



NR000010

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Presentation to the Commission

Combined License Application Review

Vogtle Units 3 and 4

SER Panel 1
September 27 – 28, 2011



Presentation to the Commission

Combined License Application Review Vogtle Units 3 and 4

Chapter 1, Introduction and Interfaces

September 27 – 28, 2011

Vogtle COL Overview

| Part Number | Description | Evaluation |
|-------------|--|---|
| 1 | General and Administration Information | Section 1.5.1 |
| 2 | Final Safety Analysis Report | In appropriate SER Chapters |
| 3 | Environmental Report | Final Supplemental Environmental Impact Statement |
| 4 | Technical Specifications | Chapter 16 |
| 5 | Emergency Plan | Chapter 13 |
| 6 | Limited Work Authorization # 2 | Section 3.8.5 |
| 7 | Departure Reports | In appropriate SER Chapters |
| 8 | Security Plan | Section 13.6 |

Vogtle COL Overview (Cont'd)

| Part Number | Description | Evaluation |
|-------------|---|-----------------------------|
| 9 | Withheld Information | In appropriate SER Chapters |
| 10 | Proposed Combined License Conditions (Including ITAAC) | In appropriate SER Chapters |
| 11 | Information Incorporated by Reference (e.g., Quality Assurance Plan, Material Control and Accountability Program, Mitigative Strategies Document, Cyber Security Plan, SNM Material Control & Accounting Program, New Fuel Shipping Plan) | In appropriate SER Chapters |

Overview of Vogtle COL FSAR Chapter 1

| FSAR Section | Summary of Departures/Supplements |
|--|---|
| 1.1 Introduction | Incorporated By Reference (IBR) with standard and site-specific supplements |
| 1.2 General Plant Description | IBR with site-specific supplements |
| 1.3 Comparisons with Similar Facility Designs | Completely IBR |
| 1.4 Identification of Agents and Contactors | IBR with site-specific supplements |
| 1.5 Requirements for Further Technical Information | Completely IBR |

Overview of Vogtle COL FSAR Chapter 1 (Cont'd)

| FSAR Section | Summary of Departures/Supplements |
|--|---|
| 1.6 Material Referenced | IBR with standard and site-specific supplements |
| 1.7 Drawings and Other Detailed Information | IBR with site-specific supplements |
| 1.8 Interface for Standard Designs | IBR with site-specific supplements |
| 1.9 Compliance with Regulatory Criteria | IBR with standard and site-specific supplements |
| 1.10 Nuclear Power Plants to be Operated on Multi-Unit Sites | Standard and site-specific supplemental information |

Vogtle COL Exemptions from Current Regulations

| Description | Regulations | Location of Evaluation in FSER |
|--|--|--------------------------------|
| COL application organization and numbering | 10 CFR Part 52, Appendix D, Section IV.A.2. | Section 1.5.4 |
| Exemption Criteria | 10 CFR 52.93(a)(1) | Section 1.5.4 |
| SNM MC&A Program | 10 CFR 70.22(b), 70.32(c), 74.31, 74.41, 74.51 | Section 1.5.4 |

Vogtle COL Departures from AP1000 Design Certification

| Departure Numbers | Description | FSER Location |
|--------------------------|--|------------------------------|
| VEGP DEP 1.1-1 | Administrative departure for organization and numbering of the FSAR sections | Section 1.5.4 |
| VEGP DEP 2.5-1 | Lower and Upper Mudmat | Section 2.5.4 |
| VEGP DEP 3.4-1 | Waterproofing Membrane Material | Sections 3.4.1 and 3.8.5 |
| VEGP DEP 8.3-1 | Class 1E voltage regulating transformer current limiting features | Section 8.3.2 |
| VEGP DEP 9.2-1 | PWS Filtration | Section 9.2.1 |
| VEGP DEP 18.8-1 | Emergency response facility locations | Sections 12.5, 13.3 and 18.8 |

