S1)
 - 9) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Affidavit from Southern Nuclear Operating Company for Withholding Under 10 CFR 2.390 (LAR-17-023S1)
 - 10) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Westinghouse Authorization Letter CAW-18-4704 Affidavit and Proprietary Information Notice and Copyright Notice (LAR-17-023S1)
 - 11) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Response to NRC Request for Additional Information (RAI) and Supplemental Information Regarding the LAR-17-023 Review (WITHHOLD from Public Disclosure) (LAR-17-023S1)

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Southern Nuclear Operating Company

ND-18-0096

Enclosure 7

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

**Response to NRC Request for Additional Information (RAI) and Supplemental
Information Regarding the LAR-17-023 Review**

(LAR-17-023S1)

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

The following are questions provided by the NRC Staff regarding the review of Southern Nuclear Operating Company (SNC) License Amendment Request (LAR) 17-023, which was submitted by SNC letter ND-17-1297 on August 31, 2017.

RAI No. 06.04-1:

Key Issue 1:

On page 23 of 60 of Enclosure 1 of the license amendment request (LAR), item O states that the licensee is clarifying that for the fuel handling accident (FHA), the depth of water above a dropped fuel assembly could be reduced below the licensing basis DBA dose analysis assumption of 23 feet currently reported in the updated final safety analysis report (UFSAR). The LAR goes on to assert that

...continued conformance with Regulatory Guide 1.183 is clarified by confirming that a minimum water height of 18.6 feet above a postulated dropped fuel bundle is needed to support an overall iodine decontamination factor of 200 as specified in Appendix B of Regulatory Guide 1.183."

In apparent contradiction to the licensee's statement, RG 1.183, Appendix B, Position 2, "Water Depth," states:

If the depth of water above the damaged fuel is 23 feet or greater, the decontamination factors for the elemental and organic species are 500 and 1, respectively, giving an overall effective decontamination factor of 200 (i.e., 99.5% of the total iodine released from the damaged rods is retained by the water). This difference in decontamination factors for elemental (99.85%) and organic iodine (0.15%) species results in the iodine above the water being composed of 57% elemental and 43% organic species. If the depth of water is not 23 feet, the decontamination factor will have to be determined on a case-by-case method.

The LAR does not provide further discussion of this topic.

Question 1

To facilitate staff understanding of the application information, sufficient to make appropriate regulatory conclusions with respect to compliance with 10 CFR 52.47(a)(1) and GDC 19, the staff requests that the licensee:

Provide an assessment of the iodine decontamination factor applicable to a pool water depth of 18.6 feet above fuel damaged in the design basis FHA, including the basis for the method used to determine the overall effective iodine decontamination factor. If the overall effective iodine decontamination factor is determined to be less than that used in the current license basis, revise the DBA FHA dose analysis and provide a description of the revised analysis, including dose results at the Exclusion Area Boundary (EAB), Low Population Zone (LPZ) and in the MCR and technical support center (TSC). Note that RG 1.183 mentions that an overall effective iodine decontamination factor of 200 is appropriate for a water depth of 23 feet or greater and the depth cited in the LAR is only 18.6 feet.

SNC Response to NRC Question 1Introduction

An overall iodine decontamination factor (DF) of 200 was used in the FHA analysis. Westinghouse Topical Report WCAP-7518-L, "Radiological Consequences of a Fuel Handling Accident," dated June 1970, is the technical basis for the overall DF of 200 described in Regulatory Guide (RG) 1.183, Appendix B, Position 2. The experimental data and formulations found in WCAP-7518-L are used to demonstrate that the overall DF of 200 is valid for pool depths as low as 18.6 feet and with fuel pin pressures of up to 1500 psig. This demonstration was to address a concern that a dropped fuel assembly lying horizontally on top of the spent fuel racks could be at a depth of approximately 21.8 feet, which is less than the 23-foot depth specified in the technical specifications. This demonstration confirms that the analysis is conservative.

