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a subsidiary of
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Docket No. 50-321

HL-5280

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

Edwin I. Hatch Nuclear Plant - Unit 1
Licensee Event Report
Incorrect Circuit Breaker Setting Results in
Emergency Diesel Generator Being Inoperable - Rev. 1

Gentlemen:

License Event Report (LER) 50-321/1996-014 transmitted to the NRC on 12/2/96 contained an incorrect date. This LER revision corrects the corrective action completion date on pages 1 and 7 to 6/15/97.

Sincerely,

J. T. Beckham, Jr.

IFL/eb

Enclosure: LER 50-321/1996-014, Rev. 1

cc: *Georgia Power Company*
Mr. H. L. Sumner, Nuclear Plant General Manager
NORMS

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. K. Jabbour, Licensing Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. S. D. Ebneter, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

NRC FORM 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 5/31/95
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB7714), 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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Edwin I. Hatch Nuclear Plant - Unit 1	0 5 0 0 0 3 2 1	1 OF 7

TITLE (4)
Incorrect Circuit Breaker Setting Results in Emergency Diesel Generator Being Inoperable - Rev. 1

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)
1 1	0 6	9 6	9 6	– 0 1 4	– 0 1	1 2	1 1	9 6	Plant Hatch, Unit 2	0 5 0 0 0 3 6 6
									FACILITY NAME	0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ?: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include area code)
Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch	AREA CODE 9 1 2 3 6 7 - 7 8 5 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

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 11/6/96 at 1300 EST, Unit 1 was in the Run mode at a power level of 2558 CMWT (100 percent of rated thermal power). At that time, engineers from the plant Architect/Engineer (A/E) were performing a design review of certain electrical power systems. Upon finding a documentation discrepancy, they asked the site system engineer to inspect the trip settings on a feeder breaker to Motor Control Center (MCC) 1R24-S026. Some loads on this MCC are required for operating the Unit 1 "B" Emergency Diesel Generator (EDG). The 600-volt primary feeder breaker settings were found to be incorrect and under certain fault conditions could have led to the MCC tripping rather than individual load breakers. Therefore, the MCC and the Unit 1 "B" EDG were declared inoperable. A temporary modification was later installed that restored the MCC and the EDG to operable status. This action was complete by 0643 EST on 11/10/96.

This event was caused by a failure to incorporate design information into the appropriate plant single line electrical drawing and by a labeling problem on the breaker trip setting selector switch.

Corrective actions for this event included installing the temporary plant modification mentioned above and confirming correct trip settings of all similar circuit breakers in the plant. In addition, a design review which was already in progress prior to this event will continue as planned, and certain aspects of the temporary modification will be incorporated into permanent plant design by 6/15/97.

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 11/6/96 at 1300 EST, Unit 1 was in the Run mode at a power level of 2558 CMWT (100 percent of rated thermal power). At that time, engineers from the plant architect/engineer (A/E) determined that the trip device installed in the Unit 1 600-volt main feeder breaker in motor control center (MCC, EIIS Code ED) 1R24-S026 was set to the wrong setpoint. The breaker instantaneous setting should have been 12 times the long time delay pickup setting of 450 amps. The breaker instantaneous setting was found set to trip at 8 times a long time delay pickup setting of 300 amps. Under certain fault conditions, these settings might have resulted in tripping the entire MCC before a downstream fault could have been cleared by individual load breakers. This MCC supplies power to several components critical to the operation of "swing" Emergency Diesel Generator (EDG, EIIS Code EK) 1R43-S001B, such as the standby service water pump (EIIS Code LB) and ventilation systems (EIIS Code VJ) for the EDG room. As a precaution, engineers from the A/E requested a physical inspection of the breaker settings in the plant. The site system engineer inspected the breaker, found the settings incorrect, and notified the Shift Supervisor. Licensed personnel then made a conservative decision to declare the swing EDG inoperable because necessary support systems, powered through this MCC, could be inoperable.

The condition of this breaker was discovered as a result of implementing the corrective action from NRC Violation 50-321/1996-06-08. The corrective action for this violation led to performing a limited review of breaker coordination during design drawing incorporation of molded case circuit breaker trip setpoints. In this particular case, engineers discovered a discrepancy between the trip device settings for this breaker as indicated on the electrical single line diagram and the settings as indicated on the design calculation. Therefore, the A/E contacted the site system engineer who physically inspected the breaker and found it did not match either the design calculation or the single line diagram. The various settings are compared in Table 1.

