



May 25, 2016
RC-16-0083

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
FINAL SAFETY ANALYSIS REPORT (FSAR)
UPDATED THROUGH MAY 31, 2016

In accordance with 10CFR50.71(e), South Carolina Electric & Gas Company, acting for itself and as agent for South Carolina Public Service Authority, submits one (1) CD-ROM electronic copy of the Final Safety Analysis Report (FSAR) for the Virgil C. Summer Nuclear Station updated through May 31, 2016. The V. C. Summer Updated FSAR CD-ROM is a complete copy in Adobe PDF format generated from the original native master files and scanned hard copy documents.

This FSAR-Update includes:

- Changes to the FSAR that were made under the provisions of 10CFR50.59, but not previously submitted to the Commission.
- All affected chapter Table of Contents, List of Tables, List of Figures, and List of Effective Pages updated to reflect the current information contained in the FSAR.

Technical changes are annotated by a vertical revision bar and the Revision Notice number. Unaffected vertical revision bars and the amendment number changes from prior updates remain unchanged.

The Fire Protection Evaluation Report (FPER) has been achieved as a historical document as a result of the NFPA 805 program implementation. Therefore, the FPER will not be transmitted as part of this submittal.

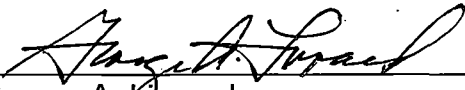
Additionally, some FSAR changes (revision notices) were not completed in time for this FSAR update. Once these changes have been completed, another FSAR update will be submitted to the NRC. This issue has been documented in the station's corrective action program as CR-16-02349.

A053
NRR

If there are any questions, please contact Scarlet Lutz at (803) 345-5640.

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

5/25/16
Executed On


George A. Lippard

SDL/GAL/ts
Attachments:

- 1) FSAR Revision Notices Incorporated Since the June 1, 2015 Update
- 2) VCSNS FSAR CD-ROM (2.390)

c: (Without CD unless noted below)

K. B. Marsh
S. A. Byrne
J. B. Archie
N. S. Carns
J. H. Hamilton
J. W. Williams
W. M. Cherry
C. Haney (w/CD, **2.390**)
S. A. Williams (w/CD, **2.390**)
NRC Resident Inspector
K. M. Sutton (w/CD, **2.390**)
NSRC
RTS (LTD 325, RR 6500)
File (813.12)
PRSF (RC-16-0083 w/CD, **2.390**)

