



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200  
ATLANTA, GEORGIA 30303-1200

May 14, 2020

Mr. Daniel G. Stoddard  
Senior Vice President and Chief Nuclear Officer  
Innsbrook Technical Center  
5000 Dominion Blvd., Floor: IN-2SW  
Glen Allen, VA 23060

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INSPECTION  
REPORT 05000395/2019014, NOTICE OF VIOLATION CLOSURE

Dear Mr. Stoddard:

On April 8, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed inspection activities related to your reply to a Notice of Violation at your Virgil C. Summer Nuclear Station, Unit 1.

On March 22, 2019, the NRC inspectors initially discussed the results of this inspection with Mr. Michael Moore, Licensing Manager, and other members of your staff. On May 13, 2020, the inspectors presented the final inspection results to Mr. George Lippard, Site Vice President, and other members of the licensee staff.

The results of this inspection are documented in the enclosed report.

No findings or violation of more than minor significance were identified during this inspection.

The issuing Inspection Report for the Notice of Violation is documented in Integrated Inspection Report 05000395/2017004 dated February 13, 2018 and is available in the Agency Documents Access and Management System (ADAMS) under Accession No. ML18044A413. Your reply to the Notice of Violation, dated March 15, 2018, is available in ADAMS (Accession No. ML18074A282).

This inspection closes the Notice of Violation identified as 05000395/2017004-02 "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01."

If you disagree with any conclusions within this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC resident inspector at V.C. Summer Unit 1.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

Randall A. Musser, Chief  
Reactor Projects Branch 3  
Division of Reactor Projects

Docket No.: 05000395  
License No.: NPF-12

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV®

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INSPECTION  
REPORT 05000395/2019014 dated May 14, 2020

**DISTRIBUTION:**

S. Price  
M. Kowal  
L. Gibson  
OE Mail  
RidsNRRDro  
Public  
RidsNrrPMSummerResource

DOCUMENT NAME: G:\DRPI\RPB3\SUMMER\REPORTS\2019\SUM IR 2019-014 FINAL

Non-Public Designation Category: MD 3.4 Non-Public \_\_\_\_\_ (A.3 - A.7 or B.1)

ADAMS ACCESSION NUMBER ML20135H247

<input checked="" type="checkbox"/> SUNSI Review		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive			<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	DRS	DRP	DRP	HQ:NRR	DRP	DRP
NAME	RPatterson	LPressley	AWilson	SSmith	SFreeman	RMusser
DATE	5/6/20	5/7/20	5/7/20	6/24/19	4/27/20	5/14/2020

OFFICIAL RECORD COPY

**U.S. NUCLEAR REGULATORY COMMISSION**

**Inspection Report**

Docket Number(s): 05000395

License Number(s): NPF-12

Report Number(s): 05000395/2019014

Enterprise Identifier: I-2019-014-0004

Licensee: Dominion Energy South Carolina (DESC)

Facility: Virgil C. Summer Nuclear Station, Unit 1

Location: Jenkinsville, SC 29065

Inspection Dates: November 1, 2018 to April 8, 2020

Inspectors: Lundy Frank Pressley, Senior Project Engineer  
Robert Patterson, Senior Reactor Inspector

Approved By: Randall A. Musser, Chief  
Reactor Projects Branch 3  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an inspection at Virgil C. Summer Nuclear Station Unit 1 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

## List of Findings and Violations

No findings or violations of more than minor significance were identified.

