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

Edwin I. Hatch Nuclear Plant - Unit 2
Licensee Event Report
Trip of 600-Volt Supply Breaker Causes Loss of
RPS Power Supply and Unplanned ESF System Actuations

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning a trip of the 600V supply breaker which caused the loss of RPS power supply and unplanned ESF system actuations.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

IFL/eb

Enclosure: LER 50-366/2000-008

cc: Southern Nuclear Operating Company
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NRC FORM 366 (06-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If a document used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)
Trip of 600-Volt Supply Breaker Causes Loss of RPS Power Supply and Unplanned ESF System Actuations

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
09	04	2000	2000	008	00	09	27	2000		05000
										DOCKET NUMBER(S) 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(vii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(ix)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch	(912) 367-7851

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)

On 09/04/2000 at 1416 EDT, Unit 2 was in the Run mode at a power level of 2763 CMWT (100 percent rated thermal power). At that time, the supply breaker to Unit 2 Reactor Protection System (RPS) bus "2A" power supply tripped. Logic systems powered by the RPS bus include the RPS trip logic, the Main Control Room Environmental Control System (MCRECS) initiation logic, Primary Containment Isolation System (PCIS) trip logic, and Steam Packing Exhauster trip logic. All affected systems responded per design on the loss of power, producing a half scram signal, several PCIS valve isolations, MCRECS pressurization mode initiation, and other actuations. Licensed personnel verified the proper plant response to the initiating signal and, by 1441 EDT, had energized the affected RPS bus from its alternate supply. Affected systems subsequently were returned to their normal lineups.

The cause of the supply breaker trip could not be determined conclusively; however, a likely cause appears to be actuation of the breaker control switch when personnel inadvertently bumped the control switch panel. Checks of the breaker and its trip unit, cables, motor starter contactor, and motor windings revealed no faults or other problems that could have caused the supply breaker to trip. Corrective actions for this event include the aforementioned checks, temporary monitoring of the 600-volt bus, and considering the possible addition of panel covers.

PLANT AND SYSTEM IDENTIFICATION

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

DESCRIPTION OF EVENT

On 09/04/2000 at 1416 EDT, Unit 2 was in the Run mode at a power level of 2763 CMWT (100 percent rated thermal power). At that time, the 600-volt supply breaker to the Unit 2 "2A" Reactor Protection System (RPS, EIIS Code JE) bus power supply motor-generator set tripped. This breaker is supplied from Unit 2 600-volt bus "C." When the breaker tripped, the motor-generator set coasted down until its own output breakers tripped on underfrequency per design.

The trip of the output breakers caused some Group 2, Group 5, and outboard small-bore Group 1 Primary Containment Isolation System (PCIS, EIIS Code JM) valves to receive an automatic isolation signal. Those valves open at the time of the event closed per design. Also, the Main Control Room Environmental Control System (MCRECS, EIIS Code VI) entered the pressurization mode; the Primary Containment Hydrogen and Oxygen Analyzers (EIIS Code IK) isolated; and the Reactor Water Cleanup (RWCU, EIIS Code CE) system, the Fission Product Monitoring (FPM, EIIS Code IJ) system, and the operating Steam Packing Exhauster tripped.

Licensed personnel verified the proper plant response to the initiating signal per procedure 34AB-C71-002-2S, "Loss of RPS." By 1441 EDT, licensed personnel had energized the "2A" RPS bus from its alternate supply. Affected systems subsequently were returned to their normal lineups.

CAUSE OF EVENT

The cause of the supply breaker trip could not be determined conclusively. However, a likely cause appears to be actuation of the breaker control switch when personnel inadvertently bumped the control switch panel. Checks of the breaker and its trip unit, motor-generator set power supply cable, motor starter contactor, and motor windings revealed no faults or other problems that could have caused the supply breaker to trip.

A few minutes following the loss of power to the "2A" RPS bus, a plant electrician informed Main Control Room personnel that he had inadvertently bumped the bottom of a panel in the 600-volt bus "C" switchgear room while obtaining an oil sample from a transformer located in the room. The bumped panel contained the control switch for the 600-volt supply breaker to the "2A" RPS motor-generator set. Moreover, the control switch is located near the bottom of the panel.

The supply breaker control switch was removed and replaced on 09/05/2000 per Maintenance Work Order 2-00-02349. The removed switch was examined to ensure that it was the correct type of switch and that it

was in proper working order. No problems were found. Examining personnel concluded that merely bumping the panel or the switch would not have caused the switch contacts to open and trip the supply breaker. Indeed, personnel determined that the breaker would have tripped only if the switch handle had been turned approximately thirty degrees from vertical. However, the switch contains a spring that returns it to the normal position. Thus, the switch would not have stayed in the "trip" position and inadvertent movement of the switch would not have been apparent to the person who bumped the panel or to investigating personnel.

