



Stephen A. Byrne  
Vice President, Nuclear Operations  
803.345.4622

March 30, 2001  
RC-01-0067

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

Dear Sir:

Subject: VIRGIL C. SUMMER NUCLEAR STATION  
DOCKET NO. 50-395  
OPERATING LICENSE NO. NPF-12  
ANNUAL OPERATING REPORT

Enclosed is the 2000 Annual Operating Report for the South Carolina Electric & Gas Company Virgil C. Summer Nuclear Station Unit No. 1. This report is being submitted in accordance with Technical Specifications 6.9.1.4, 6.9.1.5, and Regulatory Guide 1.16.

If there are any questions, please call at your convenience.

Very truly yours,

Stephen A. Byrne

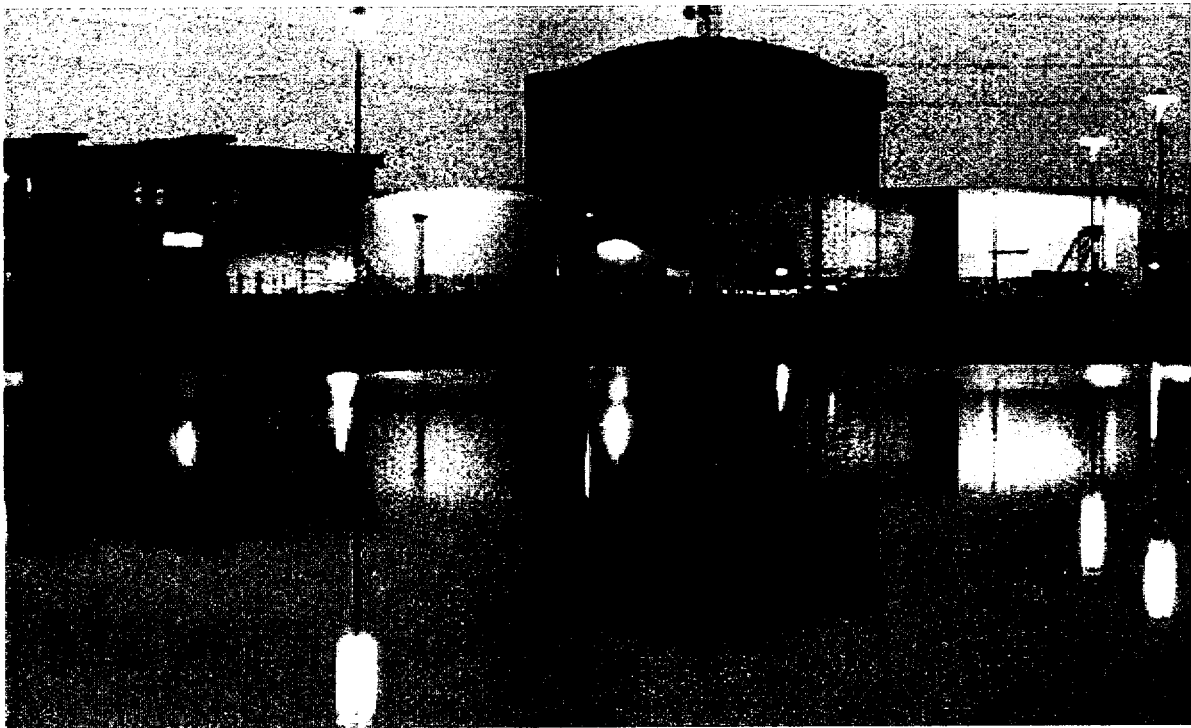
SBR/SAB/sr  
Attachment

c: N. O. Lorick  
T. G. Eppink (w/o attachment)  
R. J. White  
L. A. Reyes  
K. R. Cotton  
Mary L. Thomas (NRC)  
K. W. Sutton  
D. L. Abstance

