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REV. 6

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Clinch River Breeder Reactor Plant

REQUIREMENTS FOR ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

ENGINEERING RELEASE BY
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REQUIREMENTS FOR ENVIRONMENTAL QUALIFICATION OF CRBRP CLASS 1E EQUIPMENT

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INFORMATION CONCERNING USE OF THIS REPORT

PRELIMINARY DOCUMENT

This report contains information of a preliminary nature prepared in the course of work for the U. S. Department of Energy. This information is subject to correction or modification upon the collection and evaluation of additional data.

NOTICE

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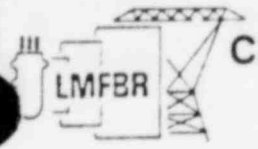

CHANGE CONTROL RECORD

WESTINGHOUSE
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TITLE	DOCUMENT NO.
Requirements for Environmental Qualification of CRBRP Class 1E Equipment	WARD-D-0165

REV NO./ DATE	CHANGE RELEASE DOCUMENT	PAGES AFFECTED	REMARKS
Rev. 1/ 8/31/78	L-00032	All	Initial Release (Rev. 0 was never released)
Rev. 2/ 5/1/79	L-00049	3-10, 3-12	Incorporates ECP L10-087
Rev. 3/ 5/1/79	L-00049	Title Page, ii 3-3 through 3-18	Incorporates ECP L10-089 and comments of ECP L10-061
Rev. 4/ 5/28/80	L-00076	Title Page, ii, 2-1, 2-2 3-1, 3-2, 3-4, 3-29 through 3-35, 4-1, 4-2, 4-3, 4-4, 4-9, 4-14	Incorporates ECP L10-109.
Rev. 5/ 4/20/81	L-00115	Title Page, ii, 3-3 through 3-36	Incorporates ECP L10-145. Alligns Tables 3-1 & 3-2 with the SDD's.
Rev. 6/ 2/9/82	L-00139	Title Page, iii, 2-9, 2-10, 3-1, 3-12c, 3-23, 3-23a, 3-27a, 3-27b, 3-29, 3-29a, 3-29b, 3-30, 3-36, 4-1, 4-2, 4-3	Incorporates ECP L10-165. Clarifies the non-severe and severe sodium aerosol environments; reduces the non-severe sodium aerosol environment; establishes the non-severe sodium aerosol qualification requirements. Establishes aging requirements for equipment located in non-severe environments.

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1. INTRODUCTION

This document establishes the qualification program which will be conducted to qualify Class IE equipment located in different areas of the Clinch River Breeder Reactor Plant and sets forth the documentation to be completed for qualification. The entire program is designed to conform to IEEE Std. 323-1974 as clarified by the forward issued by NPEC on July 24, 1975 as IEEE Std. 323A 1975. When IEEE Std. 323-1974 is mentioned in this document, it is to be understood to include the clarification issued as IEEE Std. 323A-1975.

Class 1E equipment will be qualified to meet its performance requirements by analysis, type testing, operating experience or any appropriate combination thereof. The qualification will be based upon the most severe environment predicted to occur prior to and during those portions of the specific accident transients for which the component is required to perform its safety function. Where it is practical to do so, CRBRP Class IE systems are designed with redundant channels located in separate cells. Consequently, redundant safety equipment located in separate cells is not required to be qualified for Design Basis Events and/or accident conditions if the effects of the DBE's are not propagated to the redundant cells. However, all of these equipment items shall, as a minimum, satisfy the seismic and aging qualification requirements of this document. Where the use of identical components in the same or more severe environments makes it possible to do so, component qualification data from licensed nuclear power plants will be utilized for qualification of CRBRP components.

The CRBRP qualification program described herein will meet the applicable requirements of Regulatory Guide 1.89. However, the CRBRP qualification program will use the radiological source term (site suitability source term) to define the radiation environment for qualification only for the Class IE equipment required to function during and following the SSST release to mitigate the consequences of the release. For all other Class IE equipment, the radiation environment for qualification will be defined by the enveloping DBE (excluding the SSST) for which the specific Class IE equipment must perform a safety function. The DBE will include pressure, temperature, humidity, chemical, vibration, and seismic effects as well as those of radiation.

The nominal life of the CRBRP is 30 years and, consequently, the "aging" requirement of IEEE Std. 323-74 will be met by appropriate procedures based on exposure to normal environment for a maximum of 30 years. The specific procedures to be used are described in Section 4.

Electrical equipment that is part of the thermal margin beyond the design basis (TMBDB) is not included in this document. For treatment of the qualification of this equipment, see SDD-27 and CRBRP - 3 Volume 2.

The scope of this document is limited to environment qualification of CRBRP Class IE equipment. Section 2 of this document describes normal and accident environments in the five buildings of the Nuclear Island and for emergency cooling towers.

Section 3 states the basis for environmental qualification to all significant environmental parameters and lists (in table 3-2) curves of accident parameter transients from Section 2 that apply to each specific piece of Class IE equipment. The equipment that is not subjected to severe environments as a result of the applicable design basis events is also listed (in table 3-1) with locations and maximum anticipated temperatures . Tables 3-1 and 3-2 also define the length of time the equipment must operate during and/or after the DBE. The equipment information contained in these tables is subject to correction or modification upon changes to the individual System Design Descriptions which establish the equipment requirements. All Class IE equipment will be qualified to the appropriate seismic acceleration for its location within the plant.

Section 4 describes type test qualification procedures for Class IE equipment not subjected to severe accident environments and qualification procedures for Class IE equipment that is subjected to severe accident environments. This Section also describes qualification by operating experience and analysis.

Section 5 and Appendix A set forth the content and suggested format for the preparation of Equipment Qualification Data Packages which will be prepared for each piece of equipment qualified by type test, operating experience or analysis.

The qualification program for active pumps and valves is presented in WARD-D-0174 (Active Pump and Valve Operability Verification Plan). Class IE electro-mechanical equipment subject to the requirements of WARD-D-0174 must also be qualified according to the requirements of this document.

A list of the references upon which this document is based is provided at the end of the text. A listing of acronyms is also provided.

2. ENVIRONMENTS

The environments to be considered in Class IE equipment qualification procedures are set forth in this section for normal operating conditions and for those design basis events in CRBRP that produce severe environments in cells that contain safety related equipment. Radiation doses resulting from release of the SSST are considered where appropriate. The numerical values of environment parameters specified in this section do not include the margins to be added per IEEE Std. 323-1974 for qualification. These margins have been added to produce the dotted curves in figures 2-1 to 2-9. Equipment specifications are to include the appropriate margins, the time interval during which the equipment must be capable of performing its safety function, and the applicable parameter transients from Section 2. Seismic event parameters are considered in accordance with IEEE Std. 344-1975 (Reg. Guide 1.100) and WARD-D-0037. The seismic and vibration environments for each equipment item are defined in each equipment end-item specification and, therefore are not presented in this section.

2.1 Nominal Environments

Nominal environments in the buildings of the Nuclear Island are shown in Table 2-1.

2.2 Accident Environments

For the purpose of qualification of Class IE equipment throughout CRBRP, the design basis events listed in the PSAR were reviewed and those which might produce significant environmental effects in each building were tabulated in Table 2-2. Study of the environmental parameter transients resulting from these events has shown which events produce the most severe transients and, therefore, which set of transients will serve as the basis for environmental qualification. The resultant transients are shown in Figures 2-1 through 2-9 in this section.

A DBE which produces changes in environmental parameters that are so small or otherwise of such a nature that they do not change mechanical, electrical, physical or chemical properties of any Class IE equipment is considered to produce a non-severe environment. The alternative concept is also used. A DBE which produces changes in environmental parameters which may significantly change the properties of Class IE equipment is considered to produce a severe environment.

Table 2-1

NOMINAL ENVIRONMENTAL CONDITIONS

	Temp. °F	Normal** Average % RH	Pressure	30 Year Equipment Radiation Dose RADS
Reactor Containment Building				
Head Access Area	85	30%	-¼" W.G.	*
I&C Cubicles	75	30%	-¼" W.G.	< 50
Operating Floor	100	30%	-¼" W.G.	< 50
Inerted & RAPS Cells	120	N/A	-¼" W.G.	*
All Other Areas	95	30%	-¼" W.G.	*
Reactor Service Building				
Operating Floor	100	30%	-¼" W.G.	< 50
Refueling Communication Center	80	30%	-¼" W.G.	< 50
Fuel Handling Cell Op. Gallery	80	30%	-¼" W.G.	< 50
Inerted Cells	120	N/A	-2-3/4"W.G.	*
All Other Areas	110	30%	-¼" W.G.	*
Steam Generator Building				
Intermediate Bay Na Cells	100	30%	ATM	< 50
Intermediate Bay All Other Areas	100	30%	ATM	
Loop Cell Bays	100	30%	ATM	
Auxiliary Bay AFWP Cells	100	30%	ATM	
Auxiliary Bay-All Other Areas	100	30%	ATM	
Diesel Generator Building				
Diesel Generator Room	105	30%	ATM	< 50
All Other Areas	105	30%	ATM	
Control Room Building				
Control Room	76	50%	+¼" W.G.	< 50
Control Room HVAC/Filter Cells	100	30%	+¼" W.G.	
Battery Rooms	95	30%	ATM	
All Other Areas	105	30%	ATM	
Emergency Cooling Tower Pump House	105	30%	ATM	<50

N/A = Not Applicable

For normal radiation dose in 30 years for equipment in specific cells, refer to normal radiation by area given on pages 7-190 to 7-201 of OPDD-10 and multiply area dose rate in MREM/HR by 250 to get equipment dose in RADS.

** Normal relative humidity range is 5 to 50 percent in all areas except the Control Room, which has a relative humidity of 50 percent continuous.

Table 2-2

DESIGN BASIS EVENTS WHICH MAY PRODUCE SEVERE ENVIRONMENTS

FOR CLASS 1E EQUIPMENT

I. Reactor Containment Building

1. Loss of off-site electrical power and failure of 1 diesel
2. Primary heat transport system pipe leak
3. Intermediate heat transport system pipe leak
4. Single fuel assembly cladding failure and subsequent fission gas release during refueling
5. Off-normal cover gas pressure in the reactor primary coolant boundary
6. Leakage from sodium cold traps
7. Maximum possible conventional fire
8. Primary sodium In-Containment storage tank failure during maintenance
9. Failure of ex-containment primary sodium storage tank
10. Safe Shutdown Earthquake
11. Maximum possible internal flood or water spray
12. RAPS surge tank failure (or high pressure pipe from surge vessel)

NOTE: The SSST release will produce a severe radiation environment for some of the electrical equipment which must function to mitigate the consequences of the SSST release.

