TEPD

MAINE YANKEE

ENGINEERING OFFICE

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B.4.1.1
WMY 80-145

October 31, 1980

United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Attention: Mr. Boyce H. Grier, Director

References:
(a) License No. DPR-36 (Docket No. 50-309)
(b) USNRC Letter to MYAPC, IE Bulletin 79-01B, dated January 14, 1890
(c) MYAPC letter to USNRC, dated June 2, 1980 (WMY 80-86) dated January 14, 1980
(d) USNRC Letter, to MYAPC, Order for Modification of License, dated August 29, 1980
(e) USNRC Letter to MYAPC, IE Bulletin 79-01B, Supplement No. 2, dated September 30, 1980
(f) USNRC Letter to MYAPC, IE Bulletin 79-01B Supplement No. 3, dated October 24, 1980

Subject: Environmental Qualification of Safety-Related Electrical Equipment

Dear Sir:

Your letter, Reference (d), transmitted an Order to submit information regarding environmental qualification of safety-related electrical equipment at the Maine Yankee Atomic Power Station in response to a staff request specified in Reference (b). The requirements of Reference (b) have been further modified by References (e) and (f). The attached YAEC report (YAEC 1229) contains the required information. We have made every effort to ensure that it meets your format requirements, in order to facilitate your staff's review. This report supersedes our previous submittal, Reference (c), on equipment qualification since it encompasses all previously supplied information as well as the additional information required by Reference (e). For your information, a central file containing all the available documentation for environmental qualification is located at the engineering offices of the Yankee Atomic Electric Company.

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The frequent changes in the scope of this bulletin in response to new requirements, some coming very late in the response period, is disconcerting in light of the time necessary to prepare each new increment of the response. Just one month before this report was due, we received your letter Reference (e), which required a significant redirection of manpower resources and a significant amount of overtime. On October 27, only five days before the report was due, we received another letter, Reference (f), in which your staff intended to alleviate the engineering work load imposed by Reference (e). While Maine Yankee appreciates the intended schedule relief of Reference (f), your staff should recognize that the relief came too late. We had already diverted additional manpower to the bulletin response and consequently met the requirements of Reference (e), before the relief was made available.

While we share your concerns regarding equipment qualification, we also suggest that information requests be thoroughly reviewed prior to issuance; thereby reducing the need for significant revisions. Engineering projects of the Bulletin 79-01B magnitude involve a considerable work force, and your staff should understand it is very difficult to redirect multiple activities on short notice. If a change in scope should become necessary, the staff should also adjust the schedule accordingly.

We trust that the information submitted by this letter is acceptable; however, should you have any questions, please contact us.

Very truly yours,

MAINE YANKEE ATOMIC POWER COMPANY

W. P. Johnson
Vice President

COMMONWEALTH OF MASSACHUSETTS)
)ss
COUNTY OF WORCESTER)

Then personally appeared before me, W. P. Johnson, who, being duly sworn, did state that he is a Vice President of Maine Yankee Atomic Power Company, that he is duly authorized to execute and file the foregoing request in the name and on the behalf of Maine Yankee Atomic Power Company, and that the statements therein are true to the best of his knowledge and belief.

Robert H. Groce Notary Public
My Commission Expires September 14, 1984

ROBERT H. GROCE
NOTARY PUBLIC
MASSACHUSETTS

REPORT: YAEC-1229
DOCKET NO.: 50-309
LICENSE NO.: DPR-36

ENVIRONMENTAL QUALIFICATION

OF

SAFETY-RELATED ELECTRICAL EQUIPMENT

(IE BULLETIN 79-01B)

OCTOBER 1980

Maine Yankee Atomic Power Company
Wiscasset, Maine

RECORD OF REVISIONS TO YAEC-1229

REVISION NUMBER	PREPARED BY	REVIEWED AND APPROVED					
		ELECTRICAL ENG. GROUP	INST. & CONT. ENG. GROUP	SYSTEMS ENG. GROUP	NUCLEAR ENG. & DEVEL. DEPT.	ENVIRONMENTAL ENG. DEPT.	
ORIGINAL	10/31/80	10/31/80 — F O Baxter 10/31/80	10/31/80 G T Dod 10/31/80	10/31/80 S R Miller 10/31/80	10-31-80	10/31/80	
1							
2							
3							

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ABSTRACT

General Design Criterion 4 states in part that "structures, systems and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss of coolant accidents". This report addresses the environmental qualification, and documentation thereof, of the safety-related electrical equipment at the Maine Yankee Atomic Power Station.

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1.0 INTRODUCTION

1.1 On February 8, 1979, the United States Nuclear Regulatory Commission, Office of Inspection and Enforcement, issued Bulletin 79-01 which required licensees to perform a detailed review of Class 1E electrical equipment environmental qualifications to ensure that the equipment will function under postulated accident conditions. Also, on June 6, 1979, the NRC issued a supplemental bulletin, 79-01A, which required specific action with respect to ASCO solenoid valve qualifications. The review of these bulletins for Maine Yankee was conducted with particular emphasis placed on electrical equipment located in the reactor containment. The results of this review were consolidated into YAEC Report #1180 - "Environmental Qualification of Electrical Equipment Within the Reactor Containment at Maine Yankee Atomic Power Station". A summary of this report, #1180A, was submitted to the Nuclear Regulatory Commission on June 15, 1979, in response to IE Bulletin 79-01 and 79-01A.

Subsequently, on January 14, 1980, the NRC issued IE Bulletin 79-01B as a result of their initial review of licensees' responses to IE Bulletin 79-01. Licensees were required to submit the following information:

(a) A Master List of all Engineered Safety Feature Systems required to function under postulated accident conditions. Accident conditions were defined as the LOCA/HELB inside containment and the HELB outside containment. For each system on the Master List, all Class 1E and other electrical components which were required to function under the accident conditions were required to be tabulated.

(b) Written evidence regarding environmental qualification of each component identified in the Master List.

(c) Service Condition Profiles for each component identified in the Master List.

(d) A comparison between the Service Condition Profiles and the individual component's environmental qualification.

(e) Identification of the maximum expected flood level inside the primary containment resulting from the postulated accidents.

(f) A written report summarizing the results of items (a) through (e).

YAEC Report #1217 was submitted to the NRC in June, 1980, to provide the information required by IE Bulletin 79-01B. YAEC Report #1217 superseded Reports #1180 and #1180A because its scope was broader and its contents included the information previously submitted.

The addition of missing information, together with further expansion and clarification of Bulletin 79-01B, necessitated the issuance of this report, identified as YAEC Report #1229. YAEC Report #1229 presents the

results of an exhaustive re-evaluation of environmental qualifications for safety-related electrical equipment at Maine Yankee Atomic Power Station which is required to function under the harsh environments associated with Design Basis Accidents.

2.0 REPORT FORMAT

This report is divided into four Appendices. Each Appendix contains an opening statement describing the methods used to develop the information. This is then followed by the information itself. The following is a summary of the appendices:

2.1 Appendix I

Appendix I contains information pertaining to the Master List of safety-related electrical equipment and its development.

The Master List is a comprehensive tabulation of all safety-related electrical equipment located in a potentially harsh environment due to a LOCA or HELB is provided. Electrical equipment required as a result of TMI and located in a harsh environment are also contained in the Master List. The electrical equipment required to remain operable during postulated LOCA/HELB accident conditions and bring the plant to cold shutdown are identified in the Master List in accordance with Bulletin 79-01B.

The complete electrical circuit of the required electrical equipment was traced to determine all associated electrical components. The associated equipment includes, but is not limited to: cables, connectors, penetrations, panels, motor control centers, and the like. Certain items such as rigid conduit, flexible conduit, terminal lugs etc., are not addressed because failure of these items is not envisioned to affect the integrity of the component. Certain associated electrical components are not listed separately because they are considered an integral part of other listed components.

The components are listed by system affiliation with the following information plant specific identification number, generic description, location (inside or outside containment) and, for those components required to remain operable during harsh environmental conditions reference to a qualification worksheet in Appendix II.

2.2 Appendix II - Environmental Qualification Work Sheets

A worksheet is provided in Appendix II for each item identified in the Master List of Appendix I which is required to function in a harsh environment. The work sheet contains the environmental requirements and qualification for the item as well as references to the documentation. The environmental parameters include pressure, temperature, humidity, caustic spray, radiation, duration of exposure, aging and submergence.

2.3 Appendix III - Environmental Service Conditions

Appendix III contains the harsh environment service conditions experienced in various parts of the plant after a LOCA or HELB condition. The harsh environments include LOCA and main steamline breaks inside the containment, an array of HELB's outside the containment, and the radiation dose as well as thermal effects associated with recirculation of radioactive fluids outside the containment following a LOCA.

2.4 Appendix IV

Appendix IV contains the following environmental qualification documentation.

2.4.1 A complete listing of all environmental qualification worksheet documentation references.

2.4.2 The environment qualification test profiles which are referenced in the environmental qualification worksheets.

2.4.3 Functional descriptions for each component which are referenced in the environmental qualification worksheets.

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APPENDIX I

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APPENDIX I

Introduction

The information presented in Appendix I was obtained from these sources:

1) YAEC Correspondence and Meetings
2) Maine Yankee FSAR
3) Emergency Procedures
4) Plant Drawings
5) Maine Yankee Technical Specifications
6) Physical Inspection (where permissible)

Appendix I contains a comparison of the systems or functions which are described in Appendix A of DOR Guidelines and the equivalent Maine Yankee systems or functions - (Table I.1).

A Master List of all safety-related electrical equipment normally available for accident mitigation and bringing the plant to cold shutdown status has been generated. The Master List is based on the systems included in Table I.1 and identifies the electrical equipment which is required to function under postulated accident conditions. Equipment is identified as such by a reference to an Appendix II environmental qualification worksheet. Electrical equipment not identified as being required to function under postulated accident conditions have a note reference instead of an environmental qualification worksheet. The notes are defined as follows:

(1) Required to function under non-harsh environmental conditions.

(2) Not required to function for any accident.

(3) Not required to function for the accident producing the harsh environmental conditions.

TABLE I.1: Listing of Systems or Functions Described in Appendix of DOR Guidelines and the Equivalent Maine Yankee Systems or Functions

DOR Guidelines-Appendix A Systems/Function	Corresponding Maine Yankee Systems/Functions
Engineered Safeguards Actuation	Containment Leakage Monitoring System, Reactor Coolant System, Engineered Safeguards Activation Logic
Reactor Protection	Containment Leakage Monitoring System, Reactor Coolant System, Feedwater System, Turbine Control System, Cabinet and Logic
Containment Isolation	Containment Leakage Monitoring System, Engineered Safeguards Activation, Containment Isolation Logic (For isolation valves, see system description - Appendix IV)
Steamline Isolation	Main Steam System, Feedwater System
Main Feedwater Shutdown Isolation	Turbine Control System, Main Steam System, Feedwater System
Emergency Power	Emergency Power System
Emergency Core Cooling	High Pressure Safety Injection (Part of CVCS) Safety Injection Tanks, pipes, and valves, Low Pressure Safety Injection System, Containment Spray System, Residual Heat Exchangers
Containment Heat Removal	Containment Spray System, Residual Heat Exchangers
Containment Fission Product Removal	Containment Spray System
Containment Combustible Gas Control	Combustible Gas Control System
Auxiliary Feedwater	Auxiliary Feedwater System, Feedwater System

TABLE I.1
(Cont'd)

DOR Guidelines-Appendix A Systems/Function	Corresponding Maine Yankee Systems/Functions
Containment Ventilation	Containment Purge System, Containment Isolation System
Containment Radiation Monitoring	Post-Accident Monitoring System
Control Room Habitability Systems	Control Room Breathing Air System, Control Room HVAC System
Ventilation for Areas Containing Safety Equipment	Containment Spray Building Ventilation, Primary Auxiliary Building HVAC, Steam and Feedwater Valve Area HVAC, Steam Generator Aux. Feed Pump Room HVAC
Component Cooling	Secondary Component Cooling System, Primary Component Cooling System
Service Water	Service Water System
Emergency Shutdown	RHR Heat Exchanger, Pressurizer Sprays (RCS), Chemical and Volume Control System, Power Operated Relief Valves, Steam Dump System (Steam System), Low Pressure Safety Injection System, Decay Heat Removal Valve
Post-Accident Sampling and Monitoring	Post-Accident Sampling System Post-Accident Monitoring System
Radiation Monitoring	Post-Accident Monitoring System
Safety-Related Display Instrumentation	Post-Accident Monitoring System, Reactor Protection System, Main Steam System, Feedwater System, Reactor Coolant System, Low Pressure Safety Injection System, High Pressure Safety Injection System, Containment Spray System, Emergency Power System, Containment Isolation

TABLE I.2

MASTER LIST NOTES

The following notes cover the items in the master list which do not have have an environmental qualification reference.

(1) Required to function under non-harsh environmental conditions,

(2) Not required to function for any accident,

(3) Not required to function under the harsh environmental conditions of that accident,

(4) This is required per TMI Lessons Learned; however, it is under evaluation.

(5) Not required for mitigation of design basis accidents; however, it is used to maintain Tech. Specs. prior to an accident.

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APPENDIX I

SYSTEM: AUXILIARY FEEDWATER SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-25A	Pump Motor		X	(1)
P-25C	Pump Motor		X	(1)
FT-1201A	Flow Transmitter		X	(1)
FT-1201B	Flow Transmitter		X	(1)
FT-1201C	Flow Transmitter		X	(1)
PI-1203B	Pressure Indicator		X	(2)
PI-1204B	Pressure Indicator		X	(2)
PI-1205B	Pressure Indicator		X	(2)
SOV-1102	Solenoid Pilot Valve		X	(1)
SOV-1106Y	Solenoid Pilot Valve		X	(1)
PI-1203A	Pressure Indicator		X	(2)
PI-1204A	Pressure Indicator		X	(2)
PI-1205A	Pressure Indicator		X	(2)
HIC 1201A	Flow Controller		X	(1)
HIC 1201B	Flow Controller		X	(1)
HIC 1201C	Flow Controller		X	(1)
PI-1203C	Pressure Indicator		X	(2)
PI-1204C	Pressure Indicator		X	(2)
PI-1205C	Pressure Indicator		X	(2)

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MASTER LIST

APPENDIX I

SYSTEM: AUXILIARY FEEDWATER SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
LI-1201	Level Indicator		X	(1)
LI-1202	Level Indicator		X	(1)
LI-1203	Level Indicator		X	(1)
LI-1204	Level Indicator		X	(1)

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APPENDIX I

SYSTEM: CHEMICAL AND VOLUME CONTROL SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
HCV-242	Valve Motor Operator	X		CVCS-1
SOV-201K	Solenoid Pilot Valve	X		CVCS-2
HCV-251	Valve Motor Operator	X		CVCS-1
HCV-261	Valve Motor Operator	X		CVCS-1
HCV-271	Valve Motor Operator	X		CVCS-1
SOV-257	Solenoid Pilot Valve	X		CVCS-3
FT-216	Flow Transmitter		X	CVCS-4
FT-212	Flow Transmitter		X	(2)
SOV-212	Solenoid Pilot Valve		X	(2)
HIC-212	Flow Controller		X	(2)
LT-207K	Level Transmitter		X	(2)
LS-207BK	Level Switch		X	(2)
LS-207CK	Level Switch		X	(2)
P-6A	Pump Motor		X	(2)
P-6B	Pump Motor		X	(2)
P-6C	Pump Motor		X	(2)
LCV-204V	Valve Motor Operator		X	(1)
TK-201K	Temperature Controller		X	(2)
SOV-216	Solenoid Pilot Valve		X	(3)
SOV-259K	Solenoid Pilot Valve		X	(3)

SYSTEM: CHEMICAL AND VOLUM CONTROL SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-206Q	Solenoid Pilot Valve		X	(1)
LCV-204S	Valve Motor Operator		X	(1)
LCV-204R	Valve Motor Operator		X	(1)
SOV-101P	Solenoid Pilot Valve		X	(2)
SOV-101Q	Solenoid Pilot Valve		X	(2)
1AEB-A	Heat Trace Breaker		X	(1)
6CH-A	Heat Trace Breaker		X	(1)
1AEB-B	Heat Trace Breaker		X	(1)
6CH-B	Heat Trace Breaker		X	(1)
SOV-210Z	Solenoid Pilot Valve	X		(1)
SOV-211	Solenoid Pilot Valve	X		(3)
HCV-262	Valve Motor Operator	X		(2)
HCV-252	Valve Motor Operator	X		(2)
HCV-253	Valve Motor Operator	X		(2)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
EPR/HYPALON	Power Cable	X		ELEC-2
PE/PVC/PVC	Control Cable	X	X	ELEC-8,10
1828-C19	Terminal Block	X	X	ELEC-7
OKONITE	Power Cable	X		ELEC-9
EA-740	Limit Switch	X		ELEC-13
XLP/HYPALON	Instrument Cable	X		ELEC-4

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MASTER LIST

APPENDIX I

SYSTEM: CONTAINMENT AIR ACTIVITY SAMPLING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-2001	Solenoid Pilot Valve	X		CAAS-1
SOV-2002	Solenoid Pilot Valve		X	(1)
SOV-2006	Solenoid Pilot Valve		X	(1)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable	X	X	ELEC-8,10
1828-C19	Terminal Block	X		ELEC-7
EA-740	Limit switch	X		ELEC-13

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APPENDIX I

SYSTEM: CONTAINMENT AIR RECIRCULATION SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
FN-17-1	Fan Motor	X		CAR-1
FN-17-2	Fan Motor	X		CAR-1
FN-17-3	Fan Motor	X		CAR-1
FN-17-4	Fan Motor	X		CAR-1
FN-17-5	Fan Motor	X		CAR-1
FN-17-6	Fan Motor	X		CAR-1
DG O'Brien	Penetration Assembly	X	X	ELEC-6
FIREWALL SR	Power Cable	X	X	ELEC-1

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APPENDIX I

SYSTEM: CONTAINMENT LEAK MONITORING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
PS-2012A	Pressure Switch		X	(3)
PS-2012B	Pressure Switch		X	(3)
PS-2012C	Pressure Switch		X	(3)
PS-2012D	Pressure Switch		X	(3)
PS-2003A	Pressure Switch		X	(3)
PS-2003A	Pressure Switch		X	(3)
PS-2003C	Pressure Switch		X	(3)
PS-2003D	Pressure Switch		X	(3)
PS-2033D	Pressure Switch		X	(3)
PS-2003E	Pressure Switch		X	(3)
PS-2009A	Pressure Switch		X	(3)
PS-2009B	Pressure Switch		X	(3)
PS-2009C	Pressure Switch		X	(3)
PS-2009D	Pressure Switch		X	(3)
PS-2009E	Pressure Switch		X	(3)
PS-2009F	Pressure Switch		X	(3)
PS-2010A	Pressure Switch		X	(3)
SOV-2003	Solenoid Pilot Valve		X	(1)
SOV-2004	Solenoid Pilot Valve		X	(1)

SYSTEM: CONTAINMENT LEAK MONITORING SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
PS-2010B	Pressure Switch		X	(3)
PS-2010C	Pressure Switch		X	(3)
PS-2010D	Pressure Switch		X	(3)
PT-2012	Pressure Transmitter		X	(3)
PT-2013	Pressure Transmitter		X	(3)
PE/PVC/PVC	Control Cable		X	ELEC-10
XLP/HYPALON	Instrument Cable		X	ELEC-4

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APPENDIX I

SYSTEM: CONTAINMENT SPRAY SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-61A	Pump Motor		X	CS-1
P-61B	Pump Motor		X	CS-1
P-61S	Pump Motor		X	CS-1
MOV-3207	Valve Motor Operator		X	CS-2
MOV-3208	Valve Motor Operator		X	CS-2
MOV-3209	Valve Motor Operator		X	CS-2
MOV-3210	Valve Motor Operator		X	CS-2
MOV-3211	Valve Motor Operator		X	CS-2
MOV-3212	Valve Motor Operator		X	CS-2
MOV-3213	Valve Motor Operator		X	(1)
MOV-3214	Valve Motor Operator		X	(1)
PT-352K	Pressure Transmitter		X	CS-3
PT-353K	Pressure Transmitter		X	CS-3
TE-352K	Temperature Element		X	(2)
TE-353K	Temperature Element		X	(2)
EPR/ARMOR/PVC	Power Cable		X	ELEC-11
XLP/NEOPRENE	Power Cable		X	ELEC-12
PE/PVC/PVC	Control Cable		X	ELEC-10
XLP/HYPALON	Instrument Cable	X		ELEC-4

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APPENDIX I

SYSTEM: CONTAINMENT SPRAY SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
PI-3201A	Pressure Indicator		X	(2)
PI-3201B	Pressure Indicator		X	(2)
PI-3201C	Pressure Indicator		X	(2)
LS-303AK	Level Switch		X	(1)
LS-303BK	Level Switch		X	(1)
LS-303CK	Level Switch		X	(1)
LS-304AK	Level Switch		X	(1)
LS-304BK	Level Switch		X	(1)
LS-304CK	Level Switch		X	(1)
SOV-3217A	Solenoid Pilot Valve		X	(3)
SOV-3217B	Solenoid Pilot Valve		X	(3)

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APPENDIX I

SYSTEM: EMERGENCY POWER SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
DG-1A	Diesel Generator		X	(1)
DG-1B	Diesel Generator		X	(1)
X-16	Transformer		X	(1)
X-507	Transformer		X	(1)
X-608	Transformer		X	(1)
Bus 5	Switchgear		X	(1)
Bus 6	Switchgear		X	(1)
Bus 7	Switchgear		X	(1)
MCC 7A	Motor Control Center		X	(1)
MCC 7B	Motor Control Center		X	(1)
MCC 7B1	Motor Control Center		X	EPS-1
Bus 8	Switchgear		X	(1)
MCC 8A	Motor Control Center		X	(1)
MCC 8B	Motor Control Center		X	(1)
MCC 8B1	Motor Control Center		X	EPS-1
Gould/Kinney	Sta. Battery 1/Distr. Cab.		X	(1)
Gould/Kinney	Sta. Battery 2/Distr. Cab.		X	(1)
Gould/Kinney	Sta. Battery 3/Distr. Cab.		X	(1)
Gould/Kinney	Sta. Battery 4/Distr. Cab.		X	(1)

SYSTEM: EMERGENCY POWER SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
OKONITE	Power Cable		X	ELEC-9
PE/PVC/PVC	Control Cable		X	ELEC-10
XLP/NEOPRENE	Power Cable		X	ELEC-12

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SYSTEM: FEEDWATER SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
LT-1213A	Level Transmitter	X		FW-1
LT-1213B	Level Transmitter	X		FW-1
LT-1213C	Level Transmitter	X		FW-1
LT-1213D	Level Transmitter	X		FW-1
LT-1223A	Level Transmitter	X		FW-1
LT-1223B	Level Transmitter	X		FW-1
LT-1223C	Level Transmitter	X		FW-1
LT-1223D	Level Transmitter	X		FW-1
LT-1233A	Level Transmitter	X		FW-1
LT-1233B	Level Transmitter	X		FW-1
LT-1233C	Level Transmitter	X		FW-1
LT-1233D	Level Transmitter	X		FW-1
SOV-1211	Solenoid Pilot Valve		X	(3)
SOV-1221	Solenoid Pilot Valve		X	(3)
SOV-1231	Solenoid Pilot Valve		X	(3)
SOV-1212	Solenoid Pilot Valve		X	(3)
SOV-1222	Solenoid Pilot Valve		X	(3)
SOV-1232	Solenoid Pilot Valve		X	(3)
RI-1801	Radiation Monitor		X	(2)

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APPENDIX I

SYSTEM: FEEDWATER SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
DG O'Brien	Penetration Assembly	X	X	ELEC-6
Continental	Instrumentation Cable	X	X	ELEC-4
CR-151B	Terminal Block	X		ELEC-5

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

MASTER LIST

APPENDIX I

SYSTEM: FIRE PROTECTION SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-2906	Solenoid Pilot Valve	X		FP-1
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC	Control Cable	X		ELEC-8
EA-740	Limit Switch	X		ELEC-13

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

MASTER LIST

APPENDIX I

SYSTEM: HEATING, VENTILATION & AIR CONDITIONING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
FN-7A	Fan Motor		X	(3)
FN-11A	Fan Motor		X	(3)
FN-44A	Fan Motor		X	(3)
FN-7B	Fan Motor		X	(3)
FN-11B	Fan Motor		X	(3)
FN-44B	Fan Motor		X	(3)
FN-31	Fan Motor		X	(3)
AC-1A	Air Conditioner		X	(3)
AC-1B	Air Conditioner		X	(3)
MOV-6013	Valve Motor Operator		X	(3)
MOV-6014	Valve Motor Operator		X	(3)
MOV-6010	Valve Motor Operator		X	(3)
MOV-6017	Valve Motor Operator		X	(3)
MOV-6016	Valve Motor Operator		X	(3)

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

MASTER LIST

APPENDIX I

SYSTEM: HIGH PRESSURE SAFETY INJECTION SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-14A	Pump Motor		X	HPSI-1
P-14B	Pump Motor		X	HPSI-1
P-14S	Pump Motor		X	HPSI-1
HCV-300	Valve Motor Operator		X	HPSI-2
HCV-301	Valve Motor Operator		X	HPSI-2
HCV-302	Valve Motor Operator		X	HPSI-2
HCV-303	Valve Motor Operator		X	HPSI-2
HCV-311	Valve Motor Operator		X	HPSI-2
HCV-321	Valve Motor Operator		X	HPSI-2
HCV-331	Valve Motor Operator		X	HPSI-2
HCV-313	Valve Motor Operator		X	HPSI-2
HCV-323	Valve Motor Operator		X	HPSI-2
HCV-333	Valve Motor Operator		X	HPSI-2
SOV-314	Solenoid Pilot Valve	X		HPSI-3
SOV-324	Solenoid Pilot Valve	X		HPSI-3
SOV-334	Solenoid Pilot Valve	X		HPSI-3
SOV-254	Solenoid Pilot Valve		X	HPSI-4
SOV-255	Solenoid Pilot Valve		X	HPSI-4

SYSTEM: HIGH PRESSURE SAFETY INJECTION SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-14A-1	Lube Oil Pump Motor		X	HPSI-6
P-14A-2	Lube Oil Pump Motor		X	HPSI-6
P-14A-3	Lube Oil Pump Motor		X	HPSI-7
P-14B-1	Lube Oil Pump Motor		X	HPSI-6
P-14B-2	Lube Oil Pump Motor		X	HPSI-6
P-14B-3	Lube Oil Pump Motor		X	HPSI-7
P-14S-1	Lube Oil Pump Motor		X	HPSI-6
P-14S-2	Lube Oil Pump Motor		X	HPSI-6
P-14S-3	Lube Oil Pump Motor		X	HPSI-7
PT-311	Pressure Transmitter	X		(5)
PT-321	Pressure Transmitter	X		(5)
PT-331	Pressure Transmitter	X		(5)
PT-312	Pressure Switch	X		(5)
PT-313	Pressure Switch	X		(5)
PS-322	Pressure Switch	X		(5)
PS-323	Pressure Switch	X		(5)
PS-332	Pressure Switch	X		(5)
PS-333	Pressure Switch	X		(5)
LT-311	Level Transmitter	X		(5)
LT-321	Level Transmitter	X		(5)

SYSTEM: HIGH PRESSURE SAFETY INJECTION SYSTEM (Cont.)

PLANT IDENT. NO.	GNEERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
LT-331	Level Transmitter	X		(5)
LS-312	Level Switch	X		(5)
LS-313	Level Switch	X		(5)
LS-322	Level Switch	X		(5)
LS-323	Level Switch	X		(5)
LS-332	Level Switch	X		(5)
LS-333	Level Switch	X		(5)
FT-311	Flow Transmitter		X	HPSI-5
FT-321	Flow Transmitter		X	HPSI-5
FT-331	Flow Transmitter		X	HPSI-5
PT-301	Pressure Transmitter		X	(1)
PT-303	Pressure Transmitter		X	(1)
PC-224X	Pressure Control Switch		X	HPSI-8
PC-224Y	Pressure Control Switch		X	HPSI-8
PC-224Z	Pressure Control Switch		X	HPSI-8
HCV-204T	Valve Motor Operator		X	(1)
HCV-204U	Valve Motor Operator		X	(1)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable	X	X	ELEC-8,10

SYSTEM: HIGH PRESSURE SAFETY INJECTION SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
EPR/NEOPRENE	Power Cable	X	X	ELEC-12
EPR/ARMOR/PVC	Power Cable	X		ELEC-11
1828-C19	Terminal Block	X	X	ELEC-7
DTE6-?NR2	Limit Switch		X	ELEC-19

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

MASTER LIST

APPENDIX I

SYSTEM: LOW PRESSURE SAFETY INJECTION SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-12A	Pump Motor		X	LPSI-1
P-12B	Pump Motor		X	LPSI-1
HCV-312	Valve Motor Operator		X	(1)
HCV-322	Valve Motor Operator		X	(1)
HCV-332	Valve Motor Operator		X	(1)
SOV-351K	Solenoid Pilot Valve	X		LPSI-3
HCV-327	Valve Motor Operator	X		LPSI-4
HCV-328	Valve Motor Operator	X		LPSI-4
MOV-3202	Valve Motor Operator		X	(2)
MOV-3204	Valve Motor Operator		X	(2)
MOV-3205	Valve Motor Operator		X	(1)
MOV-3206	Valve Motor Operator		X	(1)
PT-354K	Pressure Transmitter		X	(1)
FT-312	Flow Transmitter		X	LPSI-5
FT-322	Flow Transmitter		X	LPSI-5
FT-332	Flow Transmitter		X	LPSI-5
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable	X	X	ELEC-8,10
EPR/ARMOR/PVC	Power Cable		X	ELEC-11

SYSTEM: [illegible] ESSURE SAFETY INJECTION SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
EPR/NEOPRENE	Power Cable		X	ELEC-12
1828-C19	Terminal Block	X	X	ELEC-7
EA-740	Limit Switch	X		ELEC-13
OKONITE	Cable			ELEC-9

FACILITY: MAINE YANKEE
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APPENDIX I

SYSTEM: MAIN STEAM SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-1001A	Solenoid Pilot Valve		X	(3)
SOV-1001B	Solenoid Pilot Valve		X	(3)
SOV-1001C	Solenoid Pilot Valve		X	(3)
PT-1013A	Pressure Transmitter		X	(3)
PT-1013B	Pressure Transmitter		X	(3)
PT-1013C	Pressure Transmitter		X	(3)
PT-1013D	Pressure Transmitter		X	(3)
PT-1023A	Pressure Transmitter		X	(3)
PT-1023B	Pressure Transmitter		X	(3)
PT-1023C	Pressure Transmitter		X	(3)
PT-1023D	Pressure Transmitter		X	(3)
PT-1033A	Pressure Transmitter		X	(3)
PT-1033B	Pressure Transmitter		X	(3)
PT-1033C	Pressure Transmitter		X	(3)
PT-1033D	Pressure Transmitter		X	(3)
SOV-2601	Solenoid Pilot Valve		X	(3)
SOV-2602	Solenoid Pilot Valve		X	(3)
SOV-2603	Solenoid Pilot Valve		X	(3)
SOV-1001	Solenoid Pilot Valve		X	(3)

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: MAIN STEAM SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
RM-2601	Radiation Monitor		X	(1)
RM-2602	Radiation Monitor		X	(1)
RM-2603	Radiation Monitor		X	(1)
SOV-1001B	Solenoid Pilot Valve		X	(2)
SOV-1001K	Solenoid Pilot Valve		X	(2)
SOV-1001H	Solenoid Pilot Valve		X	(2)
SOV-1001F	Solenoid Pilot Valve		X	(2)
SOV-1001D	Solenoid Pilot Valve		X	(2)
SOV-1001B	Solenoid Pilot Valve		X	(2)
SOV-1001A	Solenoid Pilot Valve		X	(2)
SOV-1001J	Solenoid Pilot Valve		X	(2)
SOV-1001G	Solenoid Pilot Valve		X	(2)
SOV-1001E	Solenoid Pilot Valve		X	(2)
SOV-1001C	Solenoid Pilot Valve		X	(2)
SOV-1001A	Solenoid Pilot Valve		X	(2)

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: POST-ACCIDENT MONITORING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
Consip.	Hydrogen Analyzer	X		PAM-1
Gen. Atomic	Radiation Monitor	X		PAM-2
PT-102X	Pressure Transmitter	X		PAM-5
PT-102Y	Pressure Transmitter	X		PAM-5
PT-103	Pressure Transmitter	X		PAM-5
PT-103-1	Pressure Transmitter	X		PAM-5
LT-307K	Level Transmitter	X		PAM-6
LT-308K	Level Transmitter	X		PAM-6
PT-2013	Pressure Transmitter		X	PAM-7
PT-2014	Pressure Transmitter		X	PAM-8
B&W	Acoustic Accelerometer	X		PAM-10
B&W	Acoustic Transmitter	X		PAM-9
FIREWALL III	Instrument Cable	X		ELEC-3
XLP/HYPALON	Instrument Cable		X	ELEC-4
CR151B	Terminal Block	X		ELEC-5
DG O'Brien	Penetration Assembly	X	X	ELEC-6

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: PRIMARY COMPONENT COOLING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-3410	Solenoid Pilot Valve	X		PCC-1
SOV-3414	Solenoid Pilot Valve	X		PCC-1
SOV-3416	Solenoid Pilot Valve	X		PCC-1
P-9A	Pump Motor		X	PCC-2
P-9B	Pump Motor		X	PCC-2
MOV-3402	Valve Motor Operator		X	(1)
MOV-3403	Valve Motor Operator		X	(1)
MOV-3404	Valve Motor Operator		X	(1)
MOV-3401	Valve Motor Operator		X	(1)
MOV-3402	Valve Motor Operator		X	(1)
MOV-3402	Valve Motor Operator		X	(1)
TV-3417	Valve Motor Operator		X	(1)
TV-3411	Valve Motor Operator		X	(3)
TV-3413	Valve Motor Operator		X	(3)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable		X	ELEC-8,10
1828-C19	Terminal Block	X		ELEC-7
EA-740	Limit Switch	X		ELEC-13

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: PRIMARY SAMPLING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-3501	Solenoid Valve Operator	X		PS-1
SOV-3502	Solenoid Valve Operator	X		PS-1
SOV-3503	Solenoid Valve Operator	X		PS-1
SOV-3504	Solenoid Valve Operator	X		PS-1
SOV-3505	Solenoid Valve Operator	X		PS-1
SOV-3508	Solenoid Valve Operator	X		PS-1
SOV-3506	Solenoid Valve Operator		X	(3)
SOV-3507B	Solenoid Valve Operator		X	(3)
SOV-3507A	Solenoid Valve Operator		X	(3)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable	X	X	ELEC-8
1828-C19	Terminal Block	X	X	ELEC-7
D 2400X	Limit Switch	X		ELEC-16

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: PRIMARY VENT AND DRAIN SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
SOV-3002	Solenoid Pilot Valve	X		PV-1
SOV-3301	Solenoid Pilot Valve	X		PV-1
SOV-3303	Solenoid Pilot Valve	X		PV-2
SOV-3302	Solenoid Pilot Valve		X	(3)
SOV-3304	Solenoid Pilot Valve		X	(3)
SOV-3001	Solenoid Pilot Valve		X	(3)
DG O'Brien	Penetration Assembly	X	X	ELEC-6
PE/PVC/PVC	Control Cable	X		ELEC-8
1828-C19	Terminal Block	X		ELEC-7
EA-740	Limit Switch	X		ELEC-13
D 2400X	Limit Switch	X		ELEC-16

FACILITY: MAINE YANKEE
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MASTER LIST

APPENDIX I

SYSTEM: REACTOR COOLANT SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
PT-102A	Pressure Transmitter	X		RC-1
PT-102B	Pressure Transmitter	X		RC-1
PT-102C	Pressure Transmitter	X		RC-1
PT-102D	Pressure Transmitter	X		RC-1
PT-101X	Pressure Transmitter	X		RC-2
PT-101Y	Pressure Transmitter	X		RC-2
LT-101X	Level Transmitter	X		RC-2
LT-101Y	Level Transmitter	X		RC-2
HCV-110	Valve Motor Operator	X		RC-3
HCV-111	Valve Motor Operator	X		RC-3
HCV-112	Valve Motor Operator	X		RC-3
HCV-145	Valve Motor Operator	X		RC-4
HCV-146	Valve Motor Operator	X		RC-4
TE-111X	RTD	X		RC-6
TE-121X	RTD	X		RC-6
TE-131X	RTD	X		RC-6
T/C-S11	Thermocouple	X		(2)
T/C-E13	Thermocouple	X		(2)
T/C-G6	Thermocouple	X		(2)
T/C-T4	Thermocouple	X		(2)

FACILITY: MAINE YANKEE
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APPENDIX I

SYSTEM: REACTOR COOLANT SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
HCV-113	Valve Motor Operator	X		(2)
HCV-114	Valve Motor Operator	X		(2)
HCV-115	Valve Motor Operator	X		(2)
HCV-253	Valve Motor Operator	X		(2)
SOV-3007	Solenoid Pilot Valve		X	(3)
HCV-121	Valve Motor Operator	X		(2)
HCV-122	Valve Motor Operator	X		(2)
HCV-123	Valve Motor Operator	X		(2)
HCV-124	Valve Motor Operator	X		(2)
HCV-125	Valve Motor Operator	X		(2)
HCV-126	Valve Motor Operator	X		(2)
P-1-1	Pump Motor	X		(2)
P-1-2	Pump Motor	X		(2)
P-1-3	Pump Motor	X		(2)
PDT-111A	Pressure Transmitter	X		(2)
PDT-111B	Pressure Transmitter	X		(2)
PDT-111C	Pressure Transmitter	X		(2)
PDT-111D	Pressure Transmitter	X		(2)
PDT-121A	Pressure Transmitter	X		(2)
PDT-121B	Pressure Transmitter	X		(2)

FACILITY: MAINE YANKEE
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APPENDIX I

SYSTEM: REACTOR COOLANT SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
PDT-121C	Pressure Transmitter	X		(2)
PDT-121D	Pressure Transmitter	X		(2)
PDT-131A	Pressure Transmitter	X		(2)
PDT-131B	Pressure Transmitter	X		(2)
PDT-131C	Pressure Transmitter	X		(2)
PDT-131D	Pressure Transmitter	X		(2)
PCV-101T	Valve Motor Operator	X		(4)
PCV-101U	Valve Motor Operator	X		(4)
TE-112CA	Temperature Element	X		(2)
TE-112CB	Temperature Element	X		(2)
TE-112CC	Temperature Element	X		(2)
TE-112CD	Temperature Element	X		(2)
TE-112HA	Temperature Element	X		(2)
TE-112HB	Temperature Element	X		(2)
TE-112HC	Temperature Element	X		(2)
TE-112HD	Temperature Element	X		(2)
TE-122CA	Temperature Element	X		(2)
TE-122CB	Temperature Element	X		(2)
TE-122CC	Temperature Element	X		(2)
TE-122CD	Temperature Element	X		(2)

SYSTEM: REACTOR COOLANT SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
TE-122HA	Temperature Element	X		(2)
TE-122HB	Temperature Element	X		(2)
TE-122HC	Temperature Element	X		(2)
TE-122HD	Temperature Element	X		(2)
TE-132CA	Temperature Element	X		(2)
TE-132CB	Temperature Element	X		(2)
TE-132CC	Temperature Element	X		(2)
TE-132CD	Temperature Element	X		(2)
TE-132HA	Temperature Element	X		(2)
TE-132HB	Temperature Element	X		(2)
TE-132HC	Temperature Element	X		(2)
TE-132HD	Temperature Element	X		(2)
TE-115X	Temperature Element	X		(2)
TE-115Y	Temperature Element	X		(2)
TE-125X	Temperature Element	X		(2)
TE-125Y	Temperature Element	X		(2)
TE-135X	Temperature Element	X		(2)
TE-135Y	Temperature Element	X		(2)
E-2PA	Control Cabinet	X		RC-5
E-2PB	Control Cabinet	X		RC-5
E-2PA	Distribution Cabinet		X	RC-7
E-2PB	Distribution Cabinet		X	RC-7

SYSTEM: REACTOR COOLANT SYSTEM (Cont.)