Charleen T. Raddatz  
W. G. Wendland  
J&H Marsh & McLennan  
NRC Resident Inspector  
NSRC  
RTS (O-L-99-0107)  
File (818.02-10, RR 8225)  
DMS (RC-01-0067)

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# **VIRGIL C. SUMMER NUCLEAR STATION**



**2000  
ANNUAL OPERATING REPORT**

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## PREFACE

The 2000 Annual Operating Report for the Virgil C. Summer Nuclear Station is hereby submitted in accordance with Technical Specifications 6.9.1.4, 6.9.1.5, and Regulatory Guide 1.16 under Docket Number 50/395 and Facility Operating License NPF-12.

## **ANNUAL OPERATING REPORT**

### **1.0 INTRODUCTION**

The Virgil C. Summer Nuclear Station (VCSNS) utilizes a pressurized water reactor rated at 2900 MWT. The maximum dependable capacity is 966 Mwe.

The station is located approximately 26 miles northwest of Columbia, South Carolina.

### **2.0 OPERATIONAL DATA**

For the reporting period of January 1 through December 31, 2000, the station operated at a capacity factor of 75.1 percent (using maximum dependable capacity) and a unit availability of 76.2 percent. The reactor was critical for a total of 6724.9 hours, the generator remained on line 6689.6 hours, and the total gross electrical energy generated for 2000 was 6,358,809 MWH.

The station successfully completed its twelfth refueling outage in 147 days and 11.3 hours.

### **3.0 OPERATING SUMMARY**

The Virgil C. Summer Nuclear Station (VCSNS) Unit No.1 operated at 100 percent power from January 1 through March 2<sup>nd</sup>. On March 2<sup>nd</sup>, power was reduced to 89% to support maintenance activities on the "C" Main Feedwater Pump (MFP) and the "A" Feedwater Booster Pump. Power was not restored to 100% until March 11<sup>th</sup> due to "C" MFP mechanical interference. The problem appeared to stem from a clearance issue with the seal and pump cooldown methods.

VCSNS operated at 100 percent power from March 11<sup>th</sup> to April 14<sup>th</sup>. On April 14<sup>th</sup>, the plant power was reduced to 34% to support maintenance on a Reactor Coolant System transmitter. This transmitter has a common tap with those in other protection channels and the power reduction was done conservatively to get below the P-9 (38%) interlock so that a perturbation, when the transmitter was restored, would not cause a plant trip. On April 16<sup>th</sup>, power was restored to 100%.

VCSNS operated at 100 percent power from April 16<sup>th</sup> to June 15<sup>th</sup>. On June 15<sup>th</sup>, the plant power was reduced and the Main Generator Breaker was opened. This was done to support repairs to the "C" Main Feedwater Isolation Valve operator. Repairs were completed and the power was restored to 100 percent power on June 19<sup>th</sup>.

VCSNS operated at 100 percent power from June 19<sup>th</sup> to August 11<sup>th</sup>. On August 11<sup>th</sup> plant power was reduced to 99% due to high circulating water discharge temperature. The high circulating water discharge temperature was caused by high lake water inlet temperature due to the hot August weather. On August 13<sup>th</sup>, power was restored to 100 percent.

VCSNS operated at 100 percent power from August 13<sup>th</sup> to September 16<sup>th</sup>, when the station was allowed to begin the coastdown prior to the twelfth refueling outage. The main generator breaker was opened on October 7<sup>th</sup>.

The plant remained shutdown for the remainder of 2000. This planned outage was extended to conduct repairs to the "A" Loop of the Reactor Coolant System Hot Leg Pipe. This pipe was discovered to have a crack in the weld between the Reactor Coolant Pipe and the Reactor Coolant Vessel Nozzle.

### **Maintenance**

Attachment I, "Power Reductions Caused by Maintenance Activities," provide more detailed information on operating time lost as a result of maintenance activities.

### **Refuel 12 Summary**

The main generator was opened at 0154 on October 7th, for refueling outage 12.

