



BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

January 31, 1991
BECo Ltr. 91-10

George W. Davis
Senior Vice President - Nuclear

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

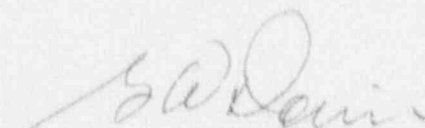
Docket No. 50-293
License No. DPR-35

Dear Sir:

The enclosed supplemental Licensee Event Report (LER) 87-002-01, "Logic System Functional Test Procedural Inadequacies", is submitted in accordance with 10 CFR Part 50.73.

This supplement is submitted at this time because of our desire to provide the most reasonably complete information possible in our reports. The submittal of this supplement follows the approval of a change to Technical Specifications regarding logic system functional testing.

Please do not hesitate to contact me if there are any questions regarding this report.


G. W. Davis

DWE/bal

Enclosure: LER 87-002-01

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station		DOCKET NUMBER (2) 05000293	PAGE (3) 1 OF 06
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TITLE (4)
Logic System Functional Test Procedural Inadequacies

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 NAMES	DOCKET NUMBER(S)
01	23	87	87	002	01	01	31	91	N/A	050000
01	23	87	87	002	01	01	31	91	N/A	050002

OPERATING MODE (9) N

POWER LEVEL (10) 01010

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)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.38(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) B	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)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Douglas W. Ellis - Senior Compliance Engineer	508 747-8160

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On January 23, 1987 during an extended outage, certain inadequacies involving logic system functional test (LSFT) procedures were discovered. The discovery resulted from a comprehensive assessment of the completeness and technical adequacy of LSFT procedures that was prompted by findings identified in NRC Inspection 50-293/86-21.

The root cause was the previous interpretation of Technical Specifications requirements for LSFT. When the original Technical Specifications were approved, the approach for interpreting functional test requirements was consistent with existing (c.1972) industry practice. The assessment applied a more conservative interpretation of LSFT requirements that more closely reflects current industry practice.

Corrective action taken consisted of revising (then) existing procedures and/or writing new test procedures. The procedures were then performed prior to refueling, and prior to startup and during subsequent operation. Corrective action also included a change to Technical Specifications that lengthened the LSFT interval to once per 18 months. Long term corrective action includes a study for possible hardware improvements related to tests (e.g. LSFT) that involve the installation of jumpers, blocking relay contacts, lifting wires, or the removal of fuses.

The procedural inadequacies posed no threat to the public health and safety. This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B).

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		8 7	- 0 0 2	- 0 1	0 2	OF 0 6

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

REASON FOR SUPPLEMENT

This supplemental report is being submitted to provide the results of our assessment of procedures used for logic systems functional testing.

EVENT DESCRIPTION

On January 23, 1987 at 1805 hours, during an extended outage, certain inadequacies involving logic system functional test (LSFT) procedures were identified by a special utility assessment team. The team was formed to assess the completeness and technical adequacy of (then) existing LSFT procedures to applicable Technical Specifications. This assessment was performed in accordance with our response to NRC Inspection 50-292/86-21. The assessment consisted of establishing the requirements (Technical Specifications and the Updated Final Safety Analysis Report) for functional testing and comparing those requirements to (then) existing test procedures for adequacy. As a result of this effort, technical inadequacies in LSFT procedures were identified for the following: the Reactor Protection System (RPS), Standby Gas Treatment System (SGTS), Control Room High Efficiency Air Filtration System (CRHEAFS), Residual Heat Removal System (RHRS)/Low Pressure Coolant Injection (LPCT) mode, Core Spray System (CSS), Diesel Generators (EDGs), and Refueling Interlocks.

Failure and Malfunction Reports 87-35, 87-36, 87-37, 87-38, 87-39, 87-40, and 87-41 were written to document the findings of the special assessment team. The NRC Operations Center was notified as required by 10 CFR 50.72 on January 23, 1987 at 1822 hours.

At the time of the findings, the reactor mode selector switch was in the REFUEL position. The Reactor Vessel (RV) head was installed and the control rods were in the inserted position. The RV pressure was zero psig and the RV water temperature was approximately 70 degrees Fahrenheit.

CAUSE

The root cause for the findings was the previous interpretation of Technical Specifications requirements for LSFT. The Technical Specification definition for Logic System Functional Test, "means a test of all relays and contacts of a logic circuit from sensor to activated device to insure components are operable per design intent. Where practicable, action will go to completion; i.e., pumps will be started and valves opened". The definition had not changed since the Pilgrim Station Technical Specifications were originally approved and issued. When the original Technical Specifications were approved, the approach for interpreting functional test requirements was consistent with existing (i.e., 1972) industry practice. The special assessment team applied a more conservative interpretation of LSFT requirements that more closely reflects current industry practice. This interpretation required logic systems testing to the individual relay contact level.