II. Control Building

1. Intermediate heat transport system pipe leak
2. Maximum possible conventional fire
3. Safe Shutdown Earthquake
4. Maximum possible internal flood or water spray
5. RAPS surge tank failure (or high pressure pipe from surge vessel)

TABLE 2-2

DESIGN BASIS EVENTS WHICH MAY PRODUCE SEVERE ENVIRONMENTS

FOR CLASS 1E EQUIPMENT

III. Turbine Building

None (no safety related equipment)

IV. Steam Generator Building

1. Loss of off-site electrical power and failure of one diesel
2. Steam or feed-line pipebreak
3. Intermediate heat transport system pipe leak
4. Maximum possible conventional fires
5. Safe shutdown earthquake
6. Maximum possible internal flood and water spray
7. RAPS surge tank failure (or high pressure pipe from surge vessel)

V. Diesel Generator Building

1. Intermediate Heat Transport system pipe leak
2. Failure of RAPS/CAPS Cold Box (or high pressure pipe from surge vessel)
3. Maximum possible conventional fire
4. Safe shutdown earthquake
5. Maximum possible internal flood and water spray

VI. Reactor Service Building

1. Loss of off-site electrical power and failure of 1 diesel
2. Intermediate heat transport system pipe leak
3. Single fuel assembly cladding failure and subsequent fission gas release during refueling
4. Cover gas release during refueling
5. Cover gas release during operation
6. Failed fuel element in FHC
7. Primary sodium in containment, storage tank failure during maintenance

TABLE 2-2

DESIGN BASIS EVENTS WHICH MAY PRODUCE SEVERE ENVIRONMENTS FOR CLASS 1E EQUIPMENT

8. Failure of ex-vessel sodium cooling system during operation
9. Maximum possible conventional fire
10. Maximum possible internal flood and water spray
11. Safe shutdown earthquake
12. RAPS surge tank failure (or high pressure pipe from surge vessel)

FIGURE 2-1

RCB ATMOSPHERE TEMPERATURE TRANSIENT
(RESULTING FROM PRIMARY Na TANK
FAILURE DURING MAINTENANCE)