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
DG O'Brien	Penetration Assembly	X	X	ELEC-6
EPR/HYPALON	Power Cable	X		ELEC-2
PE/PVC/PVC	Control Cable	X		ELEC-8
XLP/HYPALON	Inst. Cable	X		ELEC-4
CR151B	Terminal Block	X		ELEC-5
EP/HYPALON HYPALON	Control Cable	X		ELEC-2

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APPENDIX I

SYSTEM: SECONDARY COMPONENT COOLING SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-10A	Pump Motor		X	SCC-1
P-10B	Pump Motor		X	SCC-1
MOV-701	Valve Motor Operator		X	(1)
SOV-1724A	Solenoid Pilot Valve		X	(1)
SOV-1724B	Solenoid Pilot Valve		X	(1)
SOV-1725A	Solenoid Pilot Valve		X	(1)
SOV-1725B	Solenoid Pilot Valve		X	(1)
EPR/ARMOR/PVC	Power Cable		X	ELEC-11

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APPENDIX I

SYSTEM: SERVICE WATER SYSTEM

PLANT IDENT. NO.	GENERIC NAME	PRI. CONT. LOC. INSIDE	PRI. CONT. LOC. OUTSIDE	APPENDIX II WORKSHEET
P-29A	Pump Motor		X	(1)
P-29B	Pump Motor		X	(1)
P-29C	Pump Motor		X	(1)
P-29D	Pump Motor		X	(1)

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APPENDIX II

TABLE OF CONTENTS

APPENDIX II

Introduction

Appendix II contains an equipment qualification worksheet and corresponding note/reference sheet for each electrical component required to function under postulated accident conditions. The worksheets are grouped by system affiliation. Each system is assigned a tab number in Table II.1, the index for Appendix II.

The specified or required environmental service conditions contained in each worksheet are discussed in Appendix III. Each worksheet contains note and reference numbers which are explained on its corresponding note/reference sheet.

The information contained in Appendix II was obtained from the following sources:

1) Appendix III - Environmental Service Conditions
2) Plant Drawings
3) Purchase Order Files
4) Specifications
5) Vendor Data
6) Test Reports
7) Engineering Analyses
8) Consultants
9) Operating Experience

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	6 days	Note 1	019	Simultaneous Test	--
Temperature	Fig. III.1-1	Fig. IV.3-1	001	019	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-1	001	019	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	019	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	1.5 wt/% Boron pH=7.67	002	019	Simultaneous Test	--
Radiation	1.7×10^7 R	10^8 R	007	048	Sequential Test	Note 5
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	Yes	--	005	--		Note 4

Component:
Motor Operator

Manufacturer:
Limitorque Corporation

Model or Type:
SMB-00

System:
Chemical and Volume Control System

Function (See Appendix IV.2-1):
Containment Isolation

Service.
HCV-242, HCV-251, HCV-261, HCV-271

Associated Electrical Equipment:
ELEC-2 Power and Control Cable
ELEC-6 Penetration Assembly
ELEC-8 Control Cable
ELEC-9 Power Cable

Location:
Area: Reactor Containment
Elevation: 1'-5" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: No

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

CVCS-1

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) The elevations of HCV-251, HCV-261 and HCV-271 are below the maximum postulated flood level. However, the function of this equipment is completed prior to submergence (if any).

(5) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review on completion.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3 7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY103, "Radiation Dose Calculation".

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

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*021 Letter with Enclosure, Limitorque Corporation to Yankee Atomic Electric Company, dated May 4, 1979.

*022 Portions of Maine Yankee Dwgs. #11550-1.23-20A.

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corp., dated October 3, 1978.

* This Documentation Reference contains supplemental information.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

CVCS-2

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Test	
Relative Humidity	100%	100%	Note 2	047	Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Test	
Radiation	1.8×10^6 R	2.0×10^8 R	007	047	Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 24'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Chemical and Volume Control System

Function (See Appendix IV.2-22):
Pilot Valve For TCV-201K

Service:
SOV-201K

Associated Electrical Equipment:
ELEC-6 Penetration Assembly
ELEC-7 Terminal Blocks
ELEC-8 Control Cable

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-112, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEM
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Test	
Relative Humidity	100%	100%	Note 2	047	Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Test	
Radiation	1.1×10^6 R	2.0×10^8 R	007	047	Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	Yes	N/A	005	--	--	Note 6

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 0'-11"

Flood Level:
Elevation: 1.7'
Above Flood Level: (Note 6)

System:
Chemical and Volume Control System

Function (See Appendix IV.2-21):
Pilot Valve For HCV-257

Service:
SOV-257

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Block
ELEC-8	Control Cable
ELEC-13	Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

(6) This solenoid valve will be moved to above flood level when it is replaced per Note 5, however it operates prior to flooding.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY-120, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1			Note 4
Temperature	Fig. III.2-5 and III.2-6	212°F	010	044	Vendor Data	Note 4
Pressure	Fig. III.2-5	Atmos.	010	045	AE Spec	Note 4
Relative Humidity	100%	95%	Note 2	045	AE Spec	Note 4
Chemical Spray	N/A	--	--		--	--
Radiation	2.9×10^5R	3.5×10^5R	009	045	AE Spec	Note 4
Aging	40 years		Note 3		Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Flow Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
10B2495

Accuracy:
Specified: 0.5% of Span
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 11'-0"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Chemical Volume Control System

Function (See Appendix IV.2-12):
Charging Pump Header Flow Indication

Service:
FT-216

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifica ".

044 Fischer & Porter Specification for Model 10B2496.

045 Combustion Engineering Specification 4467-488-903.

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APPENDIX II

CAAS-1

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	2.5×10^6R	2.0×10^8R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 23'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Containment Air Activity Sampling System

Function (See Appendix IV.2-16):
Pilot Valve For TV-2001

Service:
SOV-2001

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Block
ELEC-8	Control Cable
ELEC-13	Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-113, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

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APPENDIX II

CAR-1

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	038 Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-7	001	011	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-8	001	011	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	011	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	10,000 ppm Boron pH=6.8	002	011	Simultaneous Test	--
Radiation	1.3×10^7R	10^8R	007	012	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Fan Motor

Manufacturer:
Reliance Electric

Model or Type:
S.O.# 324308-1X
324308-2X

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 24'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System
Containment Air Recirculation System

Function (See Appendix IV.2-8):
Containment Air Recirculation Fans

Service:
FN-17-1, FN-17-2, FN-17-3,
FN-17-4, FN-17-5, FN-17-6

Associated Electrical Equipment
ELEC-1 Power Cable
ELEC-6 Penetration Assembly

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for post-LOCA use. However, during this time operation is not continuous. (See Appendix IV.2-8.)

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978 (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-102, "Radiation Dose Calculation".

008 Acton Report No. 15564-15, Report of "Thermal Aging Analysis of Reliance Electric Fan Motor for Reactor Containment Use at Maine Yankee".

011 Test Report, "Qualification Test - Joy Axivane Fan and Reliance Motor for Recirculation Service for Nuclear Containment," dated October 1969. (Pages D-3, 4, 5.)

012 Letter with Enclosures, Reliance Electric Company to Stone and Webster, dated April 8, 1971.

*013 Letter with Enclosure, Reliance Electric Company to Stone and Webster, dated August 17, 1970.

*014 MYS-2864, "Specification for Containment Recirculating Fans for Maine Yankee Atomic Power Station," dated September 30, 1970.

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038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

* This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 5 Note 6
Temperature	Fig. III.3-1	104°F	010	042	Vendor Data	Note 5 Note 6
Pressure	Atmos.	Atmos.	Note 2	042	Vendor Data	Note 5 Note 6
Relative Humidity	Ambient	Ambient	Note 2	042	Vendor Data	Note 5 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5		009	009	Engineering Analysis	Note 5 Note 6
Aging	40 years		Note 3		Engineering Analysis	Note 5 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Motor

Manufacturer:
Allis-Chalmers

Model or Type:
507-UP

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Containment Spray Pump Area
Elevation: 20'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Containment Spray System

Function (See Appendix IV.2-37):
Containment Spray Pump

Service:
P-61A, P-61B, P-61S

Associated Electrical Equipment:
ELEC-11 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed.

(2) Since there are no HELB's postulated in these areas, relative humidity and pressure remain at ambient conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) A request has been placed with Allis-Chalmers through Acton Labs for information. However, since these motors are constructed with VPI insulation system, the same type Allis-Chalmers uses on their qualified motors, we feel that these motors are satisfactory.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

042 Vendor Data for CS Pumps.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	6 days	Note 1	019	Simultaneous Test	Note 5 Note 6
Temperature	Fig. III.3-1	Fig. IV.3-1	010	019	Simultaneous Test	--
Pressure	Atmos.	Fig. IV.3-1	Note 2	019	Simultaneous Test	--
Relative Humidity	Ambient	100%	Note 2	019	Simultaneous Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	3.02×10^5R	10^8R	009	048	Sequential Test	Note 4 Note 6
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Motor Operator

Manufacturer:
Limitorque

Model or Type:
SMB-00
SMB-000
SMB-0BC

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Containment Spray Pump Area
Elevation: 24'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Containment Spray System

Function (See Appendix IV.0-36):
Valve Operation

Service:
MOV-3207, MOV-3208, MOV-3209, MOV-3210
MOV-3211, MOV-3212

Associated Electrical Equipment:
ELEC-10 Control Cable
ELEC-12 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been established.

(2) Since there are no HELB's postulated in these areas, relative humidity and pressure remain at ambient conditions.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review when completed.

(5) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualifications has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September, 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment.

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

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*038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corporation dated 10/3/80.

* This Documentation Reference contains supplemental information.

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APPENDIX II

CS-3

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	30 days		Note 1			Note 4
Temperature	Fig. IV.3-1		010			Note 4
Pressure	Atmos.		Note 2			Note 4
Relative Humidity	Ambient		Note 2			Note 4
Chemical Spray	N/A	--	--	--	--	--
Radiation	2×10^7 R		Note 5			Note 4
Aging	40 years		Note 3	008		Note 4
Submergence	N/A	--	--	--	--	--

Component:
Pressure Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
50EP1070

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Containment Spray Pump Area
Elevation: 12'

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Containment Spray

Function (See Appendix IV.2-13):
Containment Spray Pump Discharge Pressure Transmitter

Service:
PT-352K, PT-353K

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been established.

(2) Since there are no HELB's postulated in these areas, relative humidity and pressure remain at ambient conditions.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

(5) Dosage assumed same as HCV 322, 332.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-8, Report of "Thermal Aging Analysis of Fischer & Porter Transmitters for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 6
Temperature	Normal Ambient					Note 4 Note 6
Pressure	Atmos.		Note 2			Note 4 Note 6
Relative Humidity	Ambient		Note 2			Note 4 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	3×10^5 R		Note 5			Note 4 Note 6
Aging	40 years		Note 3			Note 4 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Motor Control Center

Manufacturer:
Westinghouse

Model or Type:
Type W

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Containment Spray Pump Room
Elevation: 30'-0"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Emergency Power System

Function:
Electrical Power Distribution

Service:
MCC-7B-1
MCC-8B-1

Associated Electrical Equipment:

ELEC-9	Power Cable
ELEC-10	Control Cable
ELEC-12	Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for post-LOCA use.

(2) Since thare are no HELB's postulated in this area, relative humidity and pressure remain at ambient conditions.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) We are presently working with Westinghouse Corporation to obtain qualification data. This information will be available for review on completion.

(5) Dose fro target 009B from Reference 009.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

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APPENDIX II

FW-1

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-4	001	024	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-9	001	024	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	024	Simultaneous Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	3.5×10^6R	3.5×10^6R	007	025	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Pressure Transmitters,
Level Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
50EP1000 (Pressure),
13D2495 (Level)

Accuracy:
Specified: 5%
Demonstrated: 3.5%

Location:
Area: Reactor Containment
Elevation: 20'-0"

Flood Level:
Elevation 1.7'
Above Flood Level: Yes

System:
Feedwater System

Function (See Appendix IV.2-9):
Steam Generator Level Information

Service:
LT-1213A, LT-1213B, LT-1213C, LT-1213D,
LT-1223A, LT-1223B, LT-1223C, LT-1223D,
LT-1233A, LT-1233B, LT-1233C, LT-1233D

Associated Electrical Equipment:
ELEC-4 Instrument Cable
ELEC-5 Terminal Block
ELEC-6 Penetration Assembly

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

FW-1

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been established. (See Appendix IV.2-9.)

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-105, "Radiation Dose Calculation".

008 Acton Report No. 15564-8, Report of "Thermal Aging Analysis of Fischer & Porter Transmitters for Reactor Containment Use at Maine Yankee".

024 Test Report: #2204-51-B-006, "Maximum Credible Accident Test on Electronic Transmitters".

025 Qualification Tests of Differential Transmitters Under Nuclear Radiation.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	1.1×10^6 R	2.0×10^8 R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 51'-7"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Fire Protection System

Function (See Appendix IV.2-15):
Pilot Valve For TV-2906

Service:
SOV-2906

Associated Electrical Equipment:
ELEC-6 Penetration Assembly
ELEC-8 Control Cable
ELEC-13 Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combusion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-119, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee Nuclear Power Generating Station".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 5
Temperature	Fig. III.2-3 and III.2-7	104°F	010	053	Industry Standard	Note 5
Pressure	Fig. III.2-3	Atmos.	010	039	Vendor Data	Note 5
Relative Humidity	100%	100%	Note 2	039	Vendor Data	Note 5
Chemical Spray	N/A	--	--	--	--	--
Radiation	2.8×10^6R	2.0×10^8R	009	009	Engineering Analysis	Note 5
Aging	40 years	40 years	Note 3	008	Engineering Analysis	Note 5
Submergence	N/A	--	--	--	--	--

Component:
Motor

Manufacturer:
Westinghouse

Model or Type:
5089-S

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
High Pressure Safety Injection System

Function (See Appendix IV.2-14):
High Pressure Safety Injection System Pumps

Service:
P-14A, P-14B, P-14S

Associated Electrical Equipment:
ELEC-11 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been established. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-14, Report of "Thermal Aging Analysis of Westinghouse Motors for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521. "Evaluation of Environmental Qualifications".

039 Vendor Data for HPSI Pumps.

053 MG1, NEMA Standards Publication for Motors and Generators.

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	6 days	Note 1	Note 4	Engineering Analysis	Note 4
Temperature	Fig. III.2-4 and III.2-8	Fig. IV.3-1	010	019	Test	--
Pressure	Fig. III.2-4	Fig. IV.3-1	010	019	Test	--
Relative Humidity	100% (Max.)	100%	Note 2	019	Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5	10^8R	009	048	Sequential Test	Note 6 Note 7
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Motor Operator

Manufacturer:
Limitorque (Reliance)

Model or Type:
SMB-0
SMB-1

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
High Pressure Safety Injection System

Function (See Appendix IV.2-33):
Valve Operation

Service:
HCV-300, HCV-301, HCV-302, HCV-303
HCV-311, HCV-313, HCV-321, HCV-323
HCV-331, HCV-333

Associated Electrical Equipment:
ELEC-10 Control Cable
ELEC-12 Power Cable

APPENDIX II

NOTES:

(1) An operating requirement of one hour has been assumed for post HELB operation.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The specified radiation environment is as follows:

Component	Radiation
HCV-300	4.37×10^6 Rads
HCV-301	3.77×10^6 Rads
HCV-302	4.35×10^6 Rads
HCV-303	3.73×10^6 Rads
HCV-311	9.74×10^5 Rads
HCV-321	4.26×10^6 Rads
HCV-331	3.70×10^6 Rads
HCV-313	8.96×10^6 Rads
HCV-323	4.19×10^6 Rads
HCV-333	3.61×10^6 Rads

(6) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review on completion.

(7) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

APPENDIX II

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

*021 Letter with Enclosure, Limitorque Corporation to Yankee Atomic Electric Company, dated May 4, 1979.

*038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for the BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corp., dated October 3, 1980.

* This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	1.1×10^6R	2.0×10^8R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	Yes	Yes	005	--	--	Note 6

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 0'-11"

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
High Pressure Safety Injection System

Function (See Appendix IV.2-23):
Pilot Valve For Associated Hand Control Valve

Service:
SOV-314, SOV-324, SOV-334

Associated Electrical Equipment:
ELEC-6 Penetration Assembly
ELEC-7 Terminal Block
ELEC-8 Control Cable
ELEC-19 Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a 1 hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

(6) These valves will be moved above flood level when they are replaced per Note 5; however, valves operate prior to flooding.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY-118, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valve for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.2-5 and III.2-6	Fig. IV.3-16	010	047	Sequential Test	
Pressure	Fig. III.2-5	Fig. IV.3-16	010	047	Sequential Test	
Relative Humidity	100% (Max.)	100%	Note 2	047	Sequential Test	
Chemical Spray	N/A	--	--	--	--	
Radiation	1.5×10^6 R	2×10^8 R	Note 6	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated:

Location:
Area: Primary Auxiliary Building
Elevation: 11'-0"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Chemical and Volume Control System

Function (See Appendix IV.2-34):
Pilot Valve for HCV's

Service:
SOV-254, SOV-255

Associated Electrical Equipment:
ELEC-7 Terminal Block
ELEC-10 Control Cable
ELEC-17 Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a 1 hour operating time per Supplement #2 of IEB 79-01B. Based on the above it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

(6) Doses are for associated valves HCV-254 and HCV-255 from Reference 009.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee Nuclear Power Generating Station".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment.

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

HPSI-5

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 6
Temperature	Fig. III.2-5 and III.2-6	212°F	010	044	Vendor Data	Note 6
Pressure	Fig. III.2-5	Atmos.	010	045	AE Spec	Note 6
Relative Humidity	100%	95%	Note 2	045	AE Spec	Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	3.6×10^5R	3.5×10^5R	009	045	AE Spec	Note 6
Aging	40 years		Note 3			Note 5 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Flow Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
Flow Indication

Accuracy:
Specified: N/A
Demonstrated:

Location:
Area: Primary Auxiliary Building
ELevation: 11'-0"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
High Pressure Safety Injection System

Function:
HPSI Pump Discharge Flow Indication

Service:
FT-331, FT-321, FT-311

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) The components listed are used to verify containment spray pump discharge pressure. Once verified <30 days, pressure measurements need not be available. Therefore, we feel the units will be available for the time required.

(5) Aging qualification is under investigation and will be provided when completed.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

044 Fischer & Porter Specification for Model 10B2496.

045 Combustion Engineering Specification 4467-488-903.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 7 Note 8
Temperature	Fig. III.2-3 and III.2-7	104°F	010	053	Engineering Analysis	Note 7 Note 8
Pressure	Fig. III.2-3	Atmos.	010	039	Vendor Data	Note 7 Note 8
Relative Humidity	100%	100%	Note 2	039	Vendor Data	Note 7 Note 8
Chemical Spray	N/A	—	--	--	--	
Radiation	Note 5	x 10^8R	009	009	Engineering Analysis	
Aging	40 years		Note 3			Note 6 Note 8
Submergence	N/A	--	--	--	--	

Component:
Motor

Manufacturer:
General Electric

Model or Type:
5K37JG403

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
High Pressure Safety Injection System

Function (See Appendix III.2-7):
Main & Auxiliary Lub. Oil Pumps

Service:
P-14-A-1, P-14-A-2, P-14-B-1, P-14-B-2, P-14-S-1, P-14-S-2

Associated Electrical Equipment:
ELEC-7 Terminal Block
ELEC-12 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for long-term operability has been determined by qualifying the component for all applicable environmental parameters indicated on this worksheet.

(5) The radiation environments specified for HPSI pumps P-14A, P-14B and P-14S have been applied to their associated main and auxiliary lube oil pumps as follows:

P-14-A-1 and P-14-A-2 - 6.24×10^5 Rads

P-14-B-1 and P-14-B-2 - 2.76×10^6 Rads

P-14-S-1 and P-14-S-2 - 1.20×10^6 Rads

(6) Aging qualification is under investigation and will be available for review on completion.

(7) The motors were designed and built using Reference 053. Present analysis shows that the harsh environment will only exist for a short time and that the motors will operate satisfactorily.

(8) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

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010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

039 Vendor Data for HPSI Pumps.

053 MG1, NEMA Standards Publication for Motors and Generators.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

HPSI-7

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 8
Temperature	Fig. III.2-3 and III.2-7	104°F	010	053	Industry Standard	Note 8
Pressure	Fig. III.2-3	Atmos.	010	039	Vendor Data	Note 8
Relative Humidity	100%	100%	Note 2	039	Vendor Data	Note 8
Chemical Spray	N/A	--	--	--	--	
Radiation	Note 5	2×10^8R	009	009	Engineering Analysis	Note 8
Aging	40 years		Note 3			Note 6 Note 8
Submergence	N/A	--	--	--	--	

Component:
Motor

Manufactuer:
Westinghouse

Model or Type:
7001, 7002, 7003

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
High Pressure Safety Injection System

Function (See Appendix IV.2-10):
P-14 Gear Lub. Oil Pump

Service:
P-14-A-3, P-14-B-3, P-14-S-3

Associated Electrical Equipment:
ELEC-7 Terminal Block
ELEC-12 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The radiation environments specified for HPSI pumps P-14A, P-14B and P-14S have been applied to their associated gear lube oil pumps as follows:

P-14-A-3 - 6.24×10^5 Rads

P-14-B-3 - 2.76×10^6 Rads

P-14-S-3 - 1.20×10^6 Rads

(6) Aging qualification is under investigation and will be available for review on completion.

(7) The motors were designed and built to Reference 053. Present analysis shows that the harsh environment will only exist for a short period and that the motor will operate satisfactorily.

(8) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

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010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOC Inside Contaiment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

039 Vendor Data for HPSI Pumps.

053 MGI, NEMA Standards Publication for Motors and Generators.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	Note 7
Temperature	Fig. III.2-3 and III.2-7	150°F	010	045	Vendor Data	Note 7
Pressure	Fig. III.2-3	Atmos.	010	045	Vendor Data	Note 7
Relative Humidity	100%	95%	Note 2	045	Vendor Data	Note 7
Chemical Spray	N/A	--	--	--	--	
Radiation	Note 5	3.5×10^5R	009	045	Vendor Data	Note 7
Aging	40 years		Note 3		Engineering Analysis	Note 6 Note 7
Submergence	N/A	--	--	--	--	

Component:
Pressure Switch

Manufacturer:
Fischer & Porter

Model or Type:
1401PV03-NS

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
High Pressure Safety Injection System

Function (See Appendix IV.2-42):
Trip of HPSI Pumps on Low Suction Pressure

Service:
PC-224X, PC-224Y, PC-224Z

Associated Electrical Equipment:
ELEC-7 Terminal Block
ELEC-10 Control Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The radiation environments specified for HPSI pumps P-14A, P-14B and P-14S have been applied to their associated main and auxiliary lube oil pumps as follows:

P-14-A-1 and P-14-A-2 - 6.24×10^5 Rads

P-14-B-1 and P-14-B-2 - 2.76×10^6 Rads

P-14-S-1 and P-14-S-2 - 1.20×10^6 Rads

(6) Aging qualification is under investigation and will be available for review on completion.

(7) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

007 Engineering Analysis #MY-151, "Radiation Dose Calculation".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment.

APPENDIX II

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

045 Combustion Engineering Specification 4467-488-903.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.3-1	104°F	010	040	Vendor Data	--
Pressure	Atmos.	Atmos.	Note 2	040	Vendor Data	--
Relative Humidity	Ambient	Ambient	Note 2	040	Vendor Data	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	1.33×10^6 R	2×10^8 R	009	009	Engineering Analysis	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Motor

Manufacturer:
Westinghouse

Model or Type:
5C85P24

Location:
Area: Containment Spray Pump Area
Elevation: 14'-6"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Low Pressure Safety Injection System

Function (See Function Description IV.2-2):
LPSI Pump

Service:
P-12A, P-12B

Associated Electrical Equipment:
ELEC-11 Power Cable

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

LPSI-1

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for long-term cooling.

(2) Since there are no HELB's postulated in these areas, relative humidity and pressure remains at ambient conditions.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

*004 Maine Yankee FSAR, Section 9.13.3.

008 Acton Report No. 15564-14, Report of "Thermal Aging Analysis of Westinghouse Motors for Reactor Containment Use at Maine Yankee".

009 EDS Report 02-0570-1065 "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

040 Vendor Data for LPSI Pumps.

*This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Test	
Relative Humidity	100%	100%	Note 2	047	Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Test	
Radiation	2.5×10^6 R	2.0×10^8 R	007	047	Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 13'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Low Pressure Safety Injection System

Function (See Appendix IV.2-24):
Pilot Valve For HCV-351K

Service:
SOV-351K

Associated Electrical Equipment:
ELEC-6 Penetration Assembly
ELEC-7 Terminal Blocks
ELEC-8 Control Cable
ELEC-11 Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-113, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee Nuclear".

047 Test Report No. AQS 1678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	30 days	6 days	Note 1	019	Simultaneous Test	Note 5
Temperature	Fig. III.1-1	Fig. IV.3-1	001	019	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-1	001	019	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	019	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	1.5 wt/% Boron pH=7.67	002	019	Simultaneous Test	--
Radiation	2.0×10^7 R	10^8 R	007	048	Sequential Test	Note 4
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Motor Operator

Manufacturer:
Limitorque Corporation

Model or Type:
SMB-1

Location:
Area: Reactor Containment
Elevation: 1'-5" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: [illegible] (Note 6)

System:
Low Pressure Safety Injection System

Function (See Appendix IV.2.3):
Low Pressure Safety Injection Isolation Valves

Service:
HCV-327, HCV-328

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Blocks
ELEC-8	Control Cable
ELEC-9	Power Cable

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

LPSI-4

APPENDIX II

NOTES:

(1) An operating time of 30 days is specified based on the requirements for this equipment needed prior to long-term cooling.

(2) 100% relative humidity has been assumed to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review on completion.

(5) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(6) Valve actuator is located above flood level. Valve body is below.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

*006 Maine Yankee Emergency Procedure 2-14, "Long-Term Core Cooling Realignment".

007 Engineering Analysis #MY-125, "Radiation Dose Calculation".

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

*012 Letter with Enclosures, Reliance Electric Company to Stone and Webster, dated April 8, 1971.

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

APPENDIX II

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

*021 Letter with Enclosure, Limitorque Corporation to Yankee Atomic Electric Company, dated May 4, 1979.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corp., dated October 3, 1978.

* This Documentation Reference contains supplemental information.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

LPSI-5

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1		Engineering Analysis	Note 4 Note 6
Temperature	Fig. III.3-1	212°F	010	044	Vendor Data	Note 4 Note 6
Pressure	Atmos.	Atmos.	010	045	Vendor Date	Note 4 Note 6
Relative Humidity	Ambient	Ambient	Note 2	045	Vendor Data	Note 4 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	3.0×10^5R	3.5×10^5R	009 (Note 5)	045		Note 4 Note 6
Aging	40 years		Note 3			Note 7 Note 4 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Flow Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
10B2496

Accuracy:
Specified: 0.5% of Span
Demonstrated: N/A

Location:
Area: Containment Spray Pump Area
Elevation: 15'-6"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Low Pressure Safety Injection System

Function (See Appendix IV.2-38):
LPSI Pump Discharge Flow Indication

Service:
FT-312, FT-322, FT-332

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Units were purchased to referenced specification and we feel that operation of these units can be assumed.

(5) Doses for HCV-312, 322 and 332 motors used for these transmitters.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

(7) Aging qualification is under investigation and will be provided when available.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

044 Fischer & Porter Specification for Model 10B2496.

045 Combustion Engineering Specification 4467-488-903.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

PAM-1

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 6
Temperature	150°F		010			Note 4 Note 6
Pressure	Atmos.		010			Note 4 Note 6
Relative Humidity	100%		Note 2			Note 4 Note 6
Chemical Spray	N/A	--	--			
Radiation	2.8×10^6R		Note 5			Note 4 Note 6
Aging	40 years		Note 3			Note 4 Note 6
Submergence	N/A	--	--			

Component:
Hydrogen Analyzer

Manufacturer:
COMSIP, Inc.

Model or Type:
K-III

Accuracy:
Specified: ±2% FS
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Post-Accident Monitoring (TMI)

Function (See Appendix IV.2-31):
Containment Hydrogen Monitor

Service:
Not Assigned

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for post-LOCA use.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification is being done by the vendor under a generic utility program scheduled for completion by June 1981.

(5) Dose at this location is taken from charging pump cubicle (target 012), Reference 009.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

PAM-2

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 5
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	1.3×10^7 R		007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Radiation Detector

Manufacturer:
General Atomic

Model or Type:
RD-23

Accuracy:
Specified: ±20%
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: Top of Crane Wall

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Post-Accident Monitoring (TMI)

Function (See Appendix IV.2-26):
Containment Radiation Detection

Service:
Not Assigned Yet

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for use during post-LOCA operation.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life has been assumed.

(4) The vendor is currently testing these components to address all the environmental parameters. Complete test reports will be available for review on completion.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc. to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-122, "Radiation Dose Calculation".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Not 1	Note 4	Engineering Analysis	
Temperature	Fig. III.1-1	Fig. IV.3-2	001	024	Simultaneous Test	
Pressure	Fig. III.1-2	Fig. IV.3-2	001	024	Simultaneous Test	
Relative Humidity	100%	100%	Note 2	024	Simultaneous Test	
Chemical Spray	Note 5		--			
Radiation	3.5×10^6R	3.5×10^6R	007	025	Sequential Test	
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Pressure Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
50EP1041

Accuracy:
Specified: .25% FS Accuracy
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 20'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Post-Accident Monitoring (TMI)

Function:
Primary Component Saturation Monitor

Service:
PT-102X, PT-102Y, PT-103, PT-103-1

Associated Electrical Equipment:
ELEC-4 Instrumentation Cable
ELEC-5 Terminal Block
ELEC-6 Penetration Assembly

APPENDIX II

NOTES:

(1) A long-term operation of one year has been assumed.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) Transmitters are located in instrumentation cabinets protected from chemical spray.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc. to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-105, "Radiation Dose Calculation".

008 Acton Report No. 15564-8, Report of "Thermal Aging Analysis of Fischer and Porter Transmitter for Reactor Containment Use at Maine Yankee".

024 Test Report: #2204-51-B-006, "Maximum Credible Accident Test on Electronic Transmitters".

025 Qualification Tests of Differential Transmitters Under Nuclear Radiation.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	2 weeks	Note 1	046	Sequential Test	Note 4 Note 6
Temperature	Fig. III.1-1	280°F	001	046	Sequential Test	
Pressure	Fig. III.1-2	60 psia	001	046	Sequential Test	
Relative Humidity	100%	Steam	Note 2	046	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	--	002	--		Note 4 Note 6
Radiation	1.0×10^8R	2.0×10^8R	007	046	Sequential Test	
Aging	40 years	--	Note 3	--		Note 4 Note 6
Submergence	Yes	Note 5	005	--	Engineering Analysis	

Component:
Level Transmitter

Manufacturer:
Gems

Model or Type:
XM-36495

Accuracy:
Specified: 1/2' over total range
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 2'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
Post-Accident Monitoring (TMI)

Function (See Appendix IV.2-32):
Containment Sump Level

Service:
LT-307K, LT-308K

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for post-LOCA use.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Equipment manufacturer is currently qualifying a replacement unit which will be purchased by Maine Yankee when complete.

(5) Equipment was not tested for submergence; however, the electronics will not be affected because they are at the top of the unit which is not subject to submergence.

(6) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY-126, "Radiation Dose Calculation".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

046 Final Report F-C3834, Franklin Institute done for Gems Sensors Division; DeLaval.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	N/A	Note 1	--		Note 4
Temperature	150°F	212°F	010	044	Vendor Data	Note 4
Pressure	Atmos.	Atmos.	010	045	AE Spec	Note 4
Relative Humidity	100%	95%	Note 2	045	AE Spec	Note 4
Chemical Spray	N/A	--	--	--	--	--
Radiation	2.8 x 10^6R	N/A	Note 5	--		Note 4
Aging	40 years	N/A	Note 3	--		Note 4
Submergence	N/A	--	--	--		

Component:
Pressure Transmitter

Manufacturer:
Fischer & Porter

Model or Type:
50EP1070

Accuracy:
Specified: 1%
Demonstrated: N/A

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Post-Accident Monitoring (TMI)

Function (See Appendix IV.2-30):
Containment Pressure

Service:
PT-2013

Associated Electrical Equipment:
ELEC-4 Instrument Cable
ELEC-5 Terminal Block

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for post-LOCA use.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

(5) Dose at this location is taken from charging pump cubicle (target 012), Reference 009.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

044 Fischer & Porter Specification for Model 50EP1000.

045 Combustion Engineering Specification 4467-488-903.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1			Note 4 Note 6
Temperature	150°F	--	010			Note 4 Note 6
Pressure	Atmos.	--	010			Note 4 Note 6
Relative Humidity	100%	--	Note 2			Note 4 Note 6
Chemical Spray	N/A	N/A			--	--
Radiation	2.8×10^6R	--	Note 5			Note 4 Note 6
Aging	40 years	--	Note 3			Note 4 Note 6
Submergence	N/A	N/A	--	--	--	--

Component:
Pressure Transmitter

Manufacturer:
Rosemount

Model or Type:
1153 Series D

Accuracy:
Specified: 0.25% of FS
Demonstrated: Note 4

Location:
Area: Primary Auxiliary Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Post-Accident Monitoring (TMI)

Function (See Appendix IV.2-30):
Containment Pressure

Service:
PT-2014

Associated Electrical Equipment:
ELEC-4 Instrument Cable
ELEC-5 Terminal Block

APPENDIX II

NOTES:

(1) long-term requirement of one year has been assumed for post-LOCA use.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification is being done by the vendor under a generic utility program scheduled for completion by June 1981 and will be available for review on completion.

(5) Dose at this location is taken from charging pumps (target 012), Reference 009.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 5
Temperature	Fig. 5.1		001			Note 4 Note 5
Pressure	Fig. 5.2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	1.3×10^7 R		007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Acoustic Transmitter

Manufacturer:
Babcock & Wilcox

Model or Type:
N/A

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 46'

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Post-Accident Monitor (TMI)

Function (See Appendix IV.2-28):
PORV & SV Position Indication

Service:
Not Assigned

Associated Electrical Equipment:
ELEC-3 Instrumentation Cable

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for use during post-LOCA operation.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life has been assumed.

(4) The vendor is currently testing these components to address all the environmental parameters. Complete test reports will be available for review on completion.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-121, "Radiation Dose Calculation".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 5
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	1.3×10^7 R		007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Acoustic Accelerometer

Manufacturer:
Babcock & Wilcox

Model or Type:
N/A

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 70'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Post-Accident Monitor (TMI)

Function (See Appendix IV.2-29):
PORV & SV Position Indication

Service:
Not Assigned

Associated Electrical Equipment:
ELEC-3 Instrumentation Cable

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been assumed for use during post-LOCA operation.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life has been assumed.

