NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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 5

TITLE (4)
Blown Fuse Results in Unplanned Actuations of Engineered Safety Features

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)
0 4	0 6	9 8	9 8	– 0 0 2 –	0 0	0 4	2 8	9 8		0 5 0 0 0
									FACILITY NAME	0 5 0 0 0

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

OPERATING MODE (9)	1	20.402(b)		20.405(c)	X	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	1 0 0	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) AREA CODE
Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch	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 4/6/98 at 1015 EDT, Unit 1 was in the Run mode at a power level of 2558 CMWT (100 percent rated thermal power). At that time, nonlicensed technicians were performing a channel functional test on the main steamline radiation monitors (MSLRMs). During the course of the surveillance, annunciators alarmed in the control room indicating certain Group 1 and Group 2 primary containment isolation valves had closed and the fission products monitor had isolated. The technicians then backed out of their procedure. Investigation revealed that a fuse had blown in the relay logic controlling the actuated valves. The fuse was replaced and affected valves and systems were returned to service. On the following day, the channel functional test was repeated without incident.

The cause of this event was a blown fuse. The relay logic in the affected circuit is designed to actuate upon loss of power or control signal. Therefore, when the fuse blew, the various Group 1 and Group 2 valves closed as designed. The cause of the blown fuse was not identified.

Corrective actions for this event included replacing the blown fuse and completing the channel functional test on the MSLRMs.

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 4/6/98 at 1015 EDT, Unit 1 was in the Run mode at a power level of 2558 CMWT (100 percent rated thermal power). At that time, nonlicensed Instrument and Control (I&C) technicians were performing a channel functional test of the main steamline radiation monitor channels (MSLRMs, EIIS Code IL) per Technical Requirements Manual surveillance requirement 3.3.11.2. The procedure requires the installation of jumpers and the opening of links to prevent unwanted equipment actuations while the MSLRMS are tripped by simulated high radiation signals or downscale signals. In this event, jumpers were installed and links were opened appropriately as verified by a second observer. Then, meg-ohmmeters were installed in isolated portions of the circuits to provide indication of contact movement. However, before MSLRM "B" could be taken to its test mode, licensed control room personnel observed indications that a Group 1 primary containment isolation valve (PCIV) and several Group 2 PCIVs were closing or had closed. In addition, the fission product monitor (FPM, EIIS Code IJ) isolated as did the drywell floor drain and equipment drain sumps (EIIS Code IJ). With these systems isolated, drywell leak detection was temporarily inoperable, so Technical Specifications Limiting Condition for Operation (TS LCO) 3.0.3 was entered per TS LCO 3.4.5, required action D.1.

By 1052 EDT, the cause of the unexpected actuations had been identified. Fuse 1A71B-F21 located in panel 1H11-P622 was found blown. This fuse supplies power to a portion of a logic system designed to control isolation of the primary containment. This logic is designed to actuate and assume its safe or emergency configuration upon loss of power or control signal. Therefore, when fuse 1A71B-F21 blew, several relays deenergized, producing automatic closure of primary containment isolation valves. The valves which closed were: the reactor water sample valve, one of the inboard small-bore Group 1 PCIVs; and several inboard Group 2 PCIVs, including those leading from the drywell floor drain and equipment drain sumps, post-accident sampling system (EIIS Code IP), and the FPM system. When the blown fuse was identified, it was replaced without further investigation because it was believed that a grounded jumper had caused the event. All affected systems and valves were returned to their normal configurations by 1055 EDT. Also, TS LCO 3.0.3 was exited when drywell leak detection systems were returned to service.

On the following day, the channel functional test of the MSLRMs was completed with no unusual reactions or events being observed.

CAUSE OF EVENT

This event resulted from a blown fuse in a portion of relay logic controlling Group 2 and small bore Group 1 valves. The logic is designed to shift to its safe or emergency configuration upon loss of power or control signal. Therefore, when the fuse in this circuit blew, various relays deenergized and produced closure of some Group 1 and Group 2 isolation valves as described above.

The cause of the blown fuse could not be determined. Since technicians had been working in a portion of the circuit supplied by this fuse, it was initially concluded that the cause was a grounded jumper. Therefore, the fuse was replaced and the circuit was returned to service without any further investigation. Based on the success of this action, it is apparent that no hard fault exists since the circuit was able to be energized. This tended to confirm suspicion that a grounded jumper had blown the fuse. The fuse was discarded since it appeared the cause of the event had been identified.