## Additional Tracking Items

Type	Issue number	Title	Report Section	Status
VIO	05000395/2017004-02	Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01	71152	Closed

## **INSPECTION SCOPES**

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed this inspection using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## **REACTOR SAFETY**

### 71152 - Problem Identification and Resolution

#### Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issue:

- (1) VIO 05000395/2017004-02, "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01"

## INSPECTION RESULTS

<b>Very Low Safety Significance Issue Resolution Process:</b> Closure of VIO 05000395/2017004-02, "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01"	71152
This issue is a current licensing basis question and inspection effort is being discontinued in accordance with the Very Low Safety Significance Issue Resolution (VLSSIR) process. No further evaluation is required.	
<p><b>Description:</b></p> <p>In support of the closure of VIO 05000395/2017004-02, both regional inspectors and headquarters (HQ) technical experts reviewed the licensee's response to the Notice of Violation and the associated corrective actions taken, both performed and planned, that were identified within the response.</p> <p>The performance deficiency cited in violation 05000395/2017004-02 was against Title 10 of the <i>Code of Federal Regulations</i> (CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to ensure that conditions adverse to quality (CAQ) were promptly identified and corrected from a previously NRC-identified, Green, very low safety significance, non-cited violation (NCV). Specifically, related to a design in which the emergency feedwater (EFW) system flow control valves were susceptible to plugging by tubercles or other debris from the back-up supply from the service water (SW) system.</p> <p>In addition to the corrective actions identified in the licensee's response, the staff reviewed plant technical specifications (TS), applicable sections of the Updated Final Safety Analysis Report (UFSAR), design bases documents, and drawings of the EFW system, applicable sections of the SW system and the associated flow control valves. Staff also reviewed the SW to EFW technical report and the independent licensing basis review analysis. Design evaluations and procedures were reviewed to verify that the design and licensing bases had been appropriately translated into these documents and that the most limiting parameters and equipment line-ups were used. Test procedures and recent inspection results were reviewed against design bases documents to verify the adequacy of testing and inspection methods and that the procedural guidance aligned with program commitments. Maintenance procedures were reviewed to ensure components were appropriately included in the licensee's preventive maintenance program. System modifications, vendor documentation, system health reports, preventive and corrective maintenance history, and corrective action program documents were reviewed, as applicable, to verify that the performance capability of the back-up supply from SW to EFW cross-connect line was not negatively impacted, and that potential degradation was monitored or prevented. Maintenance Rule information was reviewed to verify that applicable back-up supply from SW to EFW components were properly scoped, and that appropriate preventive maintenance was being performed at the appropriate frequencies. A limited number of interviews were conducted to discuss inspection results.</p> <p>Additionally, the staff performed the following specific reviews:</p> <ul style="list-style-type: none"> <li>• Associated licensing and design basis documentation including Generic Letter 89-13 responses and aging management commitments with respect to the site's current licensing basis,</li> <li>• Corrective action documents, including corrective action to prevent recurrence (CAPRs) to determine if the installation of the Cured-In-Place Piping (CIPP) was adequate and to ensure that the tubercles issue was resolved,</li> </ul>	

- Inspection and preventive maintenance (PM) results including pictures and videos to ensure that the licensee verified the effectiveness of the CIPP,
- Results of diver inspections to understand the system debris history and material conditions within the system, MPR Report 0310-0026-RPT-002, "Supply of Emergency Feedwater from the Service Water System – Licensing and Design Basis Review," Rev. 0, specifically to gain context of the licensee's understanding of the licensing history of the system,
- System and component drawings relative to system configuration,
- Vendor documents to confirm qualification life and material properties along with the establishment of appropriate preventative maintenance frequencies,
- Technical report TR05220-008, "Service Water Supply Quality Relative to the Emergency Feedwater System", Revisions 0 and 1, specifically to understand, both the original and revised, methodology and approach taken by the site to conclude debris transport was adequately assessed,
- Chemistry control and treatment procedures to ensure performance frequencies were appropriate and treatments were effective at cleaning up the SW system including the impounded SW pond,
- Modification Package for the CIPP (ECR 50695), and post modification inspections,
- Associated CIPP work orders (WOs) to confirm that work and installation was completed as referenced in associated corrective action documents.