Vogtle COL Variances from Vogtle Early Site Permit

| ESP Variance Number | Description | FSER Location |
|---------------------|---|---------------|
| VEGP ESP VAR 1.6-1 | Overall reference to AP1000 DCD relating to LWA | Section 1.4.4 |
| VEGP ESP VAR 1.6-2 | Foundations | Section 3.8.5 |
| VEGP ESP VAR 1.6-3 | Accident analysis | Chapter 15 |
| VEGP ESP VAR 1.2-1 | Emergency planning – updated site layout including relocation of TSC | Section 13.3 |
| VEGP ESP VAR 2.2-1 | Updated information about hazardous chemicals in the vicinity of the site | Section 2.2 |
| VEGP ESP VAR 2.3-1 | Updated Climatological data | Section 2.3 |

Technical Topics of Interest

- Technical and Financial Qualifications
- Exemption related to SNM MC&A Program
- Licenses for Byproduct, Source, and SNM—
10 CFR Part 30, 40 and 70, respectively

Technical Qualifications Review

- FSAR Section 1.4 and Chapter 17 provide information regarding applicant's experience with nuclear plants and its QA program, respectively
- Staff concludes that SNC is technically qualified to hold licenses for Vogtle Units 3 and 4 under 10 CFR 52 in accordance with 10 CFR 52.97(a)(1)(iv) (Section 1.4.4 of the FSER)

Financial Qualifications Review

- Part 1 of the Vogtle application provides reasonable assurance regarding:
 - Total cost of Vogtle Units 3 & 4
 - Funding sources for each of the Vogtle Owners
 - Decommissioning funding assurance
 - Foreign ownership
 - Nuclear insurance and indemnity
- Staff's review considered applicable regulations and guidance (10 CFR Part 140, 10 CFR 50.33, 10 CFR 52.97(a)(1)(iv), 10 CFR 50.75, Appendix C to 10 CFR 50 and NUREG-1577)
- Staff concludes that SNC provided reasonable assurance of qualifications to construct and operate Vogtle Units 3 and 4 and engage in the activities authorized by the licenses (Section 1.5.1 of the FSER)

SNM MC&A Program Exemption

Requirement

- The provisions of 10 CFR 70.22(b) require an application for a license for SNM to include a full description of the applicant's program for MC&A of SNM under 10 CFR 74.31, 10 CFR 74.33, 10 CFR 74.41, and 10 CFR 74.51
- 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51 include exceptions for nuclear reactors licensed under 10 CFR Part 50 but not for reactor licensees under 10 CFR 52

Exemption Request

- The applicant requested an exemption from requirements of 10 CFR 70.22(b), 70.32(c), and 10 CFR 74.31, 74.41 and 74.51
- The applicant stated that the purpose of this exemption request is to seek a similar exception for this COL under 10 CFR Part 52, such that the same requirements will be applied to the SNM MC&A program as for nuclear reactors licensed under 10 CFR Part 50

SNM MC&A Program Exemption

Staff's Evaluation

- The NRC staff reviewed the request for an exemption, which will allow the applicant to have a similar exception for the COL under 10 CFR Part 52, such that the same requirements will be applied to the SNM MC&A program as for nuclear reactors licensed under 10 CFR Part 50
- Staff found that granting this requested exemption:
 - will not present an undue risk to the public health and safety
 - is otherwise in the public interest
 - Is authorized by law, due to the Atomic Energy Act, et al.
 - will not adversely affect the common defense and security
 - in these particular circumstances is not necessary to achieve the underlying purpose of the rule
- Staff found that the exemption from 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51, is justified.

10 CFR 30, 40 and 70 Licenses: Overview

- SNC requested materials licenses as part of its Part 52 Combined License Application (COL) for receipt, possession and use of Byproduct Material (Part 30), Source Material (Part 40), and Special Nuclear Material (Part 70).
- A first of a kind review for a COL application.
- Staff coordinated its review with other Offices: FSME and Region I (Parts 30 and 40), NMSS and NSIR (Parts 30, 40 and 70).
- Staff COL review for compliance with 10 CFR Part 52 also supports granting of 10 CFR Parts 30, 40, and 70 licenses.
- Major Areas of review:
 - Radiation Protection
 - Fire Protection
 - Non-Licensed Staff Training
 - Emergency Planning
 - Security

10 CFR 30, 40 and 70 Licenses: Parts 30 and 40 Reviews

- SNC provided Information regarding specific types of sources, chemical or physical form, and maximum amount.
- SNC committed not to exceed quantities in Schedule C of Part 30 material.
- SNC committed that Part 40 source material would not be received before the Commission finding under 52.103(g) and, in addition, uranium hexafluoride (UF_6) would not be received, possessed or used before or after the 52.103(g) findings.
- SNC provided sufficient details of the operational programs - radiation protection program, fire protection program, non-licensed staff training program – to support Parts 30 and 40 materials licenses.

