UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-395/94-300

Licensee: South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

Docket No.: 50-395 License No.: DRP-12

Facility Name: Virgil C. Summer Nuclear Station Unit 1

Examination Conducted: May 16 - 19, 1994

Chief Examiner: Paul Steiner For 6/15/94
Michael E. Ernstes Date Signed

Examiners: T. Guilfoil, Sonalyst
G. Hopper, RII
P. Steiner, RII

Approved By: Lawrence L Lawyer II 6/14/94
Lawrence L. Lawyer, Chief Date Signed
Operator Licensing Section 1
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

NRC examiners conducted regular, announced operator licensing initial examinations during the week of May 16, 1994. Examiners administered examinations under the guidelines of the Examiner Standards (ES), NUREG-1021, Revision 7. Seven Senior Reactor Operator (SRO) candidates received written and operating examinations.

Results:

Candidate Pass/Fail:

	SRO	RO	Total	Percent
Pass	6	-	6	83%
Fail	1	-	1	17%

Examiners identified a violation for the failure of the licensee to review AOP-501.2, "Total Loss of Chill Water," for adequacy (paragraph 2.d).

Examiners identified the inability of the candidates to make accurate calculations using steam tables as a weakness (paragraph 2.b.1).

Examiners identified the lack of operator knowledge on EOP rules of usage as a weaknes (paragraph 2.b.2) .

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. Fowlkes, Manager, Nuclear Licensing and Operating Experience
*D. Gatlin, Design Engineer
*T. Howell, Senior Instructor, Initial Training
*T. Matlosz, Supervisor Nuclear Training
*R. Quick, Nuclear Training Instructor
*B. Williams, Manager, Operations
*K. Woodward, Manager, Nuclear Training

NRC Personnel

*R. Haag, V. C. Summer, Senior Resident Inspector
L. Lawyer, Section Chief, Operator Licensing

*Attended exit interview

2. Discussion

a. Summary

NRC examiners conducted regular, announced operator licensing initial examinations during the period between May 2 - 19, 1994. Examiners administered examinations under the guidelines of the Examiner Standards, NUREG-1021, Revision 7. Seven SRO Upgrades received written examinations and operating tests. One candidate was denied a license. A violation was identified during the validation and performance of a plant walkthrough of AOP-501.2, "Total Loss of Chill Water." Candidates demonstrated a weakness in the use of EOPs during the simulator scenario portion of the examination. The average score on the written examination was an 87 with only one candidate in the 90s. Five of 35 Job Performance Measures (JPMs) were performed unsatisfactorily.

b. Reference Material

The NRC requested reference material (ES-201, Attachment 2) be sent to the region as well as to the contract examiner for development of the written and operating examinations. The training department did not send all the materials requested. Although they provided additional materials as requested, this delayed the examination generation process.

c. Operator Performance

(1) Written Examination

Performance on the written examination showed a weakness in the candidates' ability to make calculations using steam tables. The candidates, on average performed poorly in four other areas.

Four of seven candidates could not determine the subcooling margin from given plant parameters (question # 10). Three of seven candidates could not calculate the expected power operator relief valve (PORV) downstream temperature (question # 49). The examiners identified the inability of the candidates to make accurate calculations using steam tables as a weakness.

A majority of the candidates missed the questions on the following topics:

- Inputs to control circuitry (#2 and #27)
- Reactor Coolant System (RCS) loop penetrations (#19)
- Actions required after exceeding a Safety Limit (#54)
- Allowable surveillance intervals (#95)

(2) Simulator Scenarios

The applicants made errors in usage of the Emergency Operating Procedures during the simulator scenarios. These errors included improper transitions and failure to correctly execute procedures. The following paragraphs detail examples of these errors.

One crew failed to re-enter EOP-1.0, "Reactor Trip/Safety Injection Actuation" after receipt of a Safety Injection (SI). The crew tripped the reactor due to a high Reactor Coolant Pressure bearing temperature. After the reactor trip, the SRO initiated EOP-1.0. Two and one half minutes later, an automatic SI occurred. At the time of the SI, the crew had progressed to step 6 of EOP-1.0. The SRO continued in EOP-1.0 at step 6 instead of starting again at step 1. In a follow-up question, the candidate stated that since they just did those steps a little while ago, they did not need to be repeated.

One crew failed to correctly perform step 8 of EOP-15.0, "Response to Loss of Secondary Heat Sink." During a scenario with a loss of all feedwater, the crew entered EOP-15.0. Step 8 of EOP-15.0, states "Depressurize the RCS to LESS THAN 1925 psig." The purpose of this step is to allow blocking of the SI signal on low pressurizer (PZR) pressure and steamline pressure. This prevents feedline and steamline isolations from occurring which would isolate flowpaths needed for steam generator (S/G) feeding and steaming. A "CAUTION" step prior to step 9, states that if PZR pressure increases to > 1985 psig, SI actuation circuits will automatically unblock. The crew lowered RCS pressure and blocked SI. Reactor Coolant System pressure subsequently increased to greater than 1985 psig before the crew could depressurize a S/G and the SI actuation circuits unblocked. Had the scenario continued, the low pressure SI setpoint would have been reached and feedwater would isolate, eliminating the

heat sink. On follow-up questioning, the SRO stated that the basis for step 8 is to prepare for feed and bleed of the RCS. The SRO's lack of knowledge of the basis for this step caused the crew to perform it incorrectly.

