

LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 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 20556-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)
HOPE CREEK GENERATING STATION

DOCKET NUMBER (2)
05000354

PAGE (3)
1 OF 7

TITLE (4)
Inadequate Testing of Undervoltage Logic Circuitry Resulting in a Missed Surveillance, Followed by an ESF Actuation During Surveillance Testing

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
11	14	95	95	033	00	12	14	95	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
4	0	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)(B)	50.73(a)(2)(viii)				
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)				
		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)	<input checked="" type="checkbox"/>	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: **Phil Opsal, Project Manager**
 TELEPHONE NUMBER (include Area Code): **(609) 339-3172**

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)			
YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	NO			MONTH	DAY	YEAR
					XX	XX	XX

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

This LER describes two events that occurred due to identification of a Technical Specification Surveillance Test inadequacy. On 11/14/95, during Technical Specification Surveillance Improvement Program (TSSIP) review of Technical Specification 3.3.3, it was determined that the undervoltage auxiliary relays were not adequately tested in accordance with the LOGIC SYSTEM FUNCTIONAL TEST requirements of Technical Specification 4.3.3.2. As a result, the vital bus undervoltage relays were declared inoperable, and a Technical Specification Action Statement was entered for the failure to perform the appropriate surveillance testing. The surveillance test was revised to address the concerns that TSSIP identified. On 11/16/95, during the performance of the revised surveillance on the 'A' 4 kV vital bus, a bus transfer occurred at 0521. The 'A' Loss of Offsite Power (LOP) Sequencer initiated per plant design. A four-hour report was made to the NRC at 0841 in accordance with 10CFR50.72(b)(2)(ii). This LER is being submitted in accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(iv).

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LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK GENERATING STATION	05000354	95	033	00	2 OF 7

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
4.16 KVAC, EIIS Identifier: EB
Emergency Diesel Generator, EIIS Identifier: EK

IDENTIFICATION OF OCCURRENCE

Discovery Date: November 14, 1995
ESF Actuation Date: November 16, 1995
Report Date: December 14, 1995
Problem Reports: 951114174 and 951116123

CONDITIONS PRIOR TO OCCURRENCE

Plant in Operational Condition 4 (COLD SHUTDOWN)
Preparations for transition into Operational Condition 5 (REFUELING) were in progress.

There were no systems, structures, or components that were known to be inoperable at the start of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

This LER describes two events that occurred due to identification of a Technical Specification Surveillance Test inadequacy.

On November 14, 1995, during Technical Specification Surveillance Improvement Program (TSSIP) review of Technical Specification 3.3.3, "Emergency Core Cooling System Actuation Instrumentation", it was determined that the undervoltage auxiliary relays were not adequately tested in accordance with the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) requirements of Technical Specification 4.3.3.2. As a result, the vital bus undervoltage relays were declared inoperable, and a Technical Specification Action Statement was entered for the failure to perform the appropriate surveillance testing.

The surveillance test was revised to address the concerns that TSSIP identified. On November 16, 1995, during the performance of the revised surveillance on the 'A' 4 kV vital bus, a bus transfer occurred at 0521. The 'A' Loss of Offsite Power (LOP) Sequencer initiated per plant design. A four-hour report was made to the NRC at 0841 in accordance with 10CFR50.72(b)(2)(ii).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK GENERATING STATION	05000354	95	033	00	3 OF 7

TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

ANALYSIS OF OCCURRENCE

As a Corrective Action from LER 95-017, a Technical Specification Surveillance Improvement Program (TSSIP) has been initiated. The charter of this project is to compare the Technical Specification surveillance requirements (with the exception of the Technical Specification 4.0.5 requirements) to the established surveillance procedures to verify that all requirements are met.