10 CFR 30, 40 and 70 Licenses: Parts 30 and 40 Reviews (Cont'd)

- Staff reviews utilized guidance of NUREG-1556
- Major areas of review: Radiation Protection, Fire Protection, Non-Licensed staff training, emergency planning and security program (operational programs)
- These operational programs meet the policy established in SECY-05-0197 and, therefore, these operational programs are acceptable
- Emergency plan is not required for Byproduct Material and Source Material
- Staff proposed a license condition to restrict receipt, possession and use of Part 40 materials

10 CFR 30, 40 and 70 Licenses: Part 70 Review

- SNC provided information regarding Part 70 material (SNM in the form of nuclear fuel):
 - General information—financial, site description;
 - Organization and administration—responsibilities and associated resources and quality assurance program;
 - Radiation protection;
 - Nuclear criticality safety;
 - Fire safety;
 - Emergency preparedness;
 - Environmental protection—organization, procedures, and controls;
 - Material control and accounting (MC&A) program and physical security plan for nuclear fuel.

10 CFR 30, 40 and 70 Licenses: Part 70 Review (Cont'd)

- Staff review utilized guidance of NUREG-1520, and NUREG-0800, as applicable.
- Staff found that SNC is qualified to receive, possess and use SNM.
- Staff found that SNC complies with applicable Part 70 requirements regarding radiation protection, nuclear criticality safety, fire safety, and environmental protection encompassed by the design information incorporated by reference from AP1000 DCD and evaluated by staff as part of the review of COL application.
- Staff concluded that an emergency plan (to receive and possess nuclear fuel) pursuant to 10 CFR 70.22(i) is not required.

10 CFR 30, 40 and 70 Licenses: Part 70 Review (MC&A Program)

- SNC provided a program addressing the control and accounting of SNM appropriate for reactor operations and to meet the requirements stated in 10 CFR 74
 - This program will be an operational program
 - A proposed license condition will require implementation of this program prior to receipt of SNM on site
- Staff concluded
 - The MC&A program meets applicable requirements of 10 CFR 70.22(a) and 10 CFR 74
 - The MC&A program is an operational program consistent with the policy established in SECY-05-0197 and staff proposed a license condition covering implementation of the MC&A program

10 CFR 30, 40 and 70 Licenses: Part 70 Review (Security)

- Pursuant to 10 CFR 73.67(f) and (g), SNC provided
 - Its plan to protect new fuel as SNM at the Vogtle site prior to declaration of an operational PA and implementation of requirements of 10 CFR 73.55
 - Applicable provisions of ICMOs that were issued to Category III Fuel Cycle Facilities to ensure adequate protection when SNM is on site, prior to the activation of the PA
 - The New Fuel Shipping Plan, which addresses applicable requirements of 10 CFR 73.67 in the event that unirradiated new fuel assemblies or components are returned to the supplying fuel manufacturer's facility
- Staff's review of the applicant's physical security plan for SNM and the new fuel shipping plan concludes that the security plan satisfies the performance objectives, system capabilities and reporting requirements specified in 10 CFR 73.67

10 CFR 30, 40 and 70 Licenses: Conclusions

- SNC satisfied applicable requirements of 10 CFR 30, 40 and 70 and staff proposes to include specific license conditions authorizing SNC to receive, possess and use Byproduct Material, Source Material and SNM pursuant to 10 CFR Parts 30, 40 and 70
- Staff determined that SNC's application is expected to be standard for the remaining AP1000 COL applicants
 - Design-centered review approach is appropriate
 - Staff evaluation is expected to constitute a standard review for the AP1000 COLs
 - Only plant-specific differences between RCOL (Vogtle) and SCOLs will be addressed separately