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
06-044	2015-06	FSAR Figure 1.2-4	ECR-50579, Reactor Building Sump Debris Collection. Modifications were made to meet requirements of NRC Generic Letter 2004-02 and certify that the sump screens can accommodate the debris quantities following a LOCA.
11-032	2015-10	FSAR Figure 1.2-13	ECR-50798B, Safety Improvements to the Diesel Generating Building. This change revised FSAR Figure 1.2-13 to remove “air tight” note for hatch DRDB 404/405.
12-006	2015-06	FSAR Table 8.3-3 Part A1 FSAR Table 8.3-3 Part A2 FSAR Table 8.3-3 Part B1 FSAR Table 8.3-3 Part B2	ECR-50537G, Replace Heat Trace Control Panels. This change added heat tracing circuits to panels XPN2022 and XPN2023. This affects information and loading for XMC1DA2Y and XMC1DB2, which is contained in FSAR Table 8.3-3.
12-020	2016-03	FSAR Figure 1.2-16 FSAR Section 9.5 FPER Whole Document	ECR-50628, Update FSAR and FPER This revision notice updated the FSAR and made the FPER historical in accordance with transition from Appendix R to NFPA 805.
12-023	2016-02	FSAR Section 1.2 FSAR Section 3.5.1.1.3 FPER Section 4.11.3.1 FPER Section 4.11.3.2 FPER Section 4.11.7.1 FPER Section 4.11.7.2 FPER Figure E-023-001 FSAR Figure 1.2-1	ECR-50791, Relocation of Hydrogen System to Support Independent Spent Fuel Storage Installation (ISFSI). This change relocated the Hydrogen Supply systems to mitigate a hazard to Spent Fuel Storage Casks travel path.
12-024	2016-03	FSAR Figure 1.2-1 FSAR Figure 2.4-6 FSAR Figure 9.5-1, Sh 2 FPER Figure E-023-001	ECR-50792, Relocation of Underground Utilities to Support ISFSI The change relocated and modified underground utilities to accommodate ISFSI: 1) Fire Service piping and hydrant modifications, and a new B.5.b firewater line to the Monticello Reservoir for a fire pump truck connection; and 2) Storm Water drain piping and catch basin.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
12-025	2016-05	FSAR Figure 1.2-1 FSAR Figure 2.4-6 FPER E-023-001	ECR50794, Constructed ISFSI Haul Path. This change constructed the Haul Path that connects the ISFSI, Fuel Handling Building (FHB) and the HI-STORM cask fabrication pad. The haul path is for transporting empty HI-STORM storage casks from the HI-STORM cask fabrication pad to the FHB, and loaded HI-STORM storage casks from the FHB to the ISFSI.
12-036	2016-02	FSAR Figure 1.2-1 FSAR Figure 2.4-6 FPER Figure E-023-001	ECR-50793A and ECR-50793I, Provides Design Instructions for the ISFSI Pad This change provided construction details for the ISFSI Storage Pad, Approach Slab, and Protected Area fences and gates. The FSAR/FPER revision notice revises applicable FSAR/FPER figures that depict the plant layout to show these major ISFSI features.
13-006	2015-10	FSAR Figure 1.2-1 FSAR Figure 9.5-1, S2	ECR-50853, Installation of Utility Tie-ins for Emergency Response Building (ERB). This change provided connections to the existing fire service water line, potable water line and waste water line. A separate Simplex fire control panel was also installed and networked with the Combined Nuclear Operations Building and Nuclear Learning Center panels.
13-018	2015-11	FSAR Section 1.2.3.2 FSAR Section 1.2.3.7 FSAR Section 3.8.4.1.6 FSAR Section 3.8.4.4.10 FSAR Section 9.1.2 FSAR Section 9.1.4.2 FSAR Section 9.1.4.3.5 FSAR Section 9.1.5 FSAR Section 9.1.6 FSAR Section 13.1.2.2.1 FSAR Section 13.4.2.1 FSAR Table 3.2-1	ECR-50797, Upgrades for Used Fuel Storage. This change described the onsite ISFSI system description and updated the design functions of the FHB and the FHB crane.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
13-022	2015-06	FSAR Figure 3.8-17 FSAR Section 3A FSAR Section 6.2.1.6 FSAR Section 6.2.2.2.1.1 FSAR Section 6.2.2.3.1.1 FSAR Section 6.3.2.6 FSAR Section 6.3.2.14 FSAR Section 6.3.6 FSAR Figure 6.2-48	ECR-50579A, GL 2004-02, RB Sump Debris Collection (RB Sump Strainers). This change updated Chapters 3 and 6 to include updated text and figures for the new recirculation sump design.
13-029	2016-03	FSAR Figure 1.2-1 FSAR Figure 2.4-6 FSAR Section 9.4.7 FSAR Figure 9.4-35, Sh1 FSAR Figure 9.4-35, Sh2 FSAR Figure 9.4-36 FPER Figure E-023-001	ECR50793B and ECR50870, ISFSI Electrical Building (EB) and Auxiliary Electrical Equipment Building (AEB). This change added an ISFSI EB, which houses equipment used for monitoring the temperature/ventilation of the spent fuel storage casks. This change also added an ISFSI AEB, which houses a portable diesel generator to supply backup power to the ISFSI EB.
