



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1200

August 4, 2021

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

SUBJECT: VIRGIL C. SUMMER – INTEGRATED INSPECTION REPORT
05000395/2021002

Dear Mr. Stoddard:

On June 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Virgil C. Summer. On July 14, 2021, the NRC inspectors discussed the results of this inspection with George Lippard and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in 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 Virgil C. Summer.

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/

David E. Dumbacher, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket No. 05000395
License No. NPF-12

Enclosure:
As stated

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SUBJECT: VIRGIL C. SUMMER – INTEGRATED INSPECTION REPORT
05000395/2021002 – DATED August 4, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000395

License Number: NPF-12

Report Number: 05000395/2021002

Enterprise Identifier: I-2021-002-0013

Licensee: Dominion Energy

Facility: Virgil C. Summer

Location: Jenkinsville, SC

Inspection Dates: April 01, 2021 to June 30, 2021

Inspectors: E. Hilton, Resident Inspector
M. Read, Sr. Resident Inspector
A. Wilson, Project Engineer

Approved By: David E. Dumbacher, 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 integrated inspection at Virgil C. Summer, 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

Inadequate Risk Assessment of Heavy Lift in the Vicinity of Safety-Related Cables			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000395/2021002-01 Open/Closed	[H.5] - Work Management	71111.13
An NRC-identified Green finding was identified when the licensee failed to adequately assess risk associated with a heavy lift in the vicinity of a cable tray carrying safety-related cables. Specifically, the licensee failed to follow procedure SSP-001, Planning and Scheduling Maintenance Activities, when they screened a heavy lift as “low risk” during the planning process when the lift should have been classified as “medium risk” due to proximity of the cables.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000395/2020-001-00	LER 2020-001-00 for Virgil C. Summer Nuclear Station (CSNS), Unit 1, Condition Prohibited by Technical Specification 3.7.3	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On May 12, 2021, the unit was shut down to repair the 'B' feedwater isolation valve. The unit was returned to rated thermal power on May 16, 2021 and remained at or near rated thermal power for the remainder of the inspection period.

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 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. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions at the onset of hurricane season for the following systems during the week of June 7, 2021:
 - Emergency diesel generators
 - Emergency feedwater
 - 230kV and 115kV switchyard

External Flooding Sample (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated that flood protection barriers, mitigation plans, procedures, and equipment are consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding. Walkdowns were performed the week of June 14, 2021.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Electrical lineup for emergency buses with the XTF-31 emergency auxiliary transformer tagged out for maintenance on April 14, 2021
- (2) 'C' chiller when 'A' and 'B' chillers were inoperable on May 2, 2021
- (3) 'B' feedwater flow control and bypass valves while the 'B' feedwater isolation valve was inoperable on May 12, 2021
- (4) Component cooling system on June 21, 2021, while the 'B' component cooling water pump was inoperable for motor replacement

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Control building relay room on April 19, 2021
- (2) 'A' and 'B' battery rooms on May 4, 2021
- (3) Circulating water pump house on May 18, 2021
- (4) Intermediate building elevation 412 feet on May 26, 2021

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Intermediate Building elevation 412 feet on June 9, 2021

Cable Degradation (IP Section 03.02) (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Electrical manhole EMH0002 via direct observations on February 23, 2021, water intrusion trend reviews on April 20, 2021, and direct observation of EMH0070 on June 24, 2021

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed operations personnel during spent fuel pool level lowering to support level transmitter calibrations on April 12, 2021, isolating steam generator

blowdown and containment isolation valve testing on April 29, 2021, plant shutdown on May 10, 2021, and plant startup on May 14, 2021.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed simulator evaluations that included instrumentation failures, loss of condenser vacuum, turbine runback, reactor trip failure to actuate, and emergency declaration on June 2, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Emergency Diesel Generators, completed on May 25, 2021
- (2) Service Water, completed on June 24, 2021
- (3) Class 1E 125V DC electrical distribution system, completed on June 30, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Elevated risk during the tagout of the diesel-driven fire service water pump for maintenance activities on April 26, 2021
- (2) Elevated risk during scheduled corrective maintenance on the XTF-31 emergency auxiliary transformer on April 14, 2021
- (3) Elevated risk during 'A' train solid-state protection system testing on April 30, 2021
- (4) Elevated risk during emergent work on the 'B' feedwater isolation valve including gagging the valve open on May 12, 2021
- (5) Elevated risk with 'A' charging pump out of service for maintenance concurrent with the diesel-driven fire pump being nonfunctional on May 24, 2021
- (6) Heavy and complex lift of the new 'B' chiller into the intermediate building the week of February 15, 2021 (OpESS 2007/03 Revision 3)