Presentation to the Commission

Combined License Application Review Vogtle Units 3 and 4

Chapter 2, Site Characteristics

September 27 – 28, 2011

Purpose

- Vogtle ESP and LWA-1 Site Safety Aspects
 - Vogtle ESP Safety Review Topics
 - Vogtle LWA-1 Review Topics
- FSAR Chapter 2, Site Characteristics
 - Background information
 - Overview of Vogtle COL FSAR Chapter 2
 - Topics of Interest

Vogtle ESP Safety Review Topics

- Population density and land use
- Physical characteristics of the site
 - Meteorology
 - Hydrology
 - Geology
 - Seismology
- Potential hazards of nearby facilities, including hazards at Vogtle Units 1 & 2
- Activities related to an NPP that might be constructed on the site
- Potential transportation accidents
- Capability of site to support construction of an NPP
- Suitability of site for development of adequate physical security plans
- Proposed complete and integrated Emergency Plans
- Quality Assurance
- Exclusion area boundary and LPZ

Vogtle LWA-1 Review Topics

- Acceptability of design properties related to the engineered backfill
- Acceptability of the mudmat and waterproof membrane
- Quality Assurance Requirements
- Fitness for duty program

Vogtle FSAR Chapter 2

Site Characteristics

- Background information regarding the AP1000 design and ESP as it relates to Chapter 2 of the application
 - Content IBR from DC or ESP without modification did not involve further technical review
 - Standard content for AP1000 design center reviewed for Vogtle as “Reference” COL application
 - Content specific to the Vogtle application

Overview of Vogtle COL

FSAR Chapter 2

| FSAR Section | Content | Topics of Interest |
|---|--|--|
| 2.0 Site Characteristics | Incorporated by reference (IBR)/Plant-Specific | Vogtle site characteristics values versus AP1000 site parameter values |
| 2.1 Geography and Demography | IBR/Plant-Specific | |
| 2.2 Nearby Industrial, Transportation and Military Facilities | IBR/Standard/Plant-Specific | Potential chemical hazards (standard and plant-specific) |
| 2.3 Meteorology | IBR/Plant-Specific | Air temperature site characteristic values |
| 2.4 Hydrologic Engineering | IBR/Plant-Specific | |
| 2.5 Geology, Seismology and Geotechnical Engineering | IBR/Plant-Specific | |

Vogtle Site Characteristic Values vs. AP1000 Site Parameter Values

- Comparison of Vogtle site characteristic values with AP1000 site parameter values
- All site characteristic values fall within the AP1000 site parameter values, except for one
- Vogtle site's Ground Motion Response Spectra (GMRS) exceed the AP1000 DCD Certified Seismic Design Response Spectra (CSDRS)

Potential Chemical Hazards

- Evaluation of standard chemicals stored at an AP1000 site
 - Staff review and independent confirmatory analyses identified hydrazine and carbon dioxide exceeding IDLH concentrations outside the Vogtle Units 3 & 4 control rooms
- Evaluation of chemicals for Vogtle Units 3 & 4
 - Staff review and independent confirmatory analyses identified the onsite site-specific chemicals MPA and ammonium bisulfite as exceeding IDLH concentrations outside the Vogtle Units 3 & 4 control rooms
 - Potential accidental release of hydrazine stored at Vogtle Unit 1 does not threaten habitability of Vogtle Units 3 and 4 control rooms
- Those chemicals exceeding IDLH concentrations outside the Vogtle Units 3 & 4 control rooms were further evaluated for control room habitability in Section 6.4 of the SER

Air Temperature

Site Characteristic Values

- This variance is denoted as VEGP ESP VAR 2.3-1
- Changed the Vogtle ESP maximum and minimum normal air temperature site characteristic values
 - Vogtle ESP provided 1% annual exceedance values
 - AP1000 DCD specifies 1% seasonal exceedance values
 - 1% seasonal exceedance values are approximately equivalent to 0.4% annual exceedance values



Presentation to the Commission

Combined License Application Review Vogtle Units 3 and 4

Chapter 3, Design of Structures, Systems, and Components

September 27 – 28, 2011

Overview of Vogtle COL FSAR Chapter 3

| Section | Content | Topics of Interest |
|---|--|--------------------|
| 3.1 Conformance with NRC General Design Criteria | Incorporated by Reference (IBR)/Standard | |
| 3.2 Classification of Structures, Components, and Systems | Standard/Plant-Specific | |
| 3.3 Wind and Tornado Loadings | Plant-Specific | |
| 3.4 Water Level (Flood) Design | Standard/Plant-Specific | |
| 3.5 Missile Protection | IBR/Standard/Plant-Specific | |
| 3.6 Protection against Dynamic Effects Associated with the Postulated Rupture of Piping | Standard | |