Technical Basis for Using WCAP-7518-L

WCAP-16072-P-A, "Implementation of Zirconium Diboride Burnable Absorber Coatings in CE Nuclear Power Fuel Assembly Designs," Appendix B contains responses to NRC requests for additional information (RAIs) under the heading "Additional Information Concerning Dose Calculations." Dose Question 2 was related to fuel handling accident fission product release iodine scavenging in the spent fuel pool / reactor cavity. Dose Question 2 noted that the pool decontamination factors in Safety Guide (SG) 25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors," (a predecessor document to RGs 1.183 and 1.195) are predicated on a maximum fuel rod pressurization of 1200 psig. Dose Question 2 also noted that the assumptions in SG 25 were largely developed from the results of experiments performed by Westinghouse as reported in WCAP-7518-L. The Westinghouse response to Dose Question 2 also used the results of experiments reported in WCAP-7518-L and established that the increase in fuel pin pressure from 1200 psig to 1500 psig did not affect the pool decontamination factors in SG 25. The NRC agreed with this conclusion in their Safety Evaluation (SE) on WCAP-16072-P-A [ML041270102] and extended the conclusion to RGs 1.183 and 1.195 with the statement

...the staff has determined that there is reasonable assurance that fuel rod design pressures of up to 1500 psig will not invalidate analysis assumptions related to iodine decontamination. The staff has also determined that this conclusion remains valid for the decontamination factor of 200 provided in RG 1.183 and RG 1.195, which supercede SG 25 for alternative source terms and TID14844 source terms, respectively.

SRP 15.7.4 states that if factors less conservative than those recommended by RG 1.25 are used, guidance provided by G. Burley, Radiological Safety Branch, Division of Reactor Licensing, NRC, titled, "Evaluation of Fission Product Release and Transport for a Fuel Handling Accident," revised October 5, 1971, should be consulted to determine if an adequate basis for the proposed deviation exists. This evaluation is based, in part, on WCAP-7518-L. The basis of RG 1.25 and ultimately RG 1.195 utilizes the experimental

data and formulation of WCAP-7518-L in a manner to ensure a conservative result appropriate for licensing purposes.

With respect to FHA guidance, both RG 1.183 and 1.195 are successor documents to SG 25. A comparison of Appendix B.2 (entitled "Water Depth") of RGs 1.183 and 1.195 shows similar guidance; i.e. the same overall decontamination factor of 200 for iodines, and the same recommendation to use the paper by G. Burley in the event that select conditions are not met. With the same overall pool DF, and the same recommendation to use the Burley paper in the event that select conditions are not met, it is apparent that the technical basis for the overall spent fuel pool DF of 200 is the same. This is supported by the SE on WCAP-16072-P-A as quoted above.

The basis of RG 1.25 and ultimately RG 1.195 utilizes the experimental data and formulation of WCAP-7518-L in a manner to ensure a conservative result appropriate for licensing purposes. Because RG 1.183 and RG 1.195 have the same technical basis (i.e. the experimental data and formulation of WCAP-7518-L), the experimental data and formulation of WCAP-7518-L can be used in a manner to ensure a conservative result appropriate for licensing purposes while following RG 1.183.

Level of Conservatism Associated with Elemental Iodine DF of 500

An overall DF of 200 was used in the FHA dose analyses, which is consistent with the guidance provided in RG 1.183, Appendix B, Position 2. RG 1.183 specifies that the pool scrubbing DF is 500 for elemental iodine and 1.0 for organic iodine. Given that RG 1.183 also defines the iodine as being 95% cesium iodide (that converts instantly to the elemental form), 4.85% elemental iodine, and 0.15% organic iodine, the overall DF is calculated to be 286:

$$DF = 1 / ((0.95 + 0.0485)(1/500) + 0.0015) = 286$$

In order to obtain an overall DF of 200 using the defined iodine species split, the elemental iodine DF would need to be only 285:

$$\text{Elemental Iodine DF} = 200(0.95 + 0.0485) / (1 - 200(0.0015)) = 285$$

While RG 1.183 specifies a pool scrubbing DF of 500 for elemental iodine based on a pool depth of 23 feet, it makes no statement about any limitations associated with fuel rod pressure; however, in RG 1.195, the NRC indicates that a fuel rod pressure of ≤ 1200 psig is assumed in their guidance. On page 3-15 of WCAP-7518-L, the pool scrubbing DF is defined as being:

[

]^{a,c}

This results in a DF of 580 instead of 500 for a conservatism factor of $500 / 580 = 0.862$.

The application of the conservatism factor can be generalized by revising the DF equation by multiplying it by the adjustment factor. The equation then becomes:

[

]^{a,c}

Impact of Elevated Fuel Rod Pressure on Elemental Iodine DF

There is the potential for fuel rods to exceed 1200 psig. A maximum fuel rod pressure of 1500 psig was considered. At a rod pressure of 1500 psig, the values for bubble diameter and rise time were determined to be []^{a,c} (for a 23-foot water depth). When these values are inserted into the above equation, the result is:

[]^{a,c}

Thus, consistent with the citations above, the overall DF of 200 continues to be valid with 23 feet of water and 1500 psig fuel pin pressure.