(4) The vendor is currently testing these components to address all the environmental parameters. Complete test reports will be available for review on completion.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-121, "Radiation Dose Calculation".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	1.2×10^6 R	2.0×10^8 R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 2'-0" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Primary Component Cooling System

Function (See Appendix IV.2-18):
Pilot Valve For Associated Trip Valve

Service:
SOV-3410, SOV-3414, SOV-3416

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Block
ELEC-8	Control Cable
ELEC-13	Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to I[illegible] 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 amd 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-115, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated Marc

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 6
Temperature	210°F		010			Note 4 Note 6
Pressure	Atmos.		010			Note 4 Note 6
Relative Humidity	100%		Note 2			Note 4 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5					Note 4 Note 6
Aging	40 years		Note 3			Note 4 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Primary Comp. Cooling Sys. Pumps

Manufacturer:
Allis-Chalmers

Model or Type:
507 US

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Turbine Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Primary Secondary Component Cooling System

Function (See Appendix IV.2-39):
Primary Component Cooling Water Pumps

Service:
P-9A
P-9B

Associated Electrical Equipment:
ELEC-11 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for post-HELB use. However, during this time operation is not continuous. (See Appendix IV.2-39)

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) We are presently working with Allis-Chalmers Corp. to obtain qualification data for these motors. This information will be available for review on completion.

(5) No significant radiation in this area. No recirculating fluids in this area.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	2.5×10^6R	2.0×10^8R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	Yes	N/A	005	--	--	Note 6

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 0'-8"

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
Primary Sampling System

Function (See Appendix IV.2-17):
Pilot Valve For Trip Valve

Service:
SOV-3501, SOV-3502, SOV-3503,
SOV-3504, SOV-3505, SOV-3508

Associated Electrical Equipment:
ELEC-6 Penetration Assembly
ELEC-7 Terminal Block
ELEC-8 Control Cable
ELEC-13 Limit Switch
ELEC-16

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

(6) These valves will be moved to above flood level when they are replaced per Note 5; however, these valves operate prior to being submerged.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY-113, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	1.2×10^6R	2.0×10^8R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 2'-0" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Primary Vent & Drain System

Function (See Appendix IV.2-19):
Pilot Valve for Associated Trip Valve

Service:
SOV-3002, SOV-3301

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Blocks
ELEC-8	Control Cable
ELEC-16	Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-115, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee Nuclear Power Generating Station".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	30 days	Note 1	047	Sequential Test	
Temperature	Fig. III.1-1	Fig. IV.3-16	001	047	Sequential Test	
Pressure	Fig. III.1-2	Fig. IV.3-16	001	047	Sequential Test	
Relative Humidity	100%	100%	Note 2	047	Sequential Test	
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	047	Sequential Test	
Radiation	1.2×10^6R	2.0×10^8R	007	047	Sequential Test	
Aging	40 years	20 years	Note 3	047 008	Engineering Analysis	Note 4
Submergence	N/A	--	--	--	--	--

Component:
Solenoid Operated Pilot Valve

Manufacturer:
ASCO

Model or Type:
NP-1 series (Note 5)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 3'-1"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Primary Vent and Drain System

Function (See Appendix IV.2-20):
Pilot Valve For TV-3303

Service:
SOV-3303

Associated Electrical Equipment:

ELEC-6	Penetration Assembly
ELEC-7	Terminal Block
ELEC-8	Control Cable
ELEC-13	Limit Switch

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Reference 008 calculated a qualified life of 20 years at which time the valves will be refurbished per ASCO instructions.

(5) The solenoid operated valves currently installed are ASCO EHBX8320 and 8311A31F. Although the valves operate before the abnormal environment associated with the accident has an opportunity to develop, we have assigned a one hour operating time per Supplement #2 of IEB 79-01B. Based on the above, it is planned to replace these valves with the ASCO NP-1 Series valve which is fully qualified for LOCA and HELB environments.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-115, "Radiation Dose Calculation".

008 Acton Report No. 15564-12, Report of "Thermal Aging Analysis of ASCO Solenoid Operated Valves for Reactor Containment Use at Maine Yankee".

047 Test Report No. AQS21678/TR, "Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation", dated March 1978.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	1 hour	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-2	001	024	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-3	001	024	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	024	Simultaneous Test	--
Chemical Spray	N/A Note 5	--	--	--	--	--
Radiation	3.5×10^6R	3.5×10^6R	007	025	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Pressure Transmitters

Manufacturer:
Fischer & Porter

Model or Type:
50EP1000 (Pressure)

Accuracy:
Specified: 5%
Demonstrated: 3.5%

Location:
Area: Reactor Containment
Elevation: 20'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function (See Appendix IV.2-4):
Pressurizer Pressure

Service:
PT-102A, PT-102B, PT-102C, PT-102D

Associated Electrical Equipment:
ELEC-4 Instrument Cable
ELEC-5 Terminal Block
ELEC-6 Penetration Assembly

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

RC-1

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) Transmitters are located in instrumentation cabinets protected from chemical spray.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-105, "Radiation Dose Calculation".

008 Acton Report No. 15564-8, Report of "Thermal Aging Analysis of Fischer and Porter Transmitters for Reactor Containment Use at Maine Yankee".

024 Test Report: #2204-51-B-006, "Maximum Credible Accident Test on Electronic Transmitters".

025 Qualification Tests of Differential Transmitters Under Nuclear Radiation.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

RC-1

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	
Temperature	Fig. III.1-1	Fig. IV.3-5	001	037	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-5	001	037	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	037	Simultaneous Test	--
Chemical Spray	N/A	--	Note 5	--	--	--
Radiation	3.5×10^6R	4×10^7	007	037	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Level Transmitter
Pressure Transmitter

Manufacturer:
Rosemount

Model or Type:
1153HA5
1153GA9

Accuracy:
Specified: ±8%
Demonstrated: 6.95%

Location:
Area: Reactor Containment
Elevation: 20'

Flood Level:
Elevation: 1 7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function (See Appendix IV.2-5):
Pressurizer Pressure & Level

Service:
LT-101X, LT-101Y, PT-101X, PT-101Y

Associated Electrical Equipment:
ELEC-4 Instrument Cable
ELEC-5 Terminal Block
ELEC-6 Penetration Assembly

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

RC-2

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assigned for long-term cooling.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) Transmitters are located in instrumentation cabinets protected from chemical spray.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-105, "Radiation Dose Calculation".

008 Acton Report No. 15564-18, Report of "Thermal Aging Analysis of Rosemount Transmitters for Vapor Containment Use at Maine Yankee Nuclear Power Generating Station".

037 Test Report "3788, Rosemount, Inc., "Qualification Basis Report for Pressure Transmitters".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	24 hours	6 days	Note 1	019	Simultaneous Test	--
Temperature	Fig. III.1-1	Fig. IV.3-1	001	019	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-1	001	019	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	019	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	1.5 wt/% Boron pH=7.67	002	019	Simultaneous Test	--
Radiation	2.0×10^7R	10^8R	007	048	Se uential Test	Note 4
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Motor Operator

Manufacturer:
Limitorque Corporation

Model or Type:
SMB-000

Location:
Area: Reactor Containment
Elevation: 3' and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function (See Appendix IV.2-b):
Fill of RC System

Service:
HCV-110, HCV-111, HCV-112

Associated Electrical Equipment:
ELEC-2 Power & Control Cable
ELEC-6 Penetration Assembly
ELEC-8 Control Cable

APPENDIX II

NOTES:

(1) The specified time (24 hours) is based on Documentation Reference 006. This requirement envelopes the specified operating time of all applicable motor operators.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review on completion.

DOCUMENTATION REFERENCES:

001 Letter Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-103, "Radiation Dose Calculation".

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

*021 Letter with Enclosure, Limitorque Corporation to Yankee Atomic Electric Company, dated May 4, 1979.

APPENDIX II

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corp., dated October 3, 1978.

* This Documentation Reference contains supplemental information.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

RC-4

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	30 days	6 days	Note 1	019	Simultaneous Test	Note 5
Temperature	Fig. III.1-1	Fig. IV.3-1	001	019	Simultaneous Test	
Pressure	Fig. III.1-2	Fig. IV.3-1	001	019	Simultaneous Test	
Relative Humidity	100%	100%	Note 2	019	Simultaneous Test	
Chemical Spray	1,720 ppm Boron pH=9.5	1.5 wt/% Boron pH=7.67	002	019	Simultaneous Test	
Radiation	2.0×10^7 R	10^8 R	007	020	Sequential Test	Note 4
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Motor Operator

Manufacturer:
Limitorque

Model or Type:
SMB-00
SMB-000

Accuracy:
Specified: N/A
Demonstrated:

Location:
Area: Reactor Containment
Elevation: 1'-7"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function (See Appendix IV.2-35)
Pressurizer Relief Isolation Valves

Service:
HCV-145, HCV-146

Associated Electrical Equipment:
ELEC-2 Power Cable
ELEC-8 Control Cable

APPENDIX II

NOTES:

(1) An operating requirement of 30 days has been established.

(2) 100% relative humidity has been assumed.

(3) A 40-year qualified life requirement has been assumed.

(4) The qualified radiation data provided is for the actuator excluding the motor. We are presently working with Limitorque Corp. to obtain radiation tolerance data for these motors. This information will be available for review on completion.

(5) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-123, "Radiation Dose Calculation".

008 Acton Report No. 15564-20, Report of "Thermal Aging Analysis of Limitorque Valve Actuators for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

019 Test Report #600198, "Test of Limitorque Valve Operator to Meet General Requirements of an Electric Valve Actuator in Nuclear Reactor Containment Environment".

*020 Letter, Radiation International, Inc. to Franklin Institute Research Laboratory, dated May 23, 1972.

*021 Letter with Enclosure, Limitorque Corporation to Yankee Atomic Electric Company, dated May 4, 1979.

*038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

APPENDIX II

048 Test Report #600376A, "Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for BWR Service", dated May 13, 1976.

*049 Letter, Limitorque to Acton Testing Corporation, dated October 3, 1980.

* This Documentation Reference contains supplemental information

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

RC-5

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 6
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 6
Relative Humidity	100%		Note 2			Note 4 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5					
Aging	40 years		Note 3			Note 4 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Pressurizer Heater Dist. Cabinet

Manufacturer:
Westinghouse

Model or Type:
EHB3070

Accuracy:
Specified: N/A
Demonstrated: N/A

System:
Reactor Coolant System

Function:
Pressurizer Heater Power

Service:
E-2PA, E-2PB

Associated Electrical Equipment:
ELEC-2 Power & Control Cable
ELEC-15 Power Cable

Location:
Area: Reactor Containment (Penetration Room)
Elevation: 46'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

APPENDIX II

NOTES:

(1) A long-term requirement of one year has been established for long-term cooling after the accident.

(2) A 100% relative humidity requirement has been assumed.

(3) A 40-year qualified life requirement has been assumed.

(4) We are presently working with the vendor to determine qualification information. This information will be analyzed to determine equipment qualification.

(5) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX II

RC-6

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1			Note 4 Note 5
Temperature	Fig. III.1-1	130°F	001	045	AE Spec	Note 4 Note 5
Pressure	Fig. III.1-2	Atmos.	001	045	AE Spec	Note 4 Note 5
Relative Humidity	100%	95%	Note 2	045	AE Spec	Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5	--	002			Note 4 Note 5
Radiation	2×10^7R	3.5×10^5R	007	045	AE Spec	Note 4 Note 5
Aging	40 years	--	Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
RTD

Manufacturer:
Rosemount

Model or Type:
104 VC

Accuracy:
Specified: 0.01%
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 20'-0" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System (TMI)

Function (See Appendix IV.2-25):
Hot Leg Temperature

Service:
TE-111X, TE-121X, TE-131X

Associated Electrical Equipment:
ELEC-4 Instrument Cable

APPENDIX II

NOTES:

(1) An operating requirement of one year has been established. (See Appendix IV.2-25)

(2) 100% relative humidity has been assumed.

(3) A 40-year qualified life requirement has been assumed.

(4) The qualifications of various RTD's for a post-accident environment are being investigated.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc. to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-124, "Radiation Dose Calculation".

045 Combustion Engineering Specification 4467-488-903.

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 5
Temperature	220°F	140°F	010	056	Vendor Data	Note 4 Note 5
Pressure	19 psig	Atmos.	010	056	Vendor Data	Note 4 Note 5
Relative Humidity	100%	99%	Note 2	056	Vendor Data	Note 4 Note 5
Chemical Spray	N/A	--				Note 4 Note 5
Radiation	Note 5	3.5×10^5R		056	Vendor Data	Note 4 Note 5
Aging	40 years		Note 3			--
Submergence	N/A	--	--	--	--	--

Component:
Control Cabinets E-2PA, E-2PB

Manufacturer:
Westinghouse

Model or Type:

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Cable Penetration Room
Elevation: 46'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function:
Pressurizer Heaters Control

Service:
E-2PA
E-2PB

Associated Electrical Equipment:
ELEC-15 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been established.

(2) 100% relative humidity has been assumed.

(3) A 40-year qualified life requirement has been assumed

(4) Operation of equipment utilizing this component occurs after the abnormal environment associated with an accident has had an opportunity to fully develop and decrease in severity. Therefore, we feel adequate operation will occur.

(5) No significant dose exists because of no recirculating fluids in this area.

(6) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

056 CE Spec. No. 4467-488-701, A Project Engineering Specification for a Pressurizer Heater Proportional Power Control Unit, Combustion Engineering, Inc., Utility Division, Windsor, Connecticut.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 6
Temperature	210°F		010			Note 4 Note 6
Pressure	Atmos.		010			Note 4 Note 6
Relative Humidity	100%		Note 2			Note 4 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5					Note 4 Note 6
Aging	40 years		Note 3			Note 4 Note 6
Submergence	N/A	--	--	--	--	--

Component:
Sec. Comp. Cooling Sys. Pumps

Manufacturer:
Allis-Chalmers

Model or Type:
507 US

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Turbine Building
Elevation: 21'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Secondary Component Cooling System

Function (See Appendix IV.2-40):
Secondary Component Cooling Water Pumps

Service:
P-10A,
P-10B

Associated Electrical Equipment:
ELEC-11 Power Cable

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for post-HELB use. However, during this time operation is not continuous. (See Appendix IV.2-39)

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) We are presently working with Allis-Chalmers Corp. to obtain qualification data for these motors. This information will be available for review on completion.

(5) No significant radiation in this area. No recirculating fluids in this area.

(6) Because of preliminar results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-10	001	015	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-10	001	015	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	015	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	1,720 ppm Boron	002	015	Simultaneous Test	--
Radiation	7.6×10^7 R	2×10^8 R	007	016	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Power Cable

Manufacturer:
Cerro Wire & Cable Company
(Rockbestos)

Model or Type:
Firewall SR

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 24'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Containment Air Recirculation System

Function (See Appendix IV.2-10):
Recirculation System Power Cable

Service:
FN-17-1, FN-17-2, FN-17-3, FN-17-4,
FN-17-5, FN-17-6

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been established for operation of the CAR Fans.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-101, "Radiation Dose Calculation".

008 Acton Report No. 15564-2, Report of "Thermal Aging Analysis of Rockbestos Firewall SR Cable for Reactor Containment Use at Maine Yankee".

015 Test Report #F-C2857, "Test of Electrical Cables Under Simulated Post-Accident Reactor Containment Service".

016 Letter, Cerro Wire and Cable Company to Stone and Webster, dated March 8, 1971.

*017 Letter, Cerro Wire and Cable Company to Maine Yankee Atomic Power Company, dated May 20, 1971.

*018 MYS-3912, "Specification for 600V Insulated Power Cable for Containment Recirculating Fans", dated March 22, 1971.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

*This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	24 hours	69 days	Note 1	023 Note 4	Simultaneous Test	--
Temperature	Fig. III.1-1	Fig. IV.3-11	001	023	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-11	001	023	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	023	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.5	002	023	Simultaneous Test	--
Radiation	2.3×10^7	10^8R	007	023	Simultaneous Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	-	--	--	--	--

Component:
Power & Control Cable

Manufacturer:
Anaconda

Model or Type:
EPR/Hypalon &
EPR/Hypalon,Hypalon

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 3'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Chemical and Volume Control System
Reactor Coolant System

Function (See Appendix IV.2-11):
Electrical Power to Control Valves

Service:
HCV-242, HCV-251, HCV-261, HCV-271
HCV-110, HCV-111, HCV-112

APPENDIX II

NOTES:

(1) The specified time (24 hours) is based on Documentation Reference 006. This requirement envelopes the specified operating time of all applicable power and control cable.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

*001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

*002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

*006 Maine Yankee Emergency Procedure 2-14, "Long-Term Core Cooling Realignment".

007 Engineering Analysis #MY-104, "Radiation Dose Calculation".

008 Acton Report No. 15564-3, Report of "Thermal Aging Analysis of Anaconda Power Cable for Reactor Containment Use at Maine Yankee".

023 Test Report #F-C3341, "Long-Term Testing of Electrical Cables Under Simultaneous Exposure to Gamma Radiation, Steam and Chemical Spray", dated January 1973.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

*This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-12	001	026	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-12	001	026	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	026	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	3,000 ppm Boron pH=9.11	002	026	Simultaneous Test	--
Radiation	7.6×10^7R	2×10^8R	007	026	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Instrumentation Cable

Manufacturer:
The Rockbestos Company

Model or Type:
Firewall III

Function:
Electrical Power and Control

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 24'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function (See Appendix IV.2-12):
Electrical Power and Control for Transmitters

Service:
LT-101X, LT-101Y

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for long-term cooling requirements.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-106, "Radiation Dose Calculation".

008 Acton Report No. 15564-1, Report of "Thermal Aging Analysis of Rockbestos Firewall III Cable for Reactor Containment Use at Maine Yankee".

026 Test Report: "Qualification of Firewall III Class 1E Electric Cables".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-13, IV.3-14	001	027	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-13, IV.3-14	001	027	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	027	Simultaneous Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	2,500 ppm Boron pH=7.11	002	027	Simultaneous Test	--
Radiation	7.6×10^7 R	10^8 R	007	028	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Instrumentation Cable

Manufacturer:
Continental Wire & Cable Company
(Division of Anaconda)

Model or Type:
CC-2210
CC-2230

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 20'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System
Feedwater System

Function (See Appendix IV.2-13):
RC&FW Instrumentation Cable

Service:
Pressurizer Pressure,
Pressurizer Level,
Steam Generator Level

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for long-term cooling requirements.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-107, "Radiation Dose Calculation".

008 Acton Report No. 15564-9, Report of "Thermal Aging Analysis of Continental Wire and Cable Company's Instrument Cable for Reactor Containment Use at Maine Yankee".

027 Test Report: #IPS-383, "Qualification Test Program of Electrical Instrumentation Cables for Virginia Electric and Power Company for Surry Power Station - Units 1 and 2," dated 11/27/78.

028 Letter, Anaconda (Continental) to Yankee Atomic Electric Company, dated May 30, 1979.

*029 Letter with Enclosure, Anaconda (Continental) to Stone and Webster, dated July 11, 1978.

*030 Letter, Continental Wire and Cable Corporation to Stone and Webster, dated June 2, 1971.

*031 MYS-3268, "Specification for 600V Instrumentation Cable".

APPENDIX II

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

* This Documentation Reference contains supplemental information.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-15	001	032	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-15	001	032	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	032	Simultaneous Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	8.0×10^6R	10^7R	007	033	Engineering Analysis	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Terminal Block

Manufacturer:
General Electric

Model or Type:
CR151B

Function:
Electrical Connection

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 20'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System
Feedwater System

Function (See Appendix IV.2-14):
Electrical Connection of Instrumentation

Service:
Pressurizer Pressure,
Steam Generator Level,
Pressurizer Level

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for long-term cooling requirements.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-108, "Radiation Dose Calculation".

008 Acton Report No. 15564-11, Report of "Thermal Aging Analysis of General Electric Terminal Block for Reactor Containment Use at Maine Yankee".

032 Letter, General Electric to Vermont Yankee Nuclear Power Corporation, #G-HB-8-13, dated February 2, 1978.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

033 Engineering Analysis #MY-401, "Qualification for Radiation Environment".

APPENDIX II

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Fig. III.1-1	Fig. IV.3-4	001	034	Simultaneous Test	--
Pressure	Fig. III.1-2	Fig. IV.3-4	001	034	Simultaneous Test	--
Relative Humidity	100%	100%	Note 2	034	Simultaneous Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	8.0×10^6R	10^7R	007	035	Engineering Analysis	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Penetration Assembly

Manufacturer:
D. G. O'Brien

Model or Type:
Per Maine Yankee Specification (Custom)

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 46'-0"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
All Systems

Function:
Reactor Containment Electric Penetrations

Service:
All Equipment Inside the Reactor Containment

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-109, "Radiation Dose Calculation".

008 Acton Report No. 15564-19, Report of "Thermal Aging Analysis of D.G. O'Brien Penetrations for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

034 Test Report: #ER-184, "DBA Test - Stone and Webster Cable Assembly", by D. G. O'Brien, Inc., dated September 1971.

035 Letter, Maine Yankee Atomic Power Station to USNRC, #WMY 77-113, dated December 8, 1977.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	--	Note 1	Note 4		Note 5 Note 6
Temperature	Fig. III.1-1	--	001	Note 4		Note 5 Note 6
Pressure	Fig. III.1-2	--	001	Note 4		Note 5 Note 6
Relative Humidity	100%	--	Note 2	Note 4		Note 5 Note 6
Chemical Spray	N/A	--	--	--	--	--
Radiation	2.5×10^6R	--	007	Note 4		Note 5 Note 6
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Terminal Block

Manufacturer:
Square D

Model or Type:
1828-C19

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: Various

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Containment Air Activity System
Primary Component Cooling System
Low Pressure Safety Injection System
Primary Vent and Drain System
Primary Sampling System
High Pressure Safety Injection System
Chemical and Volume Control System

Function:
Electrical Connection

Service:
HCV-351, HCV-314, HCV-324, HCV-334
TCV-20[illegible], TV-3002, TV-3301, TV-3303
TV-341[illegible], TV-3414, TV-3416, TV-3502
TV-3501, TV-3503, TV-3504, TV-3505
TV-3508, TV-2001

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed for conservatism.

(3) A 40-year qualified life requirement has been assumed.

(4) Operation of equipment utilizing this component occurs before the abnormal environment associated with an accident has had an opportunity to fully develop and affect component integrity.

(5) These units will be replaced during the next scheduled outage.

(6) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containmen pressure and temperature tables for Maine Yankee.)

007 Engineering Analysis #MY-114, "Radiation Dose Calculation".

008 Acton Report No. 15564-7, Report of "Thermal Aging Analysis of Square D Terminal Blocks for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	45 min.	Note 1	036	Sequential Test	Note 4 Note 5
Temperature	Fig. III.1-1	260°F	001	036	Sequential Test	Note 4 Note 5
Pressure	Fig. III.1-2	30 psig	001	036	Sequential Test	Note 4 Note 5
Relative Humidity	100%	100%	Note 2	036	Sequential Test	Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	7.7×10^6R	2.0×10^7R	007	051	Engineering Analysis	Note 4
Aging	40 years	20 years	Note 3	008	Engineering Analysis	Note 4 Note 5
Submergence	Yes	N/A	--	--	--	Note 4 Note 5

Component:
Control Cable

Manufacturer:
Collyer

Model or Type:
PE/PVC/PVC

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 0'-8" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
Containment Air Activity System
Primary Sampling System
Low Pressure Safety Injection System
Primary Component Cooling System
High Pressure Safety Injection System
Primary Vent and Drain System
Chemical and Volume Control System

Function:
Electrical Control

Service:

HCV-314,	HCV-324,	HCV-334,	HCV-351K
TV-3301,	TV-3303,	TV-3410,	TV-3414
HCV-242,	TCV-201K,	HCV-271,	TCV-3002
TV-3416,	TV-3501,	TV-3502,	TV-3503
TV-3504,	TV-3505,	TV-3508,	TV-2001
HCV-251,	HCV-261	HCV-350K	

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed for conservatism.

(3) A 40-year qualified life requirement has been assumed.

(4) The presently installed cable is qualified by test for expected environment and operating time. Qualification for an operating time of one hour will necessitate replacing this cable with cable that is appropriately qualified.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-116, "Radiation Dose Calculation".

008 Acton Report No. 15564-10, Report of "Thermal Aging Analysis of Collyer Cable for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

036 Letter with Enclosure, Collyer Engineering Corporation to Connecticut Yankee Atomic Power Company, dated January 13, 1967.

051 "Radiation Effects on Electrical Insulations" by P. H. Ware.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour	1 hour	Note 1	052	Sequential Test	--
Temperature	Fig. III.1-2	Fig. IV.3-6	001	052	Sequential Test	--
Pressure	Fig. III.1-2	Fig. IV.3-6	001	052	Sequential Test	--
Relative Humidity	100%	100%	Note 2	052	Sequential Test	--
Chemical Spray	1,720 ppm Boron pH=9.5	3,027 ppm Boron pH=10.5	002	052	Sequential Test	--
Radiation	4.2×10^6R	2.0×10^8R	007	052	Sequential Test	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	Yes	Yes	005	054	Test	

Component:
Power Cable

Manufacturer:
Okonite

Model or Type:
Okonite/Okoprene

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 1'-5" and 1'-8"

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
Chemical & Volume Control System

Function:
Electrical Power for Valves

Service:
HCV-251, HCV-261, HCV-271

APPENDIX II

NOTES:

(1) The time specified is based upon the operation of HCV-251, HCV-261, and HCV-271. See worksheet CVCS-1.

(2) 100% relative humidity has been assumed for conservatism.

(3) A 40-year qualified life requirement has been assumed.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

007 Engineering Analysis #MY-117, "Radiation Dose Calculation".

008 Acton Report No. 15564-5, Report of "Thermal Aging Analysis of Okonite Power Cable for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

052 Okonite Report No. NQRN-1, "Qualification of Okonite Ethylene-Propylene Rubber Insulation for Nuclear Plant Service".

054 Okonite Engineers Note 74-1.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

ENCLOSURE 3

ELEC-10

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Note 4	Note 1	Note 4	Engineering Analysis	
Temperature	Note 5	260°F	010	036	Engineering Analysis	--
Pressure	Note 5	15 psia	010	036	--	--
Relative Humidity	100% (Max.)	100% (Max.)	Note 2	036	Engineering Analysis	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5	2×10^7R	009	051	Engineering Analysis	
Aging	40 years	20 years	Note 3	008	Engineering Analysis	Note 6 Note 7
Submergence	N/A	--	--	--	--	--

Component:
Control Cable

Manufacturer:
Collyer

Model or Type:
PE/PVC/PVC

Accuracy:
Specified: N/A
Demonstrated: N/A

System:
High Pressure Safety Injection System
Low Pressure Safety Injection System
Containment Spray System

Function (See Appendix):
Electrical Control Cable

Service:
HCV-300, HCV-301, HCV-302, HCV-303
HCV-311, HCV-321, HCV-331, HCV-323
HCV-333, HCV-312, HCV-322, HCV-332
MOV-3207, MOV-3208, MOV-3209, MOV-3210
MOV-3211, MOV-3212, HCV-313

Location:
Area: Containment Spray Pump Area & Primary Auxiliary Building
Elevation: Various

Flood Level:
Elevation: N/A
Above Flood Level: N/A

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The temperature, pressure and radiation service conditions specified are the maximum values of the components supplied by the control cable as follows:

Component	Temperature & Pressure Profile From HELB (Appendix #)	Temperature Profile From Recirc. Fluid (Appendix #)	Radiation
HCV-300	III.2-4	III.2-6	4.37×10^6 Rads
HCV-301	III.2-4	III.2-6	3.77×10^6 Rads
HCV-302	III.2-4	III.2-6	4.35×10^6 Rads
HCV-303	III.2-4	III.2-6	3.73×10^6 Rads
HCV-311	III.2-4	III.2-6	9.74×10^5 Rads
HCV-321	III.2-4	III.2-6	4.26×10^5 Rads
HCV-331	III.2-4	III.2-6	3.70×10^6 Rads
HCV-313	III.2-4	III.2-6	8.96×10^6 Rads
HCV-323	III.2-4	III.2-6	4.19×10^6 Rads
HCV-333	III.2-4	III.2-6	3.61×10^6 Rads
HCV-312	N/A	N/A	3.02×10^5 Rads
HCV-322	N/A	N/A	3.02×10^5 Rads
HCV-332	N/A	N/A	3.02×10^5 Rads
MOV-3207	N/A	N/A	3.02×10^5 Rads
MOV-3208	N/A	N/A	3.02×10^5 Rads
MOV-3209	N/A	N/A	3.02×10^5 Rads
MOV-3210	N/A	N/A	3.02×10^5 Rads
MOV-3211	N/A	N/A	3.02×10^5 Rads
MOV-3212	N/A	N/A	3.02×10^5 Rads

(6) A qualified life of 20 years has been established. Therefore the cable will be replaced at that time.

APPENDIX II

(7) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-10, Report of "Thermal Aging Analysis of Collyer Cable for Reactor Containment Use at Maine Yankee".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September, 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

036 Letter with Enclosure, Collyer Engineering Corporation to Connecticut Yankee Atomic Power Company, dated January 13, 1967.

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

051 "Radiation Effects of Electrical Insulations" by P. H. Ware.

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	
Temperature	Fig. III.2-3	Fig. IV.3-6	010 Note 5	052	Sequential Test	--
Pressure	Fig. III.2-3	Fig. IV.3-6	010 Note 5	052	Sequential Test	--
Relative Humidity	100% (Max.)	100% (Max.)	Note 2	052	Sequential Test	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	2.8×10^6 R	2.0×10^8 R	009 Note 5	052	Sequential Test	
Aging	40 years	40 years	Note 3	008	Engineering Analysis	
Submergence	N/A	--	--	--	--	--

Component:
Power Cable

Manufacturer:
Okonite

Model or Type:
EPR/ARMOR/PVC

Accuracy:
Specified: N/A
Demonstrated: N/A

System:
High Pressure Safety Injection System
Low Pressure Safety Injection System
Containment Spray System

Function:
Electrical Power for Listed Pumps

Service:

P-12A,	P-12B,	P-14A,	P-14B
P-14S,	P-61A,	P-61B,	P-61S
P-9A	P-9B	P-10A	P-10B

Location:
Area: Containment Spray Pump Area & Primary Auxiliary Building
Elevation: Various Levels

Flood Level:
Elevation: N/A
Above Flood Level: N/A

APPENDIX II

NOTES:

(1) A long-term operating requirement of 30 days has been assumed. This is the time required to bring the plant to a cold shutdown condition following the accident.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed.

(4) Qualification of this component for long-term operability has been determined by qualifying the component for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The temperature, pressure and radiation service conditions specified are the maximum values of the components supplied by the power cable.

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-5, Report of "Thermal Aging Analysis of Okonite Power Cable for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

052 Okonite Report No. NQRN-1, "Qualification of Okonite Ethylene-Propylene Rubber Insulation for Nuclear Plant Service".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term	Long Term	Note 1	Note 4	Engineering Analysis	--
Temperature	Note 5	250°F	010	050	Engineering Analysis	--
Pressure	Note 5	15 psig	010	050	Engineering Analysis	--
Relative Humidity	100%	100%	Note 2	050	Engineering Analysis	--
Chemical Spray	N/A	--	--	--	--	--
Radiation	Note 5	4.8×10^7R	009	050	Engineering Analysis	--
Aging	40 years	40 years	Note 3	008	Engineering Analysis	--
Submergence	N/A	--	--	--	--	--

Component:
Power Cable

Manufacturer:
Anaconda

Model or Type:
EPR/NEOPRENE

Accuracy:
Specified: N/A
Demonstrated: N/A

System:
High Pressure Safety Injection System
Low Pressure Safety Injection System
Containment Spray System

Function:
Electrical Power Cable for Valve

Service:

HCV-300,	HCV-301,	HCV-302,	HCV-303
HCV-311,	HCV-321,	HCV-331,	HCV-323
HCV-333,	MOV-3207,	MOV-3208,	MOV-3209
MOV-3210,	MOV-3211,	MOV-3212,	HCV-313
HCV-312,	HCV-322,	HCV-332	

Location:
Area: Containment Spray Pump Area & Primary Auxiliary Building
Elevation: Various

Flood Level:
Elevation: N/A
Above Flood Level: N/A

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed.

(2) 100% relative humidity is assumed as a conservatism.

(3) A 40-year qualified life requirement has been assumed unles otherwise noted.

(4) Qualification of this component for the required operating time has been determined to be adequate based on an evaluation of the qualification data used to qualify it for all applicable environmental parameters indicated on this worksheet (see Reference 038).

(5) The temperature, pressure and radiation service conditions specified are the maximum values of the components supplied by the control cable:

Component	Temperature & Pressure Profile From HELB (Appendix #)	Temperature Profile From Recirc. Fluid (Appendix #)	Radiation
HCV-300	III.2-4	III.2-6	4.37×10^6 Rads
HCV-301	III.2-4	III.2-6	3.77×10^6 Rads
HCV-302	III.2-4	III.2-6	4.35×10^6 Rads
HCV-303	III.2-4	III.2-6	3.73×10^6 Rads
HCV-311	III.2-4	III.2-6	9.74×10^5 Rads
HCV-321	III.2-4	III.2-6	4.26×10^5 Rads
HCV-331	III.2-4	III.2-6	3.70×10^6 Rads
HCV-313	III.2-4	III.2-6	8.96×10^6 Rads
HCV-323	III.2-4	III.2-6	4.19×10^6 Rads
HCV-333	III.2-4	III.2-6	3.61×10^6 Rads
HCV-312	N/A	N/A	3.02×10^5 Rads
HCV-322	N/A	N/A	3.02×10^5 Rads
HCV-332	N/A	N/A	3.02×10^5 Rads
MOV-3207	N/A	N/A	3.02×10^5 Rads
MOV-3208	N/A	N/A	3.02×10^5 Rads
MOV-3209	N/A	N/A	3.02×10^5 Rads
MOV-3210	N/A	N/A	3.02×10^5 Rads
MOV-3211	N/A	N/A	3.02×10^5 Rads
MOV-3212	N/A	N/A	3.02×10^5 Rads

APPENDIX 1

DOCUMENTATION REFERENCES:

008 Acton Report No. 15564-3, Report of "Thermal Aging Analysis of Anaconda Power Cable for Reactor Containment Use at Maine Yankee".

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

037 Engineering Analysis #571, "Evaluation of Environmental Qualifications".

038 Engineering Analysis #521, "Evaluation of Environmental Qualifications".

050 C74045-1, IEEE PES Conference Paper, "Qualification of Power and Control Cable for Class 1E Applications", by T. H. Ling and W. F. Morrison of the Anaconda Wire and Cable Company.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

ENCLOSURE 3

ELEC-13

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour		Note 1			Note 4 Note 5
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 5 Note 5
Radiation	1.2×10^6R		007			Note 4 Note 5
Aging	40 years	7.7 years	Note 3	008	Engineering Analysis	Note 5
Submergence	N/A	--	--	--	--	--

Component:
Limit Switch

Manufacturer:
NAMCO

Model or Type:
EA740-80,000

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 2'-0" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Primary Vent and Drain System
Primary Component Cooling System

Function:
Primary Sampling System Valve Position Indication
Containment Air Activity Sampling System Valve Position Indication
Fire Protection System Valve Position Indication
Low Pressure Safety Injection System Valve Position Indication

Service:
TV-3303, TV-3410, TV-3414, TV-3416
TV-3505, TV-2001, TV-2906, HCV-351K
TCV-201K

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed for conservatism.

(3) A 40-year qualified life requirement has been assumed.

(4) Operation of equipment utilizing this component occurs before the abnormal environment associated with an accident has had an opportunity to fully develop and affect component integrity. In addition, we are planning to replace these.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-115, "Radiation Dose Calculation".

008 Acton Report No. 15564-4, Report of "Thermal Aging Analysis of Namco Limit Switches for Class 1E Service at Maine Yankee Nuclear Power Generating Station".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour		Note 1			Note 4 Note 5
Temperature	Fig. III.2-5 and III.2-6		010			Note 4 Note 5
Pressure	Fig. III.2-5		010			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	N/A	--	--	--	--	--
Radiation	5×10^6R		009			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Terminal Block

Manufacturer:
Square D

Model or Type:
1288-C19

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Lower Primary Auxiliary Building
Elevation: 11'-0"

Flood Level:
Elevation: N/A
Above Flood Level: N/A

System:
Reactor Coolant System

Function:
Electrical Connection

Service:
HCV-254
HCV-255

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity is conservatively assumed.

(3) A 40-year qualified life requirement has been assumed unless otherwise noted.

(4) Operation of equipment utilizing this component occurs before the abnormal environment associated with an accident has had an opportunity to fully develop and affect component integrity.

(5) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	Long Term		Note 1			Note 4 Note 5
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	1×10^8R		007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Pressurizer Heater Power Cable

Manufacturer:
General Electric

Model or Type:
Silicone Rubber Insul.
Twisted Glass Braid

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 27'-3"

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Reactor Coolant System

Function:
Electrical Power for Pressurizer Heater

Service:
Pressurizer Heaters

APPENDIX II

NOTES:

(1) A long-term operating requirement of one year has been assumed for post-LOCA use. However, during this time operation is not continuous.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40 year qualified life requirement has been assumed.

(4) We are presently with General Electric to obtain qualification documentation. This information will be available for review on completion.