The licensee implemented corrective actions to ensure the applicable aspects of the violations were appropriately resolved, and modifications to the system were made and inspection and cleaning programs of the SW system were updated. In addition, the licensee performed an engineering analysis through a technical report (TR05220-008) to verify that any possible debris transit within the system was minimal and would not affect the ability of the system to perform its safety function.

The licensee also had an independent engineering firm review both the licensing and design basis in conjunction with the technical report (MPR Report 0310-0026-RPT-002). The licensee also demonstrated through inspection, testing and recent operating experience that there was not an ongoing credible mechanism for large-particulate transport from the impounded and chemically treated SW pond into the SW system piping.

#### **Licensing Basis:**

The NRC staff concluded, that the licensee's corrective actions were reasonable and that the combination of modifications along with updated inspection and cleaning programs of the SW system provided reasonable assurance to preclude tubercles or other credible debris from impacting the ability of the SW system to provide a back-up supply to the EFW system.

NRC staff reviewed the independent engineering firm report, (MPR Report 0310-0026-RPT-002). NRC staff concluded the independent engineering firm report was reasonable with respect to the licensing and design basis.

The staff also reviewed the licensee's original revision of the engineering analysis within technical report (TR05220-008, Rev. 0). The staff identified several minor discrepancies in the licensee's debris transport analysis contained within revision 0 of the technical report.



In response to the staff's comments the licensee initiated CR 18-04928 to address the NRC identified issues with their transport analysis and revised the original version of the technical report.

NRC staff subsequently reviewed revision 1 of the technical report (TR05220-008, Rev. 1) and concluded that the changes made to the report satisfactorily addressed the minor discrepancies that were identified by the staff in March of 2019. The referenced calculation/study (Ref. 3.16), "Hydraulic Transport of Sand Shell Mixtures" used to support their position served as a reasonable resource when evaluating the transport of such debris. Although, this methodology is not formally endorsed by the NRC it does provide reasonable assurance that the EFW system would perform its safety related function if supplied by the back-up source from the SW system as currently designed.

Furthermore, NRC staff noted that any "large-particulate" would have to take a torturous path to traverse through the SW system, which includes several vertical runs. Therefore, this torturous path significantly decreases the likelihood of any potential for blockage of the back-up supply from the SW system to the EFW system. This path, in conjunction with the addition of CIPP piping and a credible schedule of inspection and chemical treatment procedures further supports the overall conclusion of reasonable assurance of the back-up supply from the SW system to the EFW system to perform its safety related function.

Finally, with regards to South Carolina Electric & Gas (SCE&G) Letter dated March 15, 2018, "Reply to a Notice of Violation," (ADAMS Accession No. ML18074A282), Item 5, "Other Considerations," given the current understanding of the Licensing Basis and known low risk of the "other debris" issue the NRC concludes that the licensee's interpretation was reasonably valid at the time of this review.

Therefore, NRC staff, comprised of both regional based specialist inspectors and HQ technical staff, in coordination, have concluded this matter to be closed given the current licensing basis, current risk information and corresponding inspection resources that were applied for the respective very low safety significance.

**Significance:**

Senior Reactor Analysts (SRA) performed an updated bounding analysis of the risk associated with the full loss of function of the back-up supply from SW to the EFW flow control valves. This analysis assumed a non-recoverable weather-related loss of offsite power (LOOP) for 24 hours with a concurrent loss of the condensate storage tank (CST) in response to a Fujita scale F3 tornado impacting the site. No credit for use of Diverse and Flexible Coping Strategies (FLEX) equipment was assumed, which would have further lowered the risk. The low frequency for a F3 level and greater tornados limited the risk and therefore the bounding analysis result was  $< 1.0E-6$ /year delta core damage frequency ( $\Delta CDF$ ) and therefore would be of very low safety significance.