During TSSIP review of Technical Specification 3.3.3, "Emergency Core Cooling System Actuation Instrumentation", it was determined that individual contacts, and their configuration, from the undervoltage auxiliary relays (27AX1, 27AX2, 27AY1, and 27AY2) and the degraded voltage relays (27X-401 and 27X-408) were not tested in accordance with the LSFT requirements of Technical Specification 4.3.3.2. These contacts deal with the load shedding of major 4.16 kV loads of the vital bus, incoming feeder breaker trips and lock outs, diesel generator start permits, and input to the load sequencer.

Technical Specification 4.3.3.2 requires that LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

On November 15, 1995 both the degraded voltage and the bus undervoltage surveillance procedures were revised to incorporate the contacts and wiring that needed to be tested to satisfy the Technical Specification surveillance testing. Operations prepared a risk analysis to determine the consequences of a loss of power to the associated vital buses while performing the undervoltage relay surveillance tests.

While testing the 'A' Vital Bus (10A401), the relay technician pulled back some insulation on the alligator clips used with his M&TE. This allowed the alligator clip to extend further, but it also exposed more of the metal surface. The technician received a resistance value different than he expected, and went to physically verify that the test leads were on the correct terminal points. While doing so, the exposed section of the alligator clip touched an adjacent terminal, causing a bus transfer to occur. The bus transfer performed as designed. The 'A' Loss of Offsite Power (LOP) Sequencer initiated per plant design. The affected systems also performed as expected. Testing was terminated, and subsequently was successfully completed.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK GENERATING STATION	05000354	95	033	00	4 OF 7

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

PRIOR SIMILAR OCCURRENCES

A logic configuration discrepancy was found in the undervoltage auxiliary contacts to the load sequencer on July 3, 1995. After review of the existing surveillance testing procedures used to perform the load shedding for the vital busses against the criteria of Information Notice 95-15 "Inadequate Logic Testing of Safety Related Circuits", dated March 7, 1995, it was determined that Technical Specification functional testing requirements 4.8.1.1.2.h.4.a and 6.a, relating to verification of load shedding, were not adequately verified by existing surveillance testing. As a result, all four Emergency Diesel Generators were declared inoperable. This occurred on July 14 and was reported in LER 95-017-00.

Following this discovery, the untested undervoltage auxiliary contacts used for load shedding were reviewed by the system manager; these results were documented. A test procedure was created that performed a functional test of 4.16 kV load shedding to satisfy Surveillance Requirements 4.8.1.1.2.h.4.a and 6.a. This test was conducted satisfactorily, and the Emergency Diesel Generators were declared operable. In addition, the system manager verified the balance of the contacts related to the undervoltage logic scheme to be functionally tested.

In response to this event, the General Manger - Hope Creek Operations chartered a Technical Specification Surveillance Review Program to investigate, define, and resolve weaknesses in the Technical Specification Surveillance Program. During the system manager's review, using the guidance of Information Notice 95-15, "Inadequate Logic Testing of Safety Related Circuits", PSE&G questioned the methodology for individual contact testing during logic system functional tests. Due to the varied interpretations throughout the industry regarding what constitutes adequate overlap testing, the resolution of this issue was assigned to the TSSIP effort, whose charter more appropriately addresses this concern.

Previously, a dead bus transfer resulted when performing these same two surveillance procedures. To prevent recurrence, a design change was implemented to allow access of the test points instead of entering the panel and risk shorting the test leads between terminal points. This did not prevent recurrence because the design change did not include the auxiliary relays that were being tested.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK GENERATING STATION	05000354	95	033	00	5 OF 7

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CAUSE OF THE OCCURRENCE

The cause for the failure to properly test the undervoltage relays is procedural inadequacies due to lack of knowledge of what constitutes a satisfactory Logic System Functional Test.

A contributing factor is the lack of guidance regarding the requirements of LSFTs. This is a recognized industry weakness as evidenced by the number of information notices issued to licensees regarding this issue. The same misconception can be shown to be present at Hope Creek in that the integrated Emergency Diesel Generator test, performed every 18 months, is credited for performing the LSFT per 4.3.3.2.

