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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

April 23, 1981

Docket No. 50-289



Mr. Henry D. Hukill, Vice  
President and Director - TMI-1  
Metropolitan Edison Company  
P. O. Box 480  
Middletown, Pennsylvania 17057

Dear Mr. Hukill:

SUBJECT: REVISION TO APPENDICES B AND C OF THE THREE MILE ISLAND  
UNIT 1 EQUIPMENT QUALIFICATION SAFETY EVALUATION

Enclosed are revised pages to the TMI-1 equipment qualification Safety Evaluation Report (SER) forwarded to you March 24, 1981. The revised Appendices reflect changes in the deficiencies for Foxboro transmitters and include a manufacturers recommended corrective action. The potential deficiencies affecting the transmitters were identified during recent testing by a utility owners group. The revised pages should be substituted for the corresponding original pages in the SER. Your response to our request for additional information identified in Sections 3 and 4 of the SER should also address these deficiencies.

Sincerely,

A handwritten signature in cursive script that reads "John F. Stolz".

John F. Stolz, Chief  
Operating Reactors Branch #4  
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Enclosure:  
Revised pages to  
Safety Evaluation Report

cc w/enclosure:  
See next three pages

cc w/enclosure(s):

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APPENDIX B

Equipment Requiring Additional Information  
and/or Corrective Action  
(Category 4.2)

LEGEND:

Designation for Deficiency

- R - Radiation
- T - Temperature
- QT - Qualification time
- RT - Required time
- P - Pressure
- H - Humidity
- CS - Chemical spray
- A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
- S - Submergence
- M - Margin
- I - HELB evaluation outside containment not completed
- QM - Qualification method
- RPN - Equipment relocation or replacement, adequate schedule not provided
- EXN - Exempted equipment justification inadequate
- SEN - Separate effects qualification justification inadequate
- QI - Qualification information being developed
- RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Plant ID No.	Deficiency
Pressure Switch	Static-O-Ring	PS-600	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-601	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-602	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-603	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-604	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-605	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-606	QT,CS,R,A,EXN,QM
Pressure Switch	Static-O-Ring	PS-607	QT,CS,R,A,EXN,QM
*Pressure Transmitter	Foxboro	SP6A-PT1	CS,A,R

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\*See Attachment 1: Foxboro Letter (3/12/81), "Potential Deficiency Affecting Foxboro Transmitters," for corrective action.

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APPENDIX B (continued)

Equipment Description	Manufacturer	Plant ID No.	Deficiency
*Pressure Transmitter	Foxboro	SP6A-PT2	CS,A,R
*Pressure Transmitter	Foxboro	SP6B-PT1	CS,A,R
*Pressure Transmitter	Foxboro	SP6B-PT2	CS,A,R
Limit Switch	NAMCO	LSA/MSV-6	T,P,H,A,EXN
Limit Switch	NAMCO	LSB/MSV-6	T,P,H,A,EXN
Limit Switch	NAMCO	LSB/MSV-13A	T,P,H,A,EXN
Limit Switch	NAMCO	33/MSV-13A	T,P,H,A,EXN
Solenoid Valve	ASCO	SV/MSV-13A	T,P,H,A,EXN
Solenoid Valve	ASCO	SV/MSV-13B	T,P,H,A,EXN
Limit Switch	NAMCO	LSA/MSV-13B	T,P,H,A,EXN
Limit Switch	NAMCO	LSB/MSV-13B	T,P,H,A,EXN
Motor	Westinghouse	EF-P2A	QT,T,P,H,A
Motor	Westinghouse	EF-P2B	QT,T,P,H,A
Motor Operator	Limitorque	EF-V-1A	T,A
Motor Operator	Limitorque	EF-V-1B	T,A
Motor Operator	Limitorque	EF-V-2A	T,A
Motor Operator	Limitorque	EF-V-2B	T,A
Pneumatic Converter	Bailey	EF-V-30A/Cont.	QT,T,P,H,R,A,RPN
Pneumatic Converter	Bailey	EFV-30B/Cont.	QT,T,P,H,R,A,RPN
Motor Operator	Limitorque	FW-V-5A	T,A
Motor Operator	Limitorque	FW-V-5B	T,A
Motor Operator	Limitorque	FW-V-92A	T,A
Motor Operator	Limitorque	FW-V-92B	T,A

\*See Attachment 1: Foxboro Letter (3/12/81), "Potential Deficiency Affecting Foxboro Transmitters," for corrective action.



