

Report No. 50-293/85-09
Docket No. 50-293
Licensee No. DPR-35

Licensee: Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Facility: Pilgrim Nuclear Power Station (PNPS)

Location: Plymouth, Massachusetts

Dates: April 22 - April 26, 1985

Inspectors:

E. W. Merschhoff
E. W. Merschhoff, Section Chief, Vendor Program Branch

6/28/85
Date

E. Trottier
E. Trottier, Inspector, Vendor Program Branch

28 JUN 85
Date

P. Milano
For P. Milano, Inspector, Vendor Program Branch

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Date

R. P. McIntyre
R. McIntyre, Inspector, Vendor Program Branch

6/28/85
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Approved by:

G. Zech
G. Zech, Chief, Vendor Program Branch

7/2/85
Date

Inspection Summary: Inspection on April 22 - April 26, 1985
(Report No. 50-293/85-09)

Areas Inspected: Four inspectors from the Vendor Program Branch, Office of Inspection and Enforcement conducted an announced inspection of the effectiveness of the information exchange between vendors of safety-related equipment and the licensee. The licensee's program for receipt, evaluation, and implementation of actions determined appropriate for vendor technical information was reviewed. The inspection involved 138 inspector-hours by Vendor Program Branch inspectors.

Results: No violations or deviations were identified; one unresolved item (85-09-01) was identified.

DETAILS

1.0 Persons Contacted

Boston Edison Company (BECo)

*L. Beckwith	*N. Simpson
*E. Grahm	S. Slater
*C. Mathis	J. Peters
R. Fairbanks	*J. Seery
F. Schallenger	*E. Damon
*S. Wollman	*W. Lobo
P. Moraites	
*N. Brosee	
*R. Sherry	
*M. McGuire	

NRC

*J. Johnson, Senior Resident Inspector
*M. McBride, Resident Inspector
*L. Tripp, Chief, Reactor Projects Section 3A, RI
*G. Zech, Chief, Vendor Program Branch, IE

The inspectors also contacted other licensee employees during the inspection.

* Denotes those present at the exit meeting on April 26, 1985.

2.0 Licensee/Vendor Interface

The inspectors reviewed the implementation of PNPS procedures that identify, track, and resolve vendor, INPO, and NRC identified deficiencies. This review was accomplished by reviewing the final disposition of: 35 Service Information Letters (SILs) (a review of the licensee's evaluation for 17 of the 35 SILs was performed) and six Service Advice Letters (SALs) issued by General Electric (GE); five notifications of deficiencies made by various vendors; 19 Significant Event Reports and Significant Operational Event Reports issued by INPO; and four Information Notices issued by the NRC.

The results of this review showed significant weaknesses in both the adequacy and implementation of the program.

a. Programmatic Weaknesses:

- (1) The program fails to address 10 CFR Part 21 notifications and vendor correspondence from vendors other than General Electric.
- (2) The program fails to address SALs issued by GE. At this time, BECo does not have a list of SALs that apply to equipment installed at PNPS. Consequently, BECo cannot be certain that all deficiencies addressed by GE SALs have been evaluated and, if appropriate, corrected at PNPS.

b. Implementation Weakness:

- (1) Although the program requires only a perfunctory evaluation of SILs for applicability at PNPS, of the 17 SIL evaluations selected for review by the inspectors, only three had documented evaluations. However, of the 14 SILs for which an evaluation had not been documented, BECo had implemented corrective action which addressed the items identified in these SILs.
- (2) BECo maintains a computerized list of SILs that BECo has received and their disposition. A review of this list by the NRC revealed that 15 SILs known to have been received by BECo had been omitted from this list.
- (3) Of the 35 SILs reviewed by the NRC, BECo could not demonstrate that two had been reviewed or evaluated. One SIL involved development and implementation of an emergency procedure for the loss of feedwater heaters. The second SIL involved the periodic verification of adequate service water cooling flow to essential motor oil coolers.
- (4) Of four IE Information Notices that provided information affecting hardware installed at Pilgrim, one had not been properly addressed. Specifically, IE Information Notice 84-68, which involved field installed electric cables with low rated insulation that are terminated inside Valcor solenoid valves having high temperature valve bodies. This Information Notice was logged and assigned an operating experience review number. However, no further action was taken, even though the specific condition existed at PNPS.

This item will be examined during a future inspection (Unresolved Item 85-09-01).