**Technical Assistance Request:** Not Applicable

**Corrective Action Reference:** CR-17-04630, CR-18-00643, CR-18-04928

**Violation Closure:**

The performance deficiency cited in violation 05000395/2017004-02 was against 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to ensure that conditions adverse to quality (CAQ) were promptly identified and corrected from a previously

NRC-identified Green, very low safety significance, non-cited violation (NCV). Specifically, related to a design in which the emergency feedwater (EFW) system flow control valves were susceptible to plugging by tubercles or other debris from the back-up supply service water (SW) system.

Given the very low safety significance of the issue NRC staff used the guidance from Inspection Manual Chapter (IMC) 0612, Appendix B, effective January 1, 2020, Block 7 VLSSIR Process, and the inspectors determined this issue met the criteria identified for closure. Therefore, VIO 05000395/2017004-02, "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01" is closed and no further evaluation is required.

## **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On March 22, 2019, the inspectors presented the initial inspection results to Mr. Michael Moore, Licensing Manager, and other members of the licensee staff.
- On May 13, 2020, the inspectors presented the final inspection results to Mr. George Lippard, Site Vice President, and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152	Corrective Action Documents	CR 12-05070		
		CR 14-02540		
		CR 15-03574		
		CR 17-02128		
	Corrective Action Documents Resulting from Inspection	CR 18-04928	Lack of Technical Rigor in Transport Analysis TR05220-008	Dated 3/28/2019
		CR 19-00357	Handwritten Portions of the Diver Reports Illegible	Dated 1/28/2019
	Drawings	1-MS-22-249	SW Flow Path Isometric	Rev. 4
		1-MS-22-255	SW Flow Path Isometrics	Rev. 5
		1-MS-22-256	SW Flow Path Isometrics	Rev. 11
		1-MS-22-569	SW Flow Path Isometrics	Rev. 7
		1-MS-50-175	Fisher Diaphragm Actuated Control Valve	Rev. 7
71152	Engineering Changes	ECR 50695	Installation of the Cured-In-Place-Piping	
	Engineering Evaluations	MPR Report 0310-0026-RPT-002	Supply of Emergency Feedwater from the Service Water System – Licensing and Design Basis Review	Rev. 0
		TR05220-008	Service Water Supply Quality Relative to The Emergency Feedwater System	Revs. 0, 1
	Miscellaneous	Alpha Service Water Bay	Divers Inspection	Dated 5/1/2017
		EQ Report No. 985	ASCO Solenoid Valve EQ Maintenance Data Sheets	
		GL 89-13 Responses		
		ICP-240.167	EQ Equipment Maintenance	Rev. 6
		RF23 Service Water Inspections	Service Water Bay Inspection and Pre-Cleaning Videos	
		SW Health Report	System Health Report	Dated 3/14/2017
		SW Health	System Health Report	8/21/2017

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152		Report		
		SW Health Reports	System Health Report	3/26/2018
		TR00160-020	License Renewal Evaluation of the Service Water System Reliability and In-Service Testing Program	Rev. 3
		Valve Cage Photo Review		
		Vendor Manual	Fisher Controls Valve Regulator Manual for 67F and 67R	7/29/1976
		Calculation	Hydraulic Transport of Sand/Shell Mixtures	Dated Sept. 2010
	Procedures	CP-913	SW Biocide Treatment Equipment Operation	Rev. 12
		CP-923	Service Water Chemical Addition	Rev. 7
		ES-505	Service Water System Corrosion Monitoring and Control Program	Revs. 1, 2, 3, 4, 5
		ES-560.211	SW Heat Exchanger Performance	Rev. 13
		ICP-240.169	FCV Diagnostic Testing	Dated 10/23-27/2019
		SAP-0156	License Renewal Program	Rev. 0
		SAP-0999	Corrective Action Program	Rev. 18
		SAP-1255	SW Reliability Optimization Program	Rev. 2
	Work Orders	1410966		
		1410969		
		1508250		
		1600049-013		
		1602828-002		
		1604087-004		
		1704898		
		1709919		
		1709922-002		
		1704754-003		
		1706193-001		
		1709922-002		