(5) Because of preliminary results from recent HELB and Heat-Up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved; and therefore, the conclusions reached herein are to be considered preliminary.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-128, "Radiation Dose Calculation".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour	--	Note 1			Note 4 Note 5
Temperature	Fig. III.1-1	--	001			Note 4 Note 5
Pressure	Fig. III.1-2	--	001			Note 4 Note 5
Relative Humidity	100%	--	Note 2			Note 4 Note 5
Chemical Spray	1, 20 ppm Boron pH=9.5	--	002			Note 4 Note 5
Radiation	2.5×10^6R	--	007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Limit Switch

Manufacturer:
NAMCO

Model or Type:
D2400X

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containment
Elevation: 2'-0" and above

Flood Level:
Elevation: 1.7'
Above Flood Level: Yes

System:
Primary Vent & Drain System
Primary Sampling System

Function:
Position Indication of TV's

Service:
TV-3002, TV-3301, TV-3501, TV-3502
TV-3503, TV-3504, TV-3508

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Operation of equipment utilizing this component occurs before the abnormal environment associated with an accident has had an opportunity to fully develop and affect component integrity. However, as a precautionary measure these units will be replaced during the next scheduled outage.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analyses #MY-113 and #MY-115, "Radiation Dose Calculation".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	1 hour		Note 1			Note 4 Note 5
Temperature	Fig. III.2-5 and III.2-6		010			Note 4 Note 5
Pressure	Fig. III.2-5		010			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	N/A	--	--	--	--	--
Radiation	1.5×10^6R		009			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	N/A	--	--	--	--	--

Component:
Limit Switch

Manufacturer:
Micro Switch Co.

Model or Type:
DTE6-2RN2

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Lower Primary Auxiliary Building
Elevation: 11'-0"

Flood Level:
Elevation: N/A
Above Flood Level: Yes

System:
Reactor Coolant System

Function:
Position Indication

Service:
SOV-254
SOV-255

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed due to saturated steam conditions.

(3) A 40-year qualified life requirement has been assumed.

(4) Position indication has been designated as an IE requirement by the NRC. Therefore, we are planning on replacing these switches.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

009 EDS Report 02-0570-1065, "Environmental Qualification of Class 1E Electrical Equipment", September 1980, Revision 0.

010 EDS Report 02-0570-1069, Revision 0, "Pressure and Temperature Conditions at Maine Yankee Due to High Energy Line Break (HELB) Outside Containment and Heat-Up Caused by Recirculation Fluids Due to Loss-of-Coolant Accident (LOCA) Inside Containment".

ENVIRONMENTAL QUALIFICATION WORKSHEET

ENVIRONMENT			DOCUMENTATION REFERENCE		QUALIFICATION METHOD	OUTSTANDING ITEMS
PARAMETER	SPECIFIED	QUALIFIED	SPECIFIED	QUALIFIED		
Operating Time	<1 hour		Note 1			Note 4 Note 5
Temperature	Fig. III.1-1		001			Note 4 Note 5
Pressure	Fig. III.1-2		001			Note 4 Note 5
Relative Humidity	100%		Note 2			Note 4 Note 5
Chemical Spray	1,720 ppm Boron pH=9.5		002			Note 4 Note 5
Radiation	1.1×10^6R		007			Note 4 Note 5
Aging	40 years		Note 3			Note 4 Note 5
Submergence	Yes		--			Note 4 Note 5

Component:
Limit Switch

Manufacturer:
Micro Switch Co.

Model or Type:
DTE6-2RN2

Accuracy:
Specified: N/A
Demonstrated: N/A

Location:
Area: Reactor Containm
Elevation: 0'-11"

Flood Level:
Elevation: 1.7'
Above Flood Level: No

System:
HPSI

Function:
Position Indication

Service:
HC.-314
HCV-324
HCV-334

APPENDIX II

NOTES:

(1) An operating time of one hour is specified based on Supplement #2 to IEB 79-01B.

(2) 100% relative humidity has been assumed.

(3) A 40-year qualified life requirement has been assumed.

(4) Position indication has been designated as a Class 1E requirement by the NRC. Therefore, we are planning on replacing these switches.

(5) This equipment is included because of NUREG-0578.

DOCUMENTATION REFERENCES:

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

007 Engineering Analysis #MY-118, "Radiation Dose Calculation".

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III

TABLE OF CONTENTS

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III

TABLE OF CONTENTS

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III

Introduction

Appendix III contains the environmental service conditions under which certain safety-related electrical equipment is required to function. The following sections of Appendix III address the various environmental parameters for the:

(1) Reactor Containment
(2) Primary Auxiliary Building/
Auxiliary Feedwater Pump Area
(3) Spray Pump Area
(4) Steam and Feedwater Valve Area
(5) Turbine Building

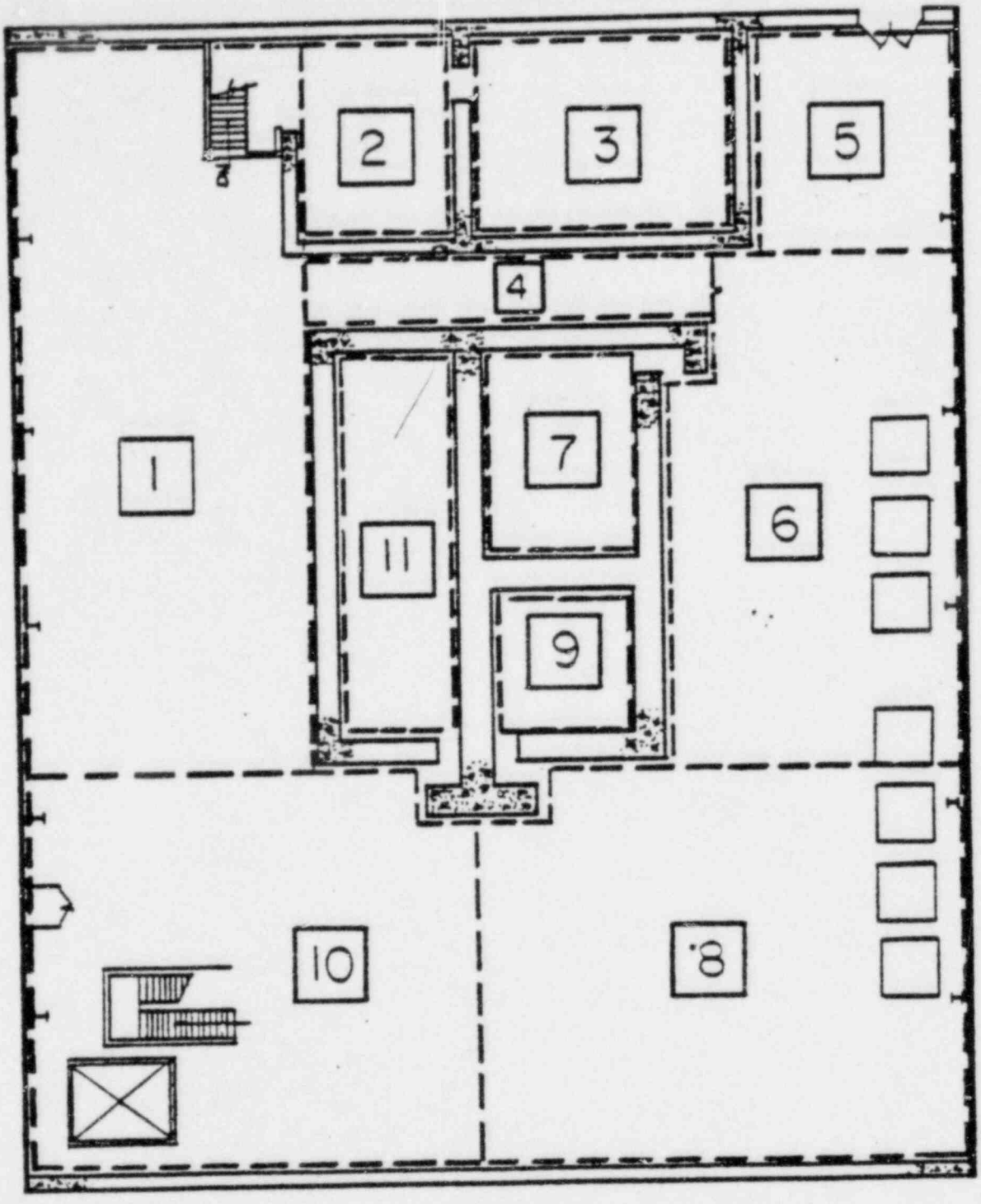
Note: Because of preliminary results from recent HELB and Heat-up studies, many areas previously believed to be non-harsh have now been determined to be harsh. The impact on equipment qualification has yet to be fully analyzed and resolved.

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III

LIST OF FIGURES

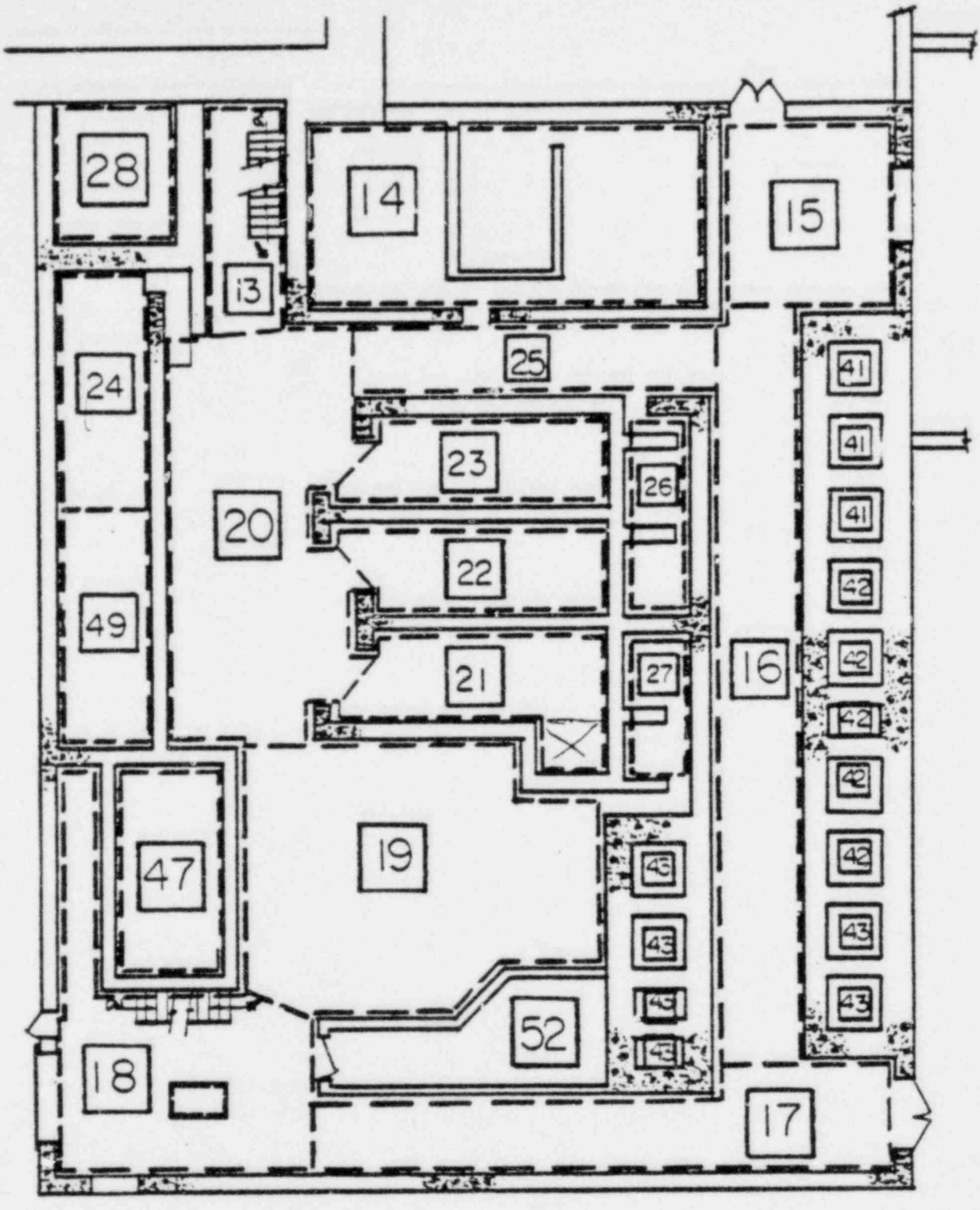
Figure No.	Description
Fig. III-1	Plan - El. 36'-0"
Fig. III-2	Plan - El. 21'-0"
Fig. III-3	Plan - El. 11'-0"
Fig. III-4	Plan - El. 20'-0"
Fig. III-5	Plan - El. 20'-0"
Fig. III-6	Plan - El. 46'-0"
Fig. III-7	Plan - El. 2'-0"
Fig. III-8	Section A-A, Section B-B
Fig. III-9	Plan - El. 21'-0"
Fig. III-10	Plan - El. 39'-0"
Fig. III-11	Plan - El. 34'-0"
Fig. III-12	Plan - El. 61'-0"



PLAN - EL 36'-0"
PRIMARY AUXILIARY BLDG
RELAP 4 / MOD 5 MODEL

MAINE YANKEE POWER STATION

Fig. III-1

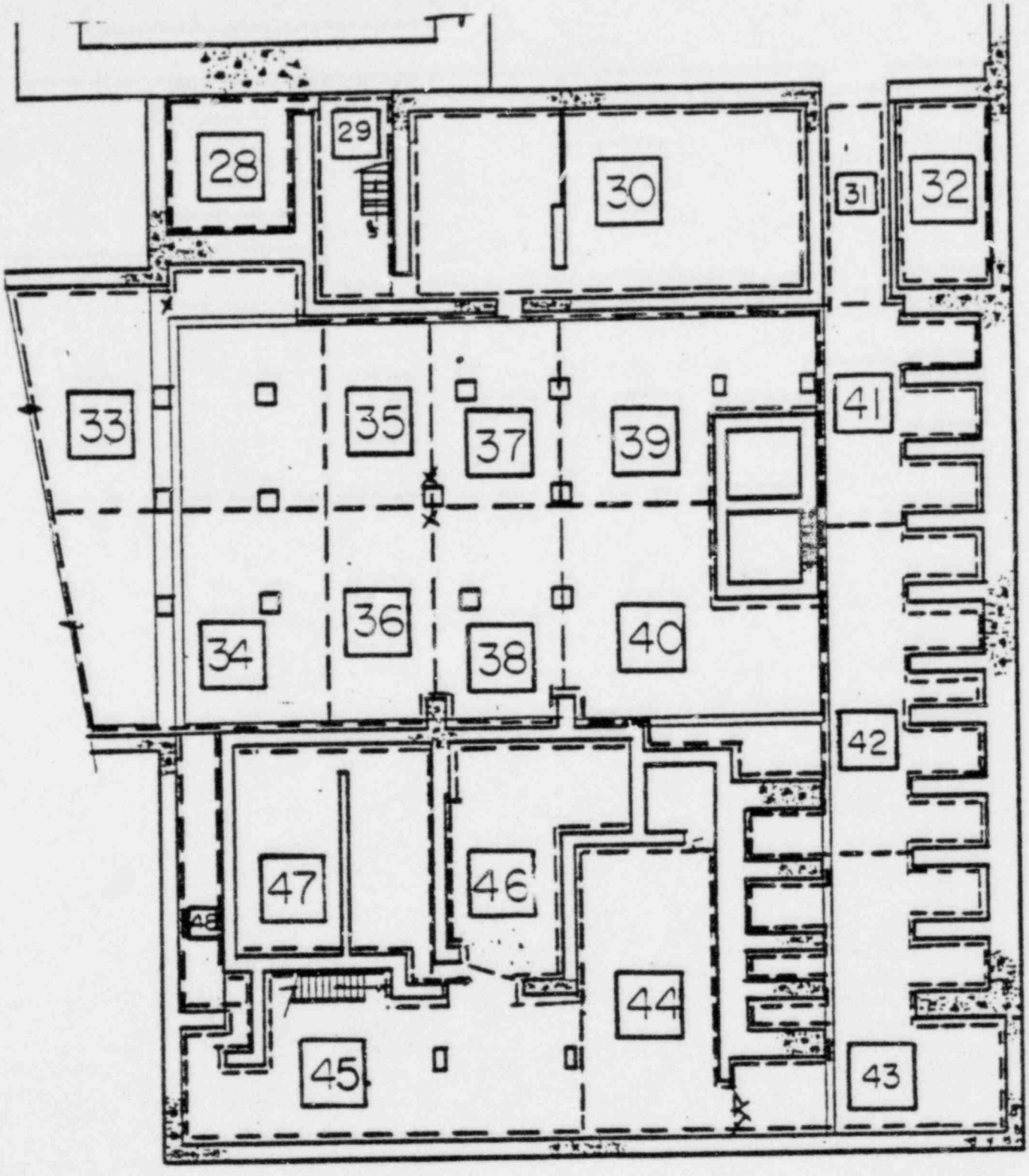


PLAN - EL 21'-0"

PRIMARY AUXILIARY BLDG
RELAP 4 / MOD 5 MODEL

MAINE YANKEE POWER STATION

Fig. III-2

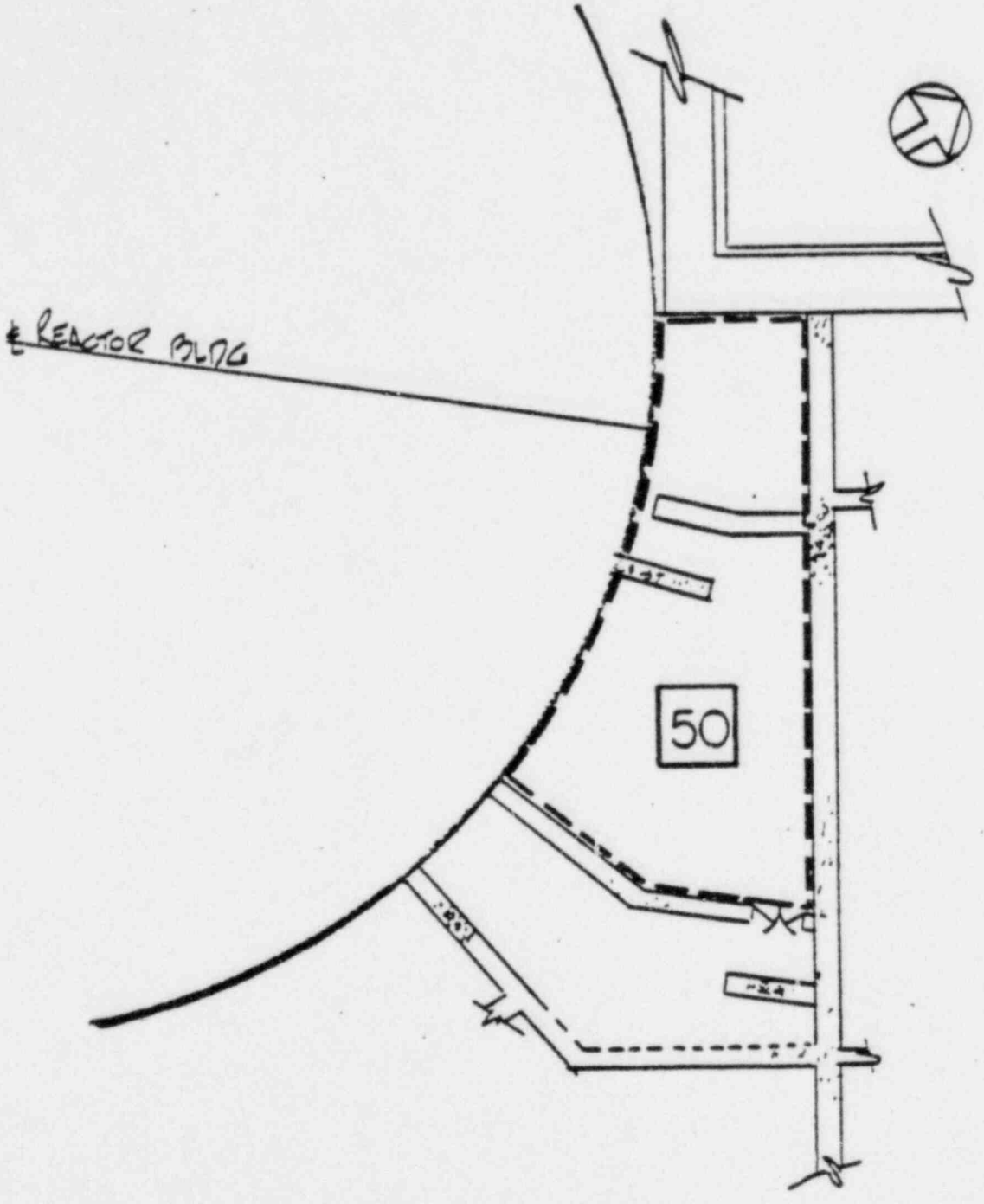


PLAN-11'-0"

PRIMARY AUXILIARY BLDG
RELAP 4 / MOD 5 MODEL

MAINE YANKEE POWER STATION

Fig. III-3

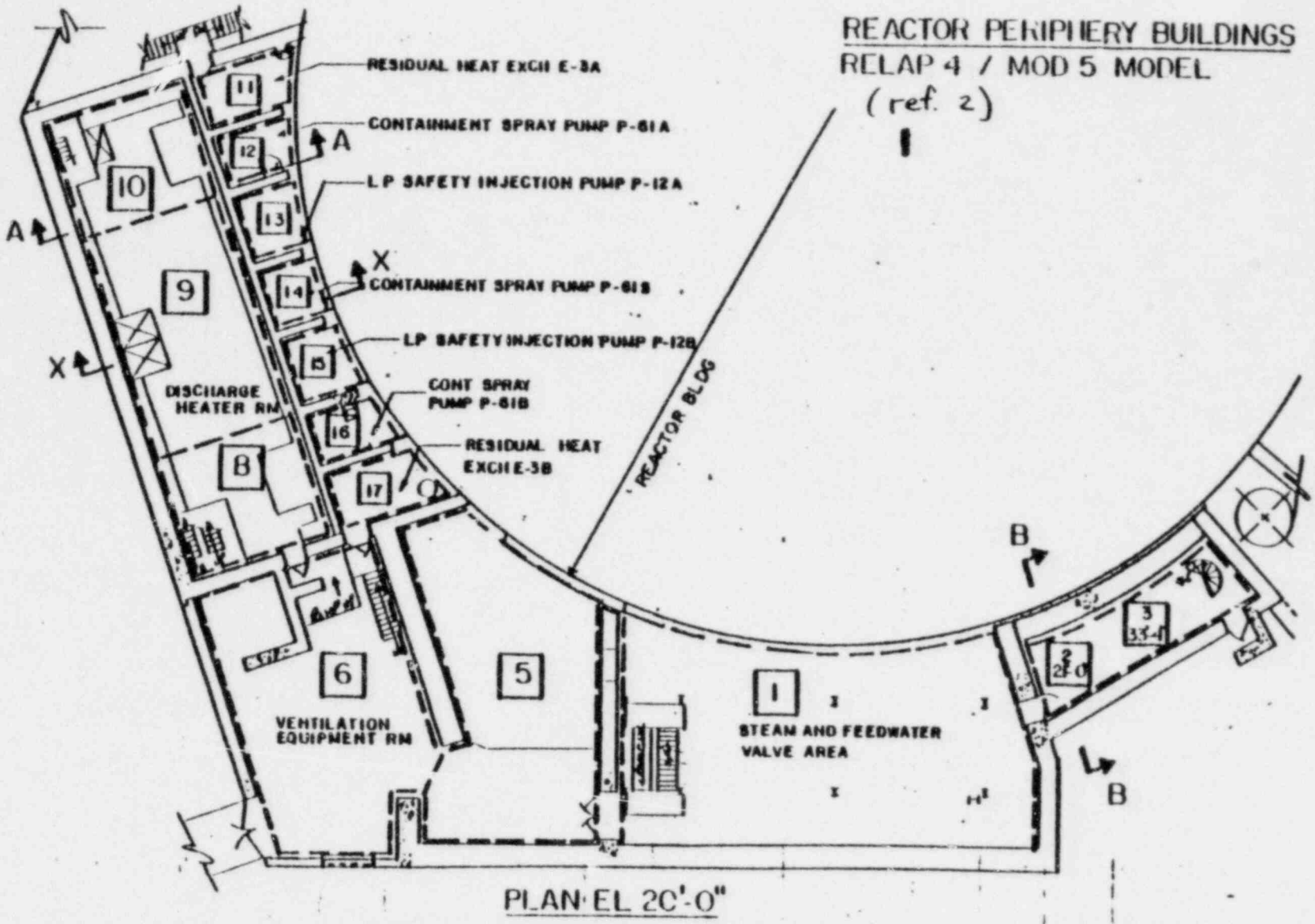


PLAN EL 20'-0"

PRIMARY AUXILIARY BLDG
RELAP 4 / MOD 5 MODEL

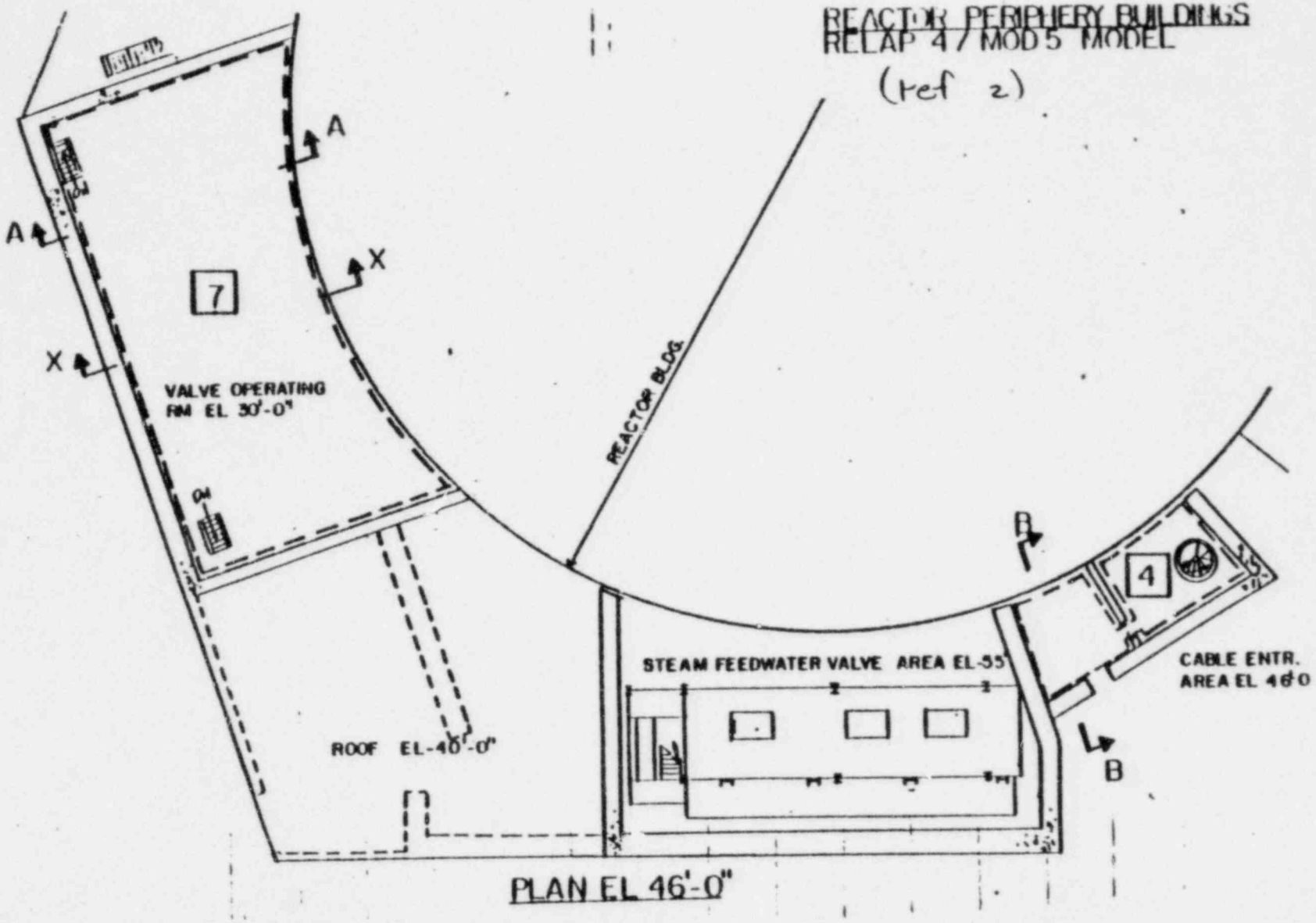
MAINE YANKEE POWER STATION

Fig. III-4



MAINE YANKEE ATOMIC POWER STATION

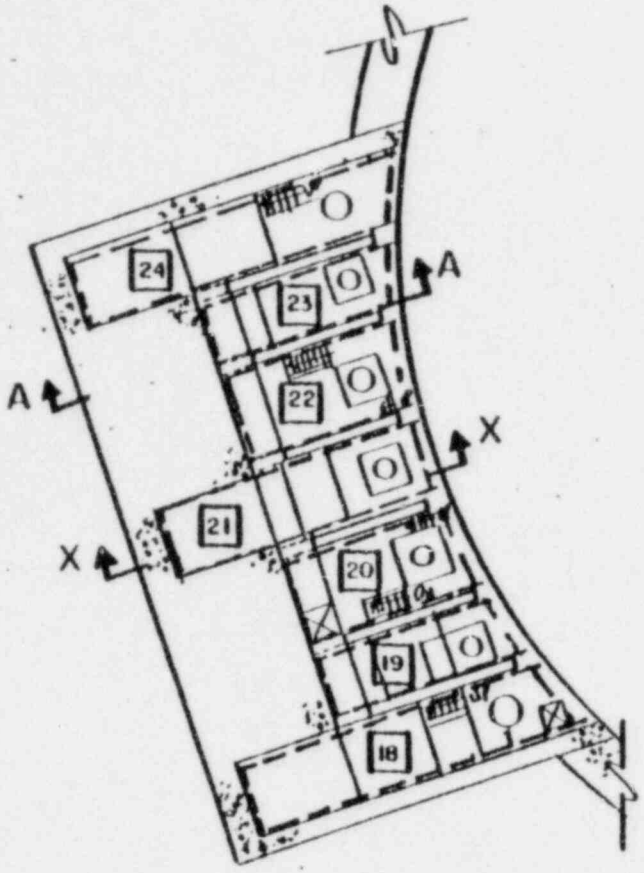
Fig. III-5



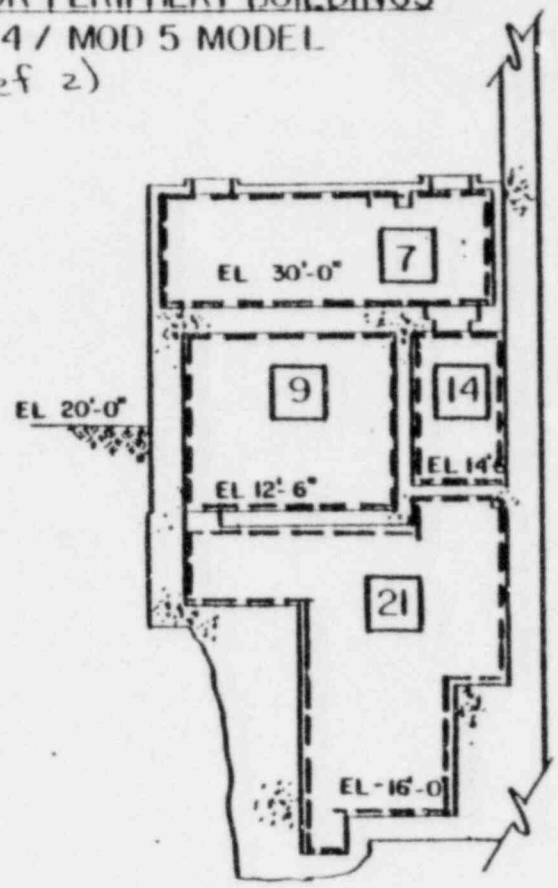
MAINE YANKEE ATOMIC POWER STATION

Fig. III-6

REACTOR PERIPHERY BUILDINGS
RELAP 4 / MOD 5 MODEL
(ref 2)



PLAN EL. 2'-0"

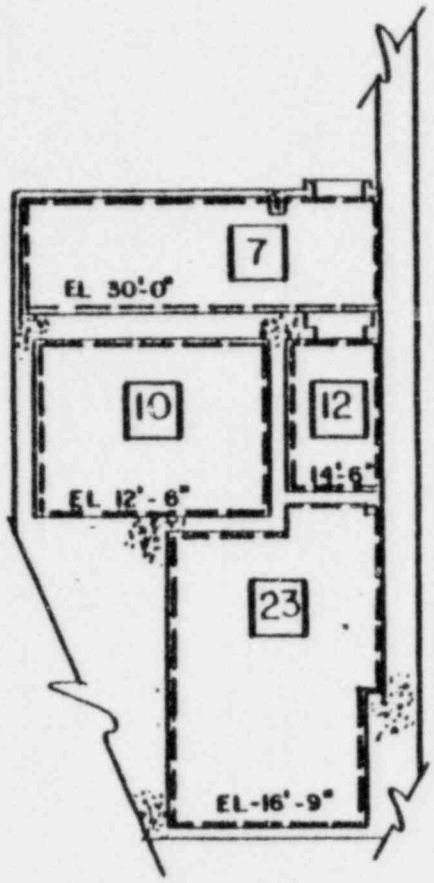


SECTION X-X

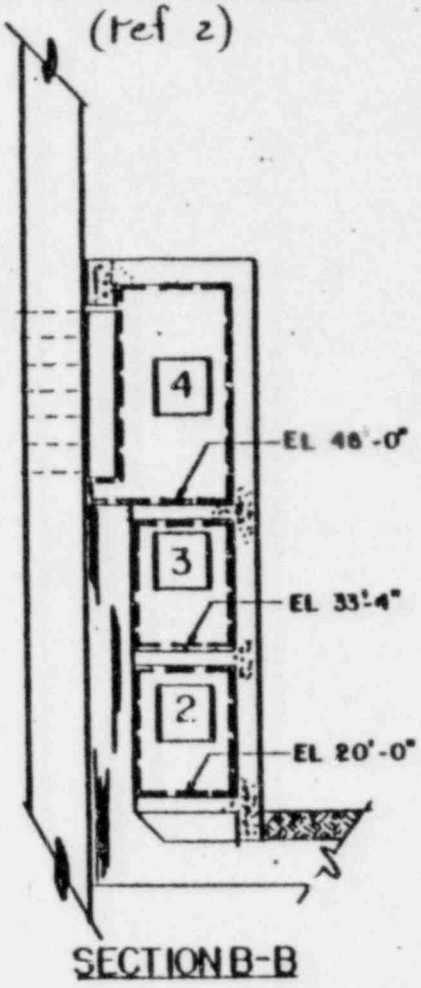
MAINE YANKEE ATOMIC POWER STATION

Fig. III-7

REACTOR PERIPHERY BUILDINGS
RELAP 4 / MOD 5 MODEL
(ref 2)