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) CR-21-00149, 'B' chiller control panel degraded connections
- (2) CR-21-01157 and CR-21-00672, 'A' chiller compressor lockouts on March 17 and May 2, 2021

- (3) CR-21-01190, 'B' emergency diesel generator failure to flash the generator field during testing on May 5, 2021
- (4) CR-21-00543, Hairline cracks on tops of safety-related batteries, reviewed on June 1, 2021
- (5) CR-21-00894, Gutor Part 21 on safety related uninterruptable power supply inverters
- (6) CR-21-00752, CRDM switchgear room supply fans both in AUTO on June 5, 2021

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Permanent Modification - Engineering Change Package ECR-50585, 'B' Chiller Replacement

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

- (1) Main steam to turbine driven emergency feedwater pump drain isolation valve after thermal overload replacement, on April 7, 2021
- (2) STP-170.002, Diesel Fire Pump Monthly Test, on April 27, 2021, following controller card replacement
- (3) STP-345.034, First Stage Turbine Pressure Instrument IPT00446 Calibration, following replacement of three control cards on May 25, 2021
- (4) STP-229.001, HVAC Chilled Water Test, for the 'B' chilled water pump following pump and motor overhauls, during the week of June 14, 2021
- (5) STP-428.401, Diesel Driven Fire Service Pump Engine Inspection, following engine preventative maintenance on June 22, 2021

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (4 Samples)

- (1) STP-212.001, Core Power Distribution Measurement, on April 26, 2021
- (2) STP-125.009 and STP 125.002B, 'B' emergency diesel generator 24-hour load test, on April 8, 2021
- (3) STP-345.037, Solid State Protection System Actuation Logic and Master Relay Test Train A, on April 30, 2021
- (4) STP-125.002A, Diesel Generator 'A' Operability Test, for disproving common cause failure following 'B' emergency diesel generator failure on May 5, 2021

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) STP-136.001, Steam Generator Blowdown Valve Operability Test, on April 29, 2021

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated a drill involving a turbine building fire, small break loss of coolant accident with fuel damage, and containment leakage on May 19, 2021.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

- (1) April 1, 2020 to March 31, 2021

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (1 Sample)

- (1) April 1, 2020 to March 31, 2021

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

- (1) April 1, 2020 to March 31, 2021

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (1 Sample)

- (1) April 1, 2020 to March 31, 2021

BI02: RCS Leak Rate Sample (IP Section 02.11) (1 Sample)

- (1) April 1, 2020 to March 31, 2021

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples)

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

- (1) Condition Reports CR-20-01145, -01146, -01721, and -01727, related to pressurizer power operated relief valve stroke time testing, completed on April 14, 2021
- (2) CR-20-01726, failure of the instrument air tubing connection to the 'C' emergency feedwater header isolation check valve, reviewed on June 11, 2021

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000395/2020-001-00, Condition Prohibited by Technical Specification 3.7.3 (ADAMS Accession No. ML20170B056). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors did not identify a violation of NRC requirements.

INSPECTION RESULTS

Inadequate Risk Assessment of Heavy Lift in the Vicinity of Safety-Related Cables			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000395/2021002-01 Open/Closed	[H.5] - Work Management	71111.13
<p>An NRC-identified Green finding was identified when the licensee failed to adequately assess risk associated with a heavy lift in the vicinity of a cable tray carrying safety-related cables. Specifically, the licensee failed to follow procedure SSP-001, Planning and Scheduling Maintenance Activities, when they screened a heavy lift as “low risk” during the planning process when the lift should have been classified as “medium risk” due to proximity of the cables.</p>			
<p><u>Description:</u> In February 2021, the licensee was in the middle of a chiller replacement project. After the old chiller was cut into pieces and removed, the new chiller was scheduled to be rigged from the 436 feet elevation to the 412 feet elevation of the Intermediate Building through a hatch in the floor. Due to their length compared to the size of the hatch, the three pieces of the new chiller were rigged using multiple lift points so that the riggers could tilt the pieces at a 45-degree angle. Each of the pieces weighed more than 6,000 pounds.</p> <p>The inspectors performed a walkdown the week of February 15, 2021, before the lift was scheduled, using the guidance contained in Operating Experience Smart Sample (OpESS) 2007/03, “Crane and Heavy Lift Inspection, Supplemental Guidance to IP 71111.20 and IP 71111.13.” On February 24, 2021, NRC inspectors questioned the on-shift Operations crew when it was apparent that they were not aware of the lift that was scheduled that morning. When Operations informed the inspectors that the lift was screened as Low Risk, the inspectors challenged the result of the screening process.</p> <p>The licensee stopped work on the lift to review the risk assessment using procedure SSP-001, Planning and Scheduling Maintenance Activities, Revision 25. The licensee determined that the weight and complexity of the lift should have screened to Medium Risk (Industrial) by the work planning organization. Furthermore, the licensee determined that the proximity of the safety-related cable tray should have been screened Medium Risk (Nuclear) by the Operations department. In accordance with SSP-001, Enclosures 8.13 and 8.14, a Risk Mitigation Strategy should be developed for any Medium-risk activity.</p> <p>The cable tray in proximity to the Auxiliary Building hatch contains cables associated with the battery room fan control power, the ‘A’ component cooling water pump speed switch, the ‘C’ component cooling water pump transfer switch, the ‘A’ control room evacuation panel, the ‘A’ reactor trip switchgear, the direct-current starter for the ‘A’ emergency diesel generator fuel oil</p>			