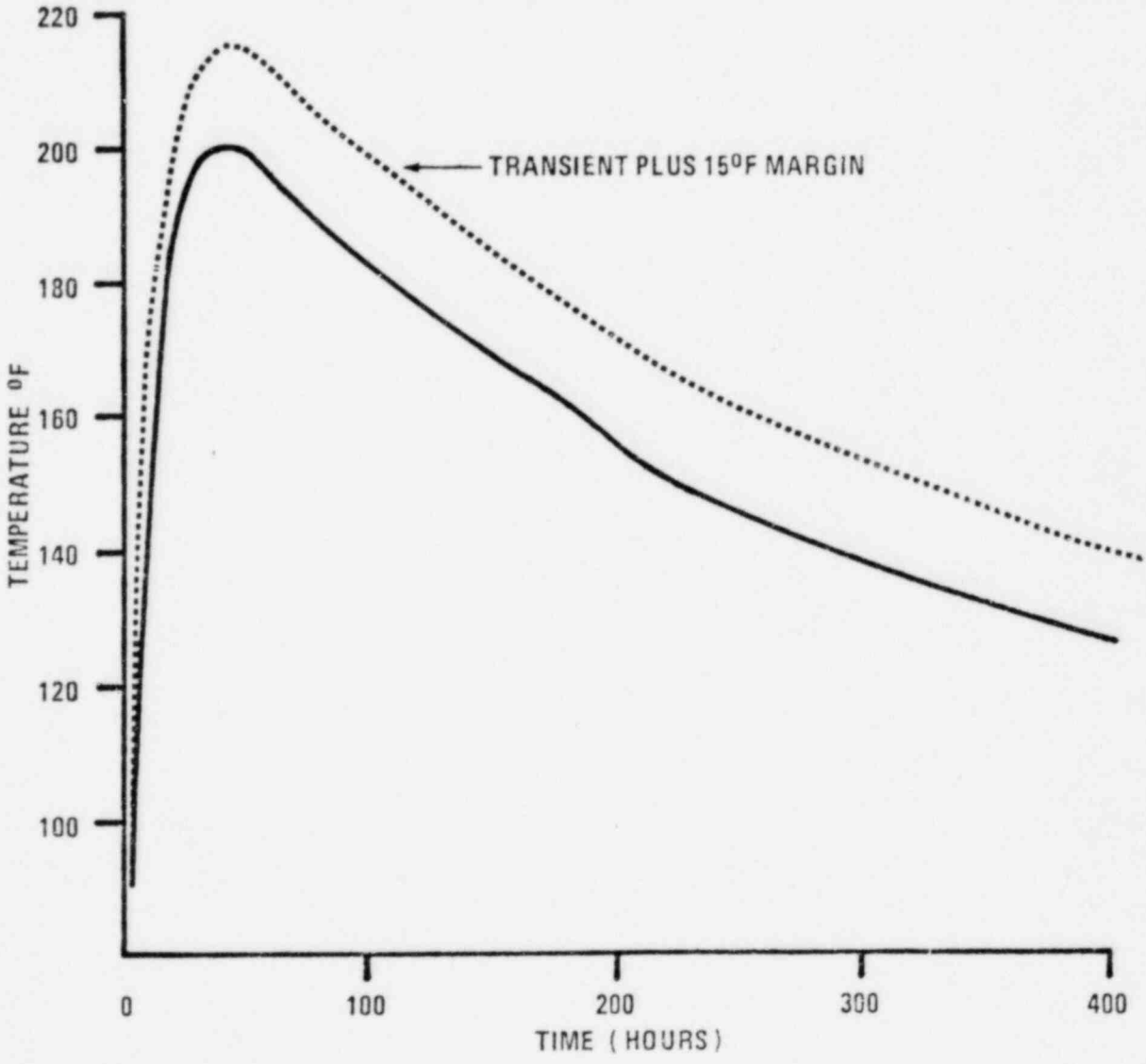

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FIGURE 2-2

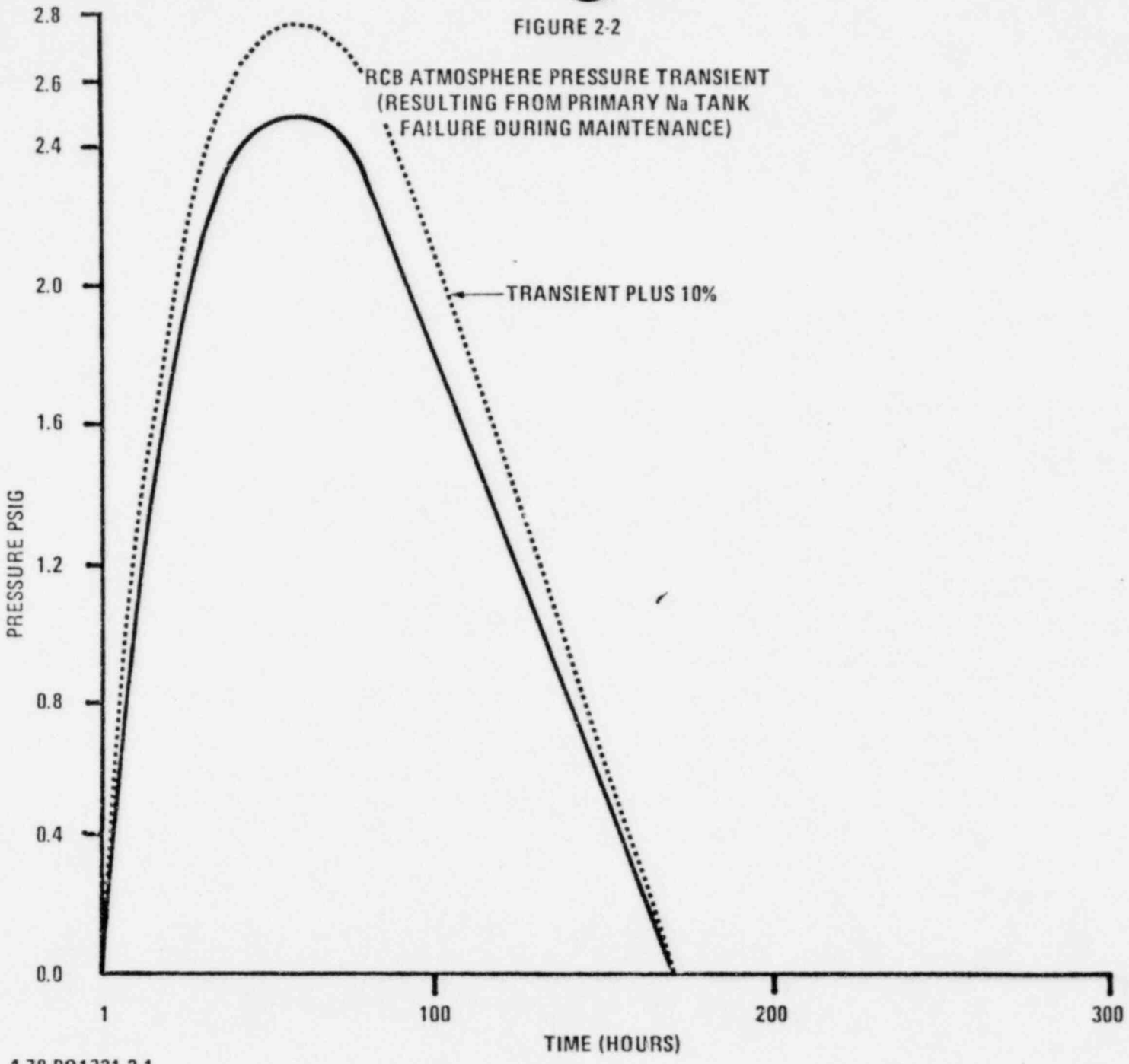

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FIGURE 2-3

RCB OPERATING FLOOR
RADIATION DOSE RATES RESULTING FROM
PRIMARY SODIUM TANK FAILURE
DURING MAINTENANCE

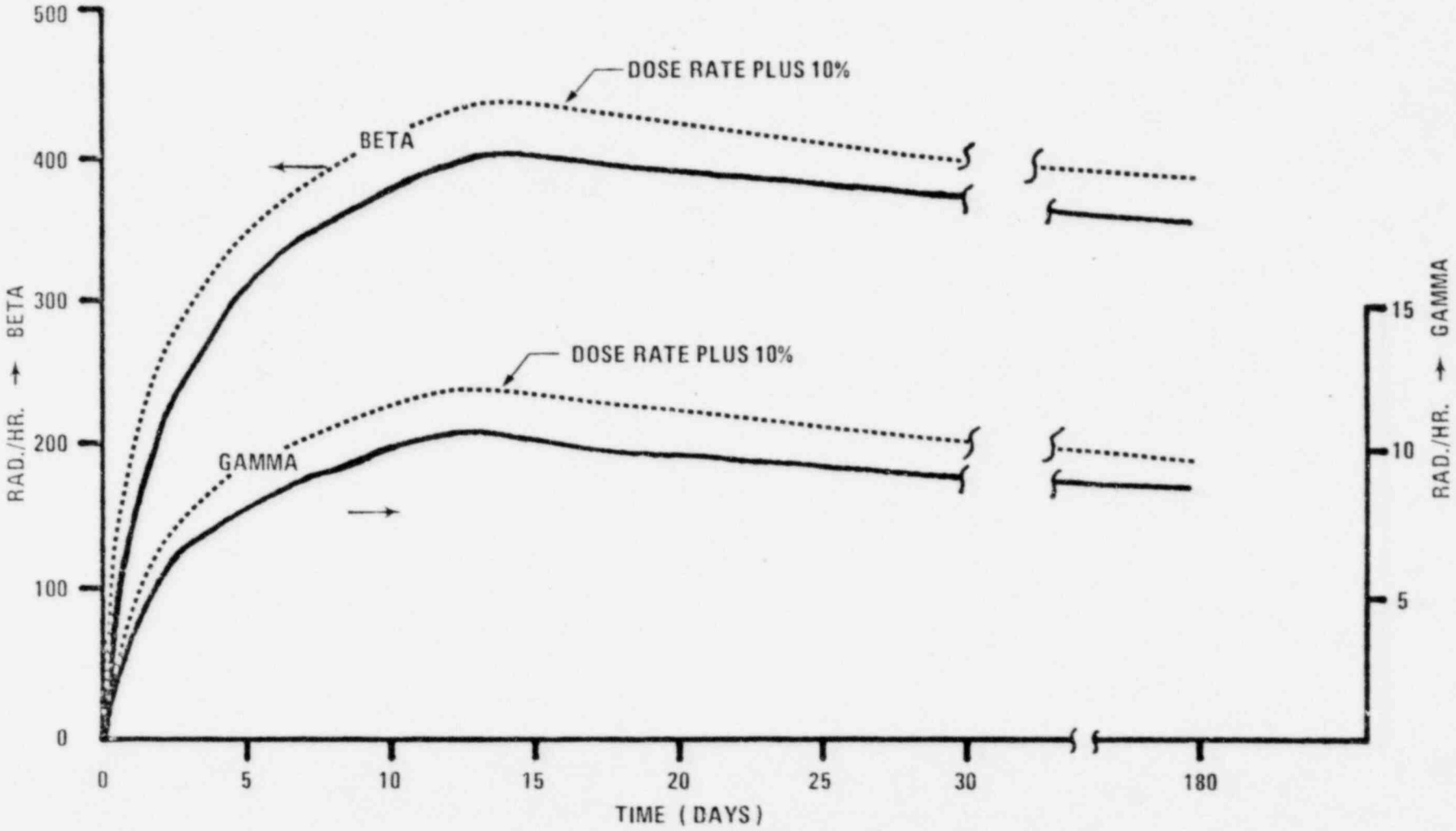

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FIGURE 2-4

RCB ATMOSPHERE
CHEMICAL TRANSIENT
DUE TO PRI. Na TANK FAILURE
DURING MAINTENANCE

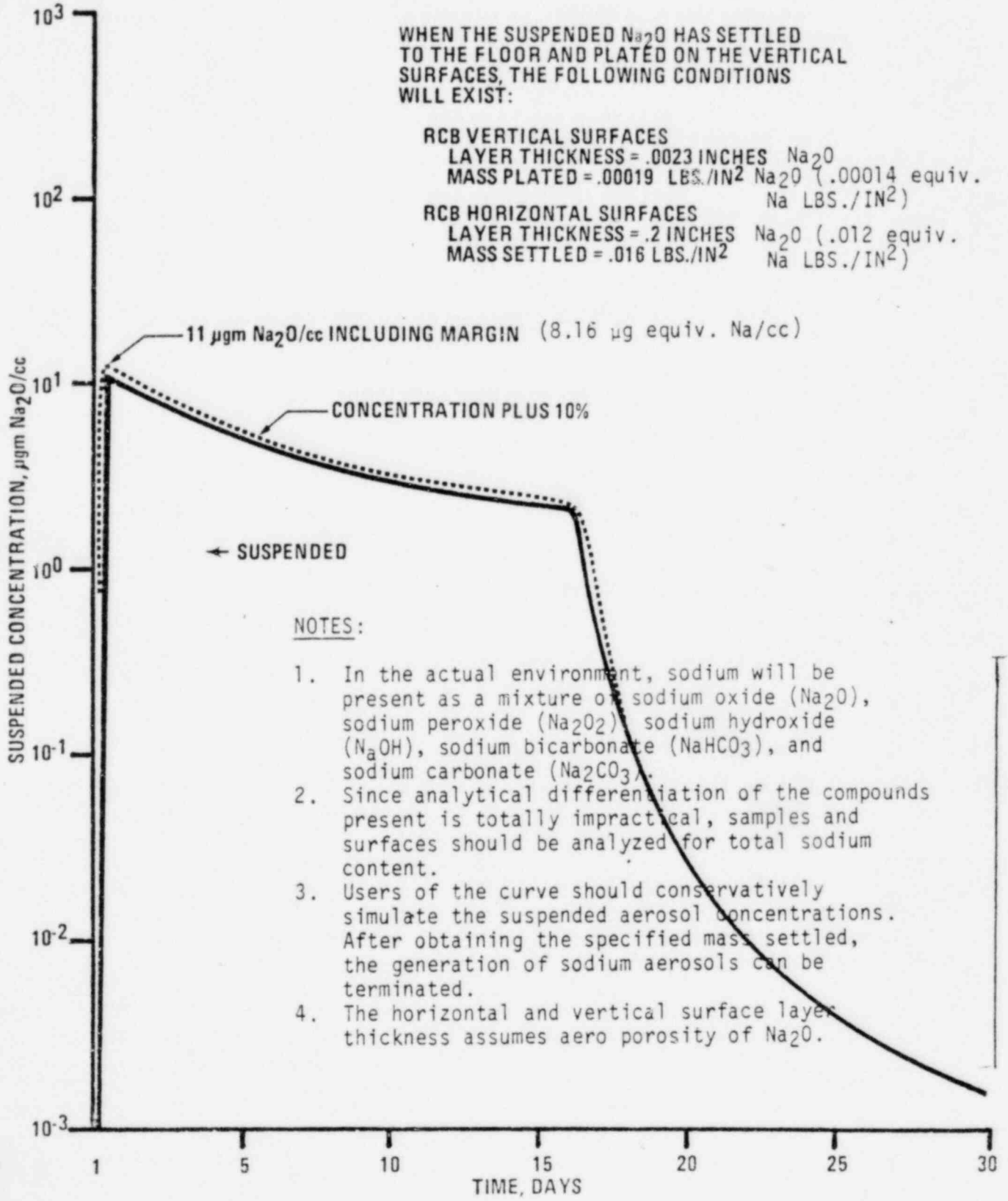

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FIGURE 2-6
RCB OPERATING FLOOR DOSE RATES AS A FUNCTION OF
TIME AFTER THE REACTOR COVER GAS RELEASE

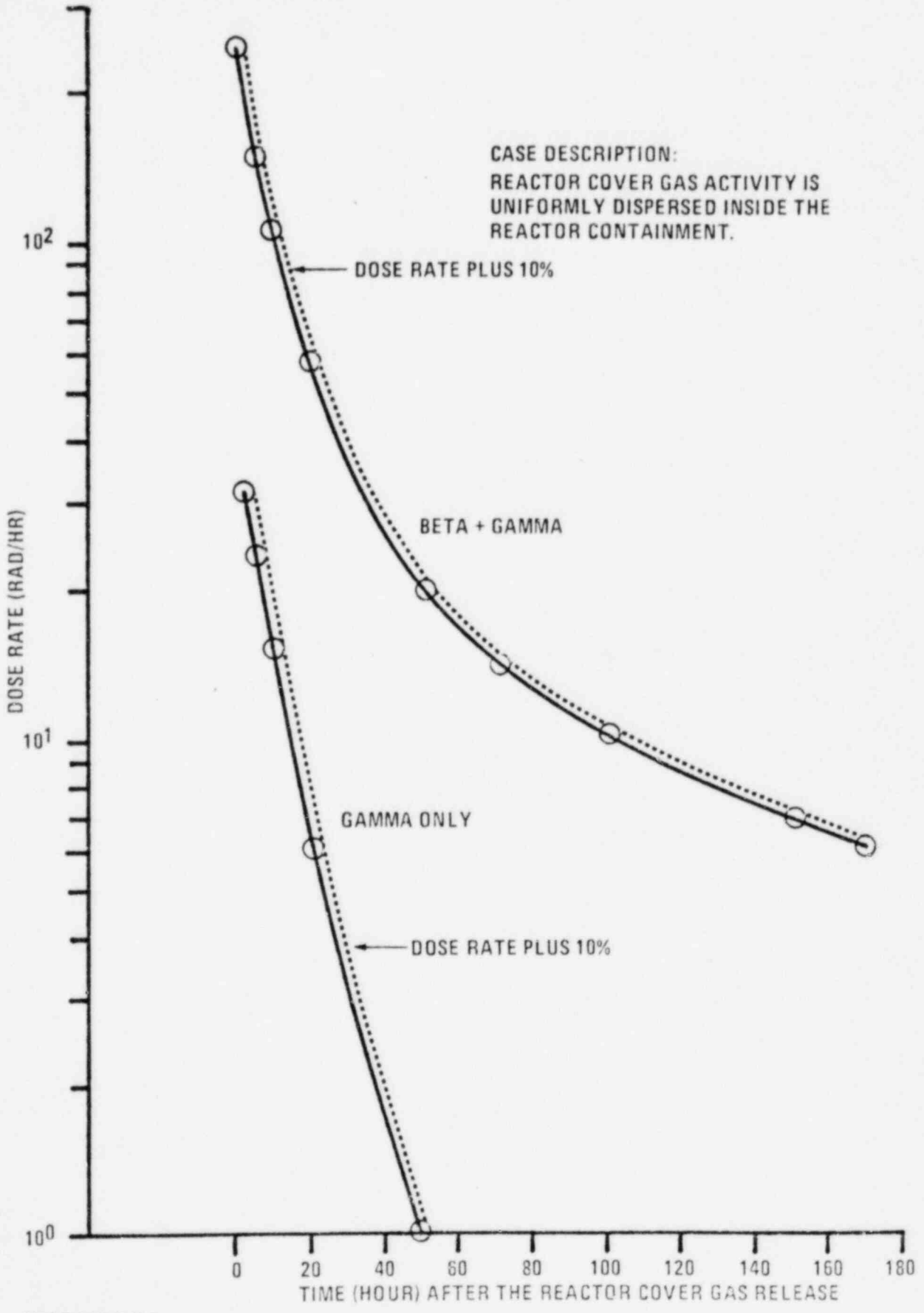

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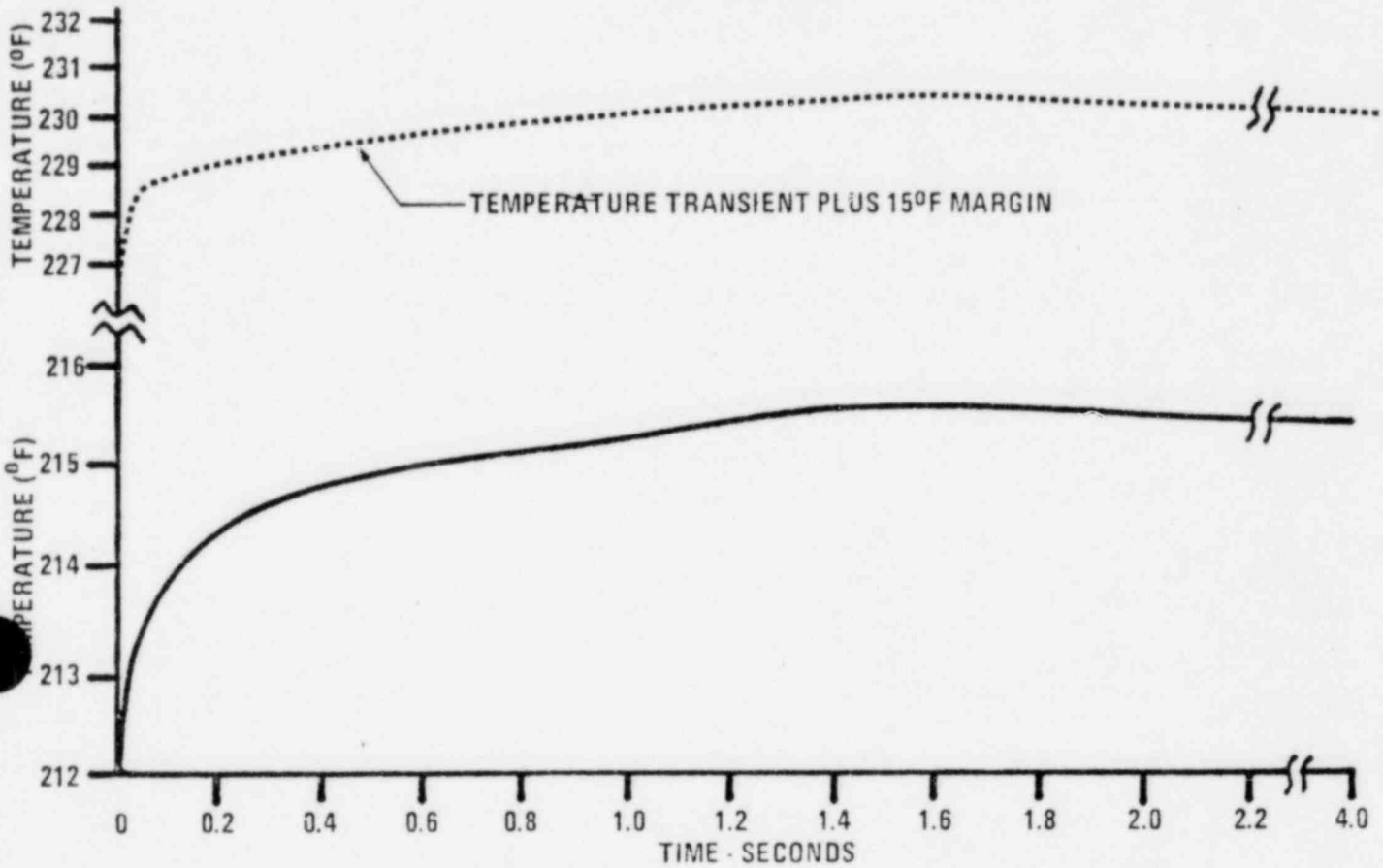
FIGURE 2-7

TEMPERATURE AFTER STEAM/
FEEDWATER LINE BREAK IN
CELL 241 OR 242 OR 243*



* NOTE:
CELLS 241, 244, 207 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS
CELLS 242, 245, 208 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS
CELLS 243, 246, 209 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS

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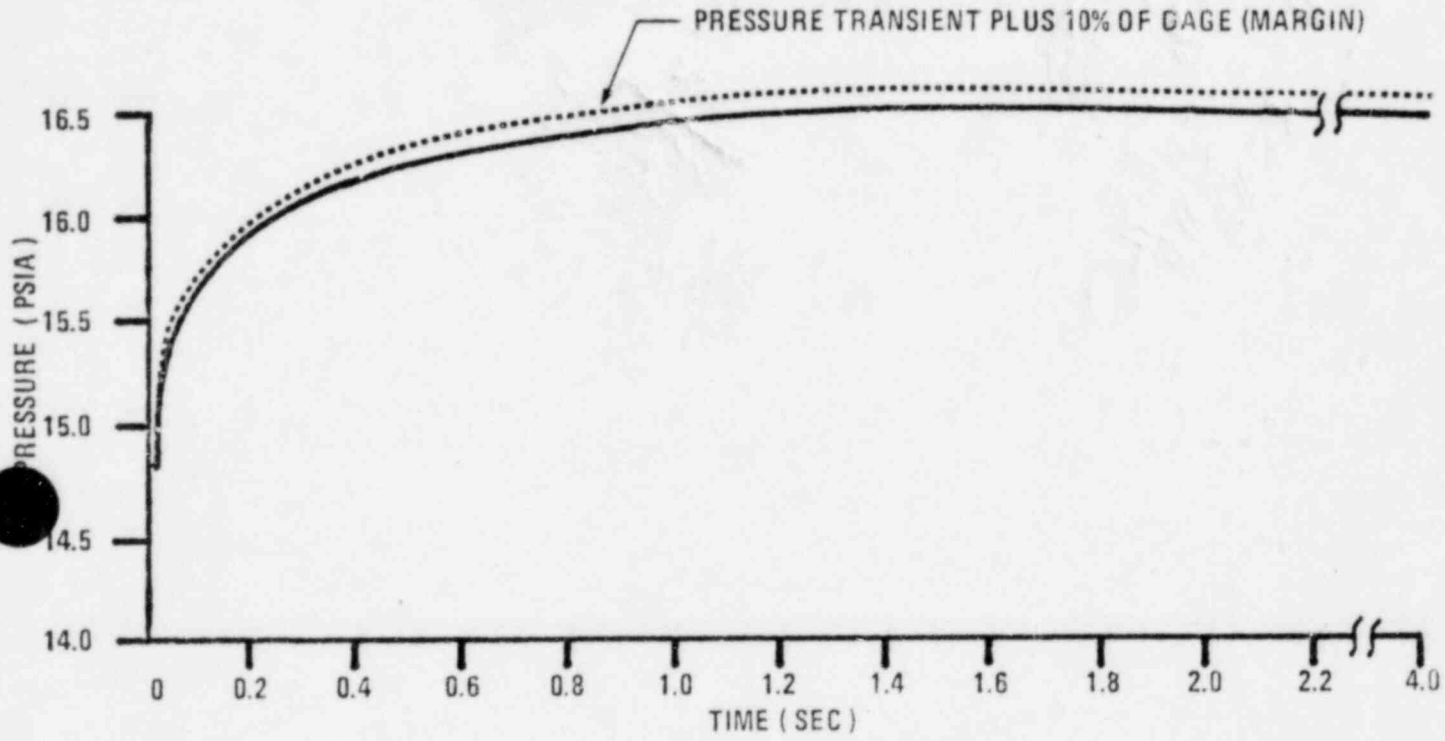
FIGURE 2-8

PRESSURE AFTER STEAM/
FEEDWATER LINE BREAK IN
CELL 241 OR 242 OR 243*



* NOTE:
CELLS 241, 244, 207 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS
CELLS 242, 245, 208 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS
CELLS 243, 246, 209 HAVE A COMMON ENVIRONMENT BECAUSE OF BLOWOUT PANELS

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FIGURE 2-9

DOSE RATE IN RSB CELLS 352A AND 353A FOR ENVELOPE OF REACTOR COVER GAS RELEASE DURING REFUELING AND FUEL ASSEMBLY FAILURE IN RSB.

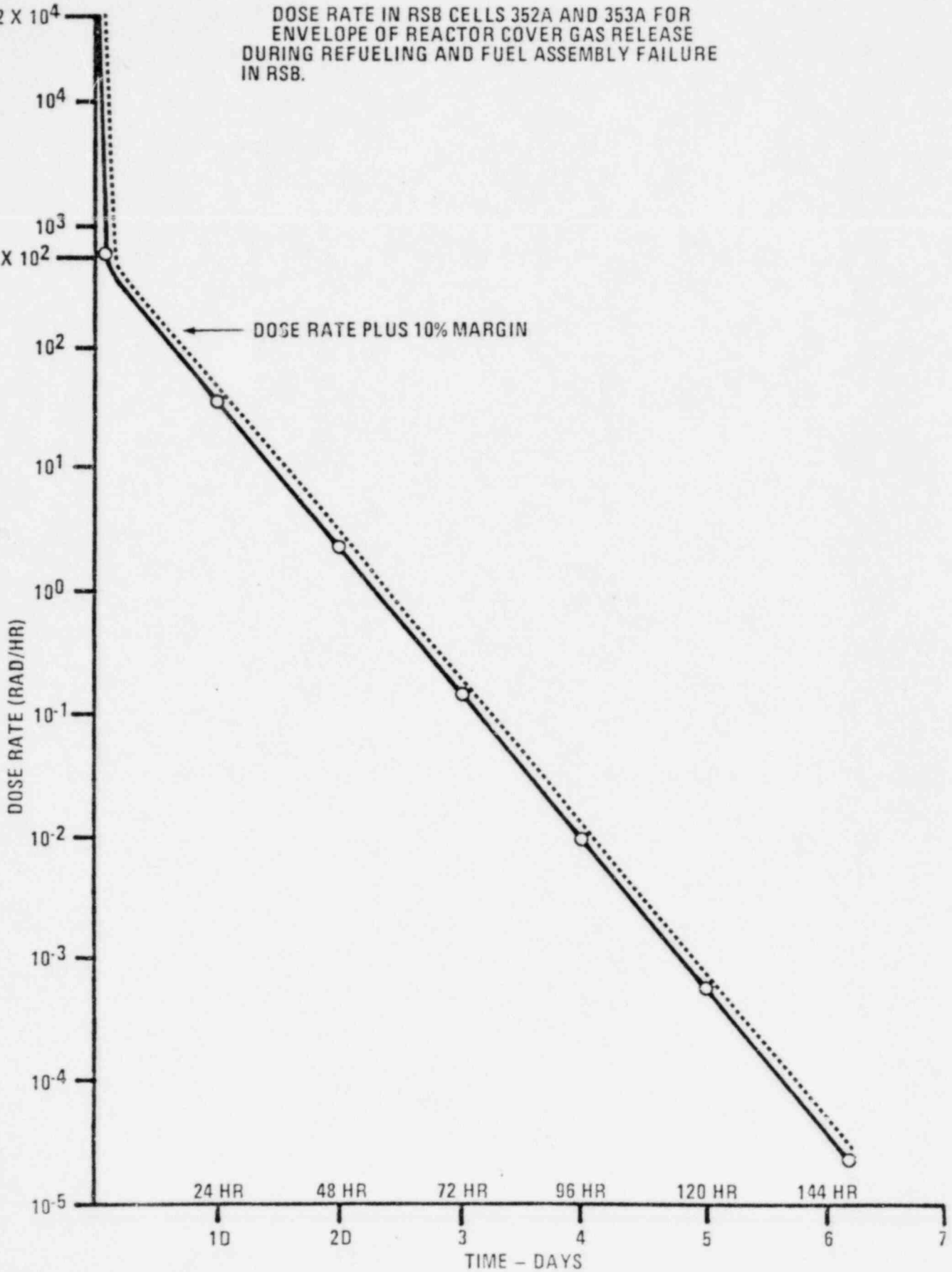

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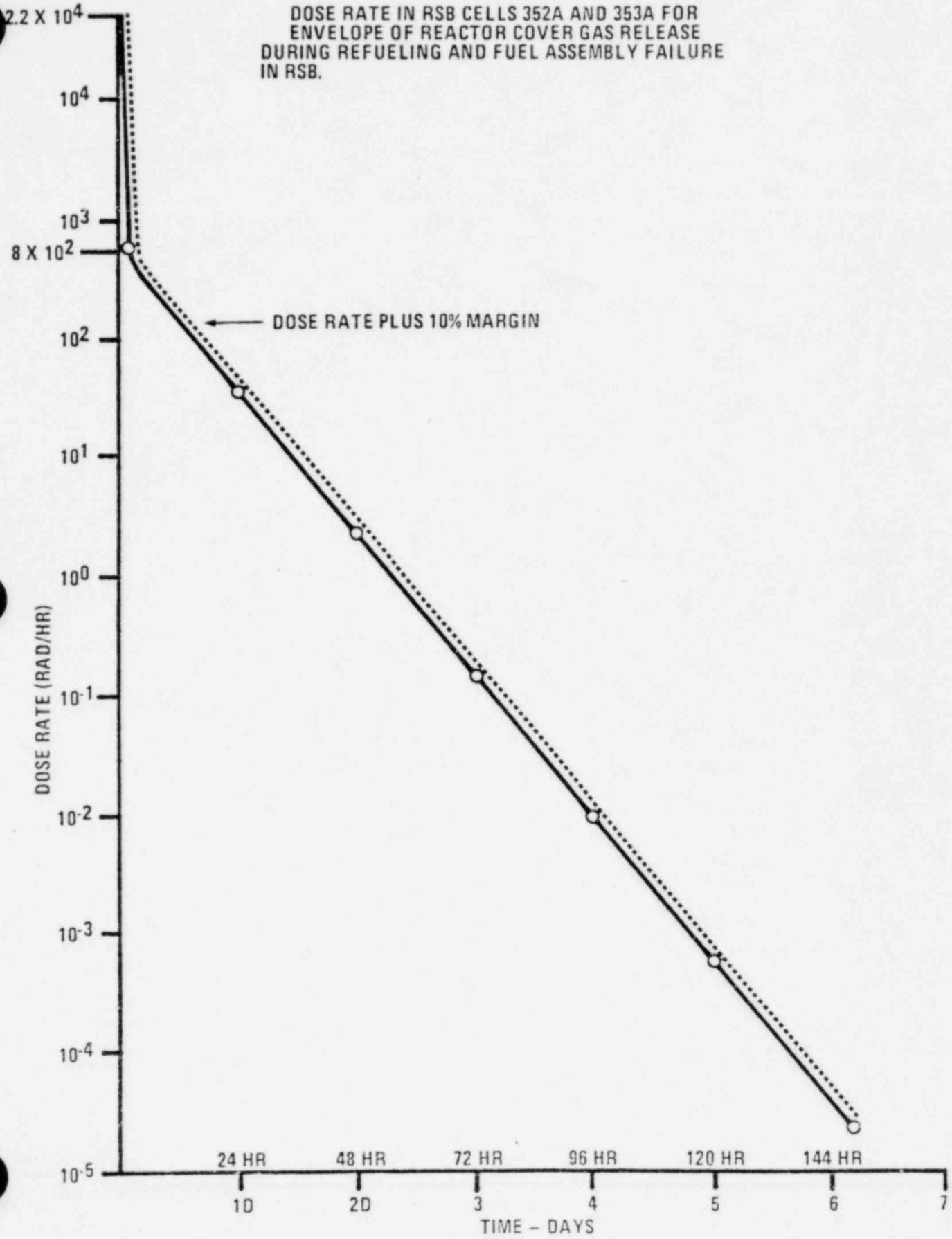
FIGURE 2-9

DOSE RATE IN RSB CELLS 352A AND 353A FOR ENVELOPE OF REACTOR COVER GAS RELEASE DURING REFUELING AND FUEL ASSEMBLY FAILURE IN RSB.



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3. QUALIFICATION BASIS AND IMPLEMENTATION

The qualification requirements presented herein are based on applicable General Design Criteria (GDC), Regulatory Guides 1.73, 1.89 (as applicable), IEEE 323-1974, and IEEE 344-1975.

Equipment not subjected to severe accident environments is listed in Table 3-1 and qualification procedures for it are discussed in paragraph 4.2.1. Class 1E equipment subjected to severe environments is listed in Table 3-2 and qualification procedures are discussed in paragraph 4.2.2.