Minimum Water Depth Supporting the FHA Analysis DF Value of 200

As shown in Table 3-5 of WCAP-7518-L, the bubble size and rise time both decrease as fuel rod pressure increases; however, it is assumed that the bubbles move through the water at a constant velocity. (This is consistent with WCAP-7518-L, which states on page 3-16 that bubble rise times for actual spent fuel pool depths of 26 and 40 feet are proportional extensions of the observed rise times for the experimental tests where the bubble rise distance was 23 feet.) To support the overall DF of 200 that was used in the analysis, an elemental iodine DF of 285 is needed. The associated minimum required water depth can be determined using the relationship discussed above which calculates the elemental iodine DF while maintaining a comparable level of conservatism to the RG 1.183 modeling.

The rise time associated with a DF of 285 is calculated using the bubble size associated with the release from fuel rods at 1500 psig:

[

] ^{a,c}

Conclusion

An overall iodine decontamination factor (DF) of 200 was used in the FHA analysis. Based on the experimental data and formulations found in WCAP-7518-L, the overall DF of 200 is valid for pool depths as low as 18.6 feet and with fuel pin pressures of up to 1500 psig. This demonstrates that the analysis is conservative for the postulated scenario where a dropped fuel assembly is lying horizontally on top of the spent fuel racks at a depth of approximately 21.8 feet, which is less than the 23-foot depth specified in the technical specifications.

RAI No. 06.04-2:

Key Issue 2:

New UFSAR Tier 2 Table 12.2-29, "Core Melt Accident Integrated Source Strengths from MCR HVAC Filters," includes the same information as previously reviewed and approved in the staff safety evaluation report for Levy Nuclear Plant Units 1 and 2 FSER Chapter 21 – "Design Changes Proposed in Accordance with ISG-11," (ADAMS Accession Number - ML16068A418), as noted in LAR Enclosure 1, item A, "Changes Impacting MCR Dose for Design Basis Accidents." Although new UFSAR Table 12.2-29 information was previously approved in the Levy COL review, the nuclear island non-radioactive ventilation system (VBS) filter loading was based on a filter efficiency of 90% for elemental and organic iodine, whereas the LAR proposes to increase the credited filter efficiency for the VBS from 90% to 99% for elemental and organic iodine (see additional change item K, "VBS Inleakage Optimization," on pages 18 and 19 of LAR Enclosure 1).

Question 2

To facilitate staff understanding of the application information, sufficient to make appropriate regulatory conclusions with respect to compliance with GDC 19, the staff requests that the licensee:

Clarify whether the proposed change in VBS filter efficiency would change the VBS filter loading source strengths used to evaluate the direct dose in the MCR from VBS filter shine. If so, please provide the revised source strength information and make the necessary changes to the MCR direct dose (filter shine) dose analysis. Also revise the associated information in the UFSAR, including new UFSAR Table 12.2-29, along with descriptions of the filter shine dose analyses and the total MCR dose analyses and results.

SNC Response to NRC Question 2

The change in VBS filter efficiency does not affect the VBS filter loading source strength as presented in UFSAR Tier 2 Table 12.2-29. The VBS filter loading source strength is based on the conservative assumption of perfect filtration. That is, for the calculation of the VBS filter loading source strengths, 100% of the non-noble gas activity entering the MCR HVAC intake is assumed to be collected on the filter. The credited filter efficiencies for the calculation of the doses accrued by the operators do not affect the calculation of the source strength.

RAI No. 06.04-3:

Background

The licensee's submittal, "Request for License Amendment and Exemption Regarding Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences (LAR 17-023)," dated August 31, 2017, provided a revised methodology for calculating doses to operators following an accident. LAR 17-023 Enclosure 4, "Proposed Changes to the Licensing Basis Documents, (withheld Information, in accordance with 10 CFR 2.390(d)), ND-17-1297) depicts the personnel travel path from the Annex Building into the "Elec. Penet. Room Division A", room identification Number 12412. Room 12412 is identified as a

Radiation Zone VII. AP1000 DCD Tier 2 Revision 19 Figure 12.3-2 (Sheet 1 of 15) "Radiation Zones, Post-Accident Legend," identifies that the maximum design dose rate in a Radiation Zone VII area is ≤ 100 Rem/hour (hr). This travel path is not shown on AP1000 DCD Tier 2 Revision 19 Figure 12.3-2 (Sheet 7 of 15) "Radiation Zones, Post-Accident Nuclear Island, Elevation 117'6".

