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WILLIAM D. HARRINGTON
SENIOR VICE PRESIDENT
NUCLEAR

BECo 85- 012
January 21, 1985

Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

License DPR-35
Docket 50-293

Subject: Environmental Qualification of Safety-Related Electrical Equipment at Pilgrim Nuclear Power Station

References:
1) Telecon between BECo and NRC dated 12/10/84
2) Telecons between P. Leech/Max Yost of NRC and T. A. Venkataraman of BECo on 11/15/84
3) BECo submittal to NRC dated 9/24/84, BECo Ltr #84-162
4) BECo submittal to NRC dated 8/3/84, BECo Ltr #84-119

Dear Sir:

This letter provides you with certain information your staff had requested from Boston Edison during telecons on 12/10/84 and 11/15/84 (References 1 and 2). This information will clarify and supplement some of the responses that Boston Edison had made in References 3 and 4.

The enclosure provides a matrix containing equipment items for which resolutions were not provided in either Reference 3 or Reference 4, as the evaluation to qualify the equipment was still ongoing at the time of BECo's submittal. We are also enclosing revised JCO's for equipment C2257A, C2257B and C2207A containing supplemental information as discussed during the telecon on 12/10/84.

In addition, your staff requested Boston Edison to clarify if the statement on JCO's (Justification for Continued Operation) as included in Reference (4) in August 1984 would apply to the JCO's that were submitted in September 1984. Please be advised that the statement on JCO's in Reference 4 applies to all JCO's. Also, an assessment review of the requirements of 10CFR50.49(b)(2) as requested by your staff was completed by BECo. Items identified as requiring qualification under this category will be included in our qualification program. The methodology used for the assessment effort is as listed below.

A048
1/1

1. A list was generated of safety-related electrical equipment as defined in paragraph (b)(1) of 10CFR50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&ID's), and electrical distribution diagrams;

2. The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips), whose failure due to postulated environmental conditions could prevent required operation of the safety-related equipment and;

3. The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&ID's, component technical manuals, and/or systems descriptions in the FSAR.

4. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

We would be pleased to answer any questions you may have regarding this submittal.

Very truly yours,

J Edward Howard for

W. D. Harrington

TAV/ns

Enclosures: 1) Resolution Matrix
2) Justification for Continued Operation

RESOLUTION MATRIX FOR EQUIPMENT ITEMS NOT INCLUDED IN BECO SUBMITTAL DATED 8/3/84 (BECO LTR 84-119)

PNPS ID #	REF. Page # BECO LTR 84-162	EQUIPMENT TYPE MANUFACTURER/MODEL #	RESOLUTION
MCC B14 B15	67-69	AC Motor Control Center Nelson Electric/1035E	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
312D Anaconda 712B Anaconda	133	Cable Anaconda/FR-EP-CPE	Qualification in Progress - Evaluation indicates that items will be qualified.
C151	137-142	Control Panel Switch/Light Electro Switch/General Electric 40/ET-16	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
MO3800 MO3801	168	Motor Operator Limitorque/SMB-000	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
MO4085A	170	Motor Operator Limitorque/SMB-000-5	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.

RESOLUTION MATRIX FOR EQUIPMENT ITEMS NOT INCLUDED IN
BECO SUBMITTAL DATED 8/3/84 (BECO LTR 84-119)
(Cont'd)

PNPS ID #	REF. Page # BECO LTR 84-162	EQUIPMENT TYPE MANUFACTURER/MODEL #	RESOLUTION
MO4084	172	Motor Operator Limitorque/SMB-000-2	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
P202 A, B, C, D, E, F	177-178	Pump Motor Terminal Splice General Electric/5K364AK2020	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
PS4058	183-184	Pressure Switch Barton/288A	A plant area modification is currently being evaluated that will reduce environmental parameters due to a postulated pipe break to levels the equipment can be qualified.
S1	187	Cable Type S1	See TER 252, Page 3 of 17 of BECo submittal dated 8/3/84.
T.B. C153	N/A, TER 265(g)	Terminal Block in Panel C153	Qualified.

NOTE: 128(h) in page 10 of 17 is corrected as 128(g).

BOSTON EDISON COMPANY
JUSTIFICATION FOR
CONTINUED OPERATION

Equipment Identification No. C2207A
TER No. N/A Sheet 1 of 1

Preparer: MR Ervin Date: 12/12/84

Independent Review: JL Rogers Date: 12/12/84

Approval: RE Grazio Date: 12/13/84

EQUIPMENT TYPE: Instrument rack w/terminal block
MANUFACTURER: Walkdown could not identify
MODEL: Walkdown could not identify

The manufacturer of two of the terminal blocks on this instrument rack (which is located outside containment) could not be positively identified during a walkdown. It was determined that they are not nylon. The terminal blocks are in a 125v DC circuit with pressure switch PS261-23A and differential pressure indicating switches dPIS261-36A and dPIS261-37A. There are no transmitters connected to the terminal blocks. The terminal blocks are physically located in enclosed junction boxes on the back of the instrument rack.