3.1 Chemical

Class 1E equipment not subjected to chemical severe environments in CRBRP buildings and in the emergency cooling towers may be subjected to sodium aerosol concentrations up to and including 15 mg/m^3 (8.85 mg/m^3 equivalent Na) suspended equivalent sodium peroxide and 0.1 g/m^2 (0.059 g/m^2 equivalent Na) deposited equivalent sodium peroxide as a result of sodium spills. This sodium aerosol environment is the result of a sodium spill in an IHTS cell being ingested by other CRBRP air filled cells. The resulting suspended sodium aerosol environment, a mixture of sodium peroxide (Na_2O_2), sodium oxide (Na_2O), sodium hydroxide (N_aOH), sodium bicarbonate (N_aHCO_3), and sodium carbonate (Na_2CO_3) existing in varying proportions, leaves the building containing the spill via air exhaust ducting and is ingested by surrounding air filled buildings for 10 seconds before the ingesting building air intake vent is isolated by closure of the air intake vent dampers. Before the dampers close, the peak suspended sodium aerosol concentration reaches 8.85 mg/m^3 equivalent sodium. This 10 second ingestion of sodium aerosols results in a uniform horizontal surface deposition of 0.059 g/m^2 of equivalent sodium. Since analytical differentiation of the ingested sodium compounds is totally impractical, the air and horizontal surfaces should be sampled and analyzed for total sodium content in order to quantify the environment surrounding the equipment. Equipment subject to this environment must be qualified by any one or a combination of the methods specified in paragraph 4.1 in accordance with paragraph 4.2-1, "Class 1E Equipment Subjected to Non-Severe Accident Environments," while equipment subject to higher than 15 mg suspended and 0.1 g/m^2 deposited sodium aerosol concentrations must be qualified in accordance with paragraph 4.2.2, "Class 1E Equipment Subject to Severe Accident Environments. R6

3.2 Temperature, Pressure, Humidity, Chemical

Class 1E equipment will be qualified to the enveloping transient with added margins per IEEE 323 for environmental parameters of temperature, pressure, humidity, and chemical. The margin for the chemical parameter shall be 10%. Figure numbers for the enveloping transients of each parameter, as it applies to specific equipment, are listed in Table 3-2 and the figures are in Section 2. These parameters will be used in the development of the qualification envelope in accordance with the procedures set forth in Section 4.

3.3 Radiation

The Class 1E equipment will be qualified to the worst case envelope (with IEEE Std. 323 margins) based upon normal service exposure plus the most

3.3 Radiation (Continued)

severe radiation environment predicted to occur prior to and during those portions of the specific accident transients for which the component is required to perform its safety function. Worst case accident parameters are shown in Table 3-2. These parameters will be used in the development of the qualification envelope as described in the procedures of Section 4.

3.4 Vibration

The vibration parameter will apply to a few sensors and transmitters which are located on mechanical devices which vibrate due to slight unbalances in rotating systems or on fluid lines which are subjected to vibration will be qualified to that environment per IEEE Std. 323-1974. Worst case parameters are not shown on Table 3-1, but will be developed on an individual component basis dependent upon the component location. In those instances where vibration is significant, the amplitude and frequency of the vibration will be provided in the equipment specification and the equipment will be qualified to acceleration 10% greater than that calculated or measured at the mounting point of the equipment. Those equipment items being qualified to the vibration environment will be identified in Tables 3-1 and 3-2.

3.5 Seismic

Qualification to the seismic environment is to be carried out in accordance with IEEE Std. 344-1975, 323-1974 and WARD-D-0037. Worst case parameters are not shown on Table 3-1 or Table 3-2, but will be developed on an individual component basis dependent upon the component location. Acceleration shall be increased by 10% for qualification per paragraph 6.3.1.5 of IEEE Std. 323-1974. Guidelines for seismic qualification of active valves and pumps are provided in WARD-D-0174. The horizontal and vertical acceleration for the safe shutdown earthquake (SSE) is specified in WARD-D-0037. These ground motions are translated to the component location as described in WARD-D-0037 and will be provided in the equipment specification for each item of Class 1E equipment.

3.6 Periodic Pressure Test

The reactor containment will be tested with an internal pressure of 11.5 psig one time during containment acceptance tests. During its 30 year lifetime, it will be subjceted to nine additional tests at 10 psig per 10CFR50, Appendix J. It is required that 1E equipment in containment remain functional after the leak rate tests, otherwise the equipment must be removed during the tests. Analysis, previous operating experience and type testing are acceptable methods for demonstrating that the equipment will remain functional after the leak rate tests. If equipment testing is required, then the tests shall be performed after the equipment is aged.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIB011A	480-120/208VAC Power Dist. Panel	DGB521	30 Days	120	
12NIB011B	480-120/208VAC Power Dist. Panel	DGB524			
12NIB012A	120/208VAC Power Dist. Panel	RSB352A			
12NIB012B		RSB353A			
12NIB013A		RSB314			
12NIB013B		RSB TBD			R5
12NIB020A		SGB271			
12NIB020B		SGB TBD			
12NIB021C		SGB273			
12NIB024A		CB413			
12NIB024B		CB412			
	Pri. Pump Under Voltage Sensors	455, 457			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIB201A	120/208VAC UPS Panel	CB423	30 Days	120	
12NIB201B		CB446			
12NIB201C		CB459			
12NIB202A		RCB165			
12NIB202B		RCB163			
12NIB202C		RCB167			R5
12NIB203A		SGB272A			
12NIB203B		SGB262			
12NIB203C		SGB272C			
12NIB204A		CB423			
12NIB204B		CB446			
12NIB204C		CB459			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIB401A	125V DC Panel	CB421	30 Days	120	
12NIB401B		CB446			
12NIB402A		CB521			
12NIB402B		CB524			
12NIB403A		RSB305F			
12NIB403B		RSB305E			R5
12NIB404A		SGB271			
12NIB404B		SGB262			
12NIB601A	480/277 Standby Lighting Panel	RCB161A			
12NIB601B		RCB171			
12NIB602A		RSB325			
12NIB602B		RSB306A			
12NIB603A		SGB TBD			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIB603B	480/277 Standby Lighting Panel	SGB TBD	30 Days	120	
12NIB604A		CB413			
12NIB604B		CB412			
12NIB605A		DGB521			
12NIB605B		DGB525			
12NIE003A	4.16KV SWGR	DGB521			R5
12NIE003B	4.16KV SWGR	DGB524			
12NIE005A	125V DC Bus	CB454			
12NIE005B	125V DC Bus	CB460			
12NIE005C	250V DC Bus	CB459			
12NIE008A	120/208V UPS Vital AC Bus	CB454			
12NIE008B		CB460			
12NIE008C		CB459			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIE010A	125V DC Battery	CB451	30 Days	120	
12NIE010B	125V DC Battery	CB458			
12NIE010C	250V DC Battery	CB453			
12NIE012A	480VAC-125V DC Battery Charger	CB454			
12NIE012B		CB460			
12NIE012C		CB454			
12NIE012D		CB460			R5
12NIE012E		CB459			
12NIE012F		CB459			
12NIE014A	125V DC-120/208VAC Vital Inverter	CB463			
12NIE014B		CB454			
12NIE014C		CB459			
12NIE014D	250V DC-480V Vital AC Inverter	CB459			
12NIE016C	Unit Substation	CB460			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIE019A	Diesel Gen. Control Panel A	CB431	30 Days	120	R5
12NIE019B	Diesel Gen. Control Panel B	CB431			
12NIE027A	4.16KV/480V Unit Substation	DGB521			
12NIE027B		DGB524			
12NIE028A		DGB521			
12NIE028B		DGB524			
12NIE032A		RSB305E			
12NIE032B		RSB305E			
12NIE033A		SGB TBD			
12NIE033B		SGB247			
12NIE040A	480V Motor Control Center	DGB521			
12NIE040B		DGB522			
12NIE041A		RSB306A			
12NIE041B		RSB305B			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIE042A	480V Motor Control Center	CB413	30 Days	120	R5
12NIE042B		CB412			
12NIE044C		SGB273			
12NIE050A		SGB271			
12NIE050B		SGB247			
12NIE052A		SGB271			
12NIE052B		SGB247			
12NIE058A		RSB305F			
12NIE058B		RSB305E			
12NIE060A		ECT			
12NIE060B		ECT			
12NIE102A	DG Jacket Water Heater	DGB TBD			
12NIE102B	DG Jacket Water Heater	DGB TBD			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIE104A	DG Lube Oil Reserve Heater	DGB TBD	30 Days	120	
12NIE104B	DG Lube Oil Reserve Heater	DGB TBD			
12NIE110A	Exciter DG Field Flash	DGB TBD			
12NIE110B	Exciter DG Field Flash	DGB TBD			
12NIE111A	DG Seq. Logic Cab	DGB522			R5
12NIE111B	DG Seq. Logic Cab	DGB523			
12NIK001A	Fuel Oil Transfer Pump	DGB526			
12NIK001B		DGB527			
12NIK001C		DGB526			
12NIK001D		DGB527			
12NIX011A	480-120/208VAC Power Dist. XFMR	DGB521			
12NIX011B		DGB524			
12NIX012A		DGB521			
12NIX012B		DGB524			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1 (2)