pump, lighting for vital areas, the reactor protection underfrequency and undervoltage relay panels, and control power to safety-related alternate-current busses 1DA, 1DA1, and 1DA2. Based on the having multiple lifting points, a failure of one half of the rigging could have resulted in swinging and impacting the cable tray.

The inspectors concluded that the licensee failed to follow procedure SSP-001, Planning and Scheduling Maintenance Activities, Revision 25, section 7.7.1, which required a risk screening by the planner and Operations shift representative who holds a senior reactor operator license using Enclosure 8.14. Enclosure 8.14 contained a risk assessment matrix which required activities to be screened at a Medium-Risk level for "Activity in the vicinity of Critical equipment or redundant component which if damaged could result in Technical Specification action statement ≤ 72 hours."

Corrective Actions: The licensee stopped the lift until the risk was reevaluated. The work was rescreened as Medium Risk and additional risk mitigating actions were developed, including additional reviews of the heavy lift plan, additional oversight during the lift, and informing the on-duty Operations crew of the potential plant impacts if the cable tray was impacted.

Corrective Action References: CR-21-00483

Performance Assessment:

Performance Deficiency: The licensee's failure to adequately evaluate the risk of the complex heavy lift in the vicinity of a safety-related cable tray per procedure SSP-001 was within the licensee's ability to foresee and correct and was a performance deficiency (PD).

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, there would have been less oversight of the heavy lifts, and Operations crews would not have been aware of the risks. The inspectors also utilized Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," effective January 1, 2020, to inform and support the determination of whether the performance deficiency was more than minor. The inspectors determined example 8.d in IMC 0612, Appendix E to be similar because the licensee's risk assessment was inaccurate. As listed in example 8.d, the performance deficiency is more than minor if the overall corrected risk assessment would result in a higher licensee-established risk category or would require additional RMAs under plant procedures.

Significance: The inspectors assessed the significance of the finding using Appendix K, "Maintenance Risk Assessment and Risk Management SDP." The inspectors determined that the failure to assess the risk associated with the heavy lift maintenance activity required additional evaluation. Although the licensee's process to specifically assess the risk associated with heavy lifts was generally qualitative, the Region II Senior Reactor Analyst determined that the incremental core damage probability deficit (ICDPD) for the maintenance activity could be estimated using SAPHIRE Version 8.2.3 and V.C. Summer SPAR model Version 8.54. The risk deficit was conservatively estimated by determining the difference between the normal baseline risk of a plant transient and assuming for the conditional case that the lift would result in a plant transient with the unavailability of mitigating equipment supplied by the cable tray in the area of the lift. The duration of the maintenance activity was then applied which yielded an estimated ICDPD of $2.66E-08$. Because ICDPD was less than $1E-07$ and the dominant cutset sequences were not associated with large early release contributors, the finding did not require additional evaluation for incremental large early

release probability deficit (ILERPD). The risk deficit was determined to be less than the 1E-06 for ICDPD and 1E-07 for ILERPD values described in Flowchart 1 of Appendix K, and therefore, of Green risk significance.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the licensee failed to adequately screen the work activities which should have been classified as Medium Risk.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

EXIT MEETINGS AND DEBRIEFS

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

- On July 14, 2021, the inspectors presented the integrated inspection results to George Lippard and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.13	Procedures	SSP-001	Planning and Scheduling Maintenance Activities	25
71153	Engineering	TWR 2021-13	XVG09627B-CC NRC Questions	4/12/2021
	Evaluations	TWR 2021-15	XVG09627B-CC NRC Questions	5/17/2021
	Procedures	1MS-94B-0623	Installation and Maintenance Instructions - ASCO Bulletin 8316	None
	Work Orders	2005463-004		4/28/2020