Visual examination of the tripped 600-volt supply breaker revealed its RMS-9 trip unit indicated a trip on "short-circuit"; that is, the short-circuit trip indicator button on the unit had actuated. It is possible the indicator button had not been reset following testing or a previous trip since reset of the indicator button is not necessary to close the breaker. Nevertheless, Maintenance personnel removed the breaker and trip unit from the bus and tested them per procedure 52PM-MEL-012-0S, "Low Voltage Switchgear Preventive Maintenance." No problems with the breaker or the RMS-9 trip unit were found. Specifically, the RMS-9 unit tripped the breaker within the expected current limits specified in the preventive maintenance procedure. Even though no problems were found with the existing RMS-0 trip unit, a new unit was connected to the supply breaker when it was reinstalled in 600-volt bus "C."

The windings of the "2A" RPS motor-generator set motor were meggered at 1000 volts per procedure 52IT-MEL-003-0S, "High Potential and Megger Testing of Electrical Equipment and Cables." No problems were noted during the test. The motor starter contactor also was visually examined for cracking, carbon build-up, and other defects per Maintenance Work Order 2-00-01801. No problems were found.

The RPS motor-generator set was started from a shutdown condition on three separate occasions following the initial trip. The motor-generator set uses a flywheel to provide inertia sufficient to maintain RPS bus voltage and frequency within five percent of rated values for at least one second following a complete loss of supply power to the drive motor. Starting the motor-generator set, and the flywheel, from shutdown conditions therefore results in an initial large in-rush of current. Indeed, the starting current is approximately ten times full-load current. Consequently, the breaker, power supply cable, motor starter contactor, and motor windings were tested as an integrated system under conditions more severe than those that exist during normal operation. No problems occurred or were detected during any of the three starts. Finally, the RPS motor-generator set was run unloaded for over two days following completion of the previously described inspection and testing. No electrical or mechanical problems occurred during this time.

Therefore, it was concluded that a likely cause of the trip of the 600-volt supply breaker was inadvertent manipulation of its control switch when the panel was bumped. This conclusion is based upon:

1. The timing of the tripping of the supply breaker and the bumping of the panel containing the breaker control switch.

2. The lack of problems found during the inspection and testing of the breaker, RMS-9 trip unit, power supply cable, motor starter contactor, and motor windings.

3. The three consecutive successful starts of the motor-generator set during which starting currents were significantly higher than running currents.

4. The successful completion of the unloaded run.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(iv) because unplanned actuations of engineered safety feature (ESF) systems occurred. Specifically, several ESF systems actuated in response to a trip of the RPS bus "2A" power supply.

The RPS power supply system is designed to supply stable, 120-volt AC power to a variety of plant instrumentation systems including the Process Radiation Monitoring System, the Neutron Monitoring System, the Reactor Protection System, and the Primary Containment Isolation System. A high degree of power stability is achieved by using two motor-generator sets to condition the power supplied by the RPS power supply system. The electrical output of each motor-generator set energizes one of two RPS busses.

In this event, the supply breaker to the "2A" RPS motor-generator set tripped. When the breaker tripped, the motor-generator set coasted down until its own output breakers tripped on underfrequency per design. Upon loss of power or control signal, systems powered by the RPS de-energize to their "safe" configuration; that is, they initiate their emergency or accident functions. All systems affected by this event responded per design for a power interruption; licensed personnel verified this per procedure immediately after the event occurred. Had a design basis accident or transient occurred in conjunction with the trip of the RPS power supply, plant systems powered from the RPS bus already would have been in their emergency configurations and no further automatic actuations of these systems would have been required to mitigate the accident or transient.

Based on this analysis, it is concluded that this event had no adverse impact on nuclear safety. This analysis is applicable to all power levels.

CORRECTIVE ACTIONS

The "2A" RPS bus was placed on the "2A" RPS motor-generator set on 9/11/2000 at 1459 EDT following completion of the unloaded run and the tests and inspections of the supply breaker, RMS-9 trip unit, power supply cable, motor starter contactor, and motor windings.

A device to monitor for intermittent electrical problems, such as grounds or short-circuits, will be connected temporarily to 600-volt bus "C."

Consideration will be given to the addition of covers to the four panels that contain Unit 1 and Unit 2 RPS motor-generator set supply breaker control switches. Should it be decided to do so, the covers will be added to these panels on a schedule determined by the normal planning and budgeting process.

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 a trip of the RPS power supply caused unplanned engineered safety feature system actuations.