Equipment Number	Description	Cell Number (1)	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIX013A	480-120/208VAC Power Dist. XFMR	RSB TBD	30 Days	120	
12NIX013B		RSB TBD			
12NIX020A		SGB TBD			
12NIX020B		SGB TBD			
12NIX021C		SGB TBD			
12NIX024A		CB413			R5
12NIX024B		CB412			
12NIX040A	480-120/208V Vital AC XFMR	CB454			
12NIX040B		CB460			
12NIX040C		CB459			
12NIX601A	480/277V Lighting Panel XFMR	RCB161A			
12NIX601B		RCB171			
12NIX602A		RSB325			
12NIX602B		RSB306A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12NIX603A	480/277V Lighting Panel XFMR	SGB TBD	30 Days	120	
12NIX603B		SGB TBD			
12NIX604A		CB413			
12NIX604B		CB412			
12NIX605A		DGB521			
12NIX605B		DGB525			R5
12SSB250A	SSPLS Logic Cabinet	SGB271			
12SSB250B		SGB247			
12SSB251A		SGB271			
12SSG251B		SGB247			
12SSB350A		RSB305F			
12SSB350B		RSB305E			
12SSB351A		RSB306A			
12SSB351B		RSB305A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12SSB550A	SSPLS Logic Cabinet	DGB521	30 Days	120	R5
12SSB550B		DGB524			
12SSB551A		DGB522			
12SSB551B		DGB523			
12TCB250A	Termination Cabinet	SGB271			
12TCB250B		SGB247			
12TCB251A		SGB271			
12TCB251B		SGB247			
12TCB350A		RSB305F			
12TCB350B		RSB305E			
12TCB351A		RSB306A			
12TCB351B		RSB305A			
12TCB550A		DGB521			
12TCB550B		DGB524			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 12					
12TCB551A	Termination Cabinet	DGB522	30 Days	120	R5
12TCB551B	Termination Cabinet	DGB523	30 Days	120	R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ECNV353 & SOV353	Iso. After Wtr. Leak Val. (Operator)	152	30 Days	120	R5
23ECNV354 & SOV354	Iso. After Wtr. Leak Val. (Operator)	152			
23ECNV400 & SOV400	Iso. After Wtr. Leak Val. (Operator)	154			
23ECNV401 & SOV401	Iso. After Wtr. Leak Val. (Operator)	154			
23ECP002A	Emergency Chilled Water Pump Motor	216			
23ECP002B	Emergency Chilled Water Pump Motor	217			
23ECPCV17A	Pressure Control Valve (Operator)	216			
23ECPCV17B	Pressure Control Valve (Operator)	217			
TE9AA & TE9BA	Chiller Outlet Temperature RDT	216 & 217			
PDISH12A & B	Chiller Diff. Pressure Switch	216 & 217			
FSL20AA & FSL20BA	Normal Chilled Wtr Low Flow Switch	271 & 262			
FIT36A & B	Emergency Chilled Water Flow	216 & 217			
LSLL41A & B	Emerg. Exp. Tnk. Low Level Switch	216 & 217			
23ECTV210	Temp. Control Valve (Operator)	262			
23ECTV218A	Temp. Control Valve (Operator)	272A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ECTV218B	Temp. Control Valve (Operator)	272B	30 Days	120	
23ECTV218C	Temp. Control Valve (Operator)	277C			
23ECH001A	Emerg. Chilled Water Chiller	216			
23ECH001B	Emerg. Chilled Water Chiller	217			
23ECTV355	Temp. Control Valve (Operator)	271			
23ECTV402	Temp. Control Valve (Operator)	271			R5
23ECAOV304A & SOV304A	Unit Cooler Iso. Valve (Operator)	216			
23ECAOV304B & SOV304B	Unit Cooler Iso. Valve (Operator)	217			
23ECAOV350 & SOV350	Unit Cooler Iso. Valve (Operator)	204B			
23ECAOV351 & SOV351	Unit Cooler Iso. Valve (Operator)	202B			
23ECAOV352 & SOV352	Unit Cooler Iso. Valve (Operator)	204A			
23ECAOV356 & SOV356	Unit Cooler Iso. Valve (Operator)	202			
23ECPSV42	Pressure Relief Valve (Operator)	216			
23ECPSV43	Pressure Relief Valve (Operator)	217			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ECAOV13A & SOV13A	EC Sys. Iso. Valve (Operator)	216	30 Days	120	
23ECAOV13B & SOV13B	EC Sys. Iso. Valve (Operator)	217			
23ECAOV18A & SOV18A	EC Sys. Iso. Valve (Operator)	271			
23ECAOV18B & SOV18B	EC Sys. Iso. Valve (Operator)	262			
23ECAOV19A & SOV19A		271			
23ECAOV19B & SOV19B		262			
23ECAOV21A & SOV21A		216			R5
23ECAOV21B & SOV21B		217			
23ECAOV22A & SOV22A		271			
23ECAOV22B & SOV22B		262			
23ECAOV23A & SOV23A		271			
23ECAOV23B & SOV23B		262			
23ECAOV165 & SOV165	Containment Iso. (Valve Operator)	210			
23ECAOV166 & SOV166		210			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ECAOV167 & SOV167	Containment Iso. (Valve Operator)	271	30 Days	120	R5
23ECAOV168 & SOV168		271			
23ECAOV211 & SOV211		262			
23ECAOV212 & SOV212		262			
23ECAOV79 & SOV79		210			
23ECAOV80 & SOV80		210			
23ECAOV415 & SOV415		271			
23ECAOV418 & SOV418		271			
23ECPSV152A	Pressure Relief Valve	321			
23ECPSV152B	Pressure Relief Valve	322			
23ECNV403 & SOV403	Iso. After Wtr Lk. Val. (Operator)	325			
23ECNV404 & SOV404		325			
23ECNV409 & SOV409		306A			
23ECNV410 & SOV410		306A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ECTV408	Temp. Control Valve (Operator)	327	30 Days	120	R5
23ECTV204A		359			
23ECTV204B		391			
23ECTV209A		398			
23ECTV209B		395			
23ECPCV181	Pressure Control Valve (Operator)	392			
23ECPCV182	Pressure Control Valve (Operator)	324			
23ECTV300	Temp. Control Valve (Operator)	412			
23ECTV301		413			
23ECTV302		410A			
23ECTV303		411A			
23ICB001	Chilled Wtr. Sys. Cont. Cabinet	CB431			
23ICB003	Field Instrument Cabinet	SGB216			
23ICB004	Field Instrument Cabinet	SGB217			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 23					
23ICB007	Field Instrument Cabinet	RSB314	30 Days	120	R5
23ICB008	Field Instrument Cabinet	RSB314	↓	↓	
23ICB015	Equipment Instrument Cabinet	SGB216			
23ICB016	Equipment Instrument Cabinet	SGB217			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 25A					
25 ARK 021	EI&C Cubicle Unit Cooler Motor	165	30 Days	120	R5
25 ARK 022	EI&C Cubicle Unit Cooler Motor	163			
25 ARK 023	EI&C Cubicle Unit Cooler Motor	167			
25 AGK 223A	Emerg. Chillers Unit Cooler Motor	216			
25 AGK 223B	Emerg. Chillers Unit Cooler Motor	217			
25 AGK 244A & 25 AGK 244B	Intermediate Bay Supply Fan Motors	262			
25 AGK 237A	Sys. 56 Panel Unit Cooler Motor	272A			
25 AGK 237B	Sys. 56 Panel Unit Cooler Motor	272B			
25 AGK 237C	Sys. 56 Panel Unit Cooler Motor	272C			
25 AGK 249A & 25 AGK 249B	Intermediate Bay Supply Fan Motors	271			
25 AGK 264A & 25 AGK 264B	Intermediate Bay Exh. Fan Motors	262			
25 AGK 267A & 25 AGK 267B	Intermediate Bay Exh. Fan Motors	271			
25 AGK 222A	Aux. Feed Pump Unit Cooler Motor	202			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 25A					
25 AGK 222B	Aux. Feed Pump Unit Cooler Motor	202B	30 Days	120	R5
25 AGK 241 A&B	Loop 1 Supply Fan Motor	244			
25 AGK 242 A&B	Loop 2 Supply Fan Motor	245			
25 AGK 243 A&B	Loop 3 Supply Fan Motor	246			
25 AGK 261 A&B	Loop 1 Exhaust Fan Motor	244			
25 AGK 262 A&B	Loop 2 Exhaust Fan Motor	245			
25 AGK 263 A&B	Loop 3 Exhaust Fan Motor	246			
25 AGK 221A	Aux. Feed Pump Unit Cooler Motor	204A			
25 AGK 221B	Aux. Feed Pump Unit Cooler Motor	204B			
25 ASK 104A	ABHX Cell Unit Cooler Motor	327			
25 ASK 104B	ABHX Cell Unit Cooler Motor	326			
25 ARK 172A	Annulus Press. Maint. Fan Motor	395			
25 ARK 173A	RCB Annulus Fltr. Fan Motor	395			
25 ARK 172B	Annulus Press. Maint. Fan Motor	398			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 25A				
25 ARK 173B	RCB Annulus Fltr. Fan Motor	398	30 Days	120
25 ASK 132	Annulus Fltr. Cell Unit Cooler Mtr.	398		
25 ARK 174A	Annulus Cooling Fan Motor	392		
25 ARK 174B				
25 ARK 174C				
25 ARK 174D				
25 ARK 175E				
25 ARK 175F				
25 ACK 441A	Control Room Fltr Unit Fan Motor	410B		
25 ACK 441B		411B		
25 ACK 451A	Control Room Return Fan Motor	410A		
25 ACK 451B	Control Room Return Fan Motor	411A		
25 ACK 452	SWGR Return Fan A Motor	413		
25 ACK 453	SWGR Return Fan B Motor	412		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 25A					
25 ACK 461	Battery #1 Room Exh. Fan Motor	412	30 Days	120	
25 ACK 462	Battery #2 Room Exh. Fan Motor	413			
25 ACK 463	Battery #3 Room Exh. Fan Motor	413			
25 ACK 464	Battery Room Exhaust Fan Motor	412			
25 ACK 410A	Control Room A/C Unit Motor	410A			
25 ACK 410B	Control Room A/C Unit Motor	411A			
25 ACK 411	SWGR A/C Unit A Motor	413			R5
25 ACK 412	SWGR A/C Unit B Motor	412			
25 ARK 175A	Cleanup Scrub Fan Motor	359			
25 ARK 175B	Cleanup Scrub Fan Motor	347			
25 ARA 182A	Annulus Filter Unit	395			
25 ARA 182B	Annulus Filter Unit	398			
25 ASA 184A	RSB Cleanup Filter Unit	391			
25 ASA 184B	RSB Cleanup Filter Unit	347			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 25A					
25 ASA 185A	Cleanup Filter Fan Motor	391	30 Days	120	
25 ASA 185B	Cleanup Filter Fan Motor	347			
25 ASK 146	Annulus Fltr Cell Unit Cooler Mtr.	395			
25 ASK 133	RSB Cleanup Fltr. Cell Unit Cooler Motor	391			
25 ASK 134	RSB Cleanup Fltr Cell Unit Cooler Motor	347			
25 ASK 139A	Containment Cleanup Pump Cell Unit Cooler Motor	305I			R5
25 ASK 139B	Containment Cleanup Pump Cell Unit Cooler Motor	305G			
25 ASK 142 A&B	Containment Cleanup Scrubber Unit Cooler Motor	359			
25 ASK 143	Containment Cleanup Pipe Chase Unit Cooler Motor	348			
25 ASK 145	Containment Cleanup Pipe Chase Unit Cooler Motor	349			
25 ASK 137	Electrical Equipment Cell Unit Cooler Motor	305E			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 25A					
25 ASK 138	Electrical Equipment Cell Unit Cooler Motor	305F	30 Days	120	R5
25 ACA 471A	Control Room Filter Unit (Heating Coil, Instrumentation)	CB410B	↓	↓	
25 ACA 471B	Control Room Filter Unit (Heating Coil Instrumentation)	CB411B	↓	↓	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 26					
26SPB015	Zone Indicating Panel	431	30 Days	120	R5
26SDAE135A,B,C	Aerosol Rel. Det. SGB Loop 1	244		120	R6
136A,B.C	1	244			
245A,B.C	2	245			
246A,B.C	2	245			
335A,B,C	3	246			
336A,B.C	3	246			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 27				
27ICB003[3]	RCB TMBDB Instrumentation Panel	247	600 hours	
	RCB Hydrogen Channel A		500 hours	
	RCB Temperature Channel A		500 hours	
	CV Temperature Channel A			
27ICB004[3]	RCB TMBDB Instrumentation Panel	271	600 hours	
	RCB Hydrogen Channel B		500 hours	
	RCB Temperature Channel B		500 hours	
	CV Temperature Channel B			
27ICB002[3]	Containment Instrumentation Panel	431	600 hours	
	RCB Hydrogen Channel A		500 hours	
	RCB Pressure Channel A		500 hours	
	RCB Temperature Channel A		500 hours	
	CV Temperature Channel A			
27ICB005[3]	Containment Instrumentation Panel	431	600 hours	
	RCB Hydrogen Channel B		500 hours	
	RCB Pressure Channel B		500 hours	
	CV Temperature Channel B		500 hours	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