14-004	2016-03	FSAR Figure 1.2-12	ECR 51004, Changed Orientation of Two Main Steam Power Operator Valves (MS PORV). This change rotated the actuator assembly for IPV02000-MS and IPV02010-MS to have its hand-wheel ergonomically positioned to improve accessibility for local control at the valve. Additionally, this change installed permanent moveable platforms adjacent to the MS PORVs IPV02010-MS and IPV02020-MS to facilitate accessibility for manual valve control during a FLEX event, if needed.
14-018	2016-01	FSAR Section 5.5.7.2.2.4	CR-12-04658, Administrative Correction. This change corrected FSAR Section 5.5.7.2.2.4, which incorrectly states that the Reactor Pressure Vessel Head (RPVH) "is gradually raised as the water level in the refueling cavity increases." Analysis supports the current VCSNS practice of performing a "dry" lift in which the RPVH is raised in a single movement disregarding water level in the refueling cavity.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
14-020	2016-02	FSAR Figure 1.2-5 FSAR Figure 1.2-12 FSAR Figure 1.2-28 FSAR Figure 9.1-3 FSAR Figure 9.2-2, S2 FSAR Figure 9.2-2, S4	ECR 51003, FLEX Feed Connections. This change installed a FLEX hose manifold as a diverse means to accomplish several key safety functions (core cooling & heat removal, spent fuel cooling and containment integrity) during an Extend Loss of AC Power (ELAP). Storage containers for hoses were also placed at strategic locations in the Intermediate and Auxiliary Buildings.
14-022	2016-05	FSAR Figure 1.2-3 FSAR Figure 1.2-5 FSAR Figure 6.3-1 FSAR Figure 9.1-3 FSAR Figure 9.3-16, S3 FSAR Figure 9.3-16, S5	ECR51007, Reactor Coolant System (RCS) Make-up and Boration Piping Modifications. This change modified the Refuel Water Storage Tankvcr5 and Boric Acid Tank piping to add new piping with a hose connection for a suction source for a Regional Response Center pump or the FLEX RCS Make-up pump. This arrangement will provide a diverse source of borated water to the Reactor Coolant System for both inventory and reactivity control during an ELAP.
14-029	2016-01	FSAR Table 3.9-8 FSAR Figure 9.2-9b FSAR Figure 10.4-16	ECR51002, FLEX Water Transfer Connections. This change provided multiple connections and piping between the Condensate Storage Tank, Demineralized Water Storage Tank and Filtered Water Storage Tank as part of the NRC Order EA-12-049 Mitigation Strategies for Beyond-Design-Basis External Events.
14-039	2016-05	FSAR Figure 8.3-2aa FSAR Figure 8.3-2ab	ECR 51006, FLEX Backup Power from Electrical Building. This change implemented the FLEX alternate power scheme strategies which mitigate an ELAP. These include: 1) Alternate Power Source of Alternate Seal Injection; 2) Alternate Battery Charging for 125VDC Class 1 E Batteries XBA1A-ED and XBA1B-ED; 3) Alternate Power for the Backup Technical Support center; and 4) Alternate power to Electrical Building 480 VAC Distribution Panel APN04071.
14-042	2016-03	FSAR Figure 9.4-25, S1 FSAR Figure 9.4-25, S2	ECR 50874, Reactor Building Cooling Upgrade (RBCU). This change installed new connections to support a new heat sink for the RBCUs. The new Industrial Cooling Water system will increase the heat removal capacity of the RBCUs and will allow for isolation of the existing Industrial Cooling Towers at a later date.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
15-007	2016-05	FSAR Table 3.9-8 FSAR Figure 9.1-3 FSAR Section 9.1.3.2	ECR 50879B and ECR50879, Modifications to the Refuel Water Storage Tank (RWST). This change added a riser loop seal to isolate any potential break in the non-safety related section of the Spent Fuel Purification loop. The safety-related riser loop seal prevents drainage of the RWST by only allowing drawdown of tank to the low level height equal to the riser height.
15-011	2015-07	FSAR Table 6.4-1 FSAR Section 6.4.1.2.1 FSAR Section 13.1.2.2.1 FSAR Section 13.1.2.3 FSAR Section 13.1.3.1.5 FSAR Section 13.2.1 FSAR Section 13.5.1.3 FSAR Section 13.5.1.3.1	CR-14-02981, VCS Unit 1 "Shift Supervisor" Position Title Change to "Shift Manager". This title change was recommended by INPO SOER 96-1, Recommendation 6.