During a scenario with a steamline break inside the reactor building, the crew immediately took action to shut the Main Steam Isolation Valves (MSIV). The crew did this without procedural guidance while performing EOP-1.0. On a follow-up question, the SRO stated that the EOP Users Guide allows shutting the MSIVs immediately if a steamline break is identified. The EOP User's Guide, OAG-103.4, Revision 1, step 16.4.a. states that, "In the event of a major Main Steam break outside the Reactor Building, it is expected the SS would immediately direct closure of the MSIVs to protect plant employees." Although this proved to be a beneficial action in this instance, deviation from the symptom based procedures into an event based response could lead to inappropriate actions being taken.

One SRO failed to transition to EOP-15.0, "Response to Loss of Secondary Heat Sink, when required." Step 19 of EOP-1.0 states that "IF Narrow Range level in all S/Gs is LESS THAN 10 percent AND total EFW flow of 425 gpm can NOT be established, THEN GO TO EOP-15.0." With S/G levels all less than 10 percent, the SRO continued in EOP-1.0 and did not enter into EOP-15.0 until two minutes later at step 24.

d. Simulator

The simulator performed well during the examination. There were no delays attributed to hardware or software failures. The simulator operator's performance was generally good, but some significant errors were committed.

The simulator did not correctly model a loss of Chill Water. Components cooled by Chill Water were unaffected during a loss of Chill Water flow. If this scenario is run during operator training sessions, negative training will occur. Operators do not receive feedback as to the effect on the plant from a loss of Chill Water. One crew did not secure the running charging pump for three and one half minutes after a loss of Chill Water. AOP-501.2 requires the running charging pump to be secured within one minute.

During performance of the simulator scenarios, the simulator operator failed to properly insert three malfunctions. The simulator operator's errors included, the failure of a PORV block valve to stick in the open position, the manual starting of a chiller when it was supposed to stay off line, and the tripping of a bistable at the

incorrect time. These errors did not invalidate the examination but altered the intended scenario. Enclosure 3 details additional problems encountered in the development and administration of the simulator scenarios.

e. AOP 501.2, Total Loss of Chill Water

The examiners identified a violation (described in Enclosure 1) during the validation and performance of AOP-501.2, "Total Loss of Chill Water." A proper review for adequacy would have identified several obstacles to performing the procedure.

Inadequate valve labeling and lack of familiarity with valve locations delayed the applicant's performance of steps of AOP-501.2, "Total Loss of Chill Water." One JPM directed the applicant to establish feed and bleed of the Chill Water System in accordance with step 4.4.b. Another JPM directed Demineralized Water alternate cooling to a Charging/SI Pump be provided using step 4.5. Applicants averaged over 20 minutes to walk through these tasks. One examiner stopped the JPM after 40 minutes of searching. These JPMs were only a simulation of the task and did not include actually turning valves, connecting hoses, or staging ladders which would have added time to the task.

Step 4.4.b.2.d directed, XVT26372-VU, "CCW PUMP 1B MOTOR COOLER OUTLET HEADER VENT" be opened. This valve did not have an attached label. Attachment IIA directed XVT26360-VU, "A TRAIN AUX BLDG CHLD WTR RTN HDR VENT" be opened. This valve was labeled in pencil on the pipe lagging below the valve. During the preparation week for the examination, the facility training department representative could not locate a ladder long enough to reach the latter valve. During the examinations, most candidates located a ladder despite the fact that there was not one in that area of the Intermediate Building 412 level.

Both sections 4.4.b and 4.5 of AOP-501.2, required an "AS-FOUND" valve lineup to be completed in its entirety prior to placing the valves in their required positions. The distances between the valves demanded a significant amount of time to perform the "AS-FOUND" valve lineup. The requirement to complete the "AS-FOUND" valve lineup prior to valve positioning, added to the delay in completing the procedure.

After the examination, the Senior Resident Inspector conducted a walkthrough of AOP-501.2, with the an Auxiliary Operator. This operator had received training on the procedure three weeks prior but could still not locate some of the valves.

Procedure AOP-501.2 is significant in that it has been credited in achieving a 25 percent reduction in the Core Damage Frequency as identified in the facility Individual Plant Assessment. The failure to review AOP-501.2, "Total Loss of Chill Water," for adequacy is identified as VIO 50-395/94-300-01.

3. Exit Interview

At the conclusion of the site visit, the examiners met with representatives of the plant staff listed in paragraph 1 to discuss the results of the examinations and their inspection findings. The licensee did not identify as proprietary any material provided to, or reviewed by the examiners.

Item Number	Status	Description and Reference
VIO-50-395/94-300-01	Open	Failure to review AOP-501.2, "Total Loss of Chill Water," for adequacy.

ENCLOSURE 3

SIMULATOR FACILITY REPORT

Facility Licensee: DRP-12

Facility Docket No.: 50-395

Operating Tests Administered On: May 17 -18, 1994

This form is to be used only to report observations. These observations do not constitute, in and of themselves, audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information that may be used in future evaluations. No licensee action is required solely in response to these observations.

While conducting the simulator portion of the operating tests, the following items were observed:

ITEM	DESCRIPTION
Total Loss of Chill Water	Components cooled by chill water did not show a temperature increase with all chill water flow secured
Hydrogen Core Monitor	Hydrogen Core Monitor was not operating while synchronizing the main generator to the grid.
Chiller Room Smoke Detector	Entering the malfunction to fail the "B" chiller caused a chiller room smoke alarm.