(3) Although the instrument is located in non-severe environment, the environment monitored is described by Figures 2-1 through 2-4. The instrument must be capable of monitoring that range of parameters.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 28					
28MAB001	Local Control Panel	105H	30 Days	120	
28MBB001	Local Control Panel	105Z			
28EATE10	Cell Temperature Switch	360			
28EBK001	Fan Motor	306A			
28EBMV001A	Solenoid Drain Valve	306A			
28EBMV001B	Solenoid Drain Valve	306A			
28EBSOV001A	Solenoid Val for Pneumatic Iso Val	306A			R5
28EBSOV001B	Solenoid Val for Pneumatic Iso Val	306A			
28EBME1	Moisture Switch	306A			
28EBNE1	Liquid Level Switch	306A			
28EAB001	Subsys. EA Field Instr. Panel	RSB325			
28EBB001	Subsys. EB Field Instr. Panel	RSB306A			
28EAB001	Subsys. MA Field Instr. Panel	RCB105L			
28EBB001	Subsys. MB Field Instr. Panel	RCB105Z			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 28					
28ICB001	Recirc. Gas Cooling Control Panel	CB431	30 Days	120	
28EBTE12	Cell Temp. Switch	357			
28MAK001	Fan Motor	105H			
28MAMV001A	Solenoid Drain Valve	105H			
28MAMV001B	Solenoid Drain Valve	105H			
28MASOV001A	Solenoid Val for Pneumatic Iso Val	105H			
28MASOV001B	Solenoid Val for Pneumatic Iso Val	105H			R5
28MAME1	Moisture Switch	105H			
28MANE1	Liquid Level Switch	105H			
28MATE10	Cell Temperature Switch	103			
28MBK001	Fan Motor	105H			
28MBMV001A	Solenoid Drain Valve	105Z			
28MBMV001B	Solenoid Drain Valve	105Z			
28MBSOV001A	Solenoid Val for Pneumatic Iso Val	105Z			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 28					
28MBSOV001B	Solenoid Val for Pneumatic Iso Val	105Z	30 Days	120	
28MBME1	Moisture Switch	105Z			
28MBNE1	Liquid Switch	105Z			
28MBTE10	Cell Temperature Switch	104			
28FHME1A	Moisture Switch	342			
28FHME1B	Moisture Switch	343			
28FHNE1A	Liquid Level Switch	342			R5
28FHNE1B	Liquid Level Switch	343			
28EAK001	Fan Motor	325			
28EAMV001A	Solenoid Drain Valve	325			
28EAMV001B	Solenoid Drain Valve	325			
28EASOV001A	Solenoid Val for Pneumatic Iso Val	325			
28EASOV001B	Solenoid Val for Pneumatic Iso Val	325			
28EAME1	Moisture Switch	325			
28EANE1	Liquid Level Switch	325			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 31					
31SDR003	Solenoid Scram Valves--subassemblies of the six Secondary Control Rod Drive Mechanisms (SCRDMs); three solenoids per SCRDM.	151	30 Days	340	R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 32	Cable serving System 90 SCRDM SCRAM Valves and System 96 Radiation Monitors	151	30 Days	130	R5
	Cable serving System 92 Reactor Coolant Operating Level Sensors	151	30 Days	220	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 44					
44SRHV033A	Containment (Iso Valve Operator)	305C	30 Days	120	R5
44SRHV069B	Containment (Iso Valve Operator)	305C	30 Days	120	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 52					
52ACH001A, B, C	Air Cooled Condenser	281,282,283	30 Days	125	R5
52AFK001A, B	AFW Pump Motor	204A,204B	30 Days (5)	120	
52AFN001	AFW Pump Drive Turbine (4)	202A	1 hour		
52AFT001 (3)	Water Storage Tank	215	30 Days		
52AFD001A-F (3)	AFW Flow Meter	202,206			
52ACD002A,B,C(3)	PACC Condensate Flow Meter	241,242,243			
52AFV103A-F	AFW Iso. Valve (Operator)	202,206			
52AFV104A-F	AFW Control Valve (Operator)	202,206			
52AFV108A, B, C	AFW Pump Recirc. Val. (Operator)	202,204			
52AFV109A, B	AFW Pump Inlet Valve Operator	215			
52AFV110A, B	AFW Pump Alternate Inlet Val (Oper)	215			
52AFV114	PWST Fill Valve (Operator)	215			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.
(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.
(3) Instrumentation only.
(4) Including Governor Valve and Trip and Throttle Valve.
(5) The Pump motors will be on, intermittently, for no more than 20 hours total during the 30 day period.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 52					
52AFV115	Alternate AFW Supply Val (Operator)	242	30 Days	120	
52AFV116A, B, C	Superheater Vent Cont. Val (Oper.)	241,242,243	11 hours		
52AFV117A, B, C	Steam Drum Vent Cont. Val (Oper.)	241,242,243	11 hours		
52AFV118A, B, C	Drive Turbine Steam Supply Iso. Valve (Operator)	241,242,243	1 hour		
52AFV121	Drive Turbine Pressure Control Valve (Operator)	202	1 hour		
52AFV122	AFW Pump Inlet Valve (Operator)	215	30 Days		
52AFV123	AFW Pump Alternate Inlet Val (Oper)	215	30 Days		
52ACV129A-F	PACC Noncondensible Vent Val (Oper)	281,282,283	30 Days	125	R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.
(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.
(3) Instrumentation only.
(4) Including Governor Valve and Trip and Throttle Valve.
(5) The Pump motors will be on, intermittently, for no more than 20 hours total during the 30 day period.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 56					
56HRB110A	SGAHRS I&C Panel,Division I	SGB272A	30 Days	120	
56HRB110B	SGAHRS I&C Panel,Division II	SGB272B	30 Days		
56HRB110C	SGAHRS I&C Panel,Division III	SGB272C	30 Days		
56PRB111AP	PHTS Primary PPS Panel,Channel A	RCB165	24 hours		
56PRB111BP	PHTS Primary PPS Panel,Channel B	RCB163	24 hours		
56PRB111CP	PHTS Primary PPS Panel,Channel C	RCB167	24 hours		R5
56PRB111AS	PHTS Secondary PPS Panel,Channel A	RCB165	24 hours		
56PRB111BS	PHTS Secondary PPS Panel,Channel B	RCB163	24 hours		
56PRB111CS	PHTS Secondary PPS Panel, Channel C	RCB167	24 hours		
56SGB100A	SGS/SGAHRS Logic Cabinet,Div. I	MCB431	30 Days		
56SGB100B	SGS/SGAHRS Logic Cabinet,Div. II	MCB431	30 Days		
56SGB100C	SGS/SGAHRS Logic Cabinet,Div. III	MCB431	30 Days		
56SGB001A	OSIS I&C Panel,Loop 1	SGB272A	24 hours		
56SGB001B	OSIS I&C Panel,Loop 2	SGB272B	24 hours		
56SGB001C	OSIS I&C Panel,Loop 3	SGB272C	24 hours		

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1 (2)

Equipment Number	Description	Cell Number (1)	Time Duration	Maximum Accident Temp (°F)
System 56				
56SGB002A	SWRPRS I&C Panel, Loop 1	SGB272A	24 hours	120
56SGB002B	SWRPRS I&C Panel, Loop 2	SGB272B	24 hours	
56SGB002C	SWRPRS I&C Panel, Loop 3	SGB272C	24 hours	
56HRPT228	Motor Driven AFW Pump "A" Outlet Pressure Transmitter	SGB204A	30 Days	
56HRPT328	Motor Driven AFW Pump "B" Outlet Pressure Transmitter	SGB204B	30 Days	
56HRPT128	Turbine Driven Pump	SGB202A	1 hour	
56HRPT125	Pump Outlet Pressure Transmitter	SGB202A	1 hour	
56SIT120	Steam Supply Pressure Transmitter Pump Tachometer	SGB202A	1 hour	
56HRTE002	PWST Temperature Sensor and Level	SGB215	30 Days	
56HRLT103	Transmitter	SGB215	30 Days	
56HRFT138	AFW (Turbine Driven Pump)	SGB202A	1 hour	
56HRFT138B	Flow Transmitters, Loop 1	SGB202A	1 hour	
56HRFT238	AFW (Turbine Driven Pump)	SGB206	1 hour	
56HRFT238B	Flow Transmitters, Loop 2	SGB206	1 hour	
56HRFT338	AFW (Turbine Driven Pump)	SGB206	1 hour	
56HRFT338B	Flow Transmitters, Loop 3	SGB206	1 hour	

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 56				
56HRFT132	AFW (Motor Driven Pumps)	SGB202A	30 Days	120
56HRFT132B	Flow Transmitters, Loop 1	SGB202A	30 Days	
56HRFT232	AFW (Motor Driven Pumps)	SGB206	30 Days	
56HRST232B	Flow Transmitters, Loop 2	SGB206		
56HRFT332	AFW (Motor Driven Pumps)	SGB206		
56HRFT332B	Flow Transmitters, Loop 3	SGB206		
56HRXE100A	PACC System Na Aerosol Detectors,	SGB281		
56HRXE100B	Loop 1	SGB281		
56HRXE100C		SGB281		
56HRXE200A	PACC System Na Aerosol Detectors,	SGB282		
56HRXE200B	Loop 2	SGB282		
56HRXE200C		SGB282		
56HRXE300A	PACC System Na Aerosol Detectors,	SGB283		
56HRXE300B	Loop 3	SGB283		
56HRXE300C		SGB283		
56PRPT124AP	Reactor Inlet Pressure	RCB101C	24 hours	150
56PRPT125AP	Transmitters, Loop 1	RCB101C		
56PRPT224BP	Reactor Inlet Pressure	RCB101D		
56PRPT225BP	Transmitters, Loop 2	RCB101D		
56PRPT324BP	Reactor Inlet Pressure	RCB101E		
56PRPT325CP	Transmitters, Loop 3	RCB101E		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 56				
56PRTE128A	IXH Outlet Temperature	RCB121	24 hours	150
56PRTE128B	Sensors, Loop 1, Channels A, B, C	RCB121		
56PRTE128C		RCB121		
56PRTE228A	IXH Outlet Temperature	RCB122		
56PRTE228B	Sensors, Loop 2, Channels A, B, C	RCB122		
56PRTE228C		RCB122		
56PRTE328A	IXH Outlet Temperature	RCB123		
56PRTE328B	Sensors, Loop 3, Channels A, B, C	RCB123		
56PRTE328C		RCB123		
56PRFE125AS	PHTS Sodium PM Flowmeter Sensors,	RCB101C		
56PRFE125BS	Loop 1, Channels A, B, C	RCB101C		
56PRFE125CS				
56PRFE225AS	PHTS Sodium PM Flowmeter Sensors,	RCB101D		
56PRFE225BS	Loop 2, Channels A, B, C	RCB101D		
56PRFE225CS		RCB101D		
56PRFE325AS	PHTS Sodium PM Flowmeter Sensors,	RCB101E		
56PRFE325BS	Loop 3, Channels A, B, C	RCB101E		
56PRFE325CS		RCB101E		
56PRTE129A, B	PHTS Sodium Pump Outlet	RCB121		
56PRTE130A, B	Temperature Sensors, Loop 1	RCB121		
56PRTE229A, B	PHTS Sodium Pump Outlet	RCB122		
56PRTE230A, B	Temperature Sensors, Loop 2	RCB122		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 56				
56PRTE329A, B	PHTS Sodium Pump Outlet	RCB123	24 hours	150
56PRTE330A, B	Temperature Sensors, Loop 3	RCB123		150
56INTE128AS	Evaporator (Sodium) Outlet	SGB227		120
56INTE128BS	Temperature Sensors, Loop 1,	SGB227		
56INTE128CS	Channels A, B, C	SGB227		
56INTE228AS	Evaporator (Sodium) Outlet	SGB228		
56INTE228BS	Temperature Sensors, Loop 2,	SGB228		
56INTE228CS	Channels A, B, C	SGB228		
56INTE328AS	Evaporator (Sodium) Outlet	SGB229		
56INTE328BS	Temperature Sensors, Loop 3,	SGB229		
56INTE328CS	Channels A, B, C	SGB229		
56INFE125AS	IHTS PM Flowmeter Sensors, Loop 1,	SGB227		
56INFE125BS	Channels A, B, C	SGB227		
56INFE125CS		SGB227		
56INFE225AS	IHTS PM Flowmeter Sensors, Loop 2,	SGB228		
56INFE225BS	Channels A, B, C	SGB228		
56INFE225CS		SGB228		
56INFE325AS	IHTS PM Flowmeter Sensors, Loop 3,	SGB230		
56INFE325BS	Channels A, B, C	SGB230		
56INFE325CS				
56PRE101A, B, C thru 104A, B, C	PHTS DR. PPS Breakers	DGB530	48 hours	

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 56					
56INE101A, B, C thru 104A, B, C	IHTS DR. PPS Breakers	DGB530 DGB530	48 hours 48 hours	120	
56INK201A, B, C	IHTS Na Pump Pony Motors	SGB244, 245, 246	30 Days	▼	R5
56INK112A, B, C	IHTS Na Pump Drive ARD Bearing Fan Motor	SGB244, 245, 246	30 Days	▼	
56INST103AP, BP, CP thru 303AP, BP, CP	IHTS Na Pump Tachometers	SGB244, 245 246	24 hours	▼	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 75					
75EPK001A	EPSW Pump Motor	ECT	30 Days	120	
75EPK001B	EPSW Pump Motor				
75EPK002A	ECT Fan Motor				
75EPK002B					
75EPK002C					
75EPK002D					R5
75EPK002E					
75EPK002F					
75EPK003A	EPSW Makeup Pump Motor				
75EPK003B	EPSW Makeup Pump Motor				
75EPTV67AA	Temp. Control Valve (Operator)				
75EPTV67AB					
75EPTV67BB					
75EPTV67BA					