APPENDIX B (continued)

Equipment Description	Manufacturer	Plant ID No.	Deficiency
Pressure Switch	Square D	PS-289	R,A
Pressure Switch	Square D	PS-290	R,A
*Pressure Transmitter	Foxboro	RC3A-PT3	CS,A,R
*Pressure Transmitter	Foxboro	RC3A-PT4	CS,A,R
*Pressure Transmitter	Foxboro	RC3B-PT3	CS,A,R
Fan Motor	GE	AH-E-1A	CS,A
Fan Motor	GE	AH-E-1B	CS,A
Fan Motor	GE	AH-E-1C	CS,A
Motor Operator	Limitorque	CF-V-1A	CS,R,A,EXN
Motor Operator	Limitorque	CF-V-1B	CS,R,A,EXN
Motor Operator	Limitorque	CF-V-2A	CS,M,A
Motor Operator	Limitorque	CF-V-2B	CS,M,A
Motor Operator	Limitorque	CF-V-3A	CS,A
Motor Operator	Limitorque	CF-V-3B	CS,A
Limit Switch	Micro Switch	LSA/CFV-19A	R,A
Limit Switch	Micro Switch	LSB/CFV-19A	R,A
Limit Switch	Micro Switch	LSA/CFV-19B	R,A
Limit Switch	Micro Switch	LSA/CFV-19B	R,A
Solenoid Valve	ASCO	20/CF-V19A	R,A
Solenoid Valve	ASCO	20/CF-V19B	R,A
Limit Switch	Micro Switch	LSA/CFV-20A	R,A
Limit Switch	Micro Switch	LSB/CFV-20A	R,A
Limit Switch	Micro Switch	LSA/CFV-20B	R,A
Limit Swtich	Micro Switch	LSB/CFV-20B	R,A
Solenoid Valve	ASCO	SV/CF-V20A	R,A

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\*See Attachment 1: Foxboro Letter (3/12/81), Potential Deficiency Affecting Foxboro Transmitters," for corrective action.

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APPENDIX B (continued)

Equipment Description	Manufacturer	Plant ID No.	Deficiency
Conax Connectors	Conax	Rosemount Connectors PL-14-B2	QT,T,P,H,CS,R,A
Conax Connectors	Conax	Bailey Connectors TG-14-2	CS,R,A
Conax Connectors	Conax	Bailey Connectors PL-16-B4	CS,R,A
Solenoid	ASCO	SV/EF-V-8A	T,P,H,A,EXN
Solenoid	ASCO	SV/EF-V-8B	T,P,H,A,EXN
Solenoid	ASCO	SV/EF-V-8C	T,P,H,A,EXN
Diff. Press. Transmitter	Barton	FI-S-77	QT,T,P,H,R,A
Diff. Press Transmitter	Barton	FI-S-78	QT,T,P,H,R,A
Diff. Press Transmitter	Barton	FI-79	QT,T,P,H,R,A
Solenoid Valve	ASCO	SV3 & SV4 FW-V-16A	T,P,H,A,EXN
Solenoid Valve	ASCO	SV3 & SV4 FW-V-16B	T,P,H,A,EXN
Solenoid Valve	ASCO	SV3 & SV4 FW-V-17A	T,P,H,A,EXN
Solenoid Valve	ASCO	SV1 & SV2 FW-V-17B	T,P,H,A
Solenoid Valve	ASCO	SV3 & SV4 FW-V-17B	T,P,H,A,EXN
*Pressure Transmitter	Foxboro	PT-282	A,R
*Pressure Transmitter	Foxboro	PT-285	A,R
*Pressure Transmitter	Foxboro	PT-288	A,R

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\*See Attachment 1: Foxboro Letter (3/12/81), "Potential Deficiency Affecting Foxboro Transmitters," for corrective action.

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APPENDIX C (continued)

Equipment Description	Manufacturer	Plant ID No.	Deficiency
Limit Switch	NAMCO	33/ICV-4	A
Limit Switch	NAMCO	LSB/ICV-4	A
Limit Switch	NAMCO	33/ICV-6	A
Limit Switch	NAMCO	LSB/ICV-6	A
Solenoid Valve	ASCO	SV/ICV-6	A
Motor Operator	Limitorque	RB-V-2	A
Pump Motor	Westinghouse	BS-P1A	A
Pump Motor	Westinghouse	BS-P1B	A
Motor Operator	Limitorque	BS-V-1A	A
Motor Operator	Limitorque	BS-V-1B	A
Motor Operator	Limitorque	BS-V-2A	A
Motor Operator	Limitorque	BS-V-2B	A
Motor Operator	Limitorque	BS-V-3A	A
Motor Operator	Limitorque	BS-V-3B	A
Neutron Detector	Westinghouse	NI-5	Exempt
Neutron Detector	Westinghouse	NI-6	Exempt
Neutron Detector	Westinghouse	NI-7	Exempt
Neutron Detector	Westinghouse	NI-8	Exempt
Motor Operator	Limitorque	RR-V-3A	A
Motor Operator	Limitorque	RR-V-3B	A
Motor Operator	Limitorque	RR-V-3C	A
Motor Operator	Limitorque	RR-V-4A	A
Motor Operator	Limitorque	RR-V-4B	A

Rev.