Key Issue 3

LAR-17-023 appears to identify a previously unidentified post-accident mission travel path. Because of the dose rates that may be present in a radiation zone VII area, a small amount of time in the area could challenge the applicable radiation exposure limits. The amount of time is dependent on the travel time to the area, the type of task to be performed, the assumed radiological conditions (e.g., airborne activity,) and the time needed to exit the area.

Question 3

To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions, with respect to compliance with 10 CFR 52.47(a)(8) and 10 CFR 50.34(f)(2)(vii), the staff requests that the licensee:

- For this new post-accident mission travel path, explain how the LAR addresses the specific requirement to perform radiation and shielding design reviews of spaces around systems that may, as a result of an accident, contain accident source term radioactive materials, and design as necessary to permit adequate access to important areas and to protect safety equipment from the radiation environment,
- Explain/Justify the apparent change to the post-accident mission travel path, including the purpose of the mission, how many times the mission may need to be performed,
- Describe the evaluation of the mission dose and results including the methods, models and assumptions, used for determining the exposure estimate,
- As necessary, revise the Vogtle Units 3 & 4 UFSAR to include the description of the apparent mission and other relevant information,

OR

Provide the specific alternative approaches used and the associated justification.

SNC Response to NRC Question 3

Post-accident vital area actions and radiation exposure assessments are complex. To clarify the actions that were taken regarding the determination of post-accident personnel accessibility for the changes in LAR-17-023, the following additional information is provided:

- Prior to submittal of LAR-17-023, a shielding and radiation protection assessment and calculation regarding the post-accident task that is shown in the markup of Figure 12.3-2, Sheet 7 in LAR-17-023, Enclosure 4 was performed and documented. This calculation considered the inputs identified in Table 3-1 (of this enclosure) and discussed in the third bullet below, and quantified the total radiation dose for an individual performing this activity under postulated accident conditions. The assessment concluded that the total personnel dose was less than 5 Rem, as committed to in the VEGP Units

3&4 licensing basis. This assessment considered the relevant sources and exposure pathways (including direct shine, airborne cloud shine, and inhalation).

- The post-accident mission travel path that is proposed to be modified in LAR-17-023 conveys the access pathway to reach the Main Control Room (MCR) ancillary fan. This pathway was changed to reflect a relocation of the MCR ancillary fans. These fans were previously conceptually envisioned to be housed in the MCR (as indicated in DCD Revision 19, Figure 12.3-2, Sheet 7), however, as part of design finalization and due to space constraints, the fans were relocated to room 12412. Therefore, the task to access these fans to establish cooling in postulated accident conditions (which was previously identified in DCD Revision 19, Figure 12.3-2, Sheet 7) was changed to reflect the change in location of the equipment. The change involved a new travel path since, previously, travel paths were within the MCR and were not explicitly shown. This mission is performed only once during the postulated accident sequence (just prior to 72 hours).

The action involves travel to room 12412 and through room 12411. Five minutes is allocated to remove the fan cart from the seismic attachments. The operator is then assumed to proceed into the MCR through rooms 12411, 12400, and 12401. After placing the fan in the MCR, the operator returns to room 12412 to acquire the second fan, transports the second fan to the MCR, and exits the Protected Area. Within the MCR, the fan is assumed to be connected to temporary duct work by other individuals to establish a forced air cooling pathway in accordance with the AP1000 post-72-hour MCR cooling design. Note that this modification is not creating a new post-accident vital area action, and only reflects a refinement in the location and travel path of a previously-identified and described vital area action. Therefore, only minimal changes are proposed in LAR-17-023 to convey the details of this design change, since conceptually the action and its associated justification are not affected, and only the location of the equipment is changed.

- The methods, models, inputs, and assumptions used to perform the shielding and radiation protection assessment of the modified vital area access action are selected to be conservative and consistent with other such assessments performed for the other vital area access actions described in UFSAR subsection 12.4.1.8. A detailed list of the most critical inputs and assumptions is provided in Table 3-1. When calculating inhalation dose, two sensitivities are performed – one considering an Assigned Protection Factor (APF) of 50 and another considering an APF of 10000, in accordance with details conveyed in 10 CFR Part 20, Appendix A. Inputs for direct radiation shine and containment penetration streaming from sources in containment are consistent with the MCR models, and are taken from the supporting evaluation. The results of the operator dose assessment for accessing the MCR ancillary fans is summarized in Table 3-2 (of this enclosure), and arises from the supporting dose evaluation.
- Consistent with the approach and treatment of other post-accident vital area access pathways described in UFSAR subsection 12.4.1.8, no licensing basis markups are conveyed to reflect the design basis details of the radiation protection assessment and related calculations. The travel pathways and associated radiation zones are clearly identified in UFSAR Figure 12.3-2. The calculation supporting the conclusion that the vital area access task can be accomplished without exceeding personnel doses of 5 rem is complete and can be made available for review.