SECTION A-A



SECTION B-B

MAINE YANKEE ATOMIC POWER STATION

Fig. III-8

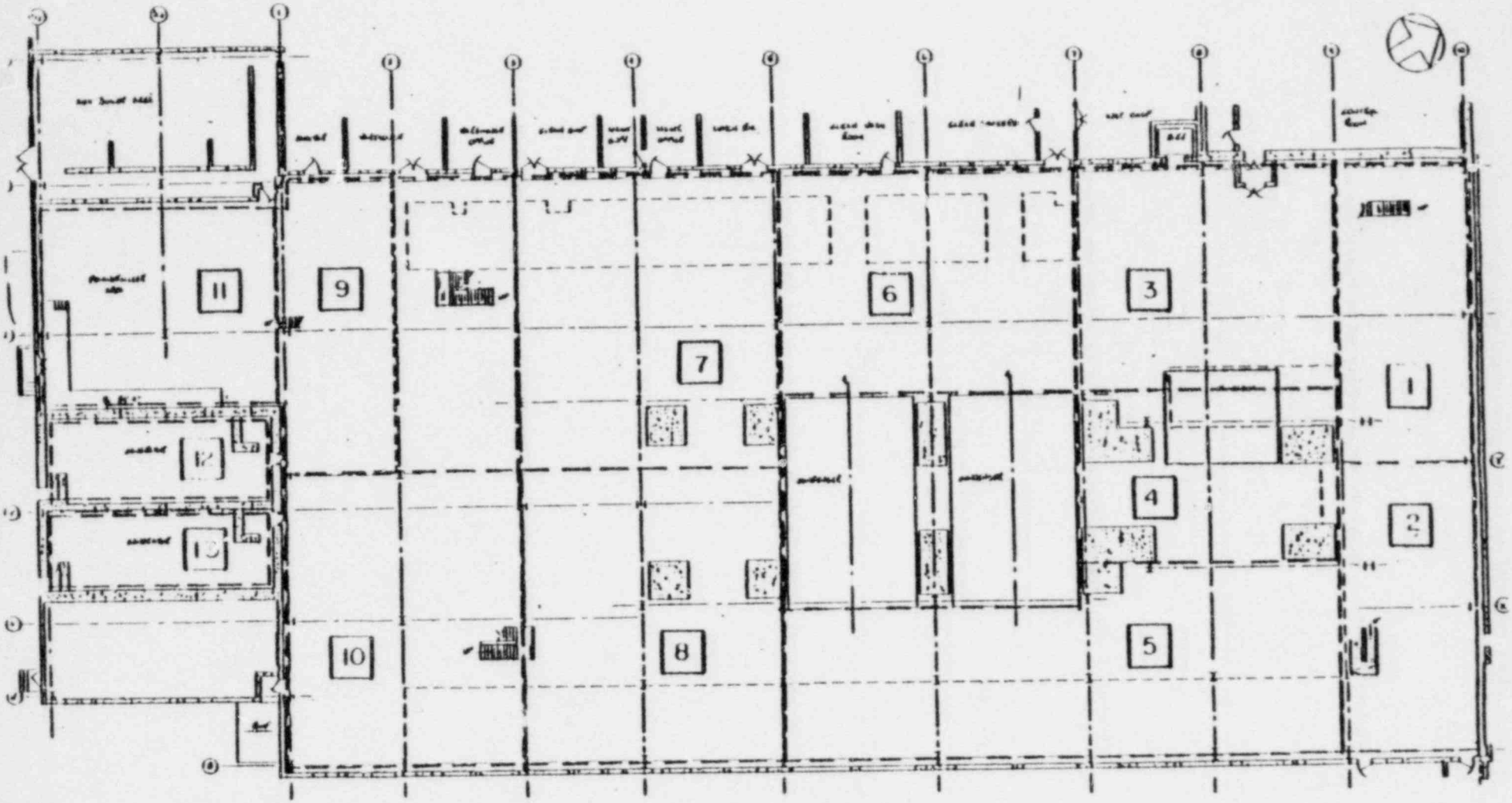
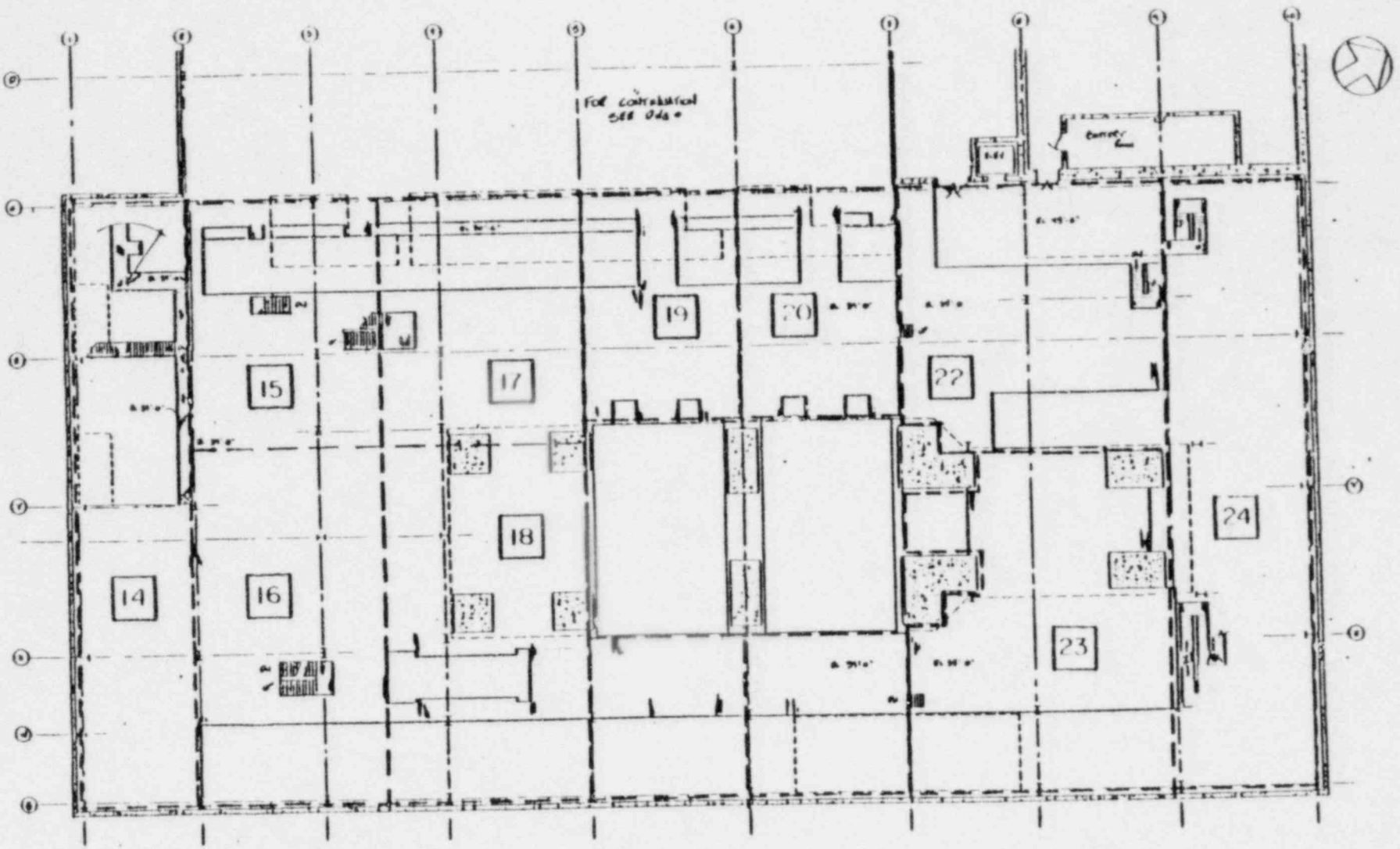
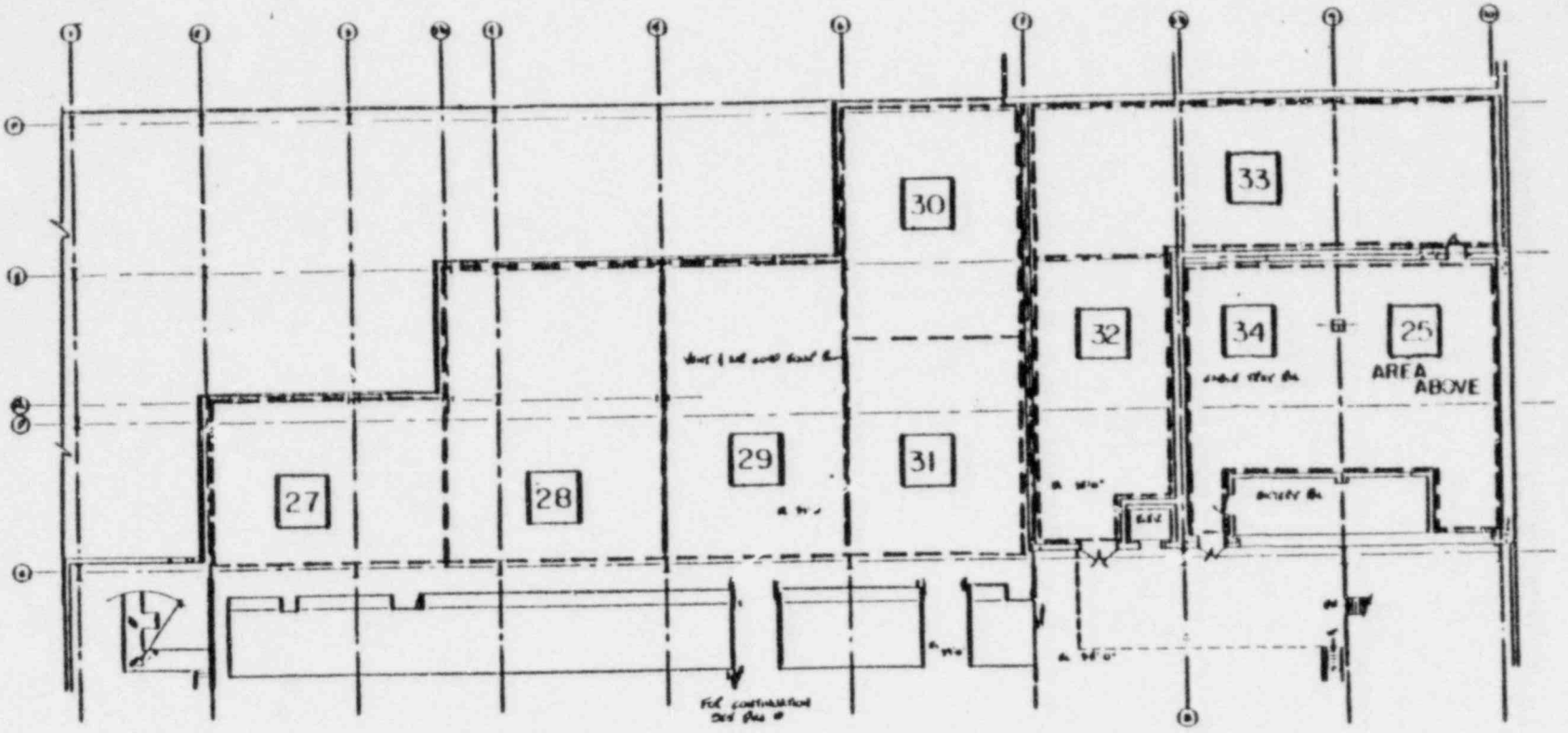


Fig. III-9



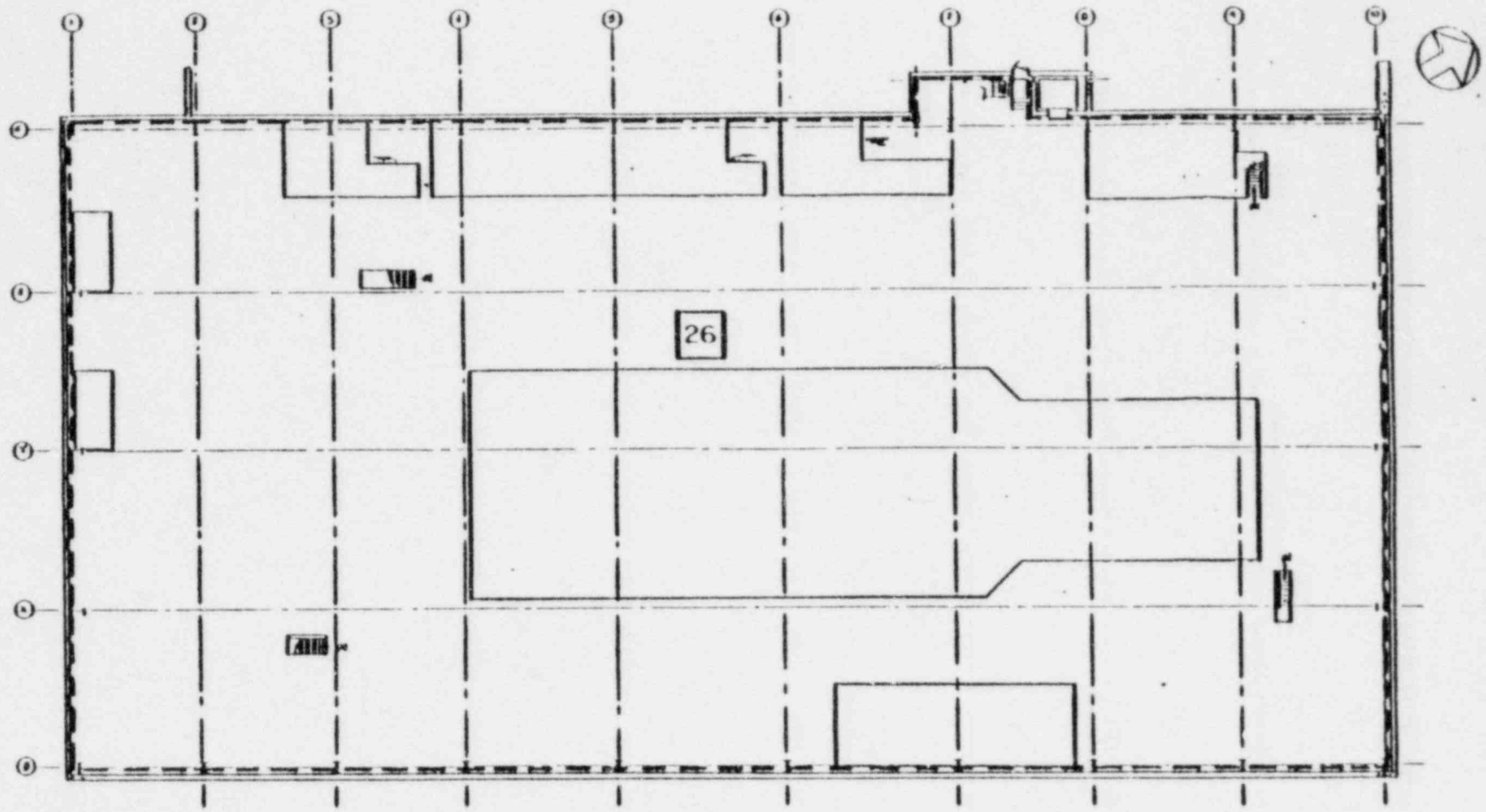
PLAN ELEV 29'-0"

Fig. III-10



PLAN ELEV 29'-0

Fig. III-11



BAY ELEV #1'-0"

Fig. III-12

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III.1

SERVICE CONDITIONS FOR: REACTOR CONTAINMENT

ENVIRONMENTAL PARAMETER	LOCA/MSLB
Temperature:	Fig. III.1-1
Pressure:	Fig. III.1-2
Relative Humidity:	100%
Chemcial Spray:	1720 ppm Boron as H_3BO_3, pH=9.5
Radiation:	Note (III.1-1)
Submergence:	Flood Level Elev.= +1.7 feet

Note (III.1-1) Radiation: The radiation doses to equipment required to function during and after a LOCA have been calculated in accordance with Supplement #2 of the IEB 79-01B and the DOR Guidelines. The radiation values entered in the worksheets are the LOCA doses which are more conservative than those for the MSLB.

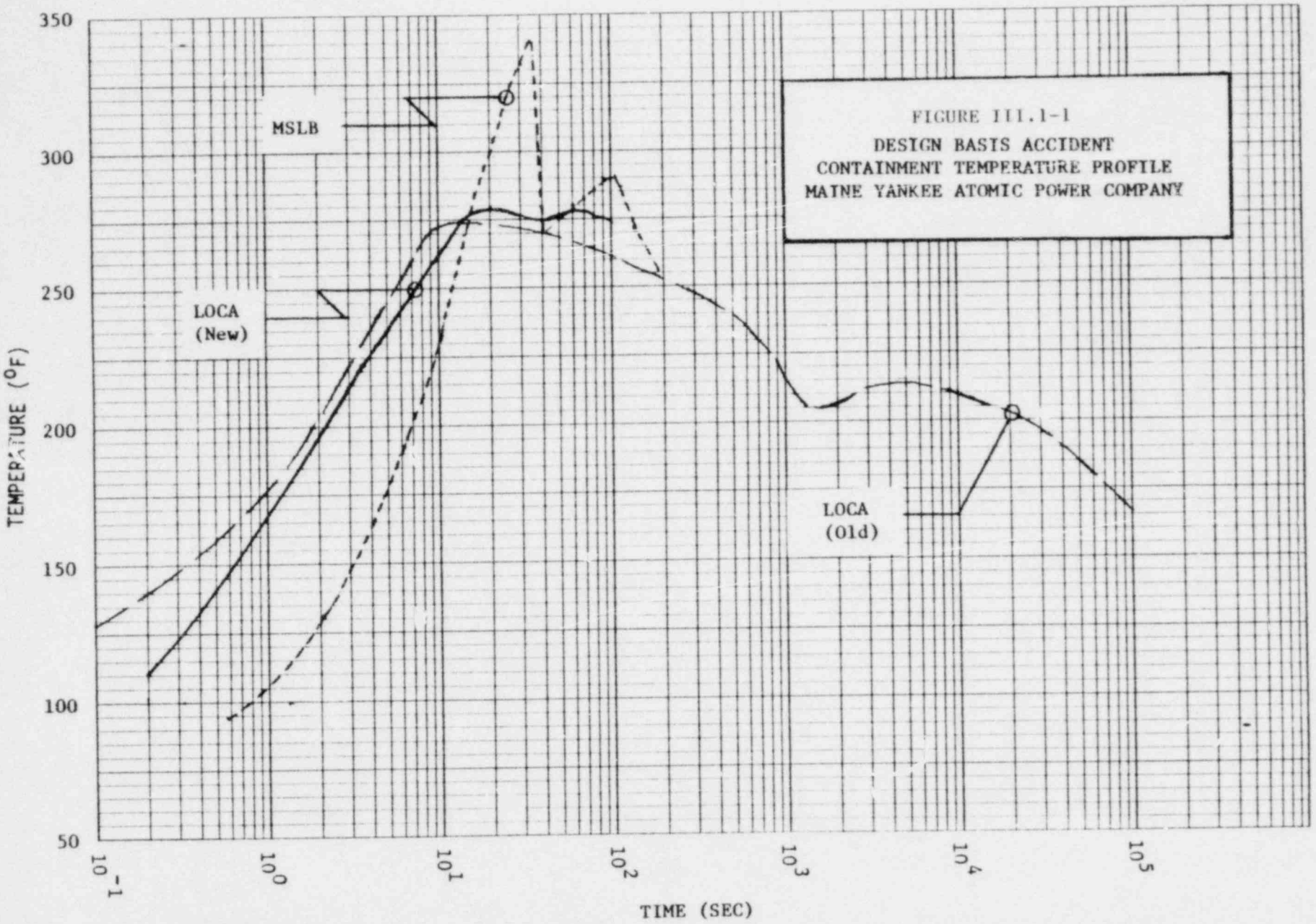


FIGURE III.1-1
DESIGN BASIS ACCIDENT
CONTAINMENT TEMPERATURE PROFILE
MAINE YANKEE ATOMIC POWER COMPANY

FIGURE III.1-1

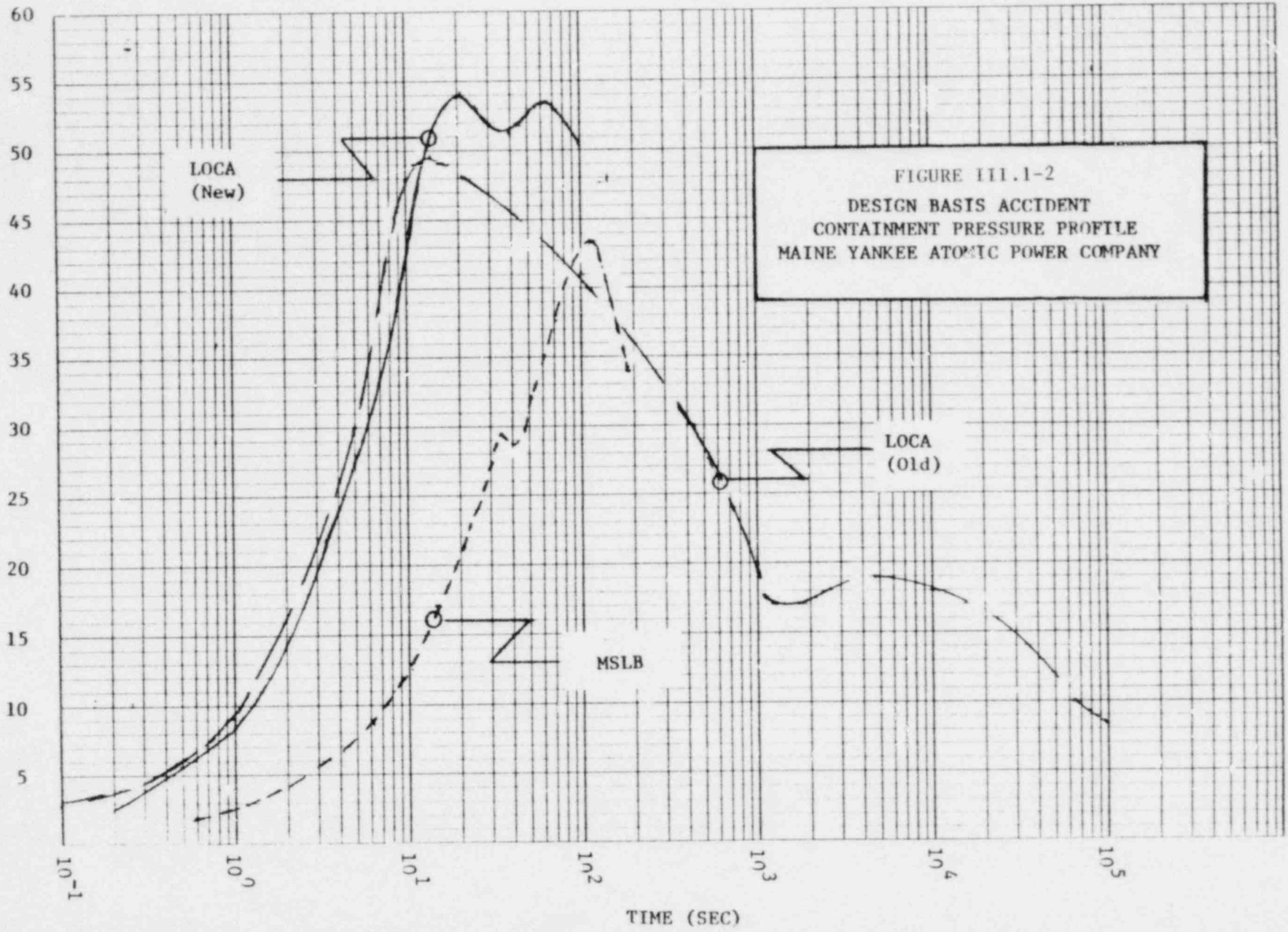


FIGURE III.1-2

DESIGN BASIS ACCIDENT
CONTAINMENT PRESSURE PROFILE
MAINE YANKEE ATOMIC POWER COMPANY

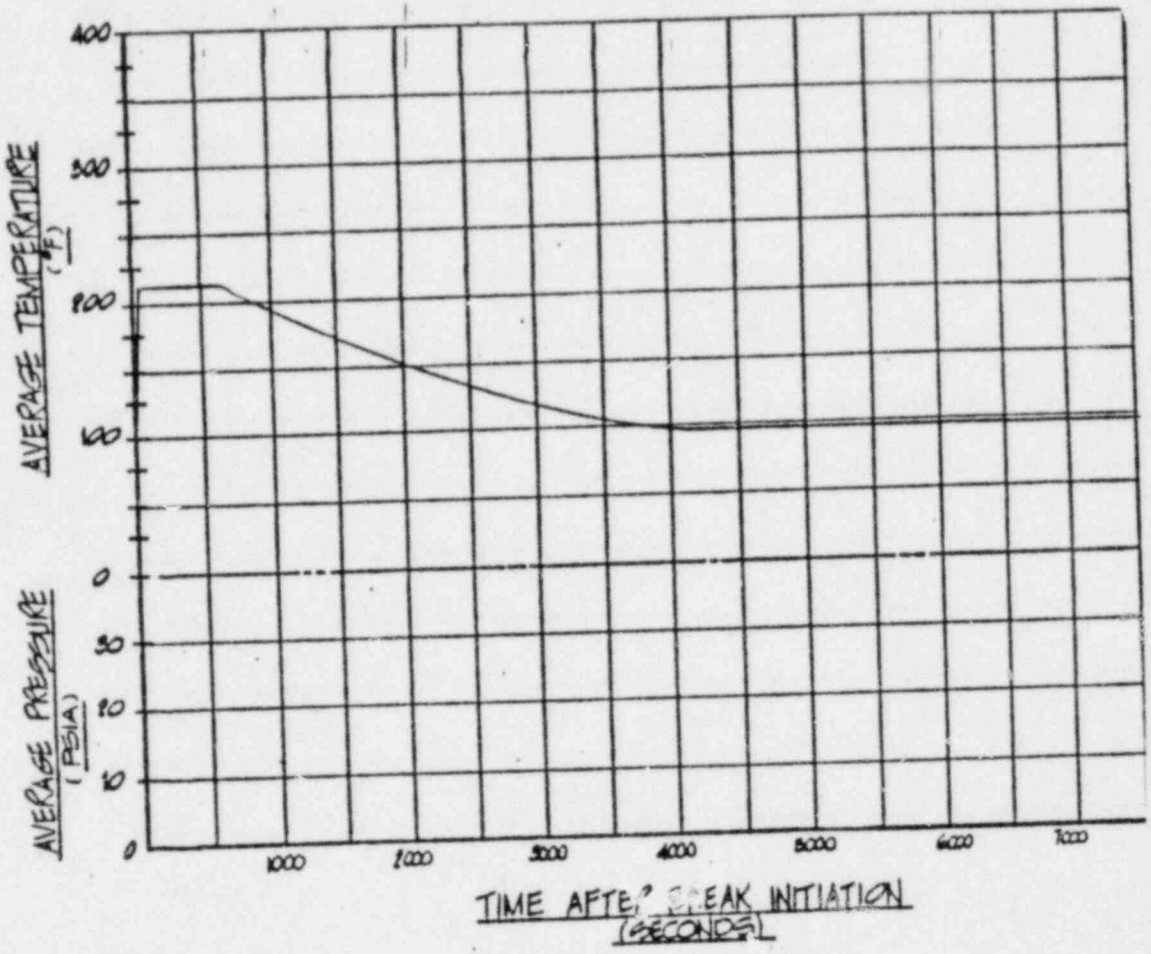
FIGURE III.1-2

FACILITY: MAINE YANKEE DOCKET NO.: 50-309 APPENDIX III.2

SERVICE CONDITIONS FOR: PRIMARY AUXILIARY BUILDING/AUX. FEEDWATER PUMP AREA

ENVIRONMENTAL PARAMETER	HIGH ENERGY LINE BREAK	POST-ACCIDENT RECIRCULATION
Temperature:	Fig. III.2-2 Fig. III.2-3 Fig. III.2-4 Fig. III.2-6	Fig. III.2-5 Fig. III.2-7 Fig. III.2-8
Pressure:	(See Temperature Profile)	N/A
Relative Humidity:	100%	Normal
Chemical Spray:	N/A	N/A
Radiation:	N/A	Note (III.2-1)
Submergence:	N/A	N/A

Note (III.2-1) Radiation Doses Due to Recirculation Fluids: Radiation doses to equipment in areas where radioactive fluids are recirculated from inside containment for long-term core cooling have been calculated in accordance with Supplement #2 of IEB 79-01B and NUREG-0588.

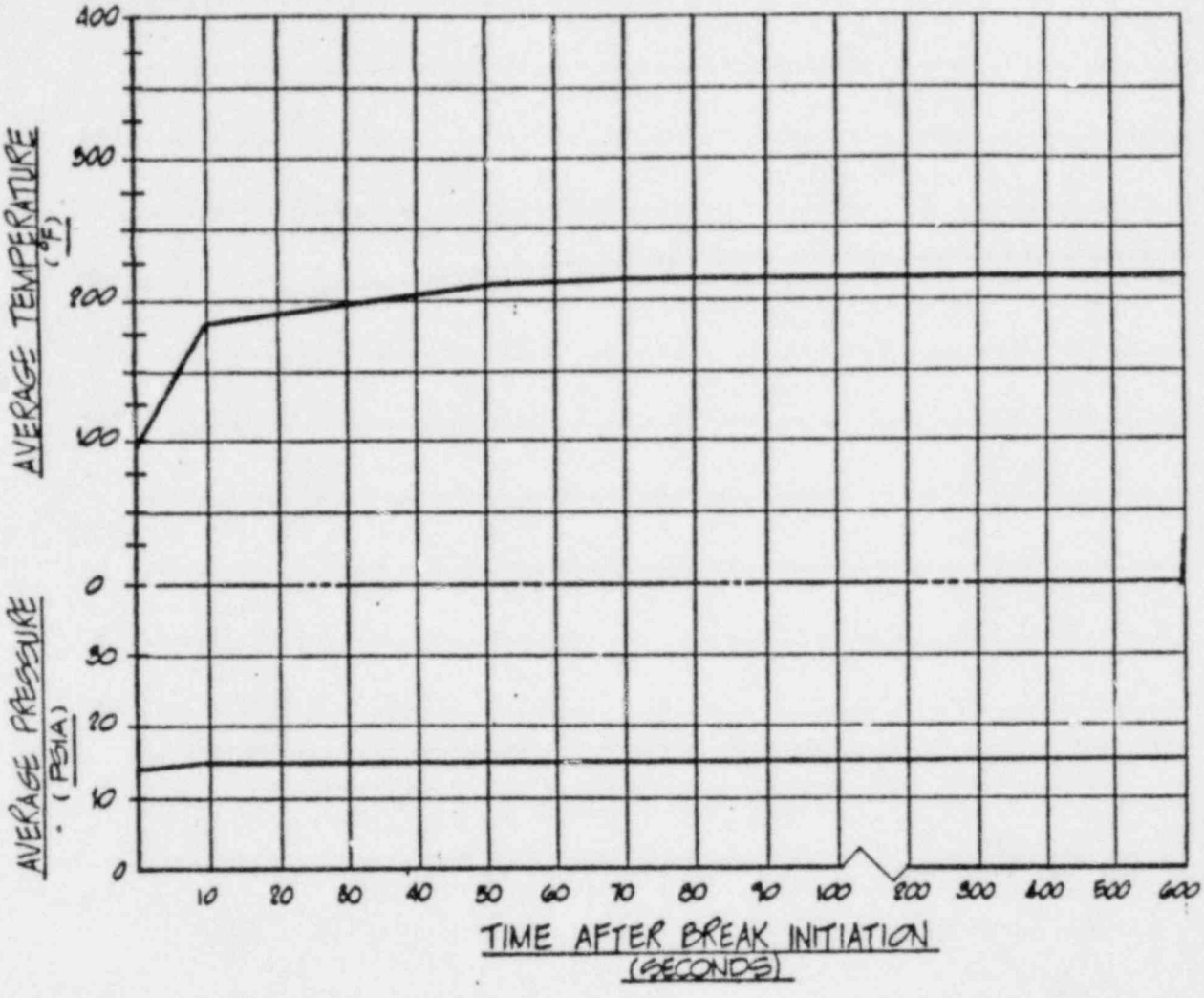


LONG TERM COOL DOWN AFTER CVCS LETDOWN LINE BREAK

MAINE YANKEE ATOMIC POWER STATION

TIME HISTORY FO PRIMARY AUX. BUILDING

Fig. III.2-2



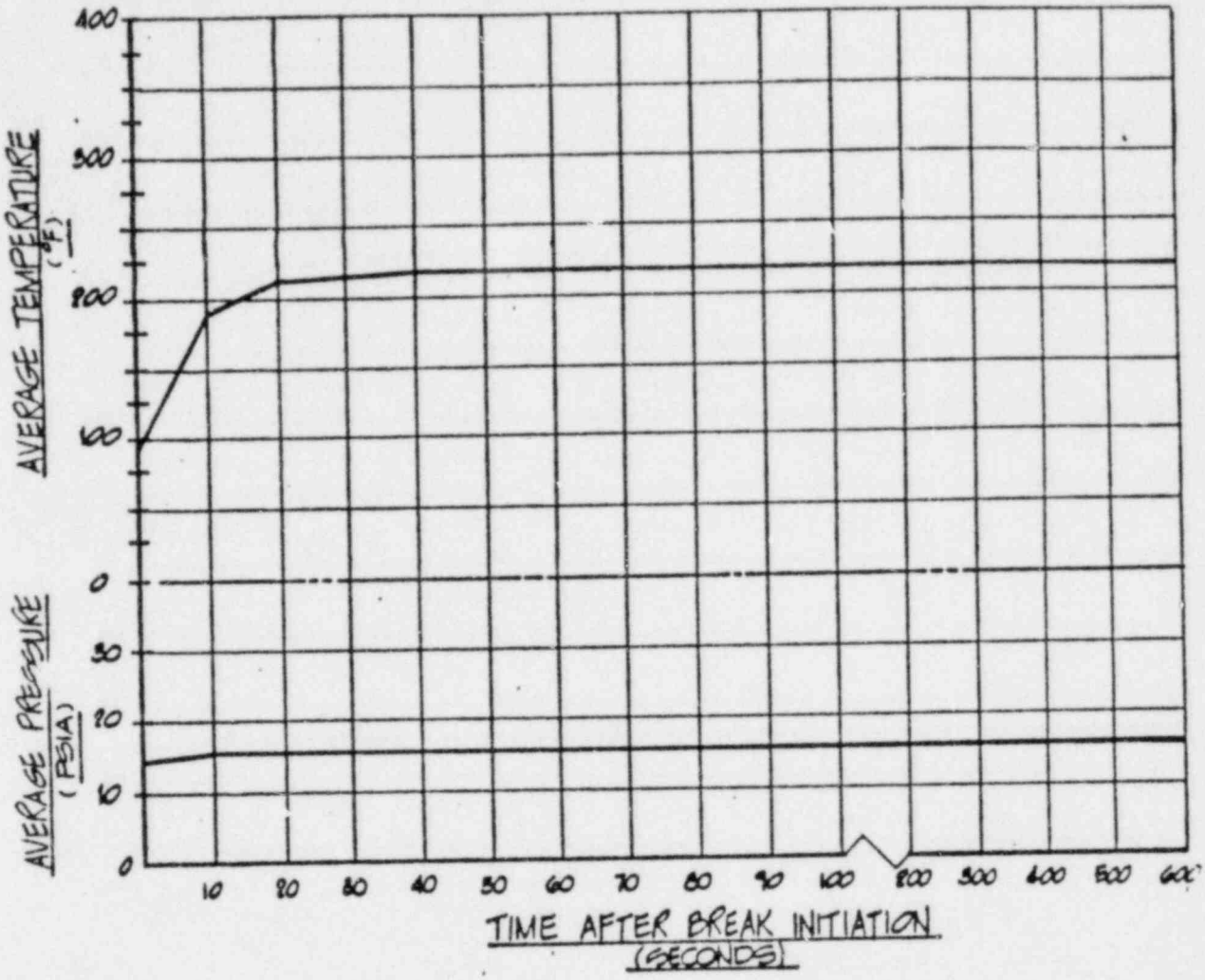
ELEVATION 21'

STEAM GEN. BLOWDOWN LINE BREAK IN VOLUME 4

MAINE YANKEE ATOMIC POWER STATION

TIME HISTORY FOR VOLUME 21 IN PRIMARY AUX. BLDG

Fig. III.2-3



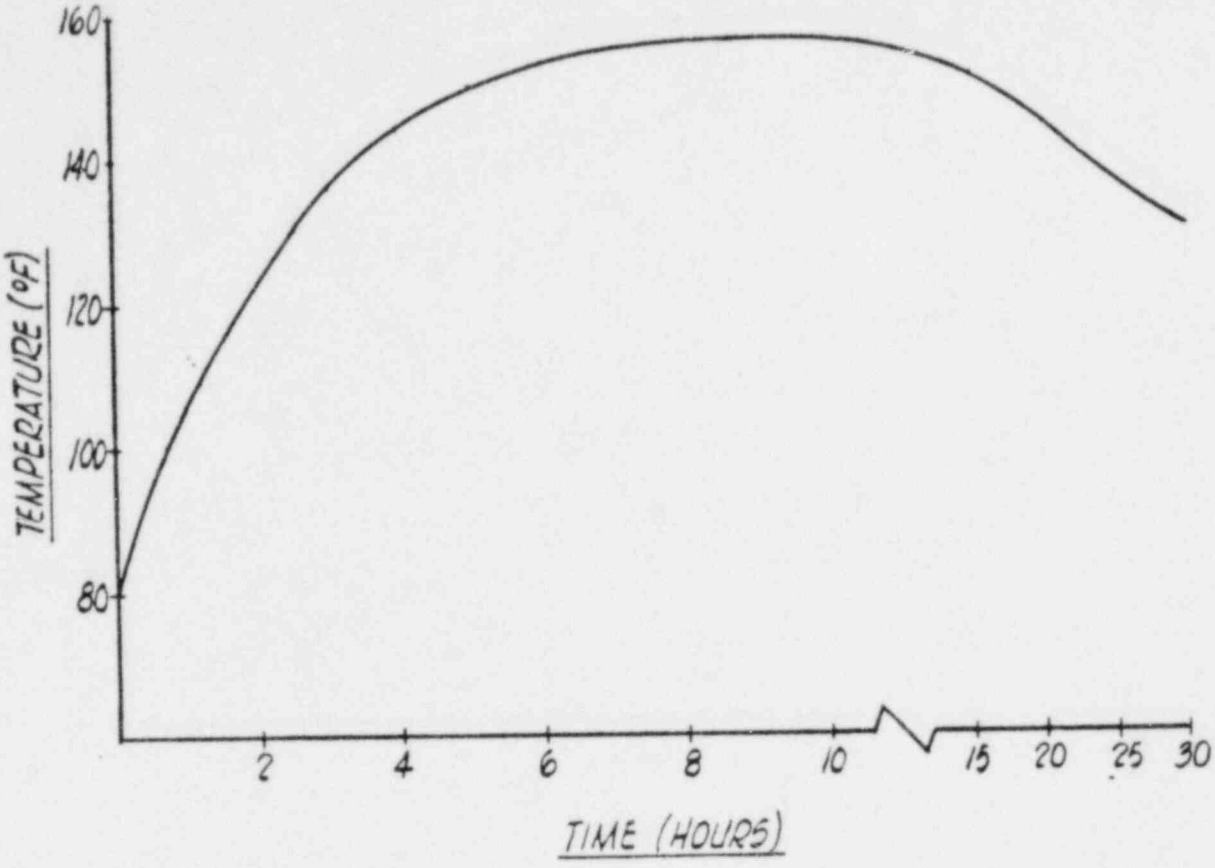
ELEVATION 21'