Overview of Vogtle COL FSAR Chapter 3

| Section | Content | Topics of Interest |
|---|-----------------------------|---------------------------------------|
| 3.7 Seismic Design | Standard/Plant-Specific | Seismic Design and System Analysis |
| 3.8 Design of Category I Structures | IBR/Standard/Plant-Specific | Waterproof Membrane Departure; LWA #2 |
| 3.9 Mechanical Systems and Components | IBR/Standard | Squib Valves |
| 3.10 Seismic and Dynamic Qualification of Mechanical and Electrical Equipment | Standard | |
| 3.11 Environmental Qualification of Mechanical and Electrical Equipment | Standard | |
| 3.12 Piping Design | Standard | |

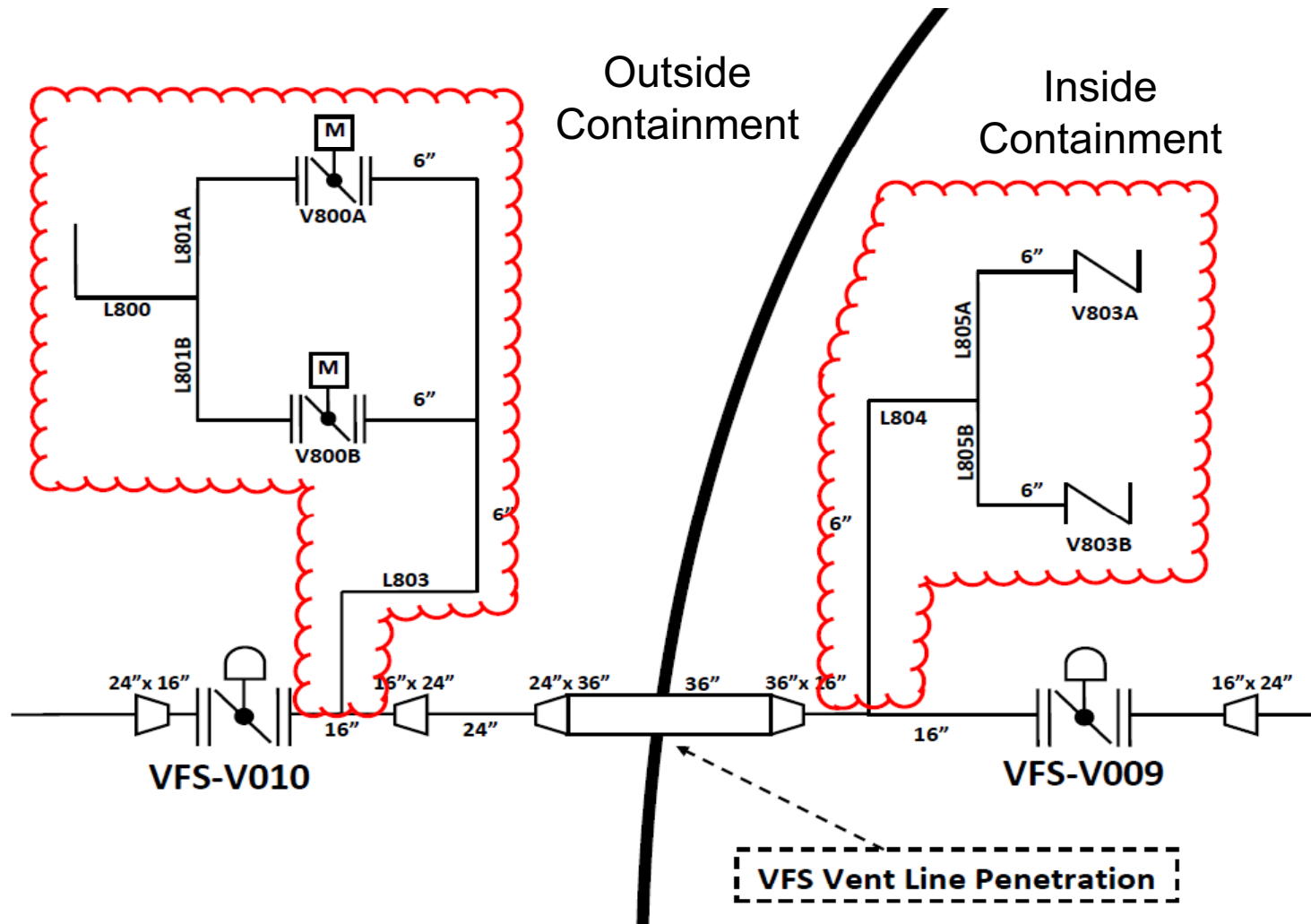
AP1000 Shield Building Design



AP1000 Shield Building Design

- Revised design for improved aircraft impact resistance
- First of a kind use of modular construction
- Review for external events (e.g., seismic)
- Inspection of supporting information on aircraft impact performance
- Revision 19 additional topics

AP1000 Vacuum Relief System



AP1000 Vacuum Relief System

- Containment vacuum relief system prevents external differential pressure between containment and shield building from exceeding the design value of 1.7 psid.
- Each redundant vacuum relief device contains a check valve inside containment, a motor operated butterfly valve outside containment, and associated piping.
- Each relief flow path provides 100% of vacuum relief capacity.
- Each of these four valves also has containment isolation function.
- Following vacuum relief function, the vacuum relief MOVs will close automatically on a containment isolation signal, or a high radiation in containment signal.

Waterproof Membrane Departure

- AP1000 DCD (Revision 15) did not specify type of material to be used for the waterproofing membrane system for the nuclear island foundation
- In ESP review, staff found the elastomeric spray-on waterproofing membrane (methyl methacrylate resin) specified in the Vogtle ESP SSAR to be an acceptable foundation waterproofing system.
- AP1000 DCD (Revision 18) Section 3.4 stated that for applicants who choose to use the sprayed-on waterproofing membrane system, the waterproofing material will consist of 100 percent solid material (polymer-modified asphalt or polyurea)