Table 3-1
Inputs and Assumptions Used to Assess Operator Dose for the Vital Area Action of
Retrieving the MCR Ancillary Fans in Postulated Post-Accident Conditions

Input Parameter	Value	Units	Basis
Timing for Action Initiation	70	Hrs	The activity is assumed to take place at 70 hours after accident initiation to ensure sufficient cooling is in place by 72 hours. This is a slightly conservative assumption since the task is estimated to require less than 2 hours of duration.
Starting Point for Exposure Assessment	Outside the Protected Area, at Site Boundary		Conservative assumption that increases the projected travel pathway.
General Pathway	Through the plant Yard area, to the Annex Building – Rooms 40311, 40301, to 40400, then to Auxiliary Building Room 12411 and on to the indicated travel pathway depicted on Figure 12.3-2, Sheet 7.		Pathway based upon the plant layout and a reasonably-efficient access route.
Ending Point for Exposure Assessment	Outside the Protected Area		Conservative assumption that increases the projected travel pathway.
Walking Speed	3	km/hr	Assumed value.
Time spent donning protective equipment	20	Min	This duration is included in the assessment as a conservatism, and is assumed to take place at the beginning of the action.
Time spent in Room 12412	5.23	min/fan	Reflecting operational feedback that five minutes is likely sufficient to unsecure the ancillary fans and prepare them for travel. This also includes a short amount of travel time to reach the fan location.
Time spent in Room 12401	11.83	min	Assumes five minutes/fan is required to place each ancillary fan, and also accounts for travel time within the room.
Dose Rate in Room 12412	0.09	Rem/hr	Calculated bounding direct radiation dose rate value at 70 hours after the accident in Room 12412.
Dose Rate in Room 12411	0.81	Rem/hr	Calculated bounding direct radiation dose rate value at 70 hours after the accident in Room 12411.
Highest Inhalation Dose Rate in Annex Building (APF=1)	35	Rem/hr	Calculated Committed Effective Dose Equivalent (CEDE) dose rate reflecting breathing rates and the airborne source term producing external cloud-shine dose rates consistent with post-accident conditions in the Annex building shown in DCD/UFSAR Figure 12.3-2 Sheets 11 and 12.

Table 3-2
Results of Radiation Protection Calculations for Operator Dose to Access and Transport
Retrieving the MCR Ancillary Fans in Postulated Post-Accident Conditions

Post-accident action	Timing [h]	Total Duration [min]	Exposure dose [Rem]	Inhalation dose [Rem]		Total dose [Rem]	
				APF= 50	APF= 10000	APF= 50	APF= 10000
B MCR Ancillary Fan Movement	70	57.80	2.62E-01	9.72E-01	4.86E-03	1.23E+00	2.67E-01

Additional Issues

In addition to providing the responses to NRC questions provided by the January 30, 2018 RAI [ML18030B069], the following provides the resolution to other, less significant inconsistencies that were identified during the course of the NRC Staff's review of LAR-17-023.

1. NRC Comment:

At the lower part of Page 16 of Enclosure, the tags for the two newly added instruments are VES-JE-PT004A/B. However, the tags for the seemingly same two new instruments are shown as VES-PDT-004A/B. The same tags should be used if they are the new instruments.

SNC Response:

Following the guidance for identification of AP1000 equipment, the instruments should be identified as VES-JE-PDT004A, where "VES" is the locator code (Main Control Room Emergency Habitability System), "JE" is the component type (instrument), and "PDT004A" is the sequence (i.e., differential pressure transmitter 004A). The tag numbers VES-JE-PDT-004A and B are consistent with the designation used in UFSAR Tables 3.11-1 and 3I.6-2. To resolve this inconsistency, the following changes are made to the original LAR provided in SNC correspondence ND-17-1297, Enclosure 1.

Revise page 16 of 60, third paragraph under item J.1, as follows (emphasis added):

"As such, MCR Isolation and Air Supply Initiation shall be initiated on Low Main Control Room Differential Pressure for 10 minutes (as detected by either VES-JE-PDT004A or B, one-out-of-two logic) in addition to the existing Loss of Battery Charger Input Voltage for 10 minutes actuation."