CVCS LETDOWN LINE
BREAK IN VOLUME 34

MAINE YANKEE
ATOMIC POWER
STATION

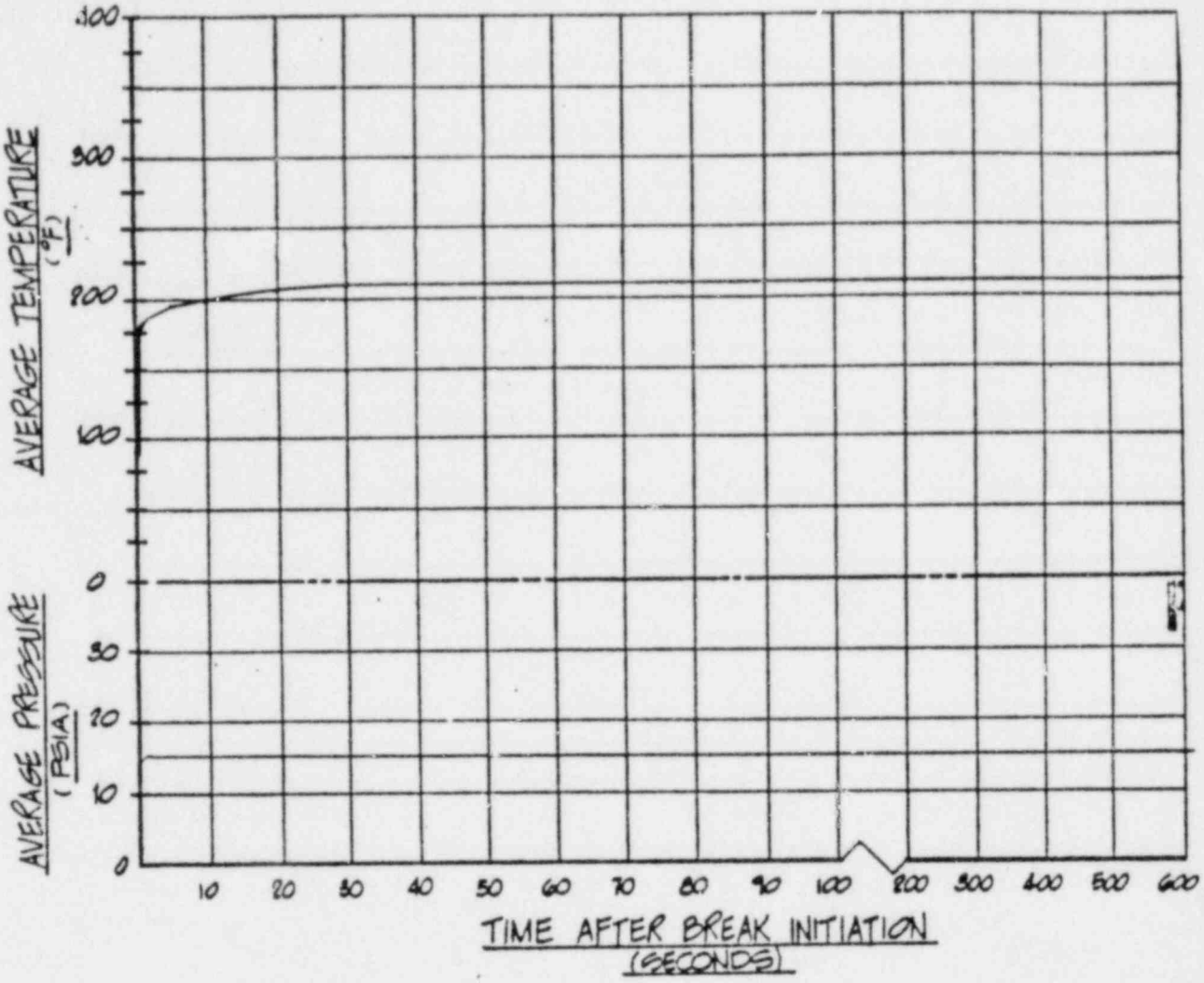
TIME HISTORY FOR
VOLUME 24 #49
PRIMARY AUX BLDG

Fig. III.2-4



MAINE YANKEE U.F.S. — HEAT-UP CURVE
PAB - EL EL 11'-0" - WEST PIPING ROOM

Fig. III.2-5



ELEVATION 11'

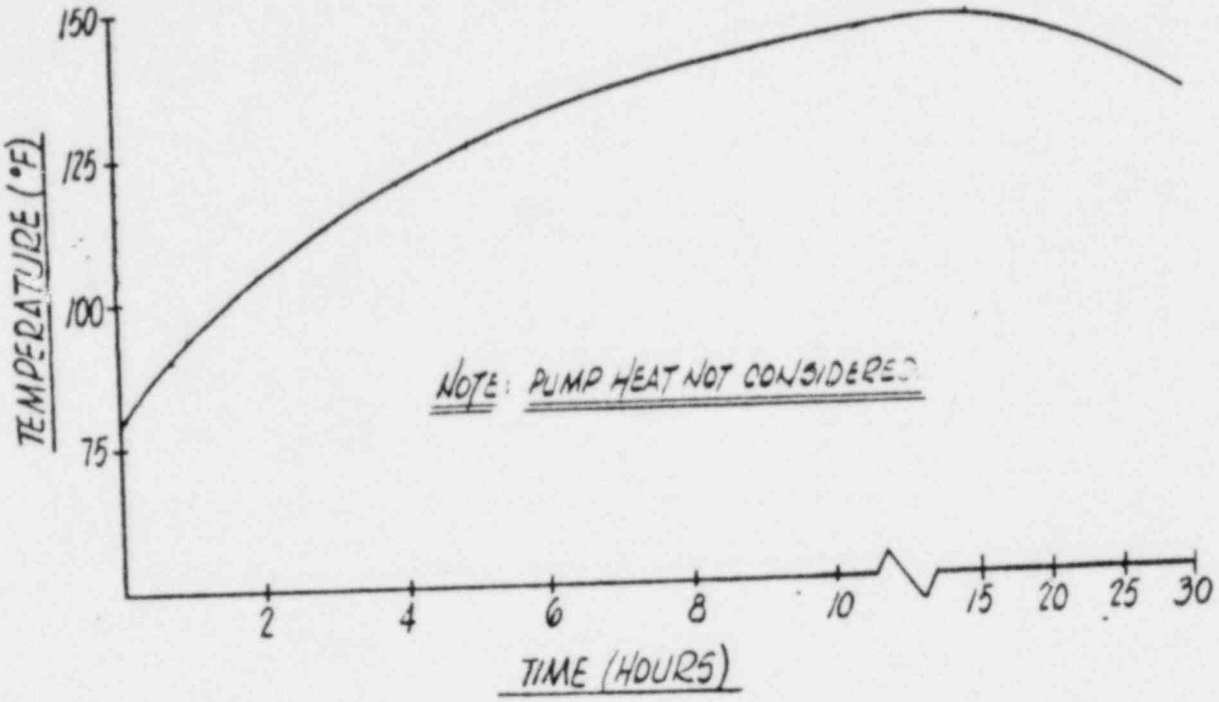
CVCS ETDOWN LINE BREAK

* TYPICAL FOR VOLUMES 29, 30, 3 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 48 49

MAINE YANKEE ATOMIC POWER STATION

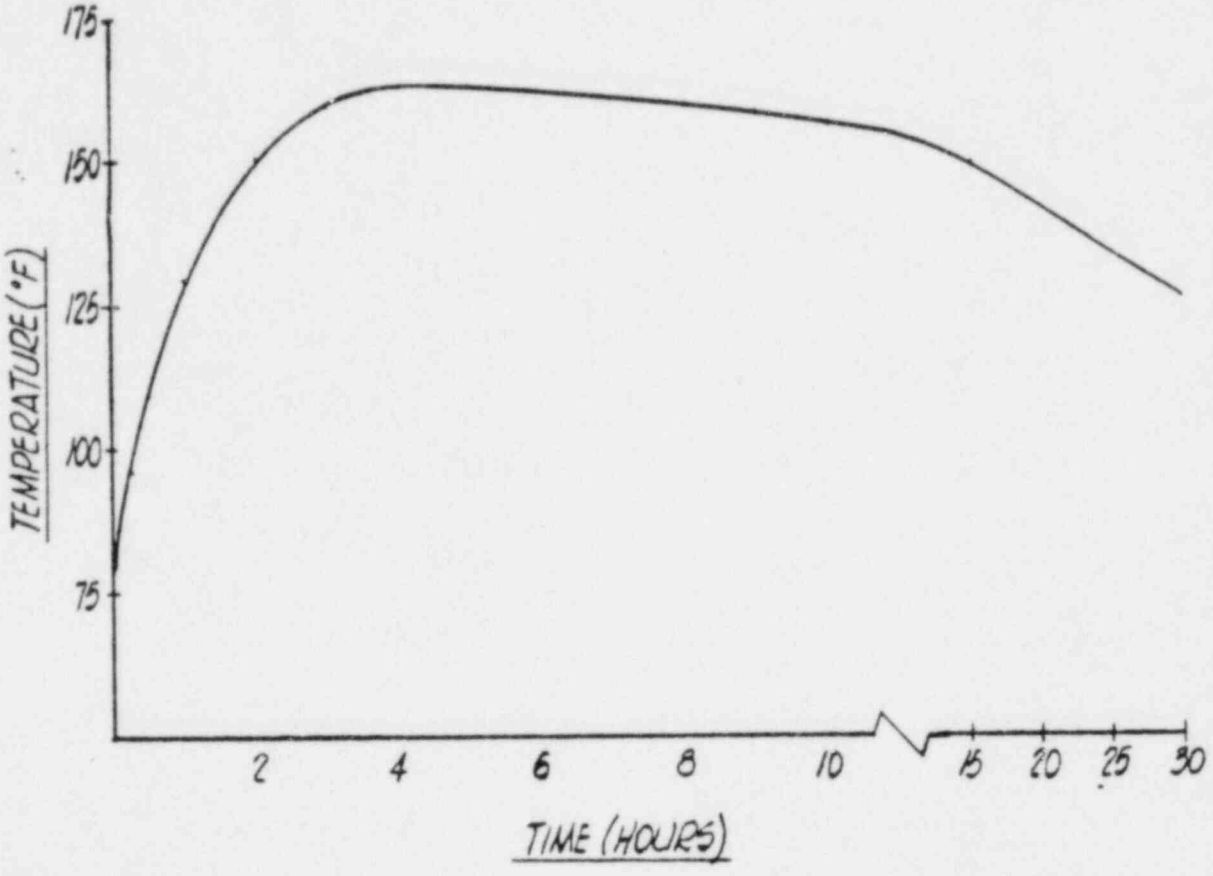
TIME HISTORY FOR VOLUME 34 IN THE PRIMARY AUX. BUILDING *

Fig. III.2-6



MAINE YANKEE A.P.S. - HEAT UP CURVE
PAB — EL. EL. 21-0". CHARGING PUMP ROOM

Fig. III.2-7



MAINE YANKEE A.P.S. – HEAT-UP CURVE
PAB – EL. EL. 21'-0" – VALVE ACCESS AREA

Fig. III.2-8

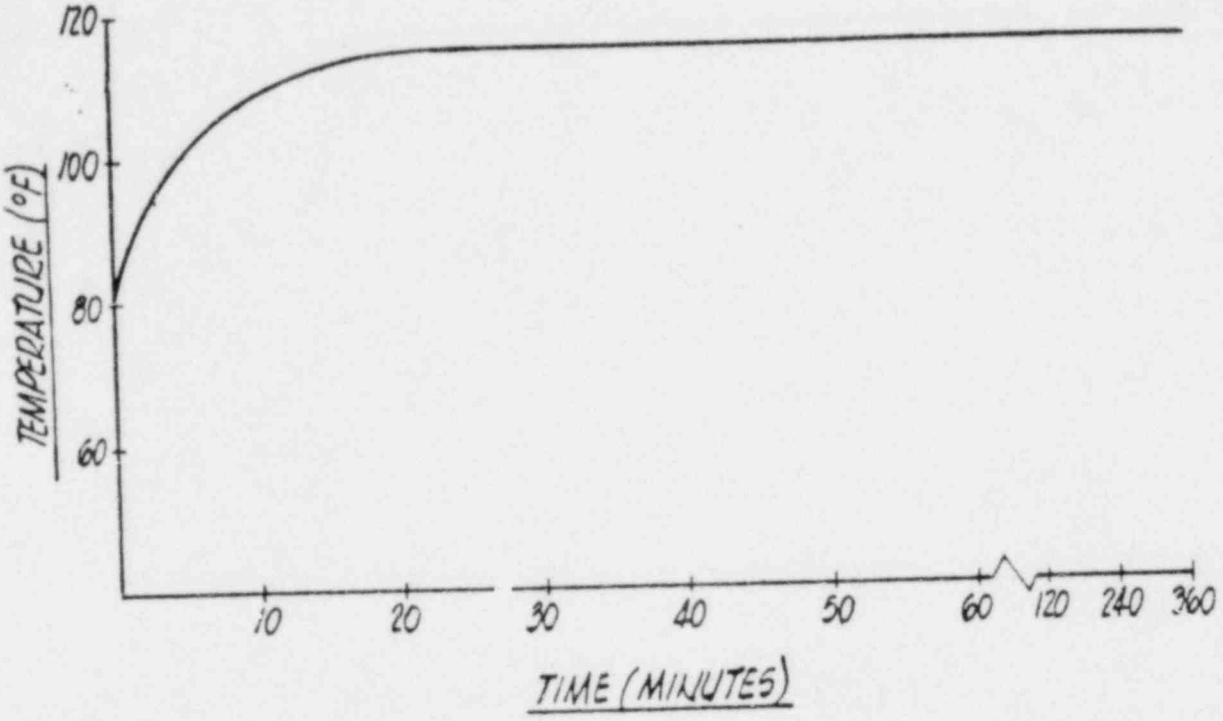
FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III.3

SERVICE CONDITIONS FOR: SPRAY PUMP AREA

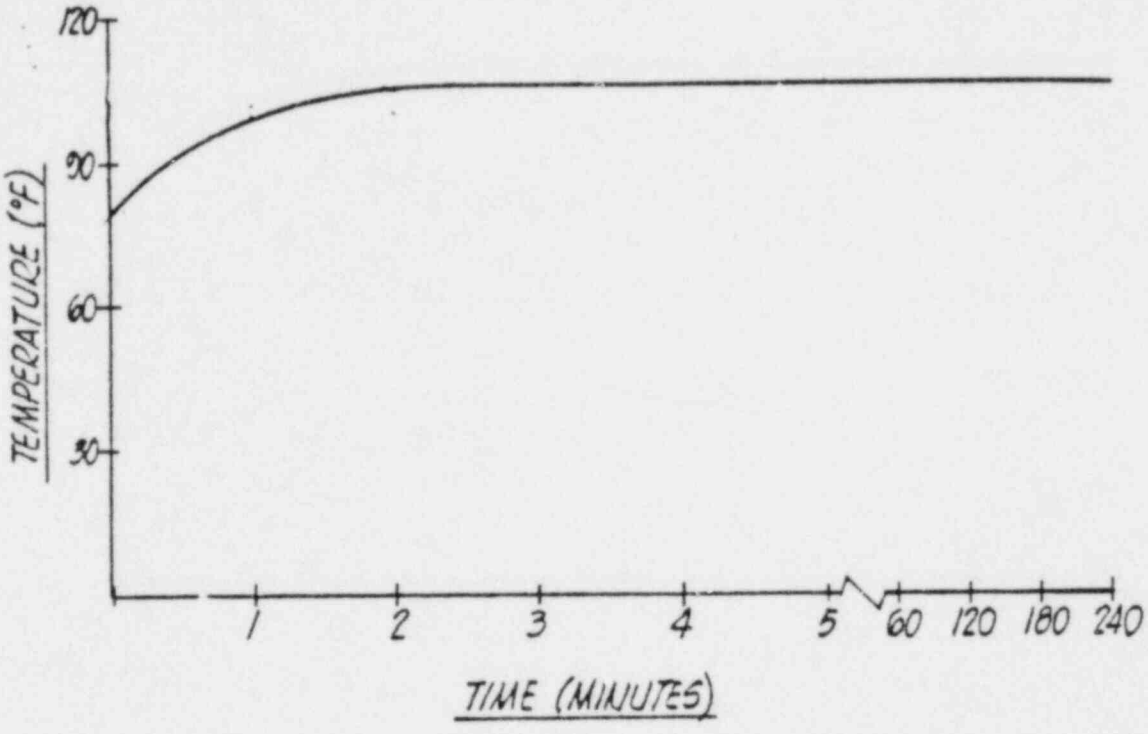
ENVIRONMENTAL PARAMETER	HIGH ENERGY LINE BREAK	POST-ACCIDENT RECIRCULATION
Temperature:	N/A	Fig. III.3-1 Fig. III.3-2 Fig. III.3-3
Pressure:	N/A	Atmospheric
Relative Humidity:	N/A	Normal
Chemical Spray:	N/A	N/A
Radiation:	N/A	Note (III.3-1)
Submergence:	N/A	N/A

Note (III.3-1) Radiation Doses Due to Recirculatioing Fluids: Radiation doses to equipment in areas where radioactive fluids are recirculation from inside containment for long-term core cooling have been calculated in accordance with Supplement #2 of IEB 79-01B and NUREG-0588.



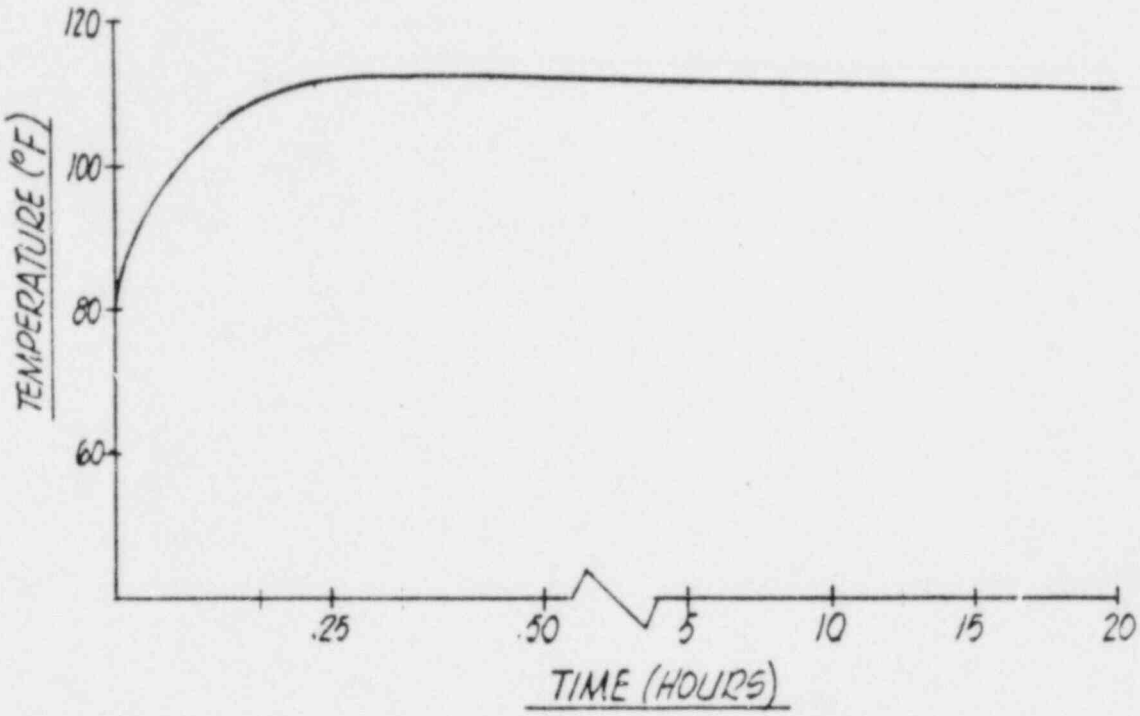
MAINE YANKEE A.P.S. — HEAT-UP CURVE
CS & ENG BLDG-FL EL 12'-6". DISCHARGE HEADER ROOM

Fig. III.3-1



MAINE YANKEE A.P.S. — HEAT-UP CURVE
PUMP ROOM - EL. EL. 14'-6" - SPRAY & RHR PUMP AREA

Fig. III.3-2



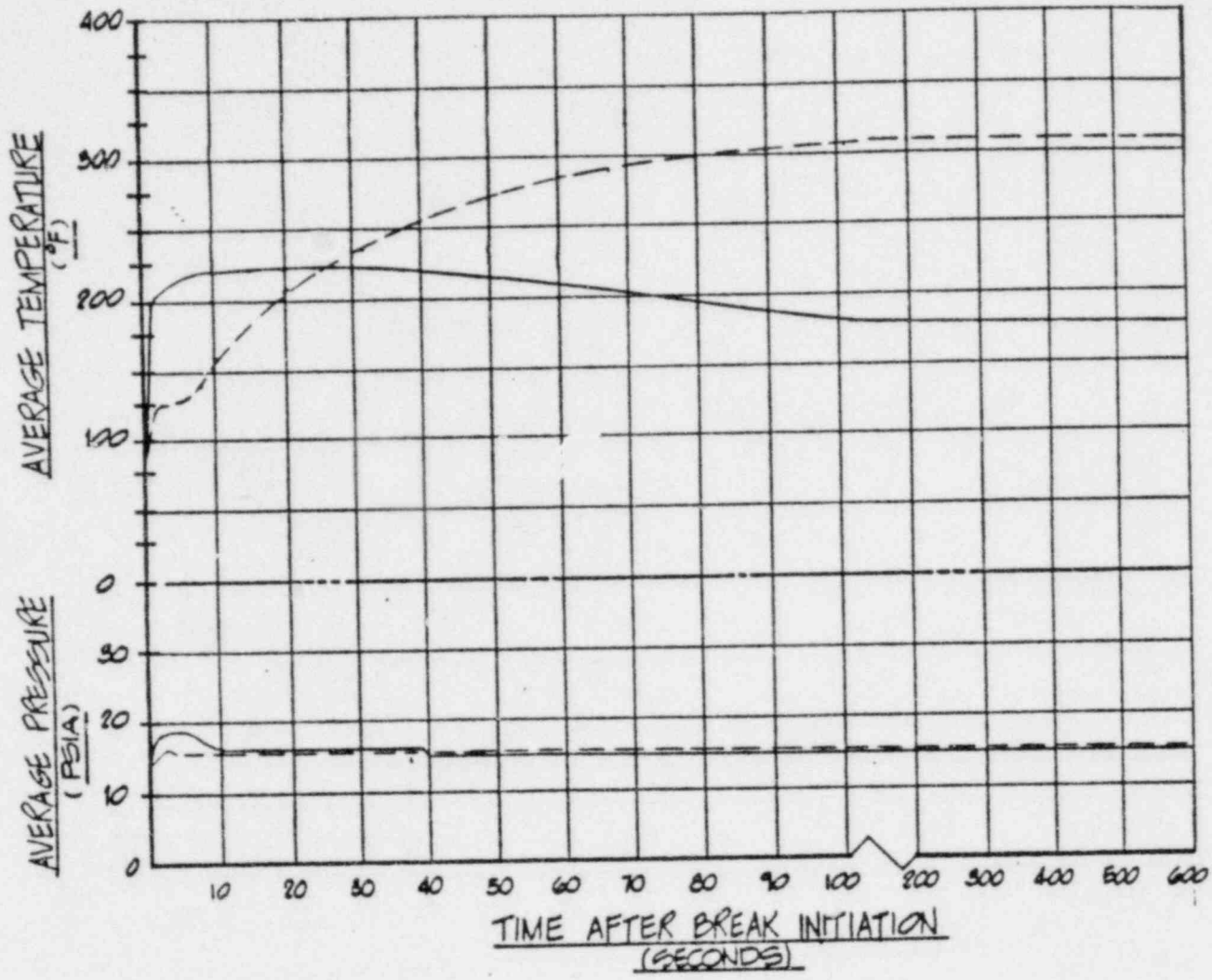
MAINE YANKEE A.D.S. - HEAT-UP CURVE
PUMP ROOM A EL. 16'-9"-6'-0" SPRAY 1 RHR PUMP LEG

Fig. III.3-3

FACILITY: MAINE YANKEE DOCKET NO.: 50-309 APPENDIX III.4

SERVICE CONDITIONS FOR: STEAM AND FEEDWATER VALVE AREA

ENVIRONMENTAL PARAMETER	HIGH ENERGY LINE BREAK	POST-ACCIDENT RECIRCULATION
Temperature:	Fig. III.4-1 Fig. III.4-2	N/A
Pressure:	(See Temperature Profile	N/A
Relative Humidity:	100%	N/A
Chemical Spray:	N/A	N/A
Radiation:	Note (III.4-1)	N/A
Submergence:	N/A	N/A



ELEVATION 21'

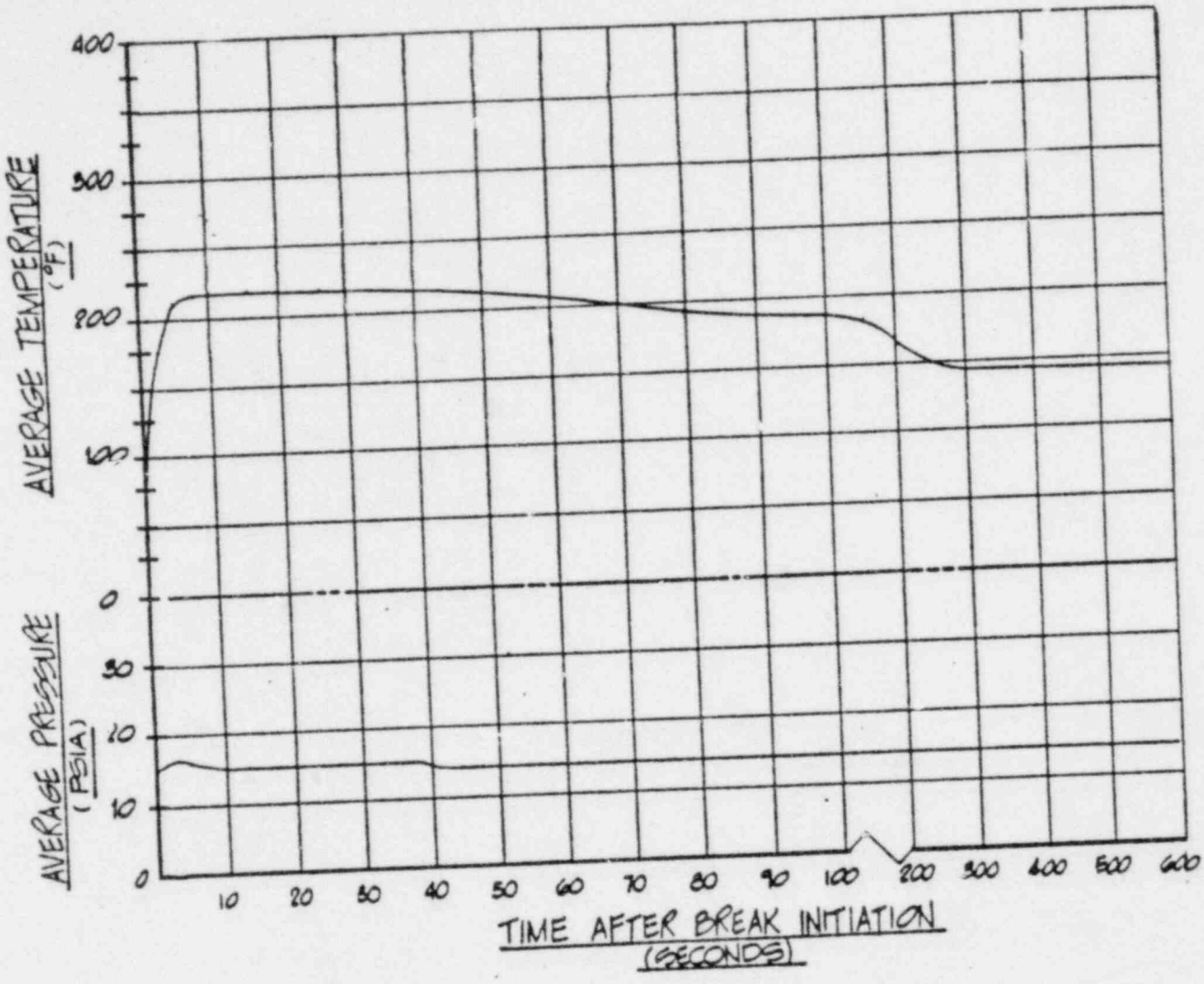
- - - STEAM TO AUX. FEED PUMP TURBINE LINE BREAK

—— MAIN FEED LINE BREAK

MAINE YANKEE ATOMIC POWER STATION

TIME HISTORY FOR VOLUME 1 IN STEAM VALVE ENCLOSURE

Fig. III.4-1



ELEVATION 21'36.46

MAIN FEED LINE BREAK

MAINE YANKEE ATOMIC POWER STATION

TIME HISTORY FOR VOLUMES 2,3,4 IN CABLE PENETRATION ROOM

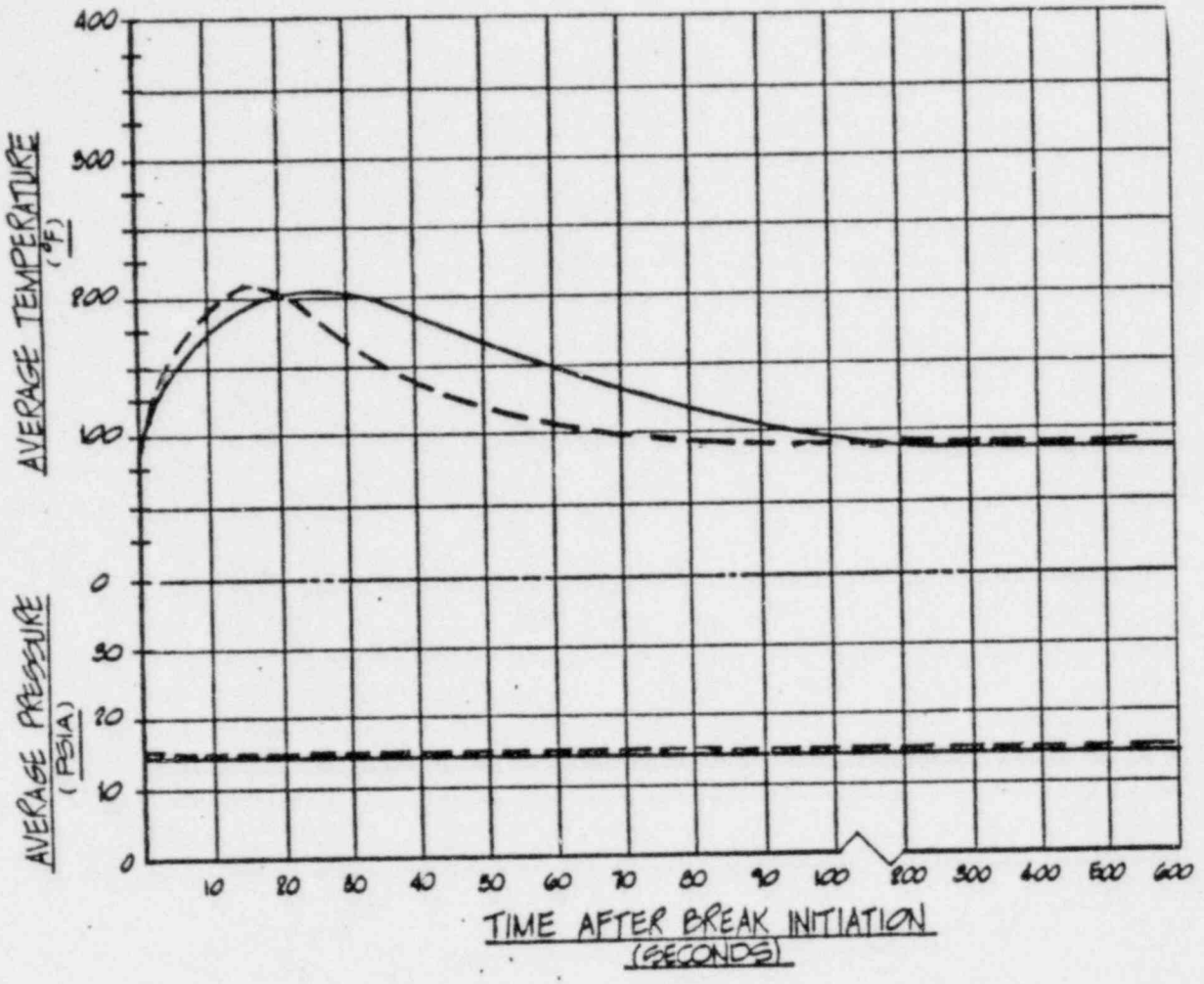
Fig. III.4-2

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX III.5

SERVICE CONDITIONS FOR: TURBINE BUILDING

ENVIRONMENTAL PRAMETER	HIGH ENERGY LINE BREAK	POST-ACCIDENT RECIRCULATION
Temperature:	Fig. III.5-1	N/A
Pressure:	(See Temperature Profile	N/A
Relative Humidity:	100%	N/A
Chemical Spray:	N/A	N/A
Radiation:	N/A	N/A
Submergence:	N/A	N/A



ELEVATION 81'

——— FEEDLINE BREAK IN VOLUME 7

- - - - STEAMLINE BREAK IN VOLUME 28

MAINE YANKEE ATOMIC POWER STATION

TIME HISTORY FOR VOLUME 1 & 2 IN TURBINE BLDG

Fig. III.5-1

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

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DOCUMENTATION REFERENCE INDEX

001 Letter, Combustion Engineering, Inc., to Maine Yankee Atomic Power Company, MYC-4169, dated January 25, 1978. (This letter contains revised containment pressure and temperature tables for Maine Yankee.)

002 Maine Yankee Atomic Power Station Technical Specification 3.7 (pages 3.7-1 and 3.7-2) and FSAR Section 6.2.

003 Maine Yankee Atomic Power Station FSAR Question/Answer 6.10.

004 Maine Yankee FSAR, Section 9.13.3.

005 Maine Yankee Atomic Power Station FSAR Question/Answer 6.11.

006 Maine Yankee Emergency Procedure 2-14, "Long-Term Core Cooling Realignment".

007 Engineering Analysis #MY-#, "Radiation Dose Calculation".

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015 Test Report #F-C2857, "Test of Electrical Cables Under Simulated Post-Accident Reactor Containment Service".

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023 Test Report: #F-C3341, "Long-Term Testing of Electrical Cables Under Simultaneous Exposure to Gamma Radiation, Steam and Chemical Spray", dated January, 1973.

024 Test Report: #2204-51-B-006, "Maximum Credible Accident Test on Electronic Transmitters".

025 Qualification Tests of Differential Transmitters Under Nuclear Radiation.

026 Test Report: "Qualification of Firewall III Class 1E Electric Cables".

027 Test Report: #IPS-383, "Qualification Test Program of Electrical Instrumentation Cables for Virginia Electric and Power Company for Surry Power Station - Units 1 and 2", dated 11/27/78.

028 Letter, Anaconda (Continental) to Yankee Atomic Electric Company, dated May 30, 1979.

029 Letter with Enclosure, Anaconda (Continental) to Stone and Webster, dated July 11, 1978.

030 Letter, Continental Wire and Cable Corporation to Stone and Webster, dated June 2, 1971.

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DOCUMENTATION REFERENCE INDEX

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034 Test Report: #ER-184, "DBA Test - Stone and Webster Cable Assembly", by D. G. O'Brien, Inc., dated September, 1971.

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040 Vendor Data for LPSI Pumps.

041 Vendor Data for LPSI Pumps.

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056 CE Specification No. 4467-488-701, A Project Engineering Specification for a Pressurizer Heater Proportional Power Control Unit, Combustion Engineering, Inc., Utility Division, Windsor, Connecticut.

APPENDIX IV.2

INDEX OF FUNCTIONAL DESCRIPTIONS

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INDEX OF FUNCTIONAL DESCRIPTIONS (Cont'd)

APPENDIX IV.2

INDEX OF FUNCTIONAL DESCRIPTIONS (Cont'd)

APPENDIX IV.2

INDEX OF FUNCTIONAL DESCRIPTIONS (Cont'd)

IV.2-1 HCV-242 Reactor Coolant Letdown Valve CVCS-1

Isolation valve on letdown line from the regenerative heat exchanger. Valve closes on a safety injection isolation signal. Qualification time will be one hour, hostile environment for inside containment.

IV.2-1 HCV-251, 261, 271 Seal Water Return Isolation Valve CVCS-1

Isolation valve for reactor coolant pump seal water return line. Valve closes on a CIS. Qualification time will be one hour, hostile environment for inside containment.

IV.2-2 P-12A, B LPSI Pump LPSI-1

The LPSI pumps inject borated water from the refueling water storage tank (RWST) into the reactor coolant system upon a safety injection actuation signal. When a low level is reached in the RWST, a recirculation actuation signal (RAS) is generated and the LPSI pumps are automatically stopped. The pumps are available for use during the accident; then, after cold shutdown (>30 days), for long-term cooling (one year). Hostile environment will be radiation.

IV.2-3 HCV-327, 328 Residual Cooling Return Valve LPSI-4

HCV-327 and 328 provide isolation between the high pressure reactor coolant system (RCS) and the low pressure residual heat removal (RHR) system. HCV-327 and HCV-328 are interlocked with RCS pressure to prevent opening the valve unless the pressure is below RHR design limits and closed if the RCS pressure is increased to above RHR design limits. HCV-328 is also key locked and administratively controlled. These valves will be used <30 days after accident when the plant is in cold shutdown. Hostile environment will be that which is inside containment.

IV.2-4 PT-102A, B, C, D Pressurizer Pressure Transmitter RC-1

Used for input into the reactor protection system for reactor trip on high pressurizer pressure. Qualification will be one hour with hostile environment inside containment. Not required to operate after trip.

IV.2-5 PT-101X, 101Y Pressurizer Pressure Transmitter RC-2

PT-101Y To be used to give indication of RCS pressure. PT-101X will be used to determine RCS saturation temperature. Both are required long-term (one year) in hostile environment inside

containment.