- (5) Of five SALs reviewed, one had not been fully accomplished. This SAL involved replacing Tuf-Loc bearings on GE Magna-Blast Breakers. This SAL was first issued in 1977 and was highlighted by IE Information Notice 84-29, which was issued in 1984. No action was taken to correct this deficiency until after the Information Notice had been issued.

3.0 Evaluation of Information Contained In General Electric Service Information Letters

The SIL is the method normally used by GE to provide their customers with recommendations for equipment modifications, plant design improvements, or changes to improve plant performance.

BECo Nuclear Operations Department (NOD) procedure No. 1.3.33, Operating Experience Review (OER), is the procedure that defines the requirements for review, evaluation and action taken, when necessary, on vendor technical information including SILs and Turbine Information Letters. This procedure also defines the requirements for evaluation and implementation

of information contained in INPO Significant Event Reports (SERs) and Significant Operating Experience Reports (SOERs), as well as NRC Bulletins and Notices.

The inspectors reviewed a sample of 35 SILs for receipt, evaluation and action taken. The current status of these 35 SILs could not be determined from the computerized status list, since the list was missing some SILs, while for others the status was not current. BECo personnel developed a separate, current SIL status list for the requested SILs.

Of the 35 SILs reviewed, two had not been evaluated and appropriate corrective action had not been implemented. The first, SIL 370, concerned possible fuel damage that could result from loss of feedwater heaters. BECo had instituted a temporary emergency procedure for loss of feedwater heaters as a result of receiving this SIL, but never instituted it as a permanent procedure. When this temporary procedure was cancelled, PNPS was left without an adequate procedure. The second, SIL 333, involved service water line plugging to essential motor oil coolers. On August 21, 1980, an Office Memorandum from the NED FS&MC group included recommendations for NOD concerning SIL 333. BECo could not provide the inspectors any documentation verifying the recommendations had been accomplished.

The remaining SILs had been evaluated and appropriate corrective action was taken. Six SILs and the action taken by PNPS are described below:

1. SIL No. 129 - Gasket Failures in HPCI System Gland Seal Condensers

Deficiency - HPCI and RCIC cooling water pressure regulating valves are susceptible to failing open on loss of air, thus subjecting components (such as the gland seal condenser gaskets) to excessive downstream pressure. Recurrent failures have resulted in loss of availability of the HPCI and RCIC systems.

Licensee Action - Per Plant Design Change Procedure (PDC 81-38), the HPCI and RCIC pressure regulating valves were replaced, following the recommendations of this SIL.

2. SIL No. 321 - Increasing Wetwell to Drywell Vacuum Breaker Reliability

Deficiency - LOCA tests in prototype Mark I containment resulted in excessive cycling and damage to wetwell-to-drywell vacuum breakers.

Licensee Action - PDC No. 83-19G was implemented to replace the portions of the vacuum breakers that are susceptible to such damage.

3. SIL No. 336 - Surveillance Testing Recommendations for HPCI and RCIC Systems

Deficiency - Operating procedures at several BWR sites reviewed by GE showed that periodic surveillance tests on HPCI and RCIC systems were in need of improvement.

Licensee Action - Per GE's recommendations, NOD procedures No. 8.5.4.1, "HPCI Pump Operability Flow Rate and Valve Test at 1000 PSIG" and No. 8.5.5.1 "RCIC Pump Operability Flow Rate and Valve Test at 1000 PSIG" were re-written and implemented.

4. SIL No. 385 - Backseating Motor Operated Valves

Deficiency - Backseating motor operated valves to reduce stem leakage can cause damage to valve components.

Licensee Evaluation - Established NOD procedure No. 3.M.3-16, "Electrically Backseating MOVs," as recommended by this SIL.

5. SIL No. 392 - Improved HPCI Turbine Mechanical Overspeed Trip Design

Deficiency - A survey of HPCI system operability and reliability at operating sites revealed concern regarding the adequacy of the mechanical overspeed trip device used on HPCI turbines (supplied by Terry Corporation). Terry Corporation redesigned the trip device, which resulted in an improvement that was strongly recommended by this SIL.

Licensee Action - PNPS implemented PDC No. 84-74, "Upgrade of HPCI Turbine Overspeed Governor," and installed the improved mechanical overspeed trip assembly as recommended.

6. SIL No. 393 - RCIC Turbine Journal Bearing Locating Pin

Deficiency - Bearings are fitted with locating pins to assure proper orientation of the bearings within the housing. The possibility exists for a reduction in the oil supply to the bearing if the locating pin is missing and the journal bearing is mislocated.

