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Docket No. 50-321

HL-6008

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

**Edwin I. Hatch Nuclear Plant - Unit 1  
Licensee Event Report  
Personnel Error Results in a Condition  
Prohibited by the Plant's Technical Specifications**

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(i), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning a personnel error that resulted in a condition prohibited by the plant's Technical Specifications.

Respectfully submitted,

A handwritten signature in black ink that reads "Lewis Sumner". The signature is written in a cursive style.

H. L. Sumner, Jr.

DMC/eb

Enclosure: LER 50-321/2000-010

cc: Southern Nuclear Operating Company  
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SNC Document Management (R-Type A02.001)

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**PLANT AND SYSTEM IDENTIFICATION**

General Electric - Boiling Water Reactor  
Energy Industry Identification System codes appear in the text as (EIS Code XX).

**DESCRIPTION OF EVENT**

On 09/27/2000 at 1015 EDT, Unit 1 was in the Run mode at a power level of approximately 2620 CMWT (approximately 94.8 percent rated thermal power). At that time, pre-outage activities were in progress. In particular, plant personnel were performing subsection 7.3 of logic system functional test procedure 42SV-E11-004-1S, "Residual Heat Removal Shutdown Cooling LSFT." This subsection provides the steps necessary to test a portion of the logic system for the "A" loop of the Residual Heat Removal (RHR, EIS Code BO) system. During the performance of the test, the "A" loop of the low pressure coolant injection (LPCI, EIS Code BO) function of the RHR system is made inoperable. At 1000 EDT when the performance of subsection 7.3 began, Operations personnel entered Unit 1 Technical Specifications Limiting Condition for Operation 3.5.1, Condition A, for one inoperable low pressure emergency core cooling subsystem.

On 09/27/2000, contract personnel, also as part of pre-outage activities, were instructed to disconnect the wires to air flow switch 1T41-N003A for safeguards equipment room cooler (EIS Code VA) 1T41-B003A and remove the associated raceway. This flow switch provides a start signal to safeguards equipment room cooler 1T41-B003B, located in the same room as, and redundant to, cooler 1T41-B003A, in the event of low air flow through cooler 1T41-B003A. The wires were to be disconnected and the raceway containing the wires removed in order to allow the removal of the "D" RHR pump motor for scheduled preventive maintenance. This work was performed per Maintenance Work Order 1-00-1657 and attached Work Process Sheet 1-00-1657-E001. Maintenance Work Order 1-00-1657 and Work Process Sheet 1-00-1657-E001 also covered the removal of two other interferences located in the same area as flow switch 1T41-N003A to facilitate the removal of two other low pressure emergency core cooling pump motors. Contract personnel, however, had been instructed to disconnect the wires only to flow switch 1T41-N003A.

At approximately 1015 EDT, contract personnel, contrary to verbal and written instructions, disconnected a power cable to the motor operator for Core Spray (EIS Code BM) pump minimum flow valve 1E21-F031B. Work Process Sheet 1-00-1657-E001 contained a step to disconnect these cables. This step appeared before those to disconnect the wires to air flow switch 1T41-N003A and remove their raceway. However, personnel had been instructed to disconnect the wires to flow switch 1T41-N003A and remove their raceway only. Furthermore, they had been told the previous day that plant personnel would disconnect the power cables to the minimum flow valve; this also was stated in Work Process Sheet 1-00-1657-E001. The individuals discovered their error and notified their foreman when they unexpectedly discovered power to one of the cables during a routine personnel safety check. They had by this time, however, already disconnected one of the cables, effectively removing power to the minimum flow valve operator motor and preventing the valve from closing as required. Outage and Modification department

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maintenance supervision to whom contract supervision reported notified Operations personnel of the error at 1054 EDT.

Disconnecting the power cables to minimum flow valve 1E21-F031B rendered inoperable the "B" loop of the Core Spray system. Specifically, the valve could no longer close when pump discharge flow reached a set value thereby creating a flow diversion path sufficiently large to prevent the required Core Spray system flow from reaching the reactor vessel. The "A" loop of the LPCI function of the RHR system previously had been rendered inoperable for scheduled testing. Therefore, with one loop of the Core Spray system and one loop of the LPCI function of the RHR system inoperable at the same time, the plant entered Condition F of Unit 1 Technical Specifications Limiting Condition for Operation 3.5.1. This Condition required the plant to enter immediately Limiting Condition for Operation 3.0.3.

At 1037 EDT, the "A" loop of the LPCI function of the RHR system was restored to an operable status when subsection 7.3 of testing procedure 42SV-E11-004-1S was completed. The unit therefore was in Limiting Condition for Operation 3.0.3 from 1015 EDT, when the minimum flow valve was made inoperable, until 1037 EDT, when the "A" loop of the LPCI function was returned to an operable status. When Operations personnel were made aware of the problem at 1054 EDT, they declared inoperable the "B" loop of the Core Spray system and the primary containment isolation function of valve 1E21-F031B; however, Limiting Condition for Operation 3.0.3 already had been exited. They initiated Required Action Sheets 1-00-235 and 1-00-236 as required by, respectively, Unit 1 Technical Specifications Limiting Condition for Operation 3.5.1, Condition A, and Limiting Condition for Operation 3.6.1.3, Condition C. By 1235 EDT, valve 1E21-F031B had been closed, using its manually operated handwheel, and deactivated in a controlled manner, that is, its motor supply breaker was tagged in the open position, as required by Unit 1 Technical Specifications Limiting Condition for Operation 3.6.1.3, Required Action C.1.