IV.2-5 PT-102X, 102Y, 103 Pressurizer Pressure Transmitters RC-2

Input to determine temperature saturation of the RCS. Long-term (one year) in hostile environment of inside containment.

IV.2-5 LT-101X, 101Y Pressurizer Level Transmitter RC-2

To be used to determine pressurizer level until plant is into long-term cooling. Qualification time will be 30 days with hostile environment of inside containment.

IV.2-6 HCV-110, 111, 112 Fill Header Root Valves RC-3

Normally shut and are normally used to fill RCS loops with CVCS. Must be able to open 20-24 hours into accident for switchover to hot leg injection. Environment is inside containment.

IV.2-7 P-14A-1, 14B-1, 14S-1 HPSI Pump Lube Oil Pumps HPSI-6

Used to start HPSI pumps by circulating lube oil until gear drive lube pump is operating. Normally will run for ten seconds. Time period will be up to 30 days since HPSI's could be started and stopped in that time period. Hostile environment will be the same as HPSI pumps.

IV.2-7 P-14A-2, 14B-2, 14S-2 HPSI Pump Auxiliary Lube Oil Pumps HPSI-6

Used as backup to start HPSI pumps if failure of HPSI pump lube oil pump. Time period will be 30 days. Hostile environment will be the same as HPSI pumps.

IV.2-7 P-14S-1, 14S-2, 14S-3 HPSI Pump Gear Lube Pump HPSI-6

Used to supply lube oil to HPSI pump gear transmission box. Qualification time period will be 30 days. Hostile environment will be same as HPSI pumps.

IV.2-8 FN-17-1, 2, 3, 4, 5, 6 Fans CAR-1

Any five of six fans will be operating in conjunction with coil coolers which are used to cool and distribute containment air. P[illegible]-accident, one recirculation fan will be required to operate [illegible] day post-accident up to one year. The hostile environment will [illegible] inside containment conditions.

IV.2-9 LT-1213A, B, C, D Steam Generator Level Transmitter FW-1
LT-1223A, B, C, D
LT-1233A, B, C, D

Normally used to give S/G level indication. Input to reactor trip. Will be used to give S/G level indication during accident, up to when plant is into shutdown cooling. Time will be one year, as a mode of long-term cooling. Hostile environment will be inside containment conditions.

IV.2-10 P-14-A-3, P-14-B-3, P-14-S-3 High Pressure Safety Injection Gear Lube Oil Pumps HPSI-7

Used for lubrication of HPSI pumps. Used after circulating lube oil pump has operated normally for ten seconds. Time period will be up to 30 days since HPSI's could be started and stopped in that time period. Hostile environment will be the same as HPSI pumps.

IV.2-11 FI-331, 321, 311 HPSI Pump Discharge Flow Indication for Cold Leg Shutdown HPSI-5

Normally not operating, but will be used when cold leg injection is in use to verify cold leg injection. Will be used for 30 days until cold shutdown is reached. High energy line break of letdown line (CVCS) will cause hostile environment.

IV.2-12 FT-216 Loop Fill Header Flow Transmitter CVCS-4

Normally not in use except when loops are being filled. Will be used to indicate flow when this flow path is used for hot leg injection 20-24 hours after accident. Will be used for long-term cooling when hot leg injection is in use for 30 days until cold shutdown is reached. Radiation is only hostile environment.

IV.2-13 PT-352K, 353K Containment Spray Pump Discharge Header Pressure CS-3

Will be used to verify that the containment spray system is in operation by indicating discharge pressure of the containment spray pumps. Time period used will be up to 30 days. Hostile environment will be radiation due to recirculating fluids.

IV.2-14 P-14A, B, S Charging Pump (HPSI) HPSI-1

One of two pumps normally operating as part of Chemical and Volume Control System (CVCS). A third pump is an installed spare. Two pumps start on SIAS taking suction from RWST however, only one is required. On low RWST level, suction is manually transferred to the discharge of the Containment Spray (CS) Pumps which takes suction

from containment sumps. Pumps are available for (a period of 30 days which, at that time, the plant will be in cold shutdown).

IV.2-15 TV-2906 Carbon Dioxide Valve FP-1

Normally open, used for fire protection of containment. CIS/SIAS closes valve. Time to qualify is one hour for inside containment environment.

IV.2-16 TV-2001 Air Monitor Sample Valve CAAS-1

Normally open, sample of containment is continuous. CIS/SIAS closes valve. Time to qualify is one hour for inside containment environment.

IV.2-17 TV-3501, TV-3502 Pressurizer Sample Valves PS-1

Normally closed except to sample. CIS/SIAS closes valves for containment isolation. Not required to reopen. Qualification time is one hour with hostile environment of inside containment.

IV.2-17 TV-3503, 3504, 3505 Reactor Coolant Sample Valves PS-1

Normally closed except to sample. CIS/SIAS closes valves for containment isolation. Will be required to reopen after accident for sample of RCS liquid and for long-term, up to one year. Hostile environment is inside containment.

IV.2-17 TV-3507A Reactor Coolant Sample Valves PS-1

Normally closed except to sample. CIS/SIAS closes valves for containment isolation. Will be required to reopen after accident for sample of RCS liquid and long-term, up to one year. Hostile environment is HELB and radiation.

IV.2-18 TV-3410 Drain, Quench Tank and Neutron Shield Tank Cooler Valve

TV-3414 Reactor Coolant Pumps, Air, Oil and Seal Water Cooler Valve

TV-3416 Drive Mechanism Cooler Valve PCC-1

These valves are normally open, feeding PCC water to the above equipment. CIS/SIAS closes the valves for containment isolation. Valves are not required to reopen. Qualification time will be one hour with hostile environment of inside containment.

IV.2-19 TV-3002 Quench Tank Pump Discharge Valve PV-1

Quench tank discharge isolation valve closes on containment isolation signal or safety injection actuation signal. Qualification time will be one hour with hostile environment inside containment.

IV.2-19 TV-3301 Hydrogenated Vent Header Isolation Valve PV-1

Isolation valve for hydrogenated vent header. Valve isolated on containment isolation signal for SIAS. Qualification time will be one hour with hostile environment for inside containment.

IV.2-20 TV-3303 Containment Sump Discharge Valve PAM-6

Containment sump isolation valve. Closes on a containment isolation signal or safety injection actuation signal. Qualification time will be one hour with hostile environment for inside containment.

IV.2-21 HCV-257 High Pressure Drain Cooler Outlet Valve CVCS-3

Drain cooler outlet isolation valve closes on a containment isolation signal or safety injector actuation signal. Qualification time will be one hour, hostile environment for inside containment.

IV.2-22 TCV-210K Reactor Coolant Letdown Valve CVCS-2

Controls outlet temperature of letdown line from regenerative heat exchanger. The valve closes on a safety injection actuation signal. Qualification time will be one hour, hostile environment for inside containment.

IV.2-23 HCV-314, 324, 334 Safety Injection Tank Fill Valve HPSI-3

Normally closed, FC valve. SIAS closes valve. Once closed in SIAS, no longer needed to operate. One hour qualification time, inside primary containment.

IV.2-24 Safety Injection Test and Tank Sample Valve LPSI-3

This valve provides containment isolation inside the containment for the safety injection tank sample line upon a containment isolation signal and SIAS. Qualification time will be one hour with hostile environment for primary containment.

IV.2-25 TE-111X, 121X, 131X Reactor Temperature and Detectors RC 6

Used to determine natural circulation of RCS and indicate RCS temperature long-term (one year) in hostile environment of inside containment.

IV.2-26 Radiation Detector PAM-2

To be used to monitor radiation levels in the containment. Required to determine dose population may receive if release was made. Long-term (one year) in hostile environment of inside containment.

IV.2-27 T/C-S11, E13, G6, T4 Thermocouples RC-7

Incore thermocouples, used to determine core temperature. Long-term (one year) inside containment.

IV.2-28 Acoustic Transmitter PAM-9

To be used to determine PORV's and stop valve's position. Qualification time will be 30 days with a hostile environment of inside containment.

IV.2-29 Acoustic Accelerometer PAM-10

Used to determine PORV's and stop valve's position. Qualification time will be 30 days with a hostile environment inside of containment.

IV.2-30 PT-2013, 2014 Containment Pressure PAM-8

Used to indicate containment pressure. Long-term (one year) hostile environment, similar to inside containment.

IV.2-31 Hydrogen Analyzer PAM-1

To be used to analyze containment atmospheric to determine hydrogen concentration. To be used after the accident long-term >1 year.

IV.2-32 LT-307K, 308K Containment Sump Level Transmitter PAM-6

Used during accident to indicate sump level. Long-term (one year) in hostile environment of inside containment.

IV.2-33 HCV-313, 323, 333 Auxiliary HPSI Flow Control Valve HPSI-2

Normally closed, fail as is valves. Valves open on SIAS. Path is for cold leg injection. Once open on SIAS, no longer needed to operate. Hostile environment will be HELB, letdown line. One hour qualification time.

IV.2-33 HCV-300, 301, 302, 303 HPSI Pump Discharge Valve HPSI-2

Normally closed, fail as is valves. Valves HCV-301, 302 open on SIAS. Valves HCV-300, 303 remain closed and are only open if respective valve fails to open. HCV-300 and 303 are opened by the operator in the control room. Between 20 and 24 hours after the accident, one flow path to the cold leg is isolated by closing either HCV-301 or 302 to start hot leg injection. Hostile environment will be radiation valves 300 and 303 will only operate for SIAS open, assumed time of one hour. Hostile environment will be HELB, letdown line.

IV.2-33 HCV-311, 321, 331 HPSI Flow Control Valves HPSI-2

Normally closed, fail as is valves. Valves open on SIAS. Path is cold leg injection. Once open on SIAS, no longer needed to operate. Hostile environment will be HELB, letdown line. Will be required to qualify for one hour.

IV.2-34 HCV-254, 255 Charging Line Isolation Valve HPSI-4

Normally open valves as part of CVCS charging system. SIAS closes valves. Once SIAS closed the valves, not needed to reopen. One hour qualification time, HELB letdown line.

IV.2-35 HCV-145, 146 Pressurizer Relief Isolation Valves RC-4

Used to isolate RCS if PORV's remain open. Qualification time will be up to 30 days once plant is in cold shutdown. Hostile environment will be inside containment.

IV.2-36 MOV-3207, 3208 Reactor Containment Sump Discharge to Injection Pump Valves CS-2

Normally closed valves, open on RAS valves aligned to suction of CS pumps to sump. Will be required to open once RWST is drained. Time will be 30 days. Will not be used once plant is in cold shutdown. Hostile environment will be radiation.

IV.2-36 MOV-3209, 3210 Residual Heat Exchanger to Charging Pump Valves CS-2

Normally closed valves, open on RAS, valves aligned to discharge of RHR heat exchanger to part of flow goes to HPSI suction. Will be required to open on low RWST level. Qualification time will be 30 days. Once plant is in cold shutdown and into RHR the valves are not needed. Hostile environment will be radiation.

IV.2-36 MOV-3211, 3212 Residual Heat Exchanger to Containment Spray Valve CS-2

Normally closed valves, open on CSAS, to direct flow from CS pumps to containment spray headers. Will be required to shut once plant is into cold shutdown after 30 days. Hostile environment will be radiation.

IV.2-37 P-61A, B, S Containment Spray Pump CS-1

There are two containment spray pumps and one installed spare which can also be used as a spare LPSI pump. Pumps normally not in use. Two CS pumps start on SIAS and take suction from RWST to spray water into containment to reduce containment pressure and remove iodine. Only one CS pump is required to operate. Once low level is indicated in the RWST, the suction of the CS pump is transferred to containment sumps. Part of the CS pump discharge is transferred to the suction of the HPSI's. The remaining flow will continue to containment spray. After cold shutdown is reached (30 days), the pumps are no longer needed. Hostile environment will be radiation.

IV.2-38 FT-312, 322, 332 LPSI Discharge Flow Transmitters LPSI-5

Normally not operating. Will be used when LPSI injection to cold leg is in use to verify LPSI injection into the cold leg during shutdown cooling. This is long-term (one year) after 30 days. Hostile environment will be radiation.

IV.2-39 P-9A, B Primary Component Cooling Water Pump PCC-2

Normally one is operating. During an accident and post-accident only one of two pumps will be required to operate. Qualification time will be long-term. Hostile environment will be a feedwater or steamline break in the turbine building.

IV.2-40 P-10A, B Secondary Component Cooling Water Pump SCC-1

Normally one is operating. During an accident and post-accident only one of two pumps will be required to operate. Qualification time will be long-term. Hostile environment will be a feedwater or steamline break in the turbine building.

IV.2-41 Pressurizer Proportional Heaters RC-5

The pressurizer proportional heaters are normally in use to control RCS pressure in conjunction with pressurizer spray. Post-accident, they will also be used as a method of control of RCS pressure. Qualification time of associated equipment will be up to 30 days (cold shutdown) with a hostile environment of inside containment.

IV.2-42 PC-224X, Y, Z HPSI Suction Pressure Control Switch HPSI-8

Switches used to trip respective HPSI pump on low suction NPSH. Normally operating if its respective HPSI pump is operating. Qualification time will be 30 days into accident (cold shutdown) for hostile environment of the HPSI pumps.

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APPENDIX IV.3

MAINE YANKEE

ENVIRONMENTAL QUALIFICATION PROFILES

FACILITY: MAINE YANKEE
DOCKET NO.: 50-309

APPENDIX IV.3

MAINE YANKEEE

ENVIRONMENTAL QUALIFICATION PROFILES

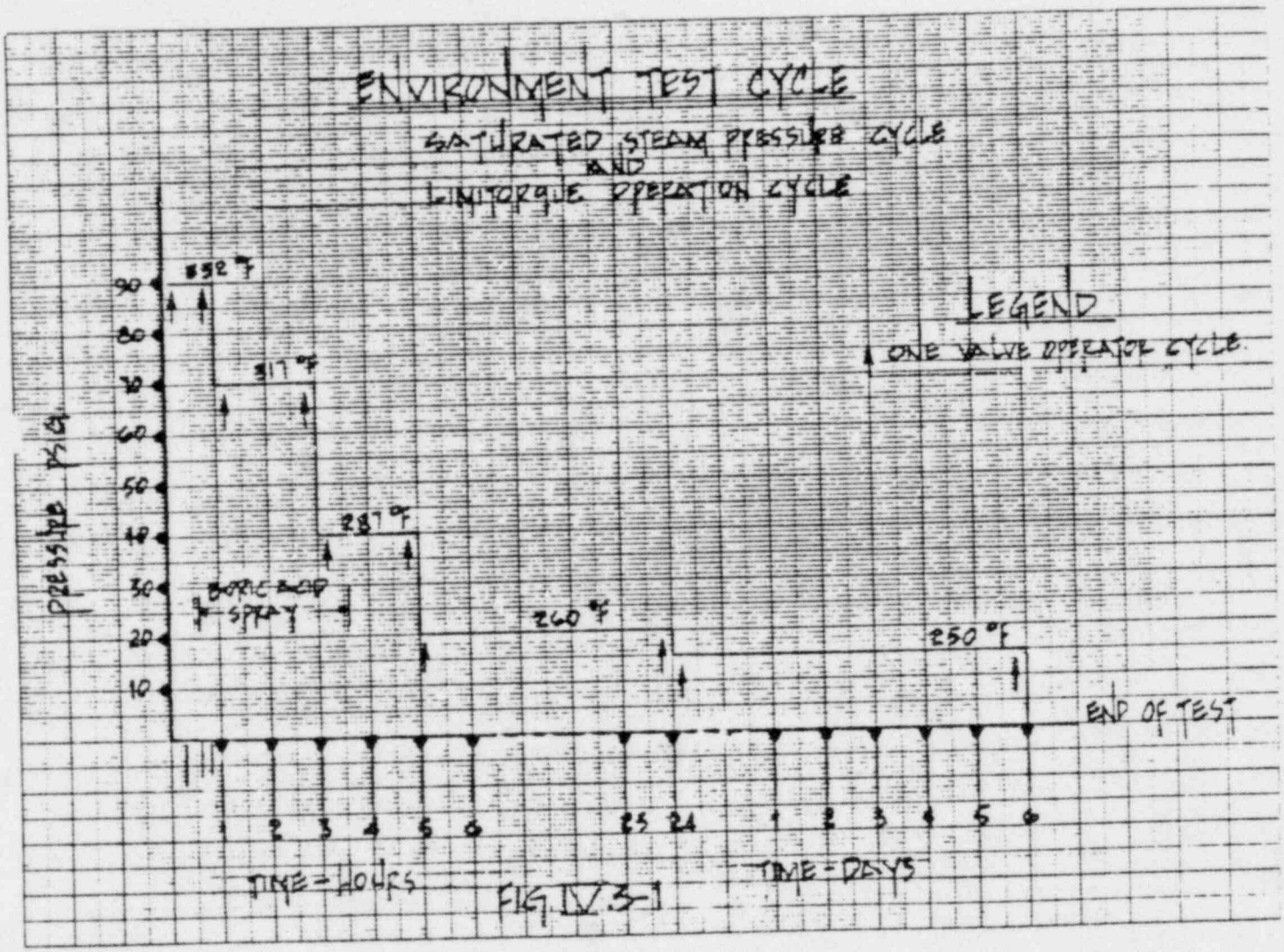


FIG. IV.3-1

LPSI-4
CVCS-1
HPSI-2
CS-2
RC-3
RC-4

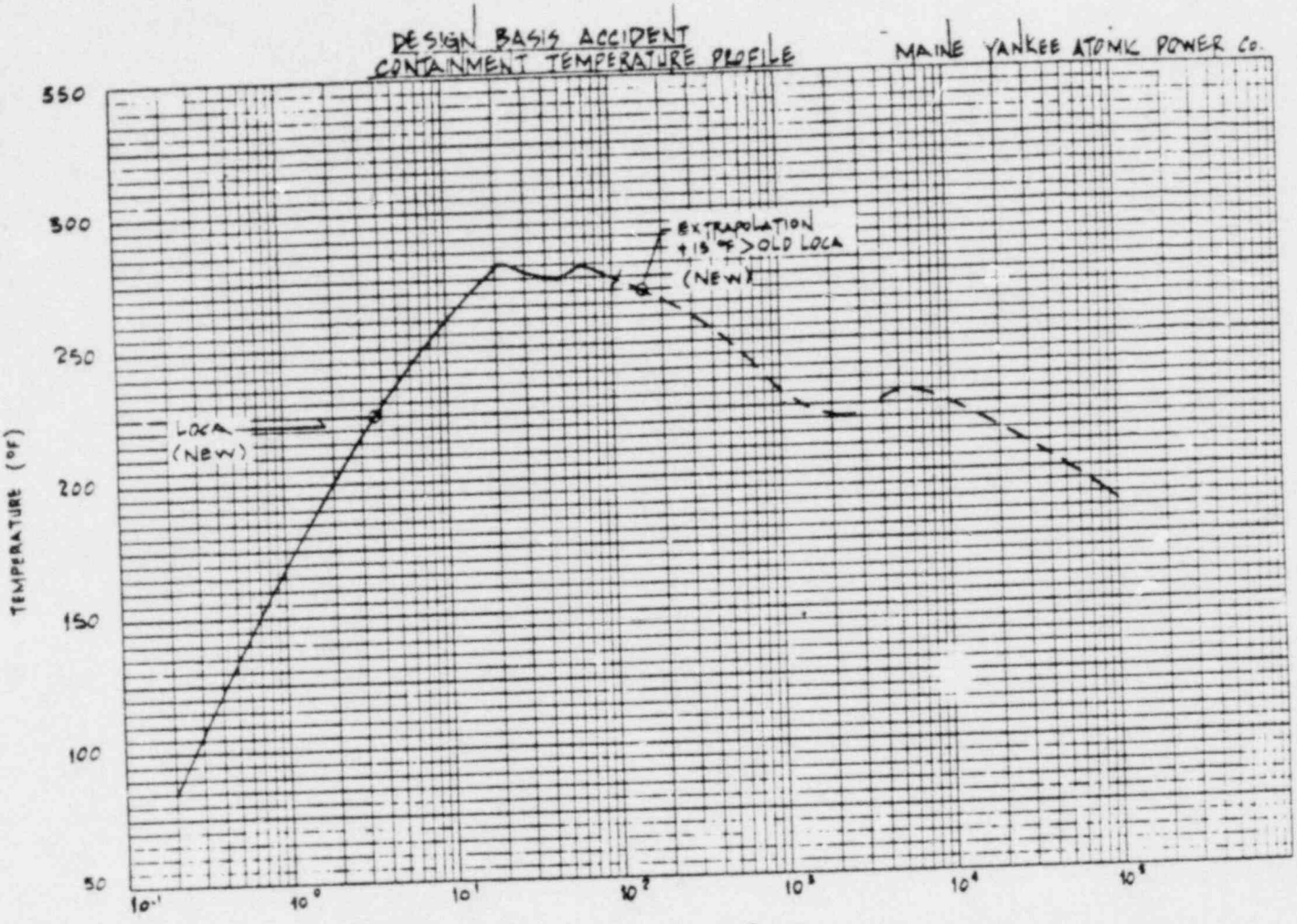


FIG. IV-3-2 RC-1

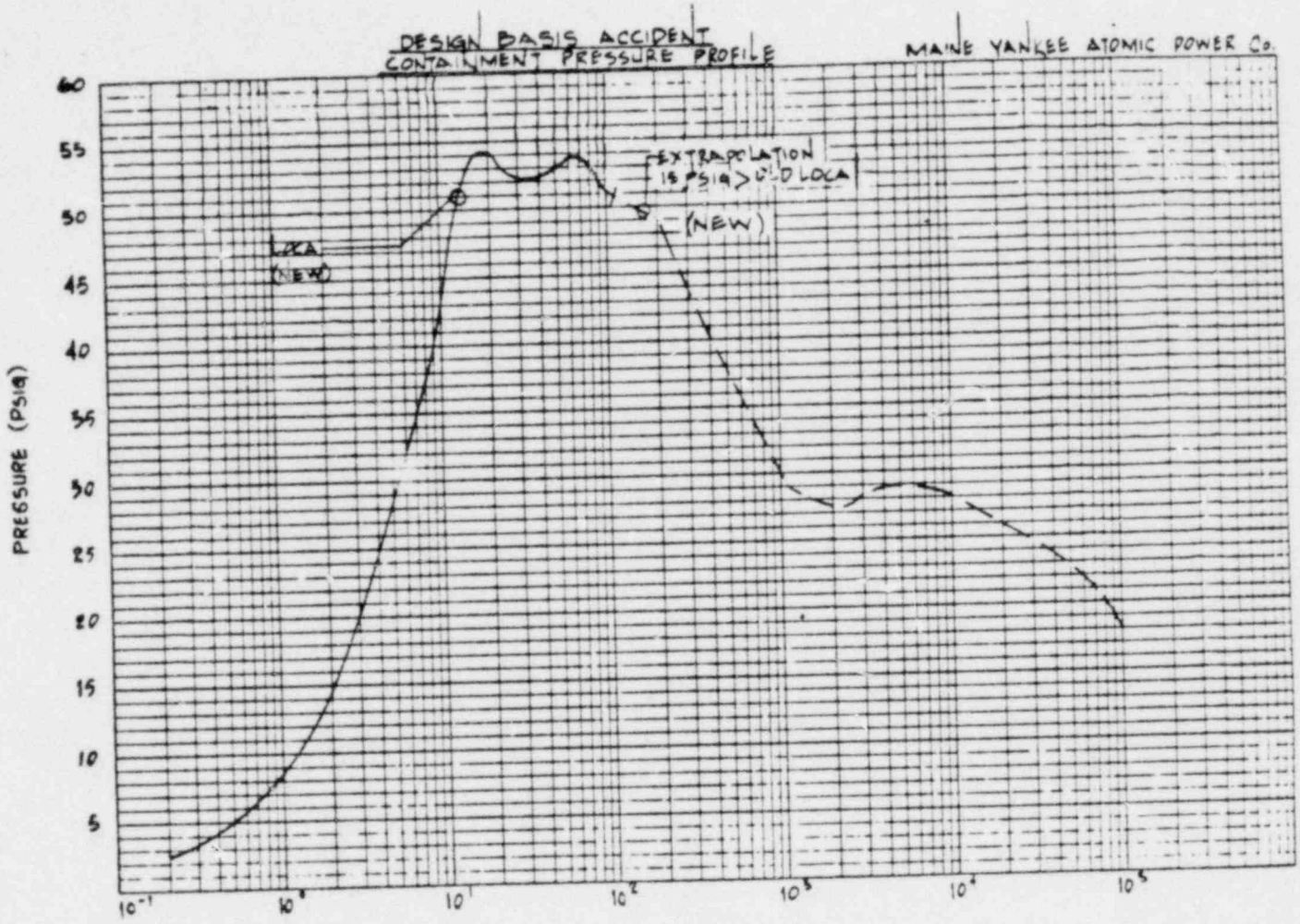
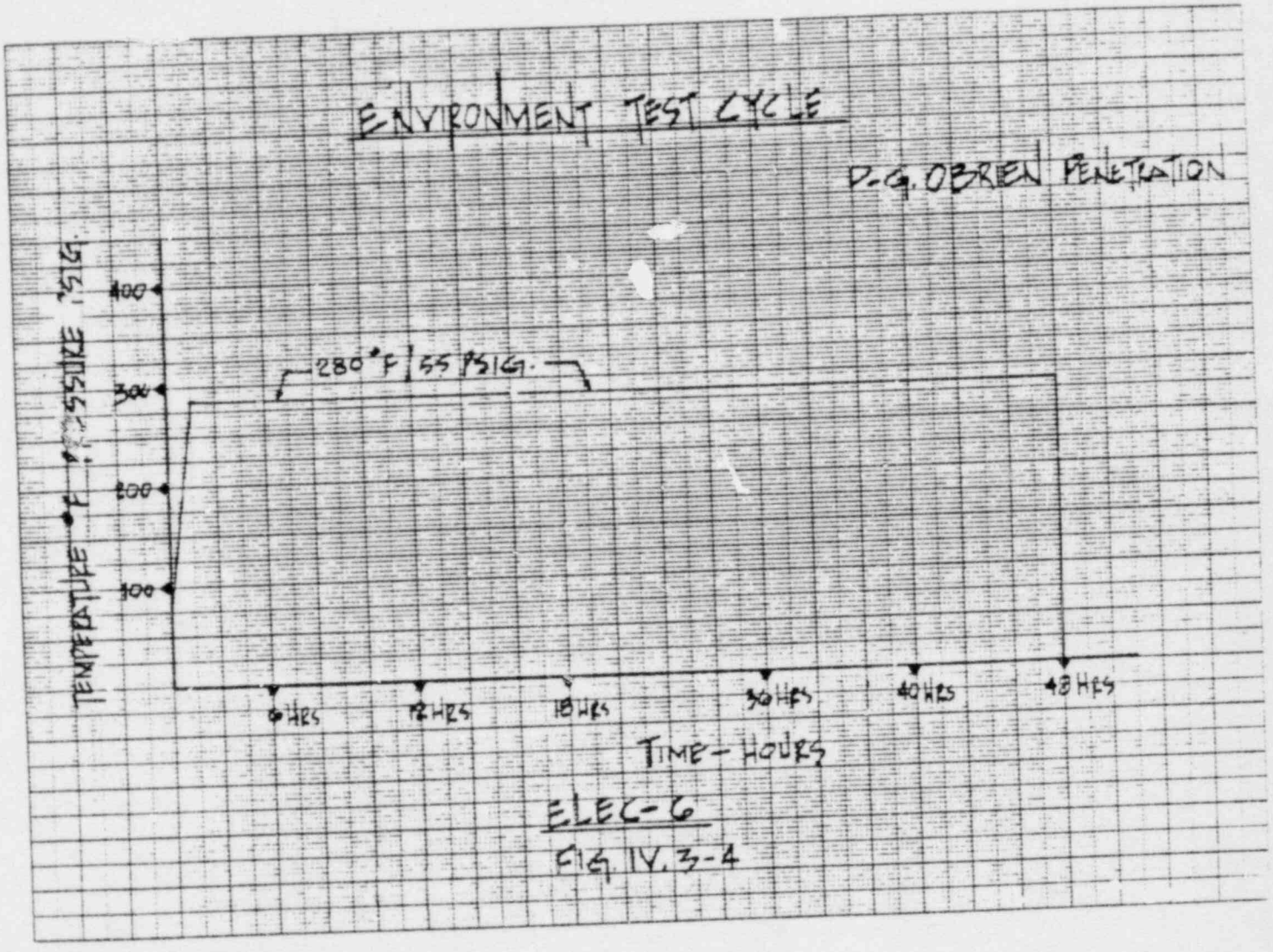