15-012	2015-08	FSAR Table 3.2-1 FSAR Section 13.1.2.2.4	Correct QAPD title. This change corrects the QAPD title in Section 13 and Table 3.2-1 Notes.
15-014	2015-08	FSAR Section 9.3 FSAR Figure 9.4-32	ECR-50682C, Control Rod Drive Mechanism (CRDM) Cooling Tower XCI0004 Drawing Change. This change added the vent lines on the spray pumps casings shown in FSAR Figure 9.4-32 (Essential Drawing D-302-852).
15-015	2016-05	FSAR Figure 8.2-2 FSAR Figure 8.2-2a	ECR50864B, Replace Main Transformer Feed Breaker 8902 and Associated Equipment. This change modified the transient recovery voltage (TRV) capacitance for the new XCB8902 from the originally specified 30nF (per phase) to 15nF (per phase). The reduced TRV capacitance is to provide an interrupt rating of 63kA. This rating is the same as the existing XCB8902 and is the interim vendor recommended configuration for XCB8902, until an acceptable long term design rated for 90kA. This design change is an interim configuration that de-rates the new breaker from a fault rating of 90kA to 63kA. The final configuration implemented by the overall modification will restore the 90kA interrupt rating of the breaker to support VCS3.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
15-016	2015-08	FSAR Figure 8.3-4	ECR-50811 and ECR-50811A, NFPA 805 Incipient Detection Implementation. This change added the Incipient Detection fire detection equipment to Figure 8.3-4.
15-017	2015-08	FSAR Section 9.3.1.1 FSAR Section 9.3.1.2	ECR-72076, Administrative Correction to Voltages in FSAR. This change corrects the FSAR Section 9.3.1.1 and 9.3.1.2 voltage from 460 to 480 volts for air compressors.
15-021	2016-05	FSAR Section 3A FSAR Table 5.2-8 FSAR Section 9.1.4.2.2.8 FSAR Section 9.1.4.2.2.11	ECR70905 Rev. 1, Replacement of Reactor Vessel HvdraNuts with Standard Nuts and Washers. This changed replaced the HydraNuts used for the Reactor Vessel Closure Head with conventional nuts and washers. The replacement, conventional nuts and washers, are equal to or better than the original design nuts and washers.
15-023	2015-12	FSAR Section 4.2.2.2.2 FSAR Section 4.2.4 FSAR Section 5.4.2 FSAR Section 5.4.5	ECR-50846D and ECR-72103, Weld Repair Contingency for RV Head Inspection During Refuel 21. This change updated the FSAR to include Relief Request RR-4-05, "Alternative Weld Repair for Reactor Vessel Upper Head Penetrations" (approved April 30, 2014) and the weld repairs performed on the reactor vessel head, during RF-21.
15-024	2016-01	FSAR Figure 10.4-8 FSAR Figure 10.4-16	ECR-50157A, Upgraded the Emergency Feedwater (EFW) Mini-flow Lines to Condensate Storage Tank (CST) from Non-nuclear Saftey (NNS) to Quality Related (QR). This change upgraded the 2 inch, 3 inch and 4 inch mini-flow/recirculation lines for the Motor Driven Emergency Feedwater, Turbine Driven Emergency Feedwater pumps and 10 inch condensate return line from the EF tie in point to the CST from NNS to QR. The upgrade of the lines also addressed concerns of potential flooding problems of the Diesel Generator Building and the potential crimping of the line during a seismic event.
15-025	2016-02	FSAR Table 8.3-3 Part A1 FSAR Table 8.3-3 Part A2 FSAR Table 8.3-3 Part B1 FSAR Table 8.3-3 Part B2 FSAR Section 9.2.1.3	ECR-50899, Service Water (SW) Traveling Screen Operation after an Engineered Safety Feature (ESF) Signal. This changed removed the function of the SW Traveling Screen to rotate after an ESF demand. The rotating function of the SW Traveling Screen is not required for SW System operability could create a failure mode of debris intrusion after the ESF demand.

FSAR/FPER REVISION NOTICES INCORPORATED SINCE JUNE 2015 UPDATE – EFFECTIVE 05/31/16

<u>RN No.</u>	<u>APPROVAL DATE</u>	<u>SECTIONS</u>	<u>BRIEF DESCRIPTION</u>
15-028	2016-02	FSAR Figure 9.3-16, SH 1C	ECR72120, Reactor Coolant Drain Tank (RCDT) Heat Exchanger (HX) Champs/Q-List Revision. This change corrected the Safety Class of the Shell Side of XHE0009 (Excess Letdown Heat Exchanger) as 2B.
16-005	2016-05	FSAR Figure 8.2-2	ECR50777, Upgrades to Switchyard Bus 3. This administrative change is to correct a drawing that was not captured as part of a previous revision notice.