Revise page 19 of 60, last paragraph, as follows (emphasis added):

"An issue was identified in which the MCR entry door opening and closing cause fast transient pressure drops that produce nuisance low pressure alarms. As introduced in proposed Change J.1, VES-JE-PDT004A/B are safety transmitters that interface with PMS and PLS and are used to actuate MCR isolation (PMS function) when pressure is below ..."

2. Editorial Consistency Change to the Title of Technical Specification (TS) 3.3.13

By letter dated February 1, 2018 [ML18011A885], the NRC issued License Amendment Nos. 108 and 107 for VEGP Units 3 and 4, respectively, approving SNC LAR-17-001, Request for License Amendment and Exemption Regarding Main Control Room Emergency Habitability System (VES) Changes [ML17129A608]. LAR-17-001 adds an automatic electrical load shed of nonsafety-related equipment to the functions that are actuated from VES automatic actuation signals. This change is reflected in TS 3.3.13 Action A.2 by the addition of the new electrical load de-energization function to the original control room isolation and air supply initiation functions. LAR-17-023 proposes a change to the title of TS 3.3.13 to more specifically address the main control room isolation and air supply initiation functions, but did not address the new electrical load shed function. To provide consistency with the changes approved by License Amendment Nos. 108 and 107, the TS 3.3.13 title should be changed to include Electrical Load De-energization.

To resolve this editorial preference, a revised markup of TS 3.3.13 is provided in Enclosure 8 (SNC will make a corresponding change to the title of the Bases for TS 3.3.13). The revised markup updates the title of TS 3.3.13 to "Engineered Safety Feature Actuation System (ESFAS) Main Control Room Isolation, Air Supply Initiation, and Electrical Load De-energization," thereby consolidating the changes approved by License Amendment Nos. 108 and 107 with those proposed in LAR-17-023. Enclosure 8, pages 2, 3, 4 and 5 of 6, replaces the licensing basis markups provided in SNC letter ND-17-1297, Enclosure 3, pages 2, 3, 4 and 5 of 64, in their entirety.

3. Correction to Markup Convention for UFSAR Table 2.3-201:

The proposed changes to the licensing basis documents in SNC letter ND-17-1297, Enclosure 3, page 16 of 64, include changes to plant-specific atmospheric dispersion factors, also referred to as χ/Q values, in UFSAR Section 2.3, Meteorology, Table 2.3-201, ARCON96 χ/Q Values at the Control Room HVAC Intake. The Licensee proposed changes to each of the eight release points for each of the five time periods addressed, for a total of 40 changes. However, the convention used in the markup of Table 2.3-201 (for 39 of the 40 changes) was inadvertently reversed from the convention specified on the cover page for Enclosure 3; i.e., new text was shown using red, strike-out font and deleted text was shown using blue, underlined font. It is noted that only the markup convention was incorrect; as both the values that are proposed to be deleted and those that are proposed to be added to the licensing basis are correct.

To correct this editorial error, a revised markup of UFSAR Table 2.3-201 was prepared. Enclosure 8 provides revised proposed changes to UFSAR Table 2.3-201 to correct mark-up convention used in the UFSAR change provided in SNC letter ND-17-1297, Enclosure 3. Enclosure 8 replaces the licensing basis markup provided in SNC letter ND-17-1297, Enclosure 3, page 16 of 64, in its entirety.

Southern Nuclear Operating Company

ND-18-0096

Enclosure 8

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Revised Proposed Changes to the Licensing Basis Documents

(LAR-17-023S1)

Note:

Added text is shown as bold **Blue Underline**

Deletions are shown as ~~**Red Strike-out**~~

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

Technical Specifications

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ESFAS Main Control Room
Isolation, Air Supply Initiation,
and Electrical Load De-energization ~~Radiation Instrumentation~~
3.3.13

3.3 INSTRUMENTATION

3.3.13 Engineered Safety Feature Actuation System (ESFAS) Main Control Room Isolation,
Air Supply Initiation, and Electrical Load De-energization ~~Radiation Instrumentation~~

LCO 3.3.13 Two channels of ~~ESFAS Control Room Air Supply Radiation – High 2 instrumentation~~ each of the following Functions shall be OPERABLE:-

a. Main Control Room Air Supply Iodine or Particulate Radiation – High 2; and

b. Main Control Room Differential Pressure – Low.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of irradiated fuel assemblies.