	Instantaneous Trip	Long Time Delay Pickup
Design Calculation	12x	450 Amps
Single Line Drawing	12x	300 Amps
Actual Breaker	8x	300 Amps
Procedure	12x	300 Amps

Table 1

The system engineer reported his discovery to licensed personnel in the main control room, and the "B" EDG was declared inoperable. Subsequently, an attempt was made to replace the trip device with one having the correct available functions and settings. However, pre-installation testing of the new device was not satisfactory. Therefore, a temporary modification was implemented to facilitate proper coordination using other installed breakers in this power system with the main feeder breaker closed in and disabled to prevent it from tripping. The modification removed the largest load from this MCC, a non-safety-related 150-amp load powering the plant's Technical Support Center, and powered it from another source. This allowed changing the settings on the upstream 4160-volt feeder breaker so that they would coordinate with the remaining load breakers on the MCC. Then the trip device installed on the Unit 1 600-volt feeder breaker in the subject MCC was disabled, leaving the upstream 4160-volt feeder breaker to the MCC to provide overcurrent protection. Once the modification was installed and tested, the affected EDG was declared operable and the event was terminated at 0643 EST on 11/10/96.

CAUSE OF EVENT

This event occurred as the result of a failure to incorporate information developed in a design calculation into the appropriate electrical single line drawing and plant maintenance procedure. A second error occurred due to a labeling problem which resulted in the installed trip device having a setting which differed even from the incorrect single line diagram.

Investigation included interviews with engineers from the plant's A/E, and a search of deficiency card history, maintenance history, design history, procedure history, and vendor manual changes in an attempt to identify a beginning point for this event. Prior to 1985, design history and maintenance history suggest that the installed breaker was set up correctly. The correct pre-1985 installation of this circuit breaker incorporated no instantaneous trip function. However, records show that in May 1987 the A/E's design calculation was changed because the installed trip device no longer matched the design in that the installed breaker had an instantaneous trip capability, which was not specified in the original design. Additionally, a letter from the A/E in 1987 mentioned the presence of an

instantaneous trip on this trip device, described it "undesirable," and indicated that replacing the trip device with a different style was warranted. Based on this information, it now appears reasonable to conjecture that some work activity between 1985 and early 1987 changed the type of trip device which was installed to one which incorporated an instantaneous trip. No such change was authorized, nor was it documented. Thus as mentioned above, the design calculation was revised in May 1987 to accommodate the installed breaker and set it up to work in this MCC. However, settings for the new design were not correctly incorporated into the electrical single line diagram in that the long time delay pickup should have been 450 amps but was left at 300 amps on the electrical single line. The instantaneous trip was to have been set at 12 times the value of the long time delay pickup, termed "12x". The multiplier of 12 *was correct* in both the design calculation and the electrical single line.

In 1987, procedure 52PM-R24-002-0S, "Air Circuit Breaker Type LA-600 Maintenance" was developed to perform periodic maintenance on this breaker. The procedure writer appears to have relied on the erroneous technical information from the electrical single line diagram and listed the long time delay pickup as 300 amps and the instantaneous trip multiplier set at 12. In October 1988, the procedure was used to service the subject breaker and trip device. Per the maintenance work order, the breaker instantaneous trip setting was to have been set at 12. At this point, a labeling problem resulted in the individual who performed the work adjusting the setting to a multiplier of 8. The labels on the face of the trip device selector switch are misleading. An individual setting the trip device to point to the numeral 12 on the face of the selector switch would actually be setting it on a reference dot corresponding to 8x. Comparing Figure 1 with Figure 2 shows the labeling problem which led to the breaker trip device being set incorrectly.

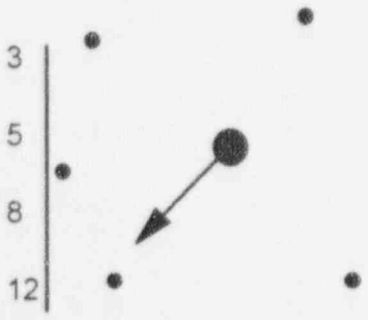

Figure 1, Actual Appearance of Selector Switch Face

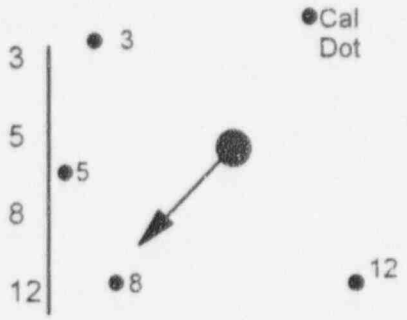

Figure 2, Selector Switch with Numbers Added to Show What Each Dot Represents

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(i) because the plant was in a condition which is prohibited by the Technical Specifications. The cause of the inoperability had existed for longer than the time allowed per Unit 1 Technical Specifications Limiting Condition for Operation 3.8, required action statement B.4, therefore, this report is required.