LICENSEE EVENT REPORT (LER)
NEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 90.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORT, MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

INITIAL CORRECTIVE ACTION TAKEN

Initial corrective action taken consisted of revising the (then) existing LSFT procedures and/or the writing of new procedures prior to fuel handling. Applicable tests were then performed using these procedures. As a result of that testing, discrepancies were identified regarding the CRHEAFS and SGTS.

- For the CRHEAFS, the following corrective action was taken. The Train 'A' and 'B' relative humidity devices (RHS-1A and RHS-1B) could not be calibrated because a suitable calibrating device was not available. Because the operability of the humidity devices could not be demonstrated without a suitable calibrating device, a safety evaluation (No. 87-34) was prepared that justified modifying the system to energize one of the four heater banks when the respective fan was energized. The change was implemented as a Temporary Modification (TM 87-5). An instrument was purchased for use during the calibration of the humidity devices and TM 87-5 was subsequently removed.
- For the SGTS, the following corrective action was taken. Timers that were found out of calibration were calibrated. Low flow switches failed to properly reset due to a dead band that was too large. A Safety Evaluation (No. 2056) was prepared that concluded the SGTS was operable and fuel handling could proceed. Those switches (PS-8135 and PS-8136) and time delay relays were subsequently replaced via a modification (PDC 86-70).

ADDITIONAL CORRECTIVE ACTION TAKEN

LSFT procedures applicable to modes of operation in addition to the refuel mode were also reviewed for technical adequacy. The review, similar to that performed for refueling, identified inadequacies in LSFT procedures for the following: High Pressure Coolant Injection System (HPCIS), Reactor Core Isolation Cooling System (RCICS), Automatic Depressurization System (ADS), Primary Containment Isolation Control System (PCIS), Reactor Building Isolation Control System (RBIS), Radwaste System, Recirculation System, Reactor Manual Control System (RMCS), Reactor Building Closed Cooling Water System (RBCCWS), and Salt Service Water System (SSWS). The (then) existing procedures were revised and/or new procedures were written.

A database was established that correlates applicable components (relays, contacts, etc.) and surveillance procedures used for LSFT. The database was created to document a review of elementary diagrams used in verifying the scope of LSFT. Since the scope of the database is logic testing, certain Simulated Automatic Actuation (SAA) surveillance procedures are also listed in the database but only when the procedure(s) is used to satisfy a logic testing requirement. The database is controlled in accordance with Station Instruction SI-TC.3.2.13, "Control of LSFT/SAA Database". Essentially, the database provides the means to assure that a change to a surveillance procedure, used for logic testing, does not adversely impact overall testing of the applicable circuitry. The database includes a listing of the surveillance procedures used for logic testing.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST, 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

Procedures are controlled in accordance with procedure 1.3.4, "Procedures". The process for a new procedure or the revision of an existing procedure was improved to include a review by the Procedure Controller and procedure owner. The review includes a check of the procedure to a listing of the LSFT/SAA surveillance procedures. If the procedure is a new surveillance procedure or is an LSFT/SAA surveillance procedure, the procedure is reviewed for impact to the LSFT/SAA database and the Master Surveillance Tracking Program.

Modifications are controlled in accordance with Nuclear Engineering Department procedure 3.02, "Preparation, Review Verification, Approval and Revision of Design Documents for Plant Design Changes", and Nuclear Organization Procedure 83E1, "Control of Modifications for Pilgrim Station". The modification process includes considerations regarding control logic and design bases, and instrument channels. The process also includes controls for identifying the need for a new procedure(s) and/or revision of an existing procedure(s).

The Master Surveillance Tracking Program (MSTP) is used for scheduling and tracking the performance of periodic tasks including surveillance procedures. The MSTP is controlled in accordance with procedure 1.8, "Master Surveillance Tracking Program". During the refueling outage (RFO 7), surveillance procedures used for LSFT/SAA testing were compared to applicable Technical Specifications for surveillance interval. This review, in conjunction with the reviews performed for the completeness and technical adequacy of the surveillance procedures, resulted in consolidation, revision and/or the writing of new procedures. Applicable tests were then performed using these procedures prior to initial startup (December 30, 1988) from RFO 7. The review also resulted in corrective action program documents (PCAQ SO 89-10 and 89-11) that were written to address administrative and technical details concerning the LSFT/SAA database.

A change was made to Technical Specifications Tables 4.2.A, 4.2.B, 4.2.C, 4.2.D and section 4.2 bases. The change (approved on October 15, 1990) lengthened the LSFT interval from once per 6 (six) months to once per 18 months. The change is consistent with the interval in NUREG-0123, "Standard Technical Specifications for General Electric Boiling Water Reactors", and General Electric document NEDC-31681, "Improved BWR Technical Specifications" for Boiling Water Reactors (BWR)/4, dated April 1989.