Licensee Action - Per GE recommendation, the RCIC turbine was inspected to assure that the locating pin was in place.

4.0 Evaluation of Operation and Maintenance Instructions Provided by the Emergency Diesel Generator Vendor, ALCO

Selected Equipment Bulletins (EBs) and Maintenance Instructions (MIs) were obtained from PNPS's diesel generator manufacturer (ALCO). The three EBs and six MIs chosen for review had the potential of affecting maintenance and reliable operation of the diesel generators. The following is a summary of these EBs and MIs, as well as the actions taken by PNPS as a result of their issuance:

- a. Equipment Bulletin 11243 of September 1981 - Fuel Injection Pump Snubber Valves: Snubbers shipped/received after January 1, 1981, may be defective in their ability to control fuel pressure pulses between a cylinder's "jerk pump" and fuel injection nozzle. The specific concern is a stuck valve disk, which prevents proper fuel pulse damping.

The inspector verified that PNPS had received this EB, evaluated the information, and had taken action which BECo determined to be appropriate. BECo performed an inventory check of the snubbers on hand as spares in the warehouse. Material Receipt Inventory Report 79-293 showed that the package of six snubbers was received as spare parts on October 3, 1979. The package had not been opened and was properly identified with the Boston Edison part code number (529569) and ALCO catalogue part number (2402466).

- b. Equipment Bulletin 11020 of April 1982 - Conversion to/use of Intake and Exhaust Valve Rotaters: The purpose of this EB is to inform engine owners of an "upgrade" feature that should improve engine performance and extend the life of intake and exhaust valves. The inspector verified that PNPS had received this EB. In discussions with the maintenance staff, it was learned that neither valve seat deposits nor excessive valve seat wear has been a problem at PNPS, thus installation of this modification was determined by BECo to be unnecessary.
- c. Equipment Bulletin 11079 of July 1981 - Repairing Damaged Cylinder Head Studs: This EB presents information that updates the method of repairing damaged cylinder head studs. Since the method of repair differs depending on when the engine was built (model year), this EB is particularly important as reference information. The inspector verified that PNPS had received this EB and has not had occasion to use it.
- d. Maintenance Instruction 12009L of July 1982 - Lubricating Oils: This MI adds one new oil refiner and several brand names to the list of those being used successfully in ALCO engines, and presents important viscosity guidelines. Specifically, page 3 states, "Lubricating oil viscosity should be maintained between 70 and 100 SSU (Universal Saybolt Seconds) at 210°F." The intent of this information, as well as the balance of the oil control guidelines section, is to explain and amplify the data an oil analysis laboratory should test for to determine the condition of the oil. It is through such routine laboratory testing (recommended every 300 engine-hours) that water or fuel contamination can be discovered. The Pilgrim Maintenance Department had Revision D of this MI in lieu of Revision L, and determined that action was unnecessary since their oil analysis program is more conservative than ALCO guidelines found in either Revision D, or this most recent revision (L). For example, a full oil analysis, including viscosity at 210°F, is performed quarterly by an outside laboratory. (A typical value for a PNPS engine's run time per quarter is 10-20 hours.)
- e. Maintenance Instruction 17078C of July 1981 - Trouble Shooting Chart: This MI provides a reformatting, with minor additions, of the previous revision's chart. The Pilgrim Maintenance Department had Revision B of this MI, rather than the most recent revision (C). However, there were no significant differences between these two revisions.