Three EDGs comprise the standby power source for the 4160-volt emergency busses. The Unit 1 "B" EDG is a shared power source that can be aligned as needed to supply a 4160-volt bus on either Unit 1 or Unit 2. The EDGs start on either a Loss of Coolant Accident (LOCA) signal or a bus degraded voltage or undervoltage signal. If degraded voltage or undervoltage are detected, the EDGs start and tie automatically to their respective power busses after the offsite power sources have been disconnected. If the LOCA signal alone causes the EDG start, then the EDGs run in standby unless and until offsite power is lost or degraded. When an EDG is tied to its emergency bus, its emergency loads are sequentially connected to the bus, with the sequence controlled by timers designed to prevent overloading the EDG. Each EDG supplies its own source of auxiliary power for cooling and EDG room ventilation.

In this event, the main feeder breaker for MCC 1R24-S026 which powers certain items of support equipment for the Unit 1 "B" EDG was declared inoperable because its instantaneous trip setting was too low for a particular, worst-case fault scenario. Licensed personnel made a conservative decision to declare the Unit 1 "B" EDG inoperable because certain fault conditions could arise in which the main feeder breaker could trip before a downstream fault could be cleared. This conservative decision was made even though the EDG has been tested by surveillances many times and found capable of supplying its rated load under a variety of ambient conditions. The nature of the fault which could render the EDG inoperable was quite narrowly defined, involving a postulated "bolted" fault on the worst possible breaker in the MCC, the 150-amp Technical Support Center. Other kinds of faults could not have tripped the MCC in this fashion because the potential fault current was smaller and the individual load breakers were also smaller.

In the unlikely event that a "bolted" fault occurred on the worst breaker during a loss of offsite power (LOSP) event affecting Unit 1, the Unit 1 "B" EDG would trip automatically on loss of the standby service water pump which provides cooling water to this EDG. This pump would be lost because it is powered from MCC 1R24-S026. Operations personnel would respond by aligning the MCC to the alternate supply, which is from Unit 2. Unit 2 is supplied by a separate offsite power source. The main feeder breaker for this MCC to the Unit 2 power source is not susceptible to the problem experienced on the Unit 1 side feeder breaker. Thus, when the MCC was re-energized from the Unit 2 side, the individual 150-amp load breaker to the TSC would have opened, allowing the

MCC to remain in service supporting the auxiliary EDG loads. Then the "B" EDG could be restarted and tied to its emergency bus to supply power.

In the extremely unlikely event that the "bolted" fault occurred on the worst breaker during an LOSP affecting both units simultaneously, operators would have controlled the plant using the "A" and "C" EDGs on each unit. In the even more unlikely event that a LOCA occurred during this situation, the "A" and "C" EDGs would have been sufficient to power low pressure emergency core cooling systems on both units. Specifically, both loops of both units' Core Spray (CS, EIIS Code BM) systems and at least two loops of both units' Residual Heat Removal (RHR, EIIS Code BO) systems would still have been operable to provide core cooling.

Should one of the "A" or "C" EDGs have been inoperable in addition to all the other failures hypothesized in this analysis, the plant-specific SAFER/GESTR LOCA analysis shows that in worst case condition, either unit can be safely shut down and maintained in a safe condition with only one operable EDG and one loop of CS.

Based on the foregoing discussion, it is concluded that both units have operated at all times within the bounds of existing accident analyses or plant-specific SAFER/GESTR LOCA analyses. Therefore, this event did not adversely affect nuclear safety in either unit. The analysis applies to all operating conditions.

CORRECTIVE ACTIONS

1. A temporary modification has been implemented with the 150-amp Technical Support Center load removed from MCC 1R24-S026 and powered from another bus and appropriate breakers set to accommodate the remaining loads on the bus. This action is complete and resulted in the "B" EDG being returned to operable status.

2. The review of breaker coordination begun as a result of NRC Violation 50-321/1996-06-08 will continue as planned.

3. Breaker settings for all similar LA-600 breakers in the plant have been checked by the system engineer. All others were found to be correctly set. This action is complete.

4. A permanent design change will be made to MCC 1R24-S026 which will remove the trip devices from the primary and alternate feeder breakers on this bus. Thereafter, circuit protection will be provided for this 600-volt bus by upstream 4160-volt breakers. The load which was removed from this 600-volt bus will be returned to the bus. This action will be completed by 6/15/97.

ADDITIONAL INFORMATION

1. Other Systems Affected: No systems other than those already mentioned in this report were affected by this event.

2. Failed Components Information: No failed components contributed to or resulted from this event.

3. Previous Similar Events: The following LERs have been submitted in the past two years reporting design or engineering problems that resulted in safety related equipment being inoperable:

   50-366-1995-009, dated 12/14/95
   50-366/1996-001, dated 06/04/96

   Corrective actions for the previous similar events involved, in one case, refining core analyses and establishing more conservative limits on the unit and cycle specific minimum critical power ratio, and in the other case, making several hardware changes on the Unit 2 remote shutdown panels (EIIS Code JG) and testing the Unit 1 remote shutdown panels. These corrective actions would not have prevented the present event because it was concerned with an entirely different area of plant design.