FIG. IV-3-3 RC-1

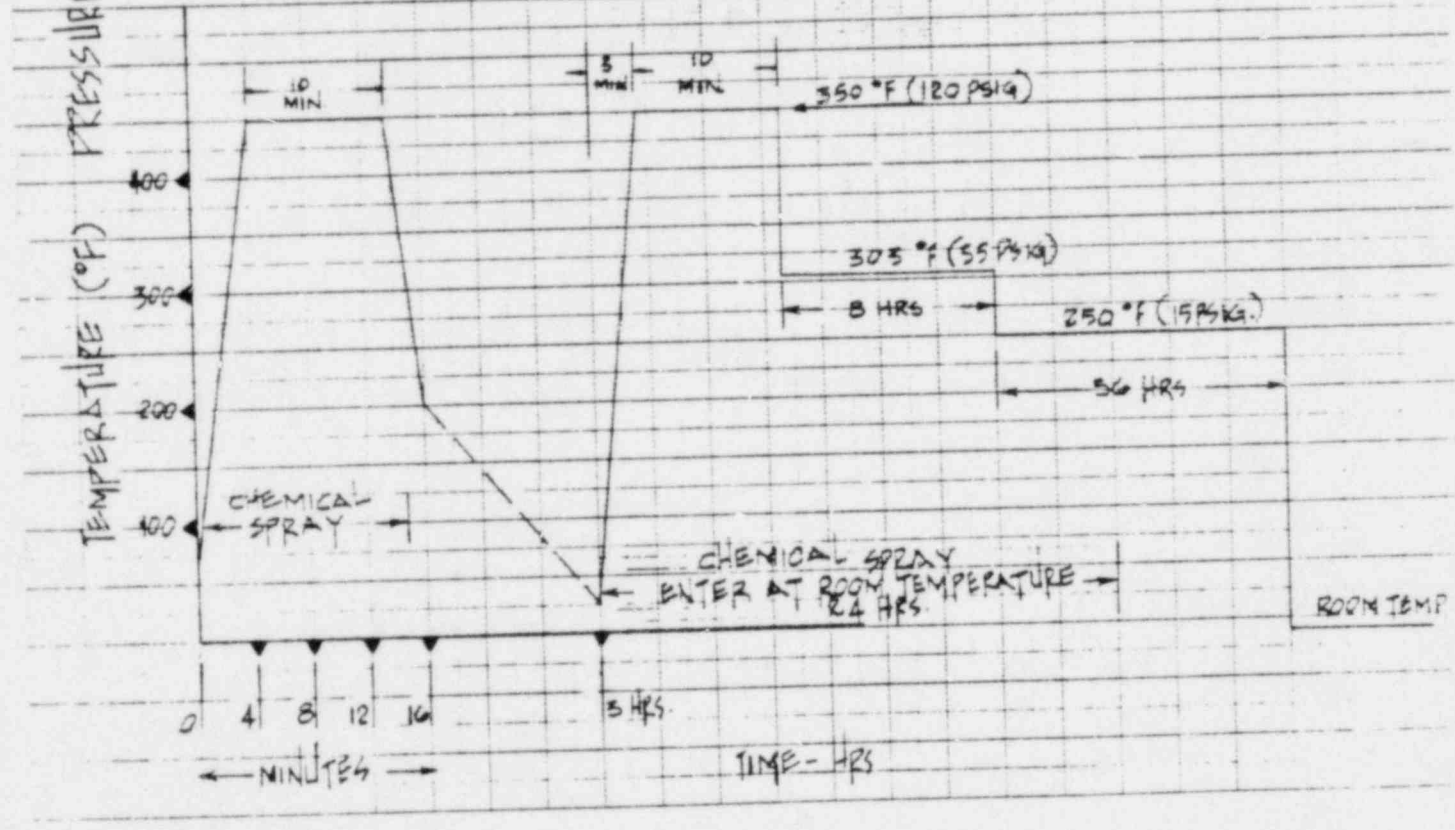


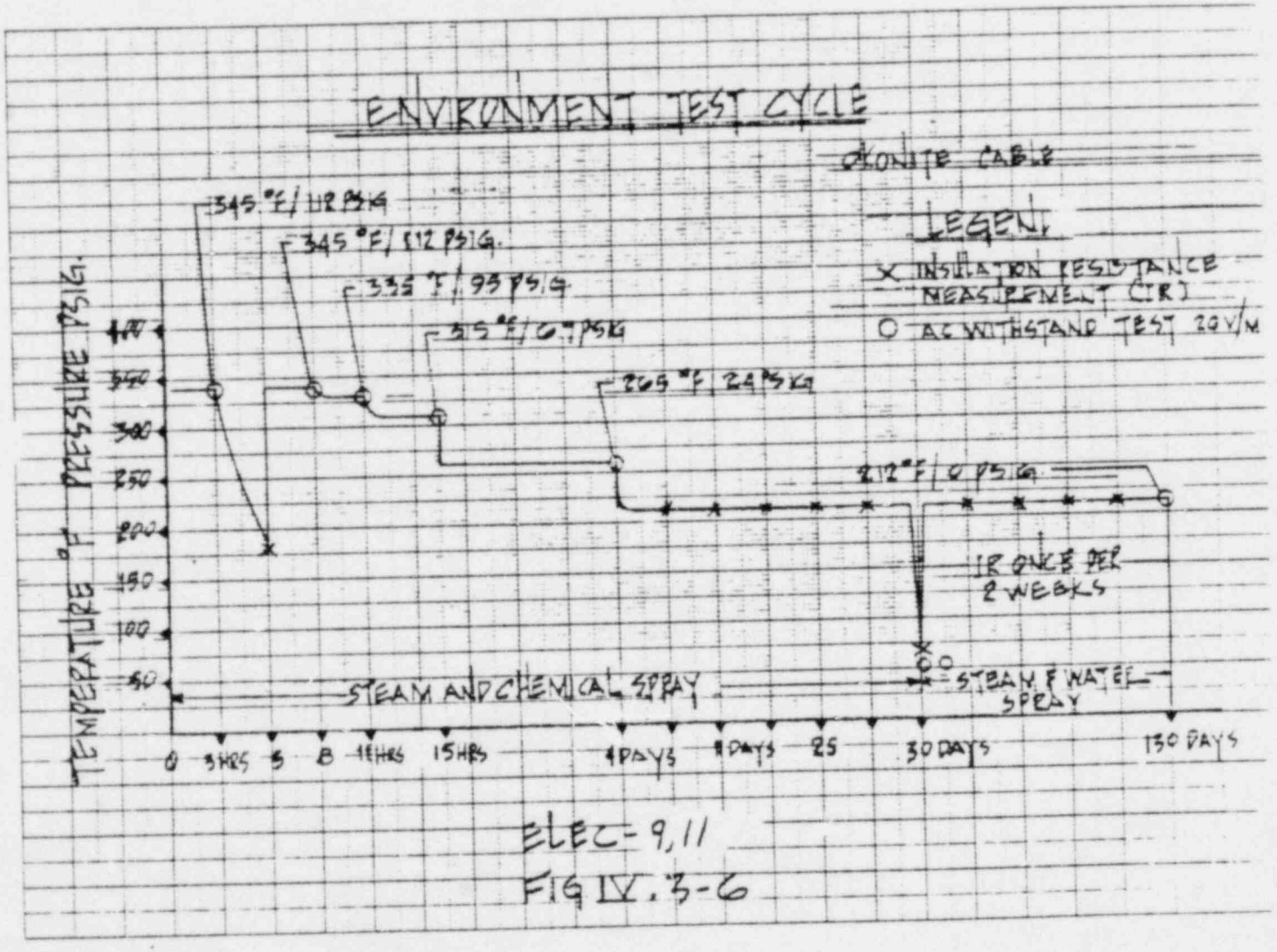
ELEC-6

FIG IV.3-4

FIG IV.3-5 RC-2

TEMPERATURE PROFILE FOR SATURATED STEAM TEST

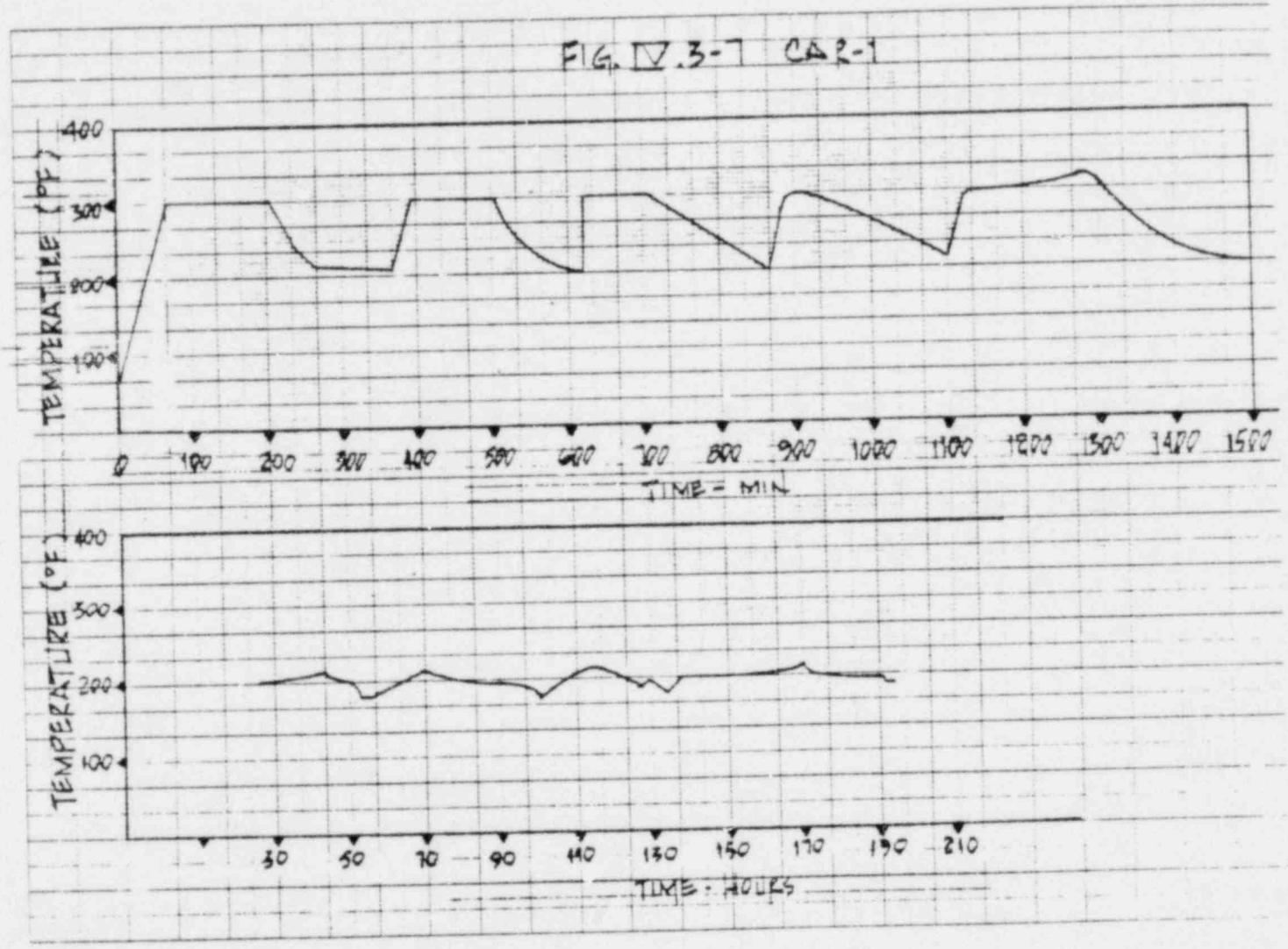




ELEC-9,11

FIG IV.3-6

FIG. IV.3-7 CAR-1



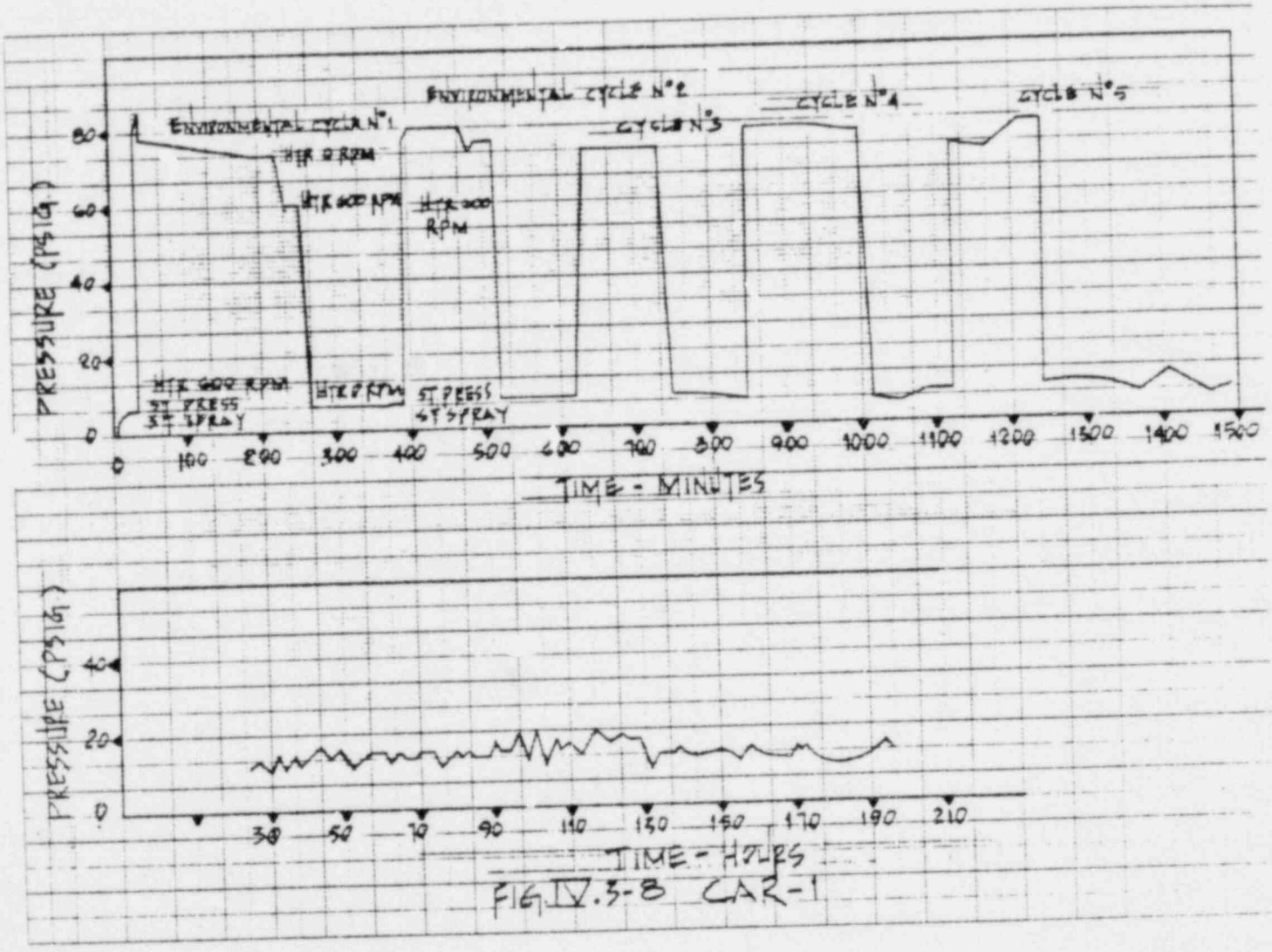


FIG IV.3-8 CAR-1

ENVIRONMENT TEST CYCLE

CONTAINMENT ENVIRONMENTAL CONDITIONS FOR TEMPERATURE AND PRESSURE VERSUS TIME.

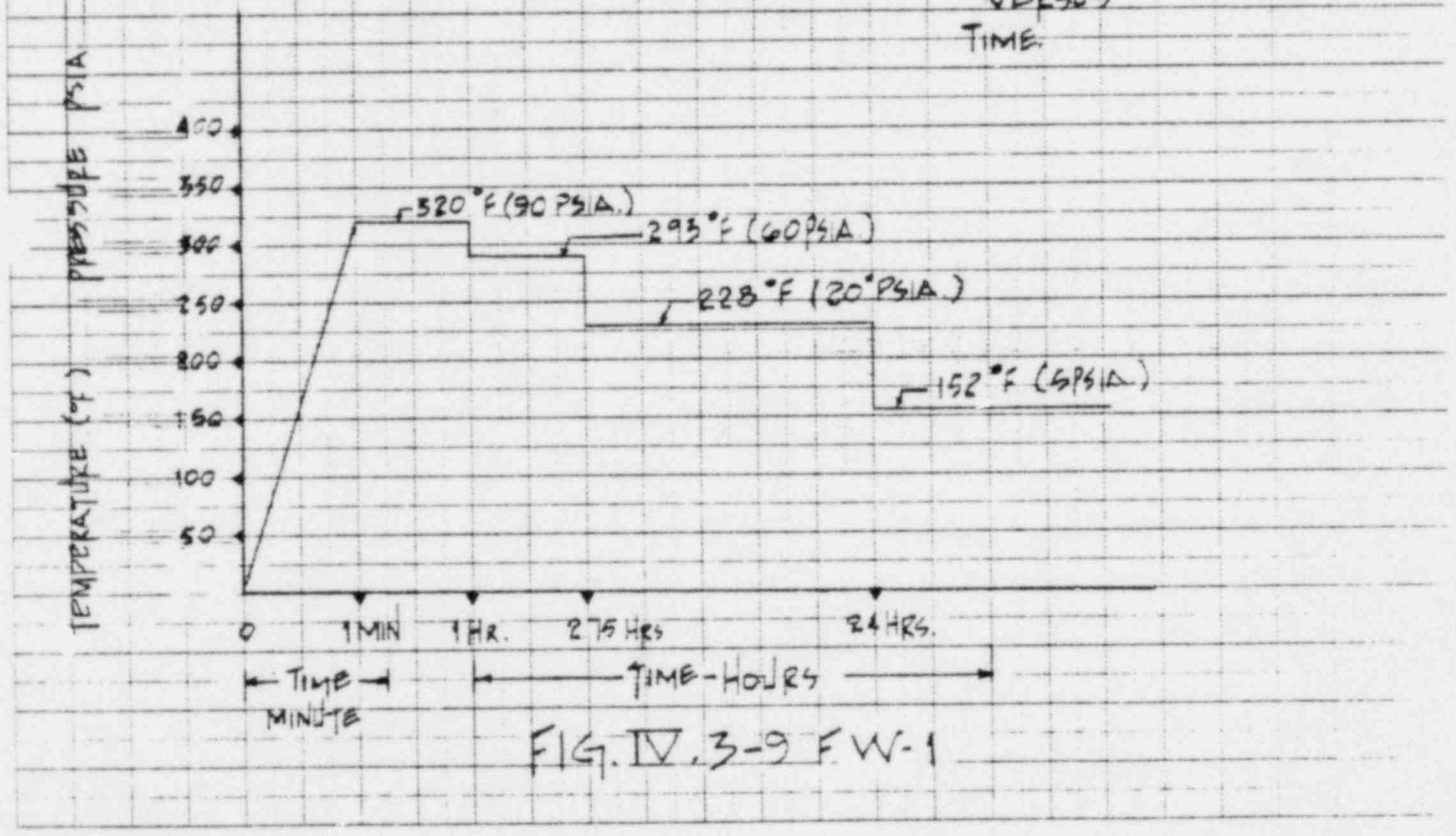
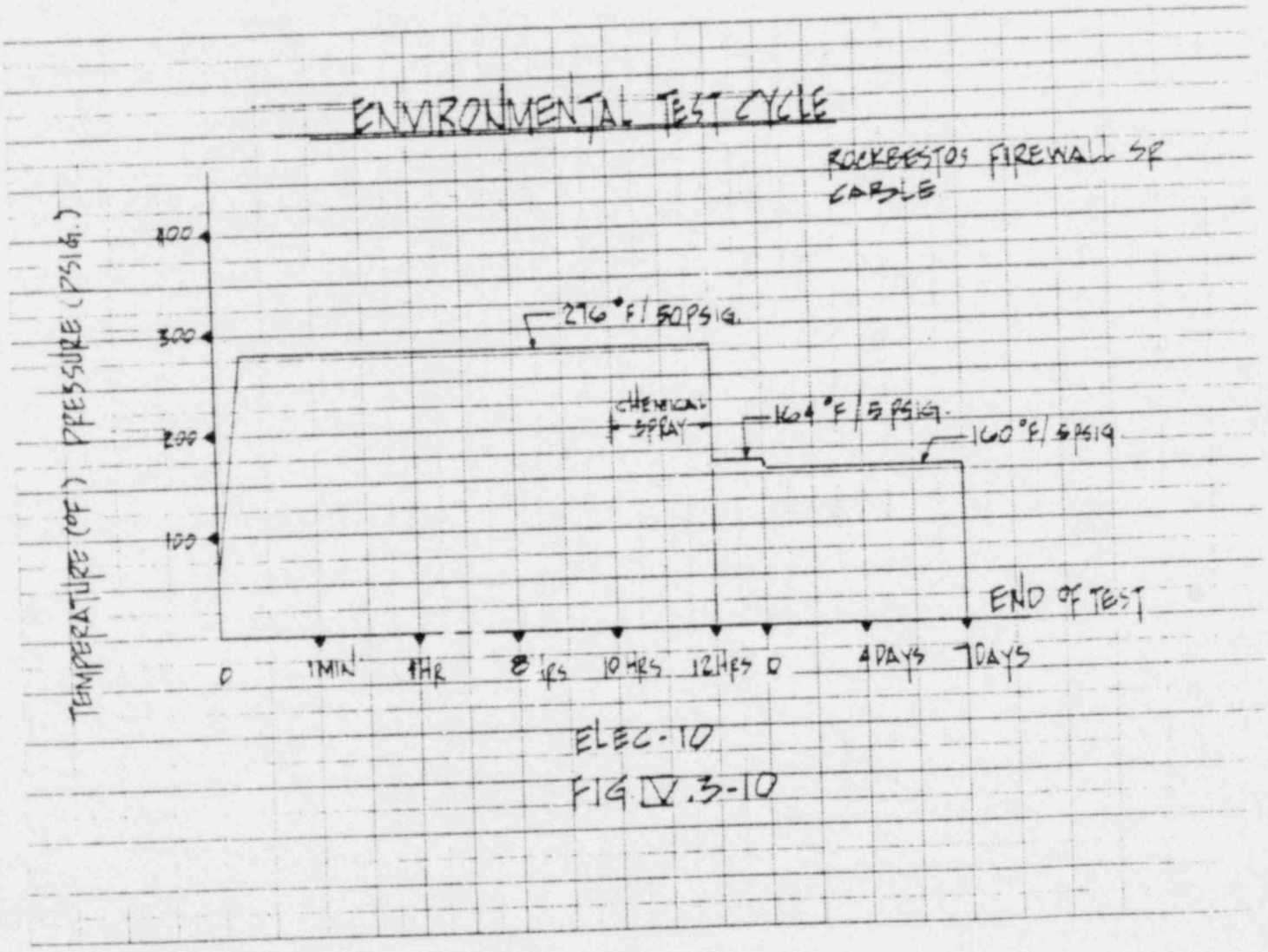
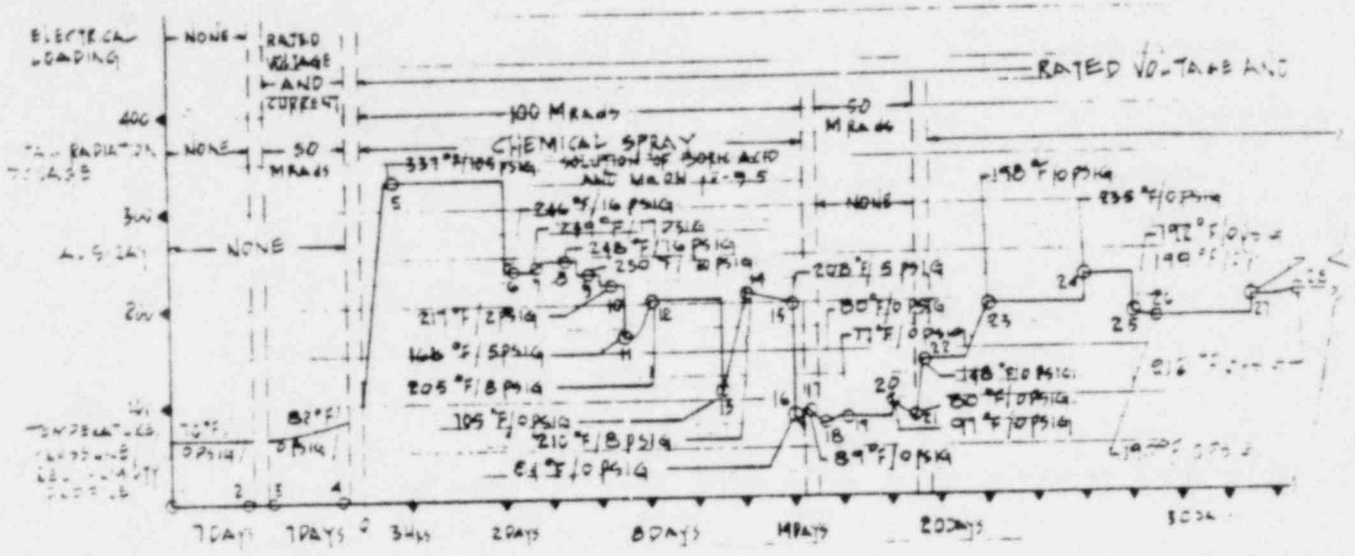


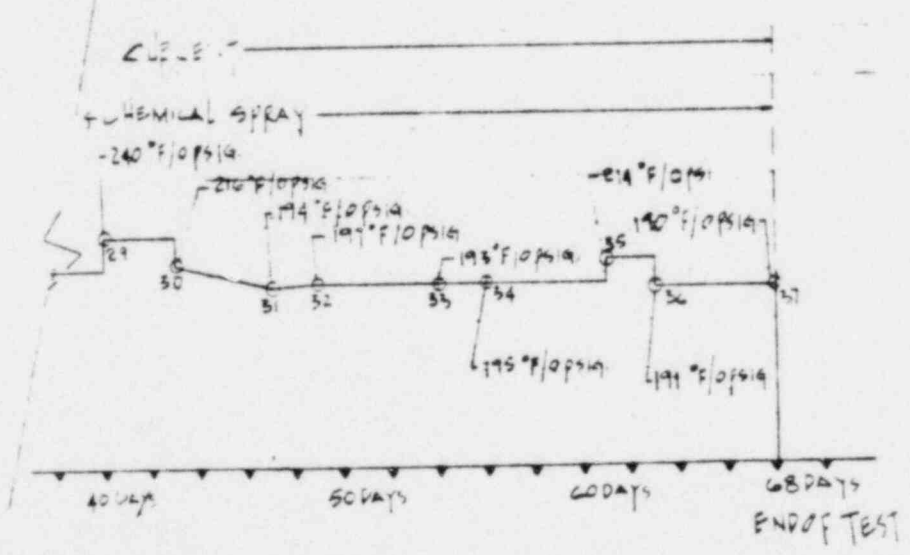
FIG. IV.3-9 FW-1



ELEC-10

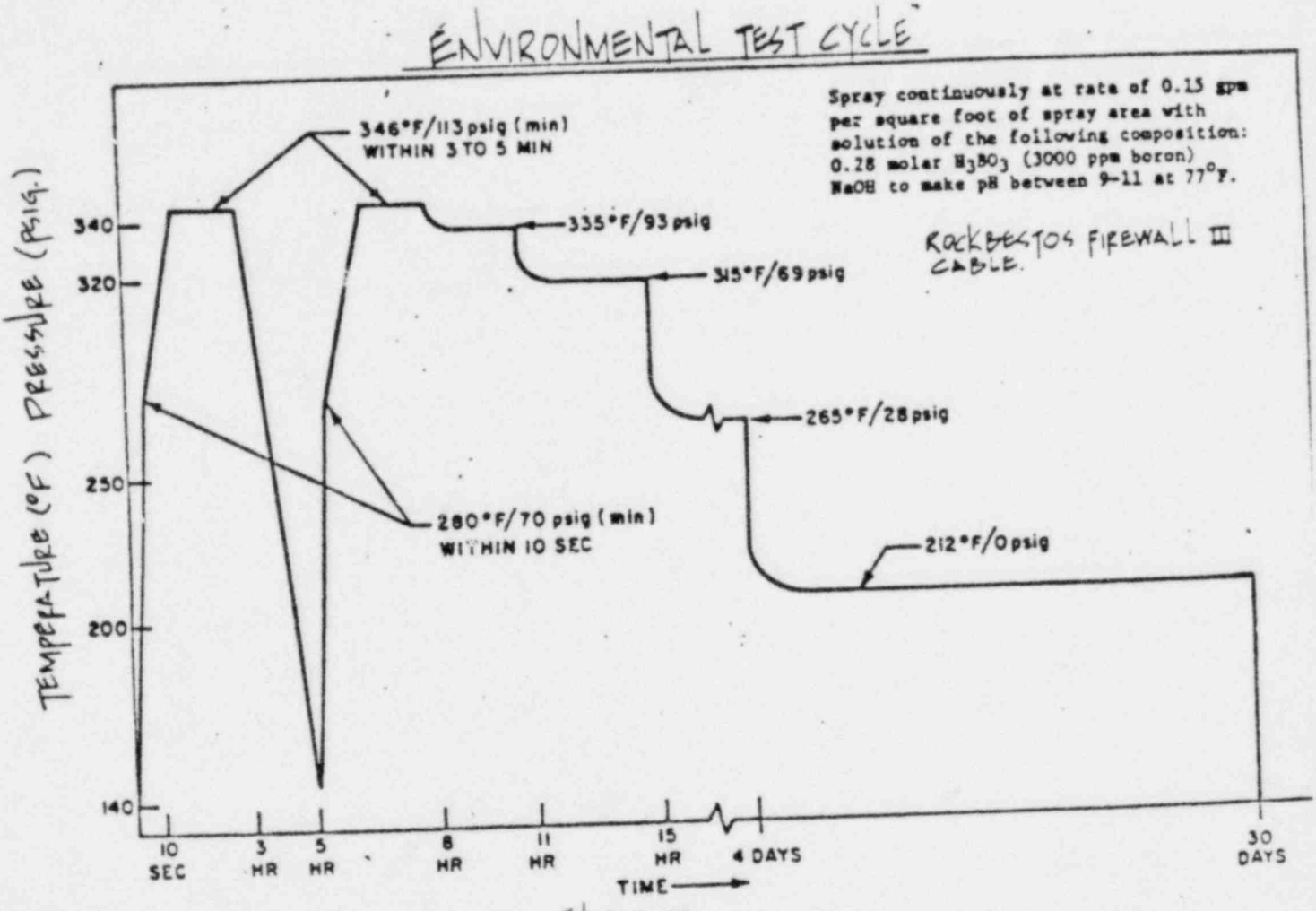
FIG V.3-10



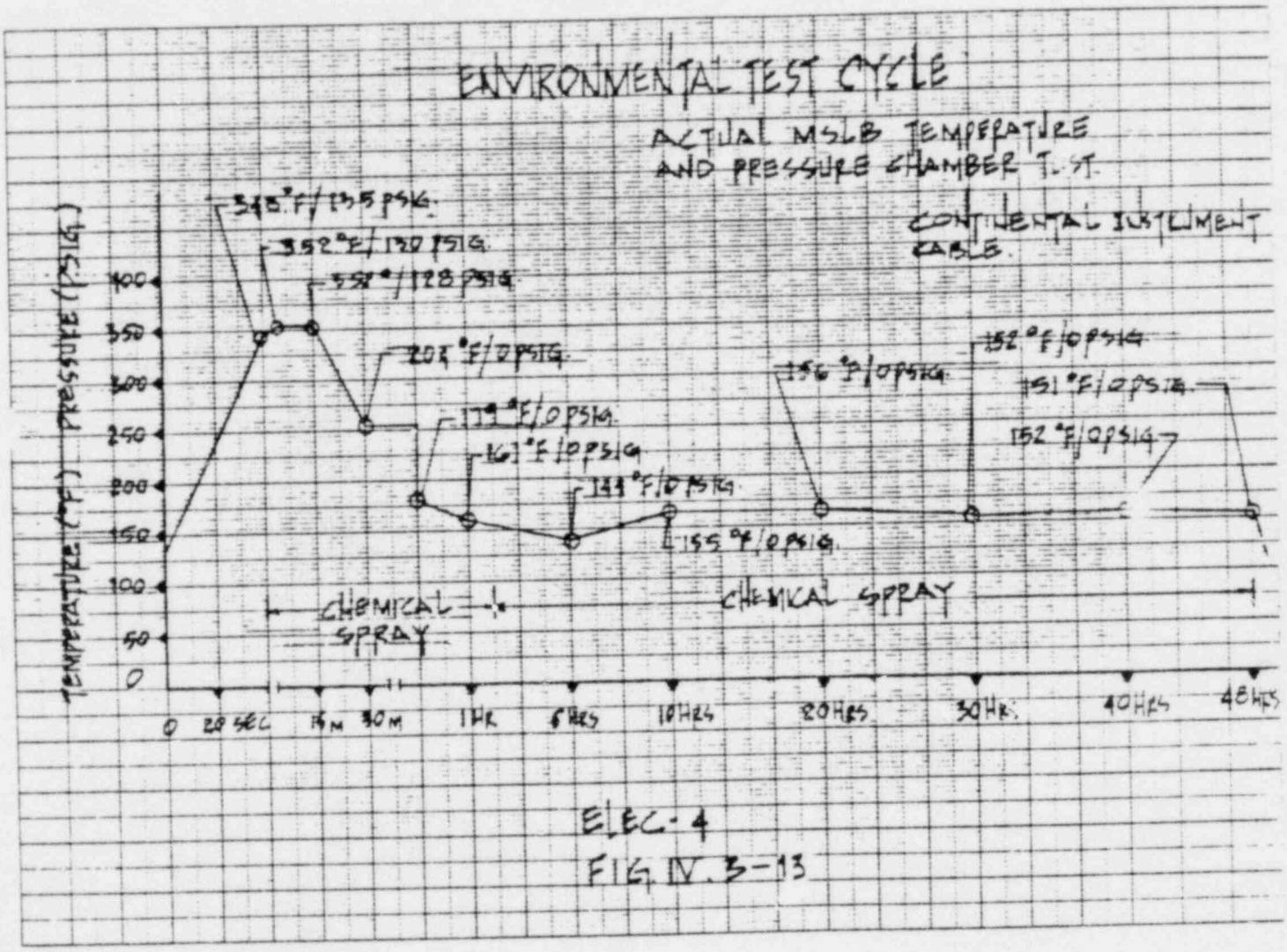


ELEC - 2

FIG V.3-11

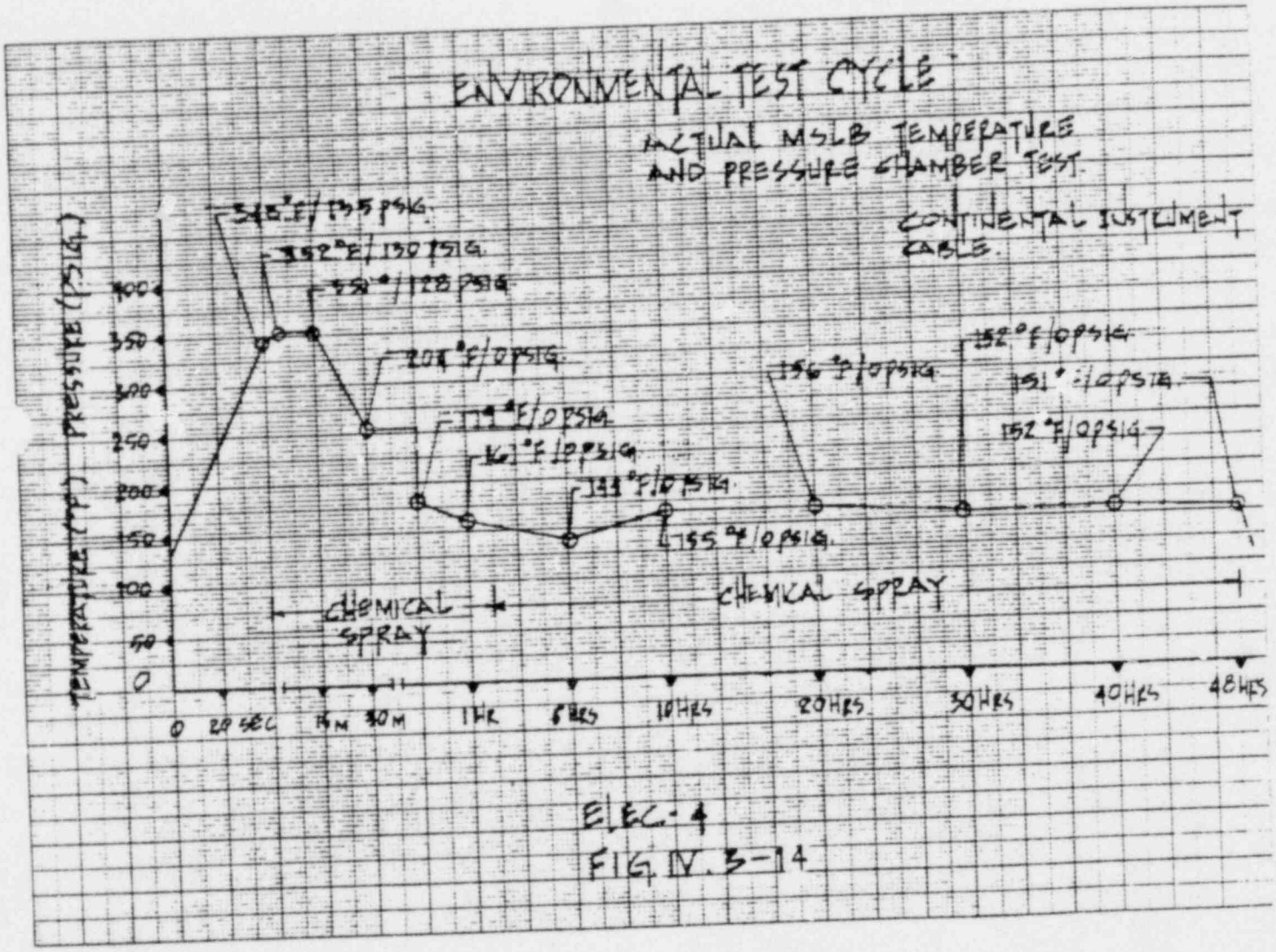


ELEC-3
FIG. IV.3-12



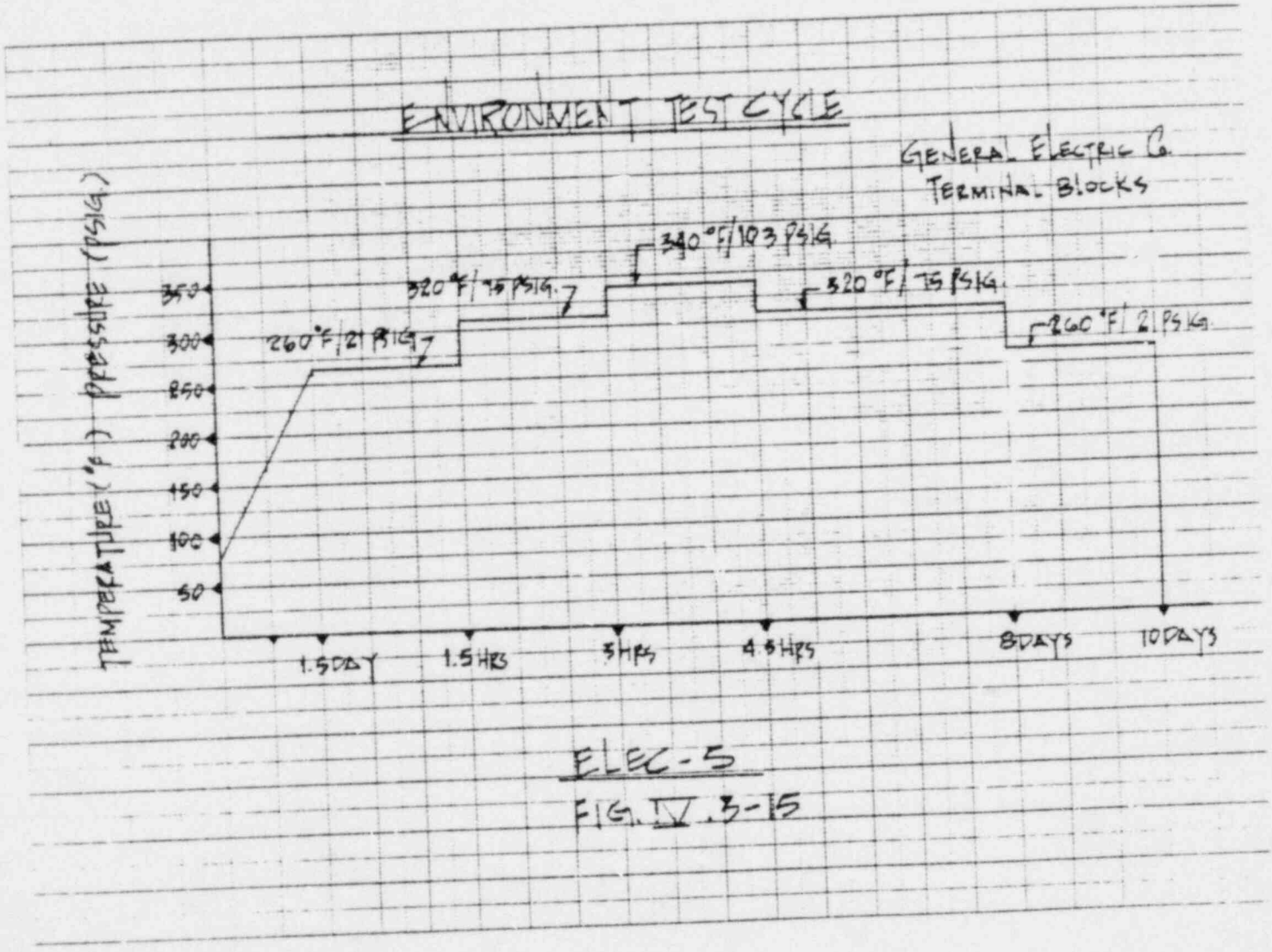
ELEC-4

FIG. IV.3-13



E.E.C. 4

FIG. IV. 3-14



ELEC-5

FIG. IV.3-15

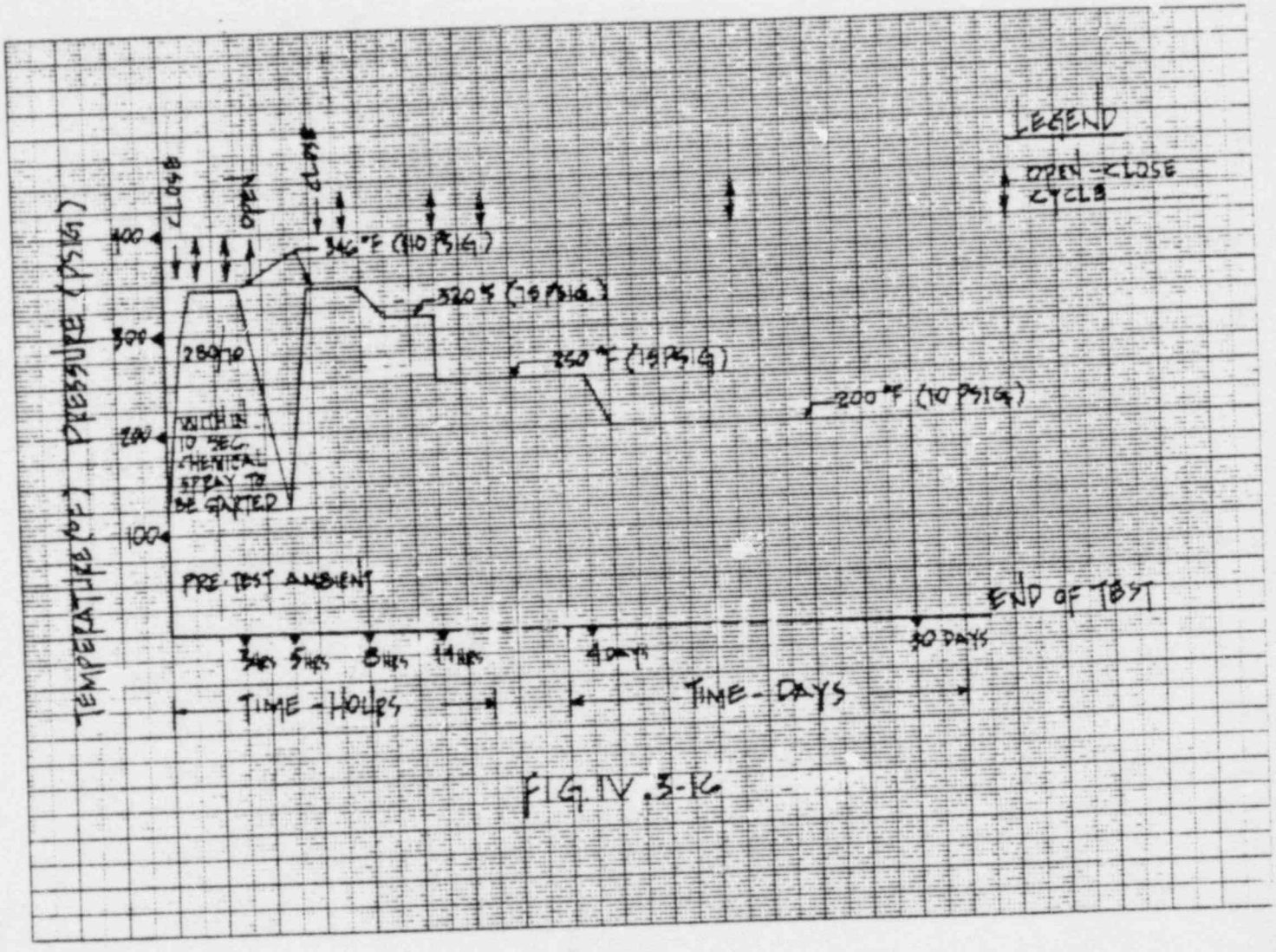


FIG IV.3-16

CAAS-1
CVCS-3
CVCS-2
HPSI-3
LPSI-3
PCC-1
PV-1
PV-2
PS-1
FP-1