Further investigation, however, indicated that technicians had probably not grounded a jumper. This conclusion was based on the following: First, it was found that the technicians had already completed establishing the jumper connections several minutes before the fuse blew. Second, the physical arrangement of the workspace would have made it difficult to ground or misplace a jumper. For example, the correct jumper placement involved use of banana-plug style jumpers, and appropriate receptacles for these had been installed on the correct terminal points. Also, the jumpers being used at the time are of a two-part design which makes it unlikely that a misplaced jumper would have been left in place without the verifier correcting it before the connection was completed. Furthermore, the banana plugs used were of a shielded design which greatly reduced the probability of an inadvertent electrical contact. Finally, the worst possible jumper placement using the installed jacks would not have produced a short circuit unless the technician had made a connection across the panel to a separate electrical division. This was also considered highly improbable since the correct connections are immediately adjacent to each other in the panel whereas a cross-divisional connection would require the jumpers to be trailed across the open doorway of the panel.

Since it was believed that a grounded jumper was not the cause of this event, investigators pursued other avenues including thermography on the involved electrical panel, a review of maintenance history, visual inspections of the involved panel, measurement of the nominal current load on the fuse, and a design review of the fuse application. No problems were identified in any of these areas. Since the fuse was discarded, it could not be examined for defects. Hence, the cause of the blown fuse was not identified.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(iv) because unplanned actuations of engineered safety features occurred. Specifically, a small bore Group 1 PCIV and several Group 2 PCIVs closed in response to a signal generated by a blown fuse. This event is reportable also per 10 CFR 50.73 (a)(2)(i) because the plant entered a condition which is prohibited by the Technical Specifications in that TS LCO 3.0.3 was entered upon loss of all drywell leak detection.

The primary containment isolation system is designed to close valves in pipes penetrating the containment boundary when the possibility of a leak is indicated. The PCIVs are divided into several groups, each group sharing similar functions. Group 1 PCIVs are those which communicate directly with the reactor coolant system, including the main steamline isolation valves, the main steamline drain valves, and the reactor water sample valves. Group 2 PCIVs are those which communicate with the primary containment atmosphere but typically not with the reactor coolant system. In general, PCIVs are controlled by logic whose design is "fail-safe;" that is, the valves are maintained in the open position by a continuously energized control circuit and automatically shift to their safe or emergency configuration upon loss of power or control signal.

In this event, a blown fuse deenergized relays in the control logic for a small-bore Group 1 PCIV and various Group 2 PCIVs as described above. The valves responded per design by closing. Post event review of data tapes showed that all PCIVs which received a closure signal either were already in the closed position prior to the event or else moved to the closed position as required.

Some of these valves are located in piping leading from the drywell floor drain and equipment drain sumps and the FPM system. Together, these systems comprise the leak detection system for reactor coolant system leakage into the drywell. With these systems isolated, therefore, the Technical Specifications require entry into TS LCO 3.0.3, which is considered a condition prohibited by the Technical Specifications. Since the condition was exited in less than an hour, however, the unit was not required to be shut down.

Based on this analysis, it is concluded that this event had no adverse impact on nuclear safety. The foregoing analysis applies to all operating conditions.

CORRECTIVE ACTIONS

The blown fuse was replaced. Licensed personnel then returned affected systems to configurations appropriate for the plant condition. The channel functional test on the MSLRMs was completed on the following day without incident.

ADDITIONAL INFORMATION

1. Other Systems Affected: The main turbine (EIIS Code TA) steam packing exhauster tripped as a result of the blown fuse. However, this had no effect on the reactor.

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

3. Commitments: No permanent commitments are created as a result of this report.

4. Previous Similar Events: One Licensee Event Report has been submitted in the past two years in which this same fuse was found to have blown. This event is described in LER 50-321/1996-015, dated 12/17/96. In that event, the cause of the blown fuse was positively identified as a relay coil having a short circuit. Hence, the fuse appropriately actuated in response to an overcurrent condition. Corrective actions for that event included replacing the fuse, replacing the failed relay coil, inspecting certain relays and replacing others. Those actions would not have prevented this event because no identifiable circuit or component failure led to this event.