ACTIONS

- NOTE -

Separate condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One <u>or more Functions</u> <u>with one-</u> channel inoperable in MODE 1, 2, 3, or 4.	A.1 <u>-----</u> <div style="text-align: center;"> - NOTE - <u>Not applicable to an</u> <u>inoperable Main Control</u> <u>Room Differential</u> <u>Pressure – Low channel.</u> <u>-----</u> </div> Verify alternate radiation monitors are OPERABLE.	72 hours

Technical Specifications ESFAS [Main](#) Control Room
[Isolation](#), Air Supply [Initiation](#),
[and Electrical Load De-energization](#) ~~Radiation Instrumentation~~
3.3.13

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<u>AND</u> A.2 Verify main control room isolation, air supply initiation, and electrical load de-energization manual controls are OPERABLE.	72 hours
B. One or more Functions with one channel inoperable during movement of irradiated fuel assemblies.	B.1 Restore channel to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition A not met. <u>OR</u> One or more Functions with two Two channels inoperable in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 5.	6 hours 36 hours
D. Required Action and associated Completion Time of Condition B not met. <u>OR</u> One or more Functions with two Two channels inoperable during movement of irradiated fuel assemblies.	D.1 Suspend movement of irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.13.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.13.2	Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.	92 days
SR 3.3.13.3	<p style="text-align: center;">----- - NOTE - This surveillance shall include verification that the time constants are adjusted to within limits. -----</p> <p>Perform CHANNEL CALIBRATION in accordance with Setpoint Program.</p>	24 months
SR 3.3.13.4	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

Revise UFSAR Tier 2 Table 2.3-201, ARCON96 χ /Q Values at the Control Room HVAC Intake, as follows:

Release Point	0 – 2 hours	2 – 8 hours	8 – 24 hours	1 – 4 days	4 – 30 days
Plant Vent	2.02E-03 <u>2.27E-03</u>	1.58E-03 <u>1.86E-03</u>	6.37E-04 <u>7.36E-04</u>	5.12E-04 <u>5.99E-04</u>	3.82E-04 <u>4.31E-04</u>
PCS Air Diffuser	1.68E-03 <u>1.71E-03</u>	1.29E-03 <u>1.32E-03</u>	5.47E-04 <u>5.56E-04</u>	4.55E-04 <u>4.63E-04</u>	3.34E-04 <u>3.43E-04</u>
Fuel Auxiliary Building Fuel Handling Area Blowout Panel	1.54E-03 <u>1.57E-03</u>	1.11E-03 <u>1.15E-03</u>	4.42E-04 <u>4.62E-04</u>	3.57E-04 <u>3.72E-04</u>	2.59E-04 <u>2.68E-04</u>
Fuel Radwaste Building Rail Bay Truck Staging Area Door	1.15E-03 <u>1.30E-03</u>	8.29E-04 <u>9.36E-04</u>	3.35E-04 <u>3.78E-04</u>	2.62E-04 <u>2.98E-05</u>	1.86E-04 <u>2.09E-05</u>
Steam Line Break	1.48E-02 <u>1.87E-02</u>	1.20E-02 <u>1.51E-02</u>	5.41E-03 <u>6.79E-03</u>	3.93E-03 <u>4.94E-03</u>	3.26E-03 <u>4.14E-03</u>
PORV & Safety Valves	1.31E-02 <u>1.77E-02</u>	1.02E-02 <u>1.41E-02</u>	4.62E-03 <u>6.25E-03</u>	3.29E-03 <u>4.61E-03</u>	2.77E-03 <u>3.87E-03</u>
Condenser Air Removal Stack	6.23E-04 <u>6.60E-04</u>	4.57E-04 <u>4.83E-04</u>	2.05E-04 <u>2.17E-04</u>	1.49E-04 <u>1.57E-04</u>	1.12E-04 <u>1.17E-04</u>
Containment Shell (As Diffuse Area Source)	3.20E-03 <u>2.93E-03</u>	1.82E-03 <u>1.75E-03</u>	8.27E-04 <u>7.78E-04</u>	7.22E-04 <u>6.81E-04</u>	5.70E-04 <u>5.30E-04</u>

Southern Nuclear Operating Company

ND-18-0096

Enclosure 9

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Affidavit from Southern Nuclear Operating Company for Withholding Under 10 CFR 2.390

(LAR-17-023S1)

(This Enclosure consists of 2 pages, plus this cover page.)