**CAUSE OF EVENT**

This event was caused by cognitive personnel error regarding the use of work process sheets (WPS) that were a part of the maintenance work order package. Contract personnel, contrary to written and verbal instructions to disconnect the wires from an air flow switch, disconnected a power cable to Core Spray pump minimum flow valve 1E21-F031B. Both actions were included on the same WPS; however, the step for disconnecting the power cable to the core spray valve clearly indicated that Maintenance personnel would perform this action. Nevertheless, the contract personnel began at the beginning of the WPS which led the electricians to take actions that were contrary to the verbal direction provided in the pre-job brief. The first step was to disconnect the core spray valve. This action rendered inoperable the "B" loop of the Core Spray system during a time when the "A" loop of the LPCI function of the RHR system was inoperable because of scheduled testing. As a result of two low pressure emergency core cooling subsystems being inoperable at the same time, the unit entered Limiting Condition for Operation 3.0.3.

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**REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT**

This report is required by 10 CFR 50.73(a)(2)(i) because a condition existed which was prohibited by the plant's Technical Specifications. Specifically, with one loop of the LPCI function of RHR inoperable and one loop of Core Spray inoperable, the unit was required to enter Limiting Condition for Operation 3.0.3. Per the guidance given in NUREG-1022, Revision 1 (section 3.2.2, page 30, item 6), entry into Limiting Condition for Operation 3.0.3 must be reported as a condition prohibited by the plant's Technical Specifications.

The emergency core cooling systems are designed, in conjunction with the primary and secondary containment, to limit the release of radioactive materials to the environment following a loss-of-coolant accident. The low pressure emergency core cooling systems consist of the Core Spray system and the LPCI function of the RHR system. The Core Spray system is composed of two independent and redundant loops. Each loop consists of a motor driven pump, a spray sparger above the core, and piping and valves to transfer water from the suppression pool to the sparger. Upon receipt of an initiation signal, the pumps in both loops are started automatically. When reactor vessel pressure drops sufficiently, Core Spray system flow will begin.

A flow transmitter monitors the Core Spray pump discharge flow. When the pump is running and discharge flow is low enough so that pump overheating may occur, the pump minimum flow valve is opened. The valve is closed automatically if flow is above the minimum flow setpoint to allow the full system flow into the reactor vessel assumed in the accident analyses.

The LPCI function is an independent operating mode of the RHR system. There are two independent and redundant LPCI loops, each consisting of two motor driven pumps and piping and valves to transfer water from the suppression pool to the reactor vessel. Upon receipt of an initiation signal, all four LPCI pumps are automatically started. RHR system valves in the LPCI flow path are automatically positioned to ensure the proper flow path for water from the suppression pool to the reactor vessel. When the vessel pressure drops sufficiently, LPCI flow will begin.

In this event, one loop of the LPCI function of the RHR system and one loop of the Core Spray system were inoperable at the same time, the former due to scheduled logic system testing and the latter due to an inoperable pump minimum flow valve. They were inoperable simultaneously for only 22 minutes; during this brief time, the redundant loops of the LPCI function of the RHR system and the Core Spray system were operable.

One loop of LPCI and one loop of Core Spray are sufficient to restore and maintain reactor water level in the event of a design basis loss-of-coolant accident. Although a single failure could prevent one of the two remaining low pressure emergency core cooling system loops from performing its intended function, the probability of the occurrence of that single failure is very low. Similarly, the probability of the occurrence of an event requiring low pressure emergency core cooling system injection is very low. It follows that the

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probability of the occurrence of a loss-of-coolant event and a single failure during the 22 minutes that two low pressure emergency core cooling system loops were inoperable is extremely low. Moreover, this probability likely would be below that which is considered credible or for which the plant's licensing basis would require evaluation. Based on this, it is concluded that this event had no adverse impact on nuclear safety.

**CORRECTIVE ACTIONS**

The power cable to minimum flow valve 1E21-F031B was restored on 09/27/2000 per Maintenance Work Order 1-00-2992. The valve was functionally tested and returned to service on 09/27/2000 at 1925 EDT. Required Action Sheets 1-00-235 and 1-00-236 were terminated.

The contract supervision conducted a safety "stand-down" with contract electricians to cover the conditions that led to this LER.

Other work performed during this outage by the same electricians has been reviewed and found to have been performed correctly. Based on this information this error is considered to be isolated.

The WPS steps that are to be performed by the contractor are now highlighted to better ensure that the designated steps are performed and no others.

A Human Performance Board was convened on October 9, 2000 to review the event, the cause determination and the proposed corrective actions. Additional human factors questions are a routine portion of these meetings to ensure that appropriate barriers are being or have been put into place to effectively preclude conditions of this nature from recurring. Additional human factors suggestions were made that are not a part of this LER since they involve enhancements to the current processes and are not explicit actions to prevent recurrence.

Responsible contract personnel were issued a written reprimand with any further infractions involving additional disciplinary up to and including termination.

**ADDITIONAL INFORMATION**

1. Other Systems Affected: No systems other than those mentioned in this report were affected by this event.
2. Failed Components Information: No failed components caused or resulted from this event.
3. Commitments: No permanent commitments are created as a result of this report.
4. Previous Similar Events: There have been no previous similar events reported in the last two years in which Limiting Condition for Operation 3.0.3 was entered.