- f. Maintenance Instruction 14012F of July 1982 - Water Treatment: Ethlene glycol does not contain sufficient corrosion inhibitor to protect cooling system parts from corrosion and is not compatible with chromate-type water treatment solutions. Thus, this MI presents a list of suitable non-chromate-type inhibitors and the concentration to be used in the cooling system of ALCO diesel engines. The inspector noted that PNPS had Revision C of this MI, vice Revision F. However, the pertinent information (preferred water treatment and concentration) was consistent in each, with the difference between revisions appearing to be more manufacturers of suitable water treatments and a cautionary note on disposing of chromate water (not applicable to PNPS). Thus, the applicable information in this MI had been received, reviewed, and was being used by PNPS.
- g. Maintenance Instructions 12018C, 17191 and 17193 Lube Oil Strainer, Operating Instructions (normal service), Operating Instructions (standby service): Maintenance Instruction 12018C was found in the Maintenance Department file. It was the current revision of this MI. Maintenance Instructions 17191 and 17193 are the original revisions and were found in the ALCO Service Manual used by the Maintenance Department.
- h. Programmatic Weaknesses: The method of managing information related to the diesel generator at PNPS is not well organized. While most of the current revisions to Maintenance Instructions and Equipment Bulletins were available, there was no apparent organization to the information. The information was contained in a large manila folder filed with the diesel manual, or loosely inserted into the manual itself. No index or sheet of current revisions could be found. It was not clear when revisions were received or how they eventually reach the Maintenance Department. It was not clear by whom or how often the material is reviewed for applicability.
- i. Evaluation of Information and Implementation of Appropriate Action: It was noted during an inspection of the diesel generator building that the machines and the surrounding area were well maintained. The operating history of the ALCO diesel generators at PNPS is good. However, recognition must be made of the role of their diesel generator consultant, a past employee of ALCO, who has many years experience on these machines. For non-routine maintenance, his advice is sought and, apparently, incorporated in activities concerning the diesel generator. As evidenced by the diesel's operating history and appearance, this relationship appears to work well. However, since the consultant-client relationship is less reliable than the employee-employer relationship, the licensee should consider expanding the diesel engine knowledge and experience base to more of its own employees.

5.0 Evaluation and Implementation of Appropriate Action in Response to Specific Actions Recommended by Various Vendors

During the course of the inspection, eight specific deficiencies that had been identified by vendors as requiring corrective action were reviewed to determine if the licensee evaluated and implemented appropriate corrective action. The six deficiencies, and the action taken by PNPS, are described below:

1. Rosemount Pressure Transmitters

Deficiency - A potential leakage path was discovered in the seal of the threads between the sensor module and the electronics housing. This path could allow moisture from the environment to enter the electronics housing and cause the transmitter to malfunction.

Licensee Action - The inspector verified that PNPS had received the notification from Rosemount and verified that none of the affected models had been received.

2. General Electric Magna-Blast Breakers

Deficiency - The M-13 operating mechanism on GE Magna-Blast 4KV circuit breakers employs a Tuf-Loc sleeve bearing that consists of Teflon-coated fiberglass. These bearings have, in some cases, worn out prematurely. GE has recommended that customers "promptly and regularly" inspect the breakers for excessive play and wear of the bearings in the linkage and pawls. GE also recommended replacement of the Tuf-Loc bearings with longer life and more suitable aluminum-bronze bearings.

Licensee Action - The licensee has inspected all Magna-Blast breakers with M-13 operating mechanisms for excessive play and wear as required, has modified its maintenance program to ensure that these breakers continue to be inspected on a regular basis, and plans to replace the Tuf-Loc bearings with aluminum-bronze bearings when the parts become available. Although this problem was first noted in a GE SAL issued in 1977, it was not until the problem was highlighted by IE Information Notice 84-29 issued on April 17, 1984, that action was taken by the licensee.

3. Anchor/Darling Valve Anti-Rotation Collars

Deficiency - Anchor/Darling valves with anti-rotation collars may fail to cycle as required if the collar setscrew vibrates loose and allows the collar to slide down the stem. Anchor/Darling recommends that these setscrews be checked for tightness and locked in place by any of several methods.

Licensee Action - The licensee identified the affected valves and locked the setscrews in place using Loctite, which was one of the methods recommended by Anchor/Darling.

4. Topaz Inverters

Deficiency - The adjustment of the low voltage shutoff and turn-on for Topaz inverters may be too high. This could result in an inverter trip and failure to restart during a design basis accident.

Licensee Action - Upon receipt of the notification, the licensee tested the setpoints for all affected Topaz inverters. None required adjustment.

5. Elma/Nutherm Power Supplies

Deficiency - Power supplies manufactured by Elma and supplied to PNPS by Nutherm may have leaking oil-filled capacitors and inadequate (cold) solder joints.

Licensee Action - The licensee has replaced all 16 oil-filled capacitors on the 8 affected power supplies, and a Maintenance Request has been issued to inspect the solder joints during the next outage.

6. GE 4160 Volt Switchgear

Deficiency - During the performance of re-qualification tests on switchgear (4160V-250 and 350 MVA-78,000 amperes, momentary) conducted July 11, 1978, test results indicated that the short circuit bus bracing was not adequate for a 10 cycle 78,000 ampere withstand test.

Licensee-Action - The licensee determined that installation of additional bus bracing was not necessary because the available momentary short circuit current to its 4160 volt buses is less than 60,000 amperes.