- SNC proposed a Tier 2 departure, stating that Vogtle Units 3 and 4 will utilize methyl methacrylate resin as base material for the waterproofing membrane system for the nuclear island foundation.

Waterproof Membrane Departure

Resolution:

Staff found that the chosen material:

- Will limit the infiltration of subsurface water to seismic category structures below grade (foundations)
- Will provide for adequate transfer of horizontal seismic shear forces consistent with the DCD design
- Was reviewed and approved as part of ESP

Therefore, the staff found the departure acceptable.

Acronyms

| | | | |
|-------|---|--------|---|
| COL | – Combined License | NMSS | – Office of Nuclear Material Safety and Safeguards |
| CSDRS | – Certified Seismic Design Response Spectra | NPP | – Nuclear Power Plant |
| DCD | – Design Control Document | NSIR | – Office of Nuclear Security and Incident Response |
| DEP | – Departure | psid | – unit of differential pressure measured in pounds per square inch. |
| EP | – Emergency Planning | PWS | – Potable Water System |
| ESP | – Early Site Permit | QA | – Quality Assurance |
| FSAR | – Final Safety Analysis Report | RCOL | – Reference Combined License |
| FSEIS | – Final Supplemental Environmental Impact Statement | SCOL | – Subsequent Combined License |
| FSME | – Office of Federal and State Materials & Environmental Management Programs | SER | – Safety Evaluation Report |
| GMRS | – Ground Motion Response Spectra | SNC | – Southern Nuclear Operating Company |
| IBR | – Incorporated by Reference | SNM | – Special Nuclear Material |
| ICMO | – Interim Compensatory Measures Orders | VAR | – Variance |
| IDLH | – Immediately Dangerous to Life or Health | VEGP | – Vogtle Electric Generating Plant |
| ITAAC | – Inspections, Tests, Analyses, and Acceptance Criteria | 10 CFR | – Title 10 of the Code of Federal Regulations |
| LPZ | – Low Population Zone | | |
| LWA | – Limited Work Authorization | | |
| MC&A | – Material Control & Accounting | | |
| MOV | – Motor Operated Valve | | |