Sandia National Laboratories and other laboratories have compiled extensive test data on terminal blocks (both protected and unprotected) of various manufacturers. Sandia tested over 400 terminals in their own facilities. The large number of blocks tested represents a cross section of terminal blocks used within the nuclear industry. The partial test data indicates that the most prevalent failure mode is an increase of leakage current to values of 10 to 20 milliamps. However, this small amount of leakage current will not affect the circuit because it will not prevent the "pick-up" or "drop-out" of any relays in the circuit. Therefore, the terminal blocks can be expected to function post accident and will not degrade the safety function of any associated equipment. In addition, the B logic associated with the B pressure switches on rack C2207B is qualified so that a qualified alternative means of accomplishing the safety function is assured. Based on these considerations, continued operation is justified.

BOSTON EDISON COMPANY
JUSTIFICATION FOR
CONTINUED OPERATION

Equipment Identification No. C2257B
TER No. N/A

Preparer: MR Ennis Date: 12/12/84

Independent Review: JL Rogers Date: 12/12/84

Approval: RL Grazio Date: 12/14/84

EQUIPMENT TYPE: Instrument rack w/terminal block
MANUFACTURER: Walkdown could not identify
MODEL: Walkdown could not identify

The manufacturer of one of the terminal blocks on this instrument rack (which is located outside containment) could not be positively identified during a walkdown. It was determined that it is not nylon. The terminal block is in a 125v DC circuit with differential pressure indicating switch dPIS1360-18. There are no transmitters connected to the terminal block. The terminal block is physically located in an enclosed junction box on the back of the instrument rack.

Sandia National Laboratories and other laboratories have compiled extensive test data on terminal blocks (both protected and unprotected) of various manufacturers. Sandia tested over 400 terminals in their own facilities. The large number of blocks tested represents a cross section of terminal blocks used within the nuclear industry. The partial test data indicates that the most prevalent failure mode is an increase of leakage current to values of 10 to 20 milliamps. However, this small amount of leakage current will not affect the circuit because it will not prevent the "pick-up" or "drop-out" of any relays in the circuit. Therefore, the terminal block can be expected to function post accident and will not degrade the safety function of any associated equipment.

In addition, the function of the differential pressure switch DPIS1360-1B is to isolate the RCIC system on detection of high steam line flow. This switch must function in a harsh steam environment following PBOC-6 (RCIC Steam Line Break in the RCIC Pump Compartment). The high steam flow signal will be quickly generated by the differential pressure switch and the RCIC isolation signal will be sealed-in prior to the terminal block associated with this switch being exposed to a harsh environment. No subsequent failure mode of this terminal block will result in unisolating the RCIC system. Also, differential pressure switch DPIS1360-1A which provides the same RCIC isolation signal is qualified so that a qualified alternative means of accomplishing the safety function is assured. Therefore, continued operation is justified.

BOSTON EDISON COMPANY
JUSTIFICATION FOR
CONTINUED OPERATION

Equipment Identification No. C2257A
TER No. N/A

Sheet 1 of 1

Preparer: NR Ervin Date: 12/12/84

Independent Review: JJ Rogers Date: 12/12/84

Approval: RL Gray Date: 12/14/84

EQUIPMENT TYPE: Instrument rack w/terminal block and wire
MANUFACTURER: Walkdown could not identify
MODEL: Walkdown could not identify

The manufacturer of one of the terminal blocks on this instrument rack (which is located outside containment) could not be positively identified during a walkdown. It was determined that it is not nylon. The terminal block is in a 125v DC circuit with differential pressure indicating switch DPIS2352. There are no transmitters connected to the terminal block. The terminal block is physically located in an enclosed junction box on the back of the instrument rack.

Sandia National Laboratories and other laboratories have compiled extensive test data on terminal blocks (both protected and unprotected) of various manufacturers. Sandia tested over 400 terminals in their own facilities. The large number of blocks tested represents a cross section of terminal blocks used within the nuclear industry. The partial test data indicates that the most prevalent failure mode is an increase of leakage current to values of 10 to 20 milliamps. However, this small amount of leakage current will not affect the circuit because it will not prevent the "pick-up" or "drop-out" of any relays in the circuit. Therefore, the terminal block can be expected to function post accident and will not degrade the safety function of any associated equipment.

In addition to the terminal block associated with DPIS2352, the manufacturer of the instrument rack wire from the terminal blocks AA and DD to DPIS2352 and DPIS2353 is unknown. The following systematic argument is applicable to both the terminal block and the instrument rack wire. The function of DPIS2352 and DPIS2353 is to isolate the HPCI system upon detection of high steam flow in the HPCI turbine steam supply line. High steam flow is indicative of a HPCI steam line break. The wire and terminal block associated with these switches and the switches themselves are exposed to a harsh steam environment following a PBOC-5 (HPCI Steam Line Break in the Torus Room). The high steam flow signal will be quickly generated by these differential pressure switches and the HPCI isolation signal will be sealed in prior to the terminal block and wire associated with these switches being exposed to a harsh environment. No subsequent failure mode of the terminal block or wire will result in unisolating the HPCI system. Therefore, continued operation is justified.