Affidavit of Brian H. Whitley

1. My name is Brian H. Whitley. I am the Regulatory Affairs Director for Southern Nuclear Operating Company (SNC). I have been delegated the function of reviewing proprietary information sought to be withheld from public disclosure and am authorized to apply for its withholding on behalf of SNC.
2. I am making this affidavit on personal knowledge, in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations, and in conjunction with SNC's filing on dockets 52-025 and 52-026, Vogtle Electric Generating Plant Units 3 and 4, Supplement to Request for License Amendment and Exemption Regarding Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1). I have personal knowledge of the criteria and procedures used by SNC to designate information as a trade secret, privileged or as confidential commercial or financial information.
3. Based on the reason(s) at 10 CFR 2.390(a)(4), this affidavit seeks to withhold from public disclosure Enclosure 11 of Vogtle Electric Generating Plant Units 3 and 4, Supplement to Request for License Amendment and Exemption Regarding Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1).
4. The following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - a. The information sought to be withheld from public disclosure has been held in confidence by SNC and Westinghouse Electric Company.
 - b. The information is of a type customarily held in confidence by SNC and Westinghouse Electric Company and not customarily disclosed to the public
 - c. The release of the information might result in the loss of an existing or potential competitive advantage to SNC and/or Westinghouse Electric Company.

- d. Other reasons identified by Westinghouse Electric Company in Enclosure 10 of Vogtle Electric Generating Plant Units 3 and 4, Supplement to Request for License Amendment and Exemption Regarding Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1) (dockets 52-025 and 52-026), and those reasons are incorporated here by reference.
5. Additionally, release of the information may harm SNC because SNC has a contractual relationship with the Westinghouse Electric Company regarding proprietary information. SNC is contractually obligated to seek confidential and proprietary treatment of the information.
6. The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.
7. To the best of my knowledge and belief, the information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method.

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

Brian H. Whitley Executed on 2/9/18
Brian H. Whitley Date

Southern Nuclear Operating Company

ND-17-0096

Enclosure 10

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

**Westinghouse Authorization Letter CAW-18-4704 Affidavit and
Proprietary Information Notice and Copyright Notice**

(LAR-17-023S1)

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



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CAW-18-4704

February 1, 2018

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: Supplement to Request for License Amendment and Exemption Regarding Improvements to
Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1)

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced response is further identified in Affidavit CAW-18-4704 signed by the owner of the proprietary information, Westinghouse. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Southern Nuclear Operating Company.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-18-4704, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2 Suite 259, Cranberry Township, Pennsylvania 16066.

Jill S. Monahan, Manager
Licensing Inspections and Special Programs



Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

Enclosures to CAW-18-4704

1. AFFIDAVIT
2. PROPRIETARY INFORMATION NOTICE and COPYRIGHT NOTICE

ENCLOSURE 1 to CAW-18-4704

AFFIDAVIT

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

SS

COUNTY OF BUTLER:

I, Jill S. Monahan, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 2-1-2018

A handwritten signature in cursive script, reading "Jill S Monahan", written in dark ink.

Jill S. Monahan, Manager
Licensing Inspections and Special Programs

- (1) I am Manager, Licensing Inspections and Special Programs, Westinghouse Electric Company LLC (“Westinghouse”), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Nuclear Regulatory Commission’s (“Commission’s”) regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission’s regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

 - (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).
 - (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
 - (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
 - (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
 - (f) It contains patentable ideas, for which patent protection may be desirable.
- (iii) There are sound policy reasons behind the Westinghouse system which include the following:
- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
 - (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
 - (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.
 - (v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
 - (vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in ND-18-0096, "Supplement to Request for License Amendment and Exemption Regarding Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences (LAR-17-023S1)," for submittal to the Commission, being transmitted by Southern Nuclear Operating Company letter. The proprietary information as submitted by Westinghouse is that associated with Southern Nuclear Operating Company License Amendment Request in ND-17-023 (WEC LAR-099; Southern LAR 17-023), and may be used only for that purpose.

- (a) This information is part of that which will enable Westinghouse to:
 - (i) Manufacture and deliver products to utilities based on proprietary designs.
- (b) Further, this information has substantial commercial value as follows:
 - (i) Westinghouse plans to sell the use of similar information to its customers for the purpose of licensing of new nuclear power stations.
 - (ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.
 - (iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

ENCLOSURE 2 to CAW-18-4704

PROPRIETARY INFORMATION NOTICE and COPYRIGHT NOTICE

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and non-proprietary versions of a document, furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.