In July, 1995, the system manager correctly identified all of the contacts in question and ensured that contacts were functionally tested. In addition, the system manager understood the charter of the TSSIP effort to include reviews and resolution of the outstanding issues regarding adequate overlap testing and logic system functional test requirements. The system manager communicated his questions regarding overlap testing of the Emergency Diesel Generator start circuit to the TSSIP team upon arrival of the first TSSIP team members in early November. As a result of this discussion, the TSSIP team project manager specified the review of the Emergency Diesel Generator related logic circuits to be the first area reviewed.

Based on this review, the TSSIP team has concluded that although the specified LSFT procedure performs a macroscopic functional test of the Emergency Diesel Generator start load shedding and sequencing logic, it does not perform the required detail to satisfy the definition and requirements of an LSFT.

The cause of the bus transfer was a test lead coming into contact with a terminal while the technician was attaching test equipment to a relay. Contributing factors were the decision to perform the test while the bus was energized and inadequate job planning in that the effects of conducting the test in an energized cubicle that was not designed for test leads were not completely analyzed.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK GENERATING STATION	05000354	95	033	00	6 OF 7

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

SAFETY SIGNIFICANCE

Although the undervoltage and degraded voltage relays were declared inoperable due to nonperformance of a surveillance requirement, reasonable assurance existed that the Emergency Diesel Generators would start and energize the bus on a loss of power coincident with a Loss of Cooling Accident, and that all required ESF loads would sequence on the vital bus. This assurance is based on previous successful past performances of the integrated Emergency Diesel Generator test. Additionally, performance of testing on the 'A' and 'C' vital busses demonstrated compliance with the LSFT requirements, and showed all required relays and contacts to be operational.

Due to the risks associated with the performance of this surveillance test (i.e., loss of the bus), Operations evaluated each load on the associated bus and provided recommendations regarding the use of redundant equipment to minimize the impact to plant operations. Therefore, the safety significance associated with this LER was minimal.

CORRECTIVE ACTIONS

The implementing procedures for testing the bus undervoltage auxiliary contacts have been revised to defeat the undervoltage trip function during the performance of the test.

The TSSIP group independently reviewed the procedures to ensure satisfactory compliance. This was completed prior to performance of the test procedures.

Logic System Functional Testing will be performed on the 'B' and 'D' vital busses to demonstrate operability of the undervoltage and degraded voltage relays to satisfy requirements of Surveillance Requirement 4.3.3.1. This will be completed prior to entry into Operational Condition 2 or 3, at the end of the current refueling outage.

The TSSIP review will continue, with particular attention to the Logic System Functional Test Requirements in the other instrumentation specifications. The TSSIP will be completed by December 31, 1996.

The Technical Specification Matrix will be updated to reflect new procedures to comply with the LSFT requirement. This will be performed as the TSSIP identifies issues and will be completed by December 31, 1996.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
HOPE CREEK GENERATING STATION	05000354	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	7 OF 7
		95	-- 033	-- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CORRECTIVE ACTIONS

Position papers will be prepared by January 31, 1996 to outline the proper test methodology and acceptance criteria for performance of technical specification surveillances, such as LSFT and Channel Functional Test requirements.

Training based on the site approved position papers will be prepared and incorporated into initial and continuing training programs for personnel responsible for the preparation, review, and approval of logic system surveillance procedures. The initial training will be conducted for licensed operators, system managers, procedure writers, and Station Qualified Reviewers, and will be completed by December 31, 1996.

Guidance will be provided to the relay and controls technicians regarding the selection and use of M&TE (specifically M&TE with alligator clips) by January 31, 1996.

The Controls Pre-Job Brief Checklist has been revised to ensure the proper use of M&TE.

The procedures used to conduct this surveillance will be revised to specify the specific alligator clip to be used. This revision will be completed prior to the next time these procedures are used.

A design change to install test points outside these cubicles will be implemented by the end of the next refueling outage.