LONG TERM CORRECTIVE ACTION

Long term corrective action includes the following:

- The Long Term Plan (item 224) includes a study for possible hardware improvements related to tests (e.g. LSFT) that involve the installation of jumpers, blocking relay contacts, lifting wires, or removing fuses.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

SAFETY CONSEQUENCES

The procedural inadequacies posed no threat to the public health and safety.

Although some elements of the logic system for the related system were not completely tested as part of the once per 6 (six) month LSFT surveillance procedures, overall system(s) operability was routinely demonstrated via other (e.g. monthly operability or periodic calibration or functional) surveillance procedures. Therefore, the impact of the inadequacies was negligible.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B).

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review focused on LERs submitted in accordance with 10 CFR 50.73(a)(2)(i) that involved similar surveillance procedure problems. The review identified related problems reported in LERs 50-293/86-012-00, 86-014-00, and 86-019-00.

For LER 86-012-00, a QAD audit finding (DR 1466) and subsequent evaluation determined that surveillance procedures for the HPCIS did not fully meet Technical Specification 4.5.C.1.a for SAA testing. The determination was made while shutdown on May 16, 1986. The Technical Specification definition for Simulated Automatic Actuation, "means applying a simulated signal to the sensor to activate the circuit in question". The HPCIS surveillance tests consisted of a series of procedures that each tested a portion of the system's circuitry, turbine/pump, and valves. This method for testing is acceptable provided that, in the aggregate, the surveillances test the circuit(s) from sensor to end device (e.g. valve). However, the HPCIS tests did not include the circuitry (wires) between Panel C-939 (Cable Spreading Room) and Panel C-903 (Main Control Room) for the HPCIS turbine steam supply valve (MO-2301-3) and the HPCIS pump minimum flow valve (MO-2301-14). The root cause was determined to be insufficient procedures to implement Technical Specification 4.5.C.1.a for once per cycle SAA testing. The HPCIS surveillance procedures were subsequently revised to (fully) implement the Technical Specification 4.5.C.1.a for SAA testing.

For LER 86-014-00, an independent review of Technical Specifications implementing procedures revealed that surveillance procedures for the RCICS did not fully meet Technical Specification 4.5.D.1.a for SAA testing. The discovery occurred while shutdown on June 10, 1986 and was made as part of corrective actions initiated from LER 86-012-00. The RCICS surveillance tests, similar to the HPCIS surveillance tests, consisted of a series of procedures that each tested a portion of the system's circuitry, turbine/pump, and valves. The RCICS tests did not include the wires between the relays (14A-K7A/B and 14A-K8A/B) for a low reactor water level condition and the relays (13A-K1 and 13A-K2) that provide the RCICS automatic initiation function. The root cause was determined to be insufficient procedures to implement Technical Specification 4.5.D.1.a for once per cycle SAA testing. A (then) new procedure was written to test the subject wires.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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For LER 86-019-00, a QAD audit finding revealed that the Recirculation Pump Trip (RPT) and Alternate Rod Insertion (ARI) features of the Anticipated Transient Without Scram (ATWS) function was not tested monthly as specified by Technical Specification 4.2.G for an instrument functional test (IFT). The finding (DR 1559) occurred while shutdown on July 15, 1986. The Technical Specification definition for IFT, "means the injection of a simulated signal into the instrument primary sensor to verify the proper instrument channel response, alarm and/or initiating action". Specifically, the monthly functional test (procedure 8.M.1-29) of the RPT and ARI circuitry injected a simulated signal to the trip units instead of the primary sensors (transmitters). The primary sensors were functionally tested and calibrated once per operating cycle via another procedure (8.M.1-30). The cause was the result of two factors. One factor was a Technical Specifications change (Amendment 42), incorporating the RPT/ARI surveillance requirements, did not consider that the IFT definition was inappropriate for the RPT and ARI features. The other factor was the surveillance procedure (8.M.1-29) that did not adequately implement Technical Specification Table 4.2.G for instrument functional testing. Technical Specification Table 4.2.G was subsequently changed for testing the RPT and ARI features.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS

Pump
Relay
Switch, Pressure
Valve

CODES

P
RLY
63
V

SYSTEMS

Closed Cooling Water System (RBCCWS)
Containment Isolation Control System (PCIS/RBIS)
Control Complex Environmental Control System (CRHEAFS)
Core Spray System (CSS)
Emergency Onsite Power Supply System (EDGs)
Engineered Safety Features Actuation System
(PCIS/RPS/RBIS)
High Pressure Coolant Injection System (HPCIS)
Integrated Control System (ADS)
Plant Protection System (Refueling Interlocks)
Reactor Core Isolation Cooling System (RCICS)
Reactor Power Control System (RMCS)
Reactor Recirculation System
Residual Heat Removal System/LPCI
Standby Gas Treatment System (SGTS)
Ultimate Heat Sink System (SSWS)

CC
JM
VI
BM
EK
JE
BJ
JA
JC
BN
JD
AD
BO
BH
BS