Major work activities included:

- Repair "A" Loop Reactor Coolant System Hot Leg Pipe
- 100% Eddy Current Inspection on the Steam Generators
- Reactor Vessel Split Pin Replacement
- Secondary System Water Hammer Modification
- Main Condenser Bellows Replacement
- Diesel Generator Governor Problem Resolution
- Main Feed Regulating Valve Leak-by
- Reactor Coolant Pump Seal Replacements
- Reactor Coolant System Pre-outage Cleanup
- Main Transformer Overhaul
- Reactor Core Barrel Removal
- Main Feedwater Piping Replacement after Flow Accelerated Corrosion Inspections
- Reactor Building Tendon Inspection
- Reactor Building Flooding Modification
- Condensate System Rerate
- Main Generator Breaker Overhaul
- Heater Drain System Digital Control Upgrade
- RHR & Spray Systems Guardpipe Inspections
- Steam Generator Feed Ring debris removal
- IWE/IWL Inspections
- 'B' Diesel Generator Heat Exchanger Replacement
- Sodium Hydroxide Spray Tank Outlet Valve Repair

On October 7<sup>th</sup>, during the containment inspection after entering the refueling outage, a large quantity of boron was found on the floor and protruding from the air boot around the "A" loop RCS hot leg pipe. On October 12<sup>th</sup>, a liquid penetrant test (PT) indicated the existence of a 4-inch long circumferential indication in the first weld between the reactor vessel and the "A" loop hot leg piping, approximately three feet from the reactor vessel. All fuel was removed from the reactor vessel to perform a more thorough examination.

Additional testing of the "A" loop hot leg piping did not confirm a flaw at the location of the circumferential indication. The tests identified, at a different location, an axial crack-like indication, approximately 2.7 inches long, and located approximately 9 degrees counterclockwise from top dead center of the weld. Visual examination from the outside diameter of the pipe identified a small "weep hole" in the center of the weld.

On November 18, a section (spool piece) of "A" hot leg pipe, approximately one foot long was cut out. The spool piece was sent to Westinghouse laboratory for examinations and analysis. A new spool piece was installed. All testing indicated that the new spool piece was installed properly.

Refuel 12 duration in 2000 was 85.9 days. Outage planned duration was approximately 38.5 days. Personnel exposure in 2000 due to the outage was approximately 184.267 man rem with 83.503 man rem being directly related to the "A" hot leg piping repair.

#### **4.0 EXPOSURES**

Attachment II consists of tables which list the number of station, utility, and other personnel (including contract personnel) receiving exposures greater than 100 mrem/year and their associated man-rem exposure according to work and job function.

#### **5.0 FAILED FUEL**

VCSNS has not had indication of failed fuel in 2000.

The reactor coolant system specific activity did not exceed the 1.0 microcuries per gram dose equivalent iodine-131 specific activity or the 100/E microcuries per gram limits of Technical Specification 3.4.8, for this reporting period.

**ATTACHMENT I**

**TO**

**2000 ANNUAL REPORT**



## V. C. Summer Nuclear Station Events

### Outage or Power Reductions Caused by Maintenance Activities

<u>Date</u>	<u>Time Start</u>	<u>Cause of Event/NERCGADS* Code</u>	<u>Date</u>	<u>Time Finish</u>	<u>Duration</u>	<u>Net Capacity MWe</u>	<u>Type</u>
03/03/2000	2150 Hrs	Main Feed Pump / 3411	03/11/2000	1840 Hrs	189.5 Hrs	929	Planned
04/14/2000	2222 Hrs	Reactor Coolant Loop Flow Repair /2390	04/16/2000	1809 Hrs	43.8 Hrs	945	Planned
06/15/2000	2137 Hrs	"C" Feedwater Isolation Valve Repair / 3431	06/19/2000	1900 Hrs	93.4 Hrs	824	Unplanned
10/07/2000	0154 Hrs	Refuel 12 Outage / 2070	11/30/2000	2400 Hrs	1318.0 Hrs	0	Planned
12/01/2000	0001 Hrs	Refuel 12 Outage / 2070	12/31/2000	2400 Hrs	744.0 Hrs	0	Planned