## The Foxboro Company

Foxboro, MA 02035 U.S.A.  
(617) 543-8750

12 March 1981

Subject: Potential Deficiency Affecting Foxboro Transmitters,  
Model Numbers N-E11, N-E13 or E11, E13 with suffix  
Codes /MCA, /MCA/RRW, or /MCA/RR

Gentlemen:

Our records indicate that you have received one or more of the Foxboro model numbered transmitters listed above. This letter is to notify you that two deficiencies have been discovered in some of these transmitters which may exist in the units shipped to you. The transmitters in question operate at a signal level of 10-50mA. Similar model numbered units operating at 4-20mA are not affected.

The first issue involves the possible use of incorrect insulating sleeving on transistor and zener diode lead wires in the amplifier. The second issue involves the use of a specific vendor's capacitor which is not hermetically sealed (although claimed to be so). As a result, the capacitor electrolyte can leak under adverse service conditions, specifically heat and time. The failure mode is a decrease in resistance across the capacitor resulting in electrical leakage. The transmitter operation can be affected by limiting the output to something less than full value which, in time, can degrade to no output at all.

Insulating Sleeving - Radiation resistant sleeving consisting of a silicone coated glass fiber braid has been substituted by a teflon sleeving in some transmitters. Tests have shown that teflon will become brittle and deteriorate with a substantial integrated radiation dose. Foxboro testing has demonstrated that the teflon sleeving used in these devices will withstand an integrated dose of 10 megarads with no noticeable deterioration. Tests to 200 megarads produce the brittle conditions which can result in the teflon flaking from the wires. Based on these tests, operating plants not expected to exceed an integrated dose of 10 megarads have no potential problem and no action is required.

Where the integrated dose rate could exceed 10 megarads, then units in service should be inspected to determine if the proper insulating material has been used. This can be accomplished by opening the transmitter in accordance with Foxboro Master Instruction MI 20-145. The amplifier cover must be removed exposing the amplifier assembly. At one end of the assembly, a transistor and a zener diode are mounted in the base casting which serves as a heat sink. The insulating material in question is a sleeving slipped over the lead wires from these two components. The proper material is white and heavy looking. Positive

**FOXBORO**

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Subject:

identification can be made by inspecting one end of the material to establish that the outer material covers an inner braid. Teflon, if used, will be a single layer material and could be either clear or white.

If improper insulation is present, then the corrective action is to replace the amplifier (Foxboro P/N N0148PW). Replacement amplifiers can be purchased from your local Foxboro Sales or Service Representatives. If you prefer to have Foxboro Service Personnel inspect the equipment and, if necessary, replace the amplifier, this can be arranged at standard service rates.

Capacitor - The capacitor degradation problem was discovered over time through tracking failure situations. Internal corrective action has been taken to remove the vendor involved from the qualified vendor list and to purge all stock of capacitors from this vendor. Degradation of this capacitor is a function of time and service conditions with heat being a primary contributor. This phenomenon was observed in recent tests of transmitters using these capacitors. The capacitor in question is manufactured by Cornell-Duebiller and can be specifically identified by a type number in the form TX-65-XXXX as well as a monogram in a box followed by a date code, e.g. CDZ 0874. It is assigned Foxboro part number N0141MF.

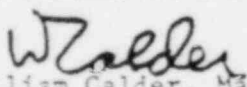
To determine if this capacitor is present requires a visual inspection of the amplifier which can be accomplished as described above for the insulating sleeving inspection. The recommended corrective action should the above described capacitor be present is to replace the amplifier (Foxboro P/N N0148PW) although it is possible to replace the capacitor with a Foxboro provided substitute. Use of Foxboro Service personnel to perform the inspection and replacement, if necessary, can be arranged at standard service rates as described above.

Due to lack of knowledge of specific application, redundancy, and the like, Foxboro cannot determine if the NRC reporting requirements of 10CFR Part 21 are applicable. This determination is the responsibility of the user and any such reporting would be made by them after completing their evaluation of the situation.

If you have any questions regarding the above, please contact the undersigned directly.

Very truly yours,

THE FOXBORO COMPANY

  
William Calder, Manager  
Corporate Quality Assurance

joy  
120381

Enclosure MI 20-145

**FOXBORO**