**ATTACHMENT II**

**TO**

**2000 ANNUAL REPORT**

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL OVER 100mREM			TOTAL MAN-REM		
	STATION WORKERS	UTILITY WORKERS	CONTRACT WORKERS	STATION WORKERS	UTILITY WORKERS	CONTRACT WORKERS
ROUTINE MAINTENANCE						
MAINTENANCE PERSONNEL	6	0	6	3.028	0.000	3.783
OPERATIONS PERSONNEL	1	0	1	0.672	0.000	0.486
HEALTH PHYSICS PERSONNEL	1	0	9	0.611	0.000	1.681
SUPERVISORY PERSONNEL	1	0	0	0.197	0.000	0.017
ENGINEERING PERSONNEL	1	0	0	0.358	0.000	0.086
SPECIAL MAINTENANCE						
MAINTENANCE PERSONNEL	63	0	176	25.161	0.003	93.505
OPERATIONS PERSONNEL	13	0	5	3.964	0.000	2.681
HEALTH PHYSICS PERSONNEL	12	0	22	3.964	0.000	6.614
SUPERVISORY PERSONNEL	3	0	2	0.862	0.000	0.356
ENGINEERING PERSONNEL	2	0	9	1.048	0.000	4.744
REACTOR OPERATIONS & SURVEILLANCE						
MAINTENANCE PERSONNEL	4	0	1	1.180	0.000	0.990
OPERATIONS PERSONNEL	11	0	2	3.526	0.000	0.673
HEALTH PHYSICS PERSONNEL	5	0	1	1.540	0.000	1.063
SUPERVISORY PERSONNEL	1	0	0	0.347	0.000	0.003
ENGINEERING PERSONNEL	0	0	0	0.208	0.000	0.046
WASTE PROCESSING						
MAINTENANCE PERSONNEL	0	0	0	0.057	0.000	0.153
OPERATIONS PERSONNEL	0	0	0	0.009	0.000	0.006
HEALTH PHYSICS PERSONNEL	5	0	1	1.162	0.000	0.381
SUPERVISORY PERSONNEL	0	0	0	0.090	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
IN-SERVICE INSPECTION						
MAINTENANCE PERSONNEL	10	0	22	3.110	0.000	8.245
OPERATIONS PERSONNEL	3	0	1	0.980	0.000	0.293
HEALTH PHYSICS PERSONNEL	2	0	7	0.798	0.000	2.332
SUPERVISORY PERSONNEL	0	0	0	0.020	0.000	0.013
ENGINEERING PERSONNEL	1	0	3	0.233	0.000	0.463
REFUELING						
MAINTENANCE PERSONNEL	4	0	23	1.337	0.001	6.092
OPERATIONS PERSONNEL	0	0	1	0.301	0.000	0.372
HEALTH PHYSICS PERSONNEL	1	0	1	0.304	0.000	0.786
SUPERVISORY PERSONNEL	0	0	0	0.062	0.000	0.007
ENGINEERING PERSONNEL	0	0	0	0.156	0.000	0.094
TOTALS						
MAINTENANCE PERSONNEL	87	0	228	33.873	0.004	112.768
OPERATIONS PERSONNEL	28	0	10	9.452	0.000	4.511
HEALTH PHYSICS PERSONNEL	26	0	41	8.379	0.000	12.857
SUPERVISORY PERSONNEL	5	0	2	1.578	0.000	0.396
ENGINEERING PERSONNEL	4	0	12	2.003	0.000	5.433
GRAND TOTAL	150	0	293	55.285	0.004	135.965

\*\*\*\*\* END OF REPORT \*\*\*\*\*