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 75					
75EPTT67A	Temperature Transmitter	DGB513	30 Days	120	R5
75EPTT67B	Temperature Transmitter	DGB525			
75EPTIC67A	Temperature Indicator Controller	DGB513			
75EPTIC67B	Temperature Indicator Controller	DGB525			
75EPDDISH92A	Pressure Differential Switch High	SGB216			
75EPPDISH92B	Pressure Differential Switch High	SGB217			
75EPLSL70A	Level Switch Low	ECT			
75EPLSL70B	Level Switch Low	ECT			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 81				
81PPHV131	Val. (Oper.) Makeup Pump Drain Tnk	107B	30 Days	150
81PPHV135	Val. (Oper.), Cold Trap A Outlet	157D		
81PPHV136	Val. (Oper.), Cold Trap A Inlet	157D		
81PPHV143	Val. (Oper.), Cold Trap A Outlet	157E		
81PPHV149	Val (Oper), Cold Trap Outlet Hdr	107B		
81PPHV153	Val Oper, Overflow Vessel Return	107B		
81PPTE100	Temperature, Overflow Heat Exchanger Outlet (T/C)	107B		
81PPTE101	Temperature, Overflow Heat Exchanger Outlet (T/C)	107B		
81EPB003B	Local Panel, EVS Processing	311		120
81EPHV383	Val. (Operator), EVST Inlet, Loop 1	360		150
81EPHV384	Val. (Oper.), EVST Outlet, Loop 1	360		
81EPHV393	Val. (Oper.), EVST Outlet, Loop 2	357		
81EPHV397	Val. (Oper.), EVST Inlet, Loop 2	357		
81EPP002A	Pump, EVS Na EM	360		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 81					
81EPP002B	Pump, EVS Na EM	357	30 Days	150	
81EPB003A	Local Panel, EVS Processing	311		120	
81PPE003B	Cabinet, Variable Transformer Drive	105A		120	
81PPB002A	Local Panel, Primary Processing	105V		120	
81PPB002B	Local Panel, Primary Processing	105V		120	
81PPP001A	Pump, Primary Na Makeup	103		150	
81PPP001B	Pump, Primary Na Makeup	104		150	R5
81PPE001A	Cabinet, Makeup Pump Control	105F		120	
81PPE001B	Cabinet, Makeup Pump Control	105A		120	
81PPE002A	Cabinet, Makeup Pump Capacitor	105F		120	
81PPE002B	Cabinet, Makeup Pump Capacitor	105A		120	
81PPE003A	Cabinet, Variable Transformer Drive	105F		120	
81PPHV102	Valve (Operator), Overflow Heat Exchanger Bypass	107B		150	
81PPHV103	Valve (Operator), Overflow Heat Exchanger Inlet	107B		150	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System				
81PPHV109	Valve (Operator), Cold Trap Inlet Header	107B	30 Days	150
81PPHV128	Valve (Operator), Cold Trap B Inlet	157E		150
81EPHV357	Val Oper, EVST/DHRS Crossover Valv.	352A		120
81EPHV358	Val Oper, EVST/DHRS Crossover Valv.	352A		
81EPHV359	Val Oper, EVST/DHRS Crossover Valv.	352A		
81EPHV415	Val Oper, EVST/DHRS Crossover Valv.	353A		
81EPHV416	Val Oper, EVST/DHRS Crossover Valv.	353A		
81EPHV420	Val Oper, EVST/DHRS Crossover Valv.	353A		
81EPHV421	Val Oper, EVST/DHRS Crossover Valv.	353A		
81EPTE480	Temp. (T/C) EVST Na Outlet	331		150
81EPTE487	Temp (T/C) EVST Na Outlet	331		
81EPTE388	Temp. (T/C) EVST Na Outlet	360		
81EPTE389	Temp. (T/C) EVST Na Outlet	357		
81AAB018A	Control Room Panel, System 81	431		120

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1 (2)

Equipment Number	Description	Cell Number (1)	Time Duration	Maximum Accident Temp (°F)	
System 81					
81AAB018B	Control Room Panel, System 81	431	30 Days	120	
81PPHV102A	Valve Accessory Package	105Y			R5
81PPHV103A		105S			
81PPHV109A		105Y			
81PPHV128A		111			
81PPHV131A		105E			
81PPHV135A		111			R6
81PPHV136A		111			
81PPHV143A		111			
81PPHV149A		105S			
81PPHV153A		105S			
81EPHV383A		352A			R5
81EPHV384A		352A			
81EPHV393A		352A			R6

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 81					
81EPHV497A	Valve Accessory Package	353A	30 Days	120	R6
81EPE004A	Cabinet, EVS Pump Control	352A			
81EPE004B	Cabinet, EVS Pump Control	353A			
81EPE005A	Cab., Variable Transformer Drive	352A			
81EPE005B	Cab., Variable Transformer Drive	353A			
81EPE006A	Cab., EVS Pump Capacitor	352A			
81EPE006B	Cab., EVS Pump Capacitor	353A			R5
81EPP003A	Pump, EVS NaK EM	352A			
81EPP003B	Pump, EVS NaK EM	353A			
81EPE007A	Cab., EVS NaK Pump Control	352A			
81EPE007B	Cab., EVS NaK Pump Control	353A			
81EPE008A	Cab., Variable Transformer Drive	352A			
81EPE008B	Cab., Variable Transformer Drive	353A			
81EPE009A	Cab., EVS NaK Pump Capacitor	352A			
81EPE009B	Cab., EVS NaK Pump Capacitor	353A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 81					
81EPH002A	Heat Exchanger, EVST Air Blast	352A	30 Days	120	R5
81EPH002B	Heat Exchanger, EVST Air Blast	353A	30 Days	120	R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 82					
82CGHV154B	Containment Iso. Valve (Operator)	317	30 Days	120	R5
82CGPV501A		397			
82NGPV351A		347			
82APHV002		376			
82CGHV153A		376			
82RPHV137B		380			
82RPHV138B		380			
82CGHV085	EVST NaK Exp. Tnk. Equalization Valve Operator	353A			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 90					
90CSB016	Main Control Panel	431	1 second (4) 30 Days (3)	120	R5
90CSB002A, B	Scram Breaker Cubicle	457	.04 seconds	120	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.
(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.
(3) PAM Instrumentation
(4) All other IE functions.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 92					
92AAB002A	Reactor Coolant Operating Level Sensor (Connector)	151	30 Days	220	
92AAB002B	Reactor Coolant Operating Level Sensor (Connector)	151	30 Days	220	R5
92AAB002C	Reactor Coolant Operating Level Sensor (Connector)	151	30 Days	220	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
System 95					
95AAB006A, B, C	Wide Range Preamplifiers	151	30 Days	130	R5
95AAB008A, B, C	Wide Range Detector Assemblies	101A	TBD	260	HOLD 95000003
95AAB003A, B, C	Power Range Junction Boxes	151	30 Days	130	R5
95AAB004A, B, C	Power Range Detector Assemblies	101A	TBD	260	
95AAB041A, B, C	Wide Range Log Count. Drawers (3)	431	N/A	120	
95AAB051A, B, C	Wide Range Log MSV Drawers (3)	431	30 Days	120	
95AAB061A, B, C	Wide Range D.C. Linear Drawers (3)	431	30 Days	120	
95AAB009A, B, C	Power Range D.C. Linear Drawers (4)	431	30 Days	120	R5
95AAB001A, B, C	Signal Conditioning Cabinets	431	30 Days	120	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.
(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.
(3) Equipment drawers A, B, & C are mounted in cabinets 95AAB001 A, B, & C respectively.
(4) Equipment Drawers A, B, & C are mounted in Primary RSS Buffer Cabinets 99SB001 A, D, & G respectively.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)
System 96				
96PMB040A	Control Room Main Air Intake (A)	CB413	30 Days	120°
96PMB040B	Control Room Main Air Intake (B)	CB413		
96PMB041A	Control Room Remote Air Intake (A)	SGB246		
96PMB041B	Control Room Remote Air Intake (B)	SGB246		
96PMB072A	Annulus Filter Discharge (A)	RSB395A		
96PMB072B	Annulus Filter Discharge (B)	RSB349		
96PMB073A	Annulus Filter Inlet (A)	RSB395A		
96PMB073B	Annulus Filter Inlet (B)	RSB349		
96PMB074A	RSB Clean-up Filter Discharge (A)	RSB348		
96PMB074B	RSB Clean-up Filter Discharge (B)	RSB347A		
96EMB018A	TMBDB Effluent Activity (A)	RSB395A		
96EMB018B	TMBDB Effluent Activity	RSB349		
96EMB019A	TMBDB Effluent PU Activity (B)	RSB395A		
96EMB019B	TMBDB Effluent PU Activity	RSB349		
96AAB003A	Class 1E Panel A (Division I)	CB431		

R6

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum Accident Temp (°F)	
96AAB003B	Class 1E Panel B (Division II)	CB431	30 days	120°	
96AAB003C	Class 1E Panel C (Division II)	CB431			
96PMB069A	RSB OP Floor Exhaust Monitor	RSB308A			R6
96PMB069B	RSB OP Floor Exhaust Monitor	RSB309			
96PMB070A	FHC Exhaust Monitor	RSB307B			
96PMB070B	FHC Exhaust Monitor	RSB307B			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

TABLE 3-1[2]

Equipment Number	Description	Cell Number[1]	Time Duration	Maximum[4] Accident Temp (°F)	
System 99					
99ESB006C	CIS Breaker Cabinet 1	271	30 Days	120	
99ESB006D	CIS Breaker Cabinet 2	262			
99PSB001A, D, G	Primary RSS Buffer Cabinets	431			
99PSB001C, F, J	Pri. RSS Comparator Cabinets	431			
99PSB002A, D, G	Secondary RSS Buffer Cabinets	431			
99PSB002C, F, J	Secondary RSS Comparator Cabinets	431			R5
99PSB003A, C, E	Primary RSS Isolation Cabinets	431			
99PSB003B, D, F	Primary RSS Logic Cabinets	431			
99PSB004A, B, C	Sec. RSS Solenoid Driver Cabinets	431			
99ESB005A, B, C	CIS Comparator Cabinets	431			
99PSB005A, C	PPS Auxiliary Isolation Cabinets	431			
99PSB005B, D	PPS Auxiliary Logic Cabinets	431			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawing.

(2) Identification of 1E equipment and equipment location shall be under the change control of the responsible system designing the component. Components which will be qualified to vibration environments will be indicated on this table at a later date.

(3) All components to be qualified to operate for a period of 30 days without margin after being exposed to the environmental envelope of Figure 4-1.

(4) This equipment does not experience the environmental conditions of design basis events. This equipment will be qualified to demonstrate operability under the expected extremes of its non-accident servile environment.

TABLE 3.2-1 (2)

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 12							
	Connectors and Terminations	Various	(6)	(6)	(6)	(6)	(6)
	Primary RSS Cable	161A (RCB)	2-1	2-2	100%	2-3	2-4
	Secondary RSS Cable	161A (RCB)	2-1	2-2	100%	2-3	2-4
	Cable	Various (RSB)				2-9	
	RSS/SGAHRS Cable	Various (SGB)	2-7	2-8	100%		
	Containment Electrical Penetration	Various	2-1	2-2	100%	2-3	2-4
12NIB001A	DG Local Control Panel	DGB511	120°F	-NA-	30%	-NA-	(5)
12NIB001B	DG Local Control Panel	DGB512	↓	↓	↓	↓	↓
12NIE002A	DG Resistor and XFMR	DGB511					
12NIE002B	DG Resistor and XFMR	DGB512					

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.
(5) Class 1E components in these locations are subjected to the following higher than normal sodium aerosol concentrations:

First Minute	14 gms/cubic meter	($8.26 g/m^3$ equiv. sodium) equiv. sodium perioxide(Na_2O_2)
Next Four Minutes	5 gms/cubic meter	($2.95 g/m^3$ equiv. sodium) equiv. sodium perioxide(Na_2O_2)
Total Deposit	30 gms/square meter	($17.69 g/m^3$ equiv. sodium) equiv. sodium perioxide(Na_2O_2)

R6

See paragraph 3-1 for definition of environment. Higher concentration attributed to absence of Diesel Generator Building Isolation.
(6) Consistent with environmental transients for equipment utilizing connectors/terminations.

TABLE (2)

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 12							
12NIE022A	Diesel Generator A(6)	DGB511	120°F	-NA-	30%	-NA-	(5)
12NIE022B	Diesel Generator B(6)	DGB512					
12NIK101A	DG Jacket Wtr Htr Pump A Motor	DGB511					
12NIK101B	DG Jacket Wtr Htr Pump B Motor	DGB512					
12NIK103A	DG Oil Htr Pump A Motor	DGB511					
12NIK103B	DG Oil Heater Pump B Motor	DGB512					
12NIK107A	DG Fuel Oil AC Backup Pump A Motor	DGB511					
12NIK107B	DG Fuel Oil AC Backup Pump B Motor	DGB512					
12NIK109A	DG Gov. Oil Booster Pump A Motor	DGB511					
12NIK109B	DG Gov. Oil Booster Pump B Motor	DGB512					

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.
(5) Class 1E components in these locations are subjected to the following higher than normal sodium aerosol concentrations:

First Minute	14 gms/cubic meter ($8.26 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)
Next Four Minutes	5 gms/cubic meter ($2.95 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)
Total Deposit	30 gms/square meter($17.69 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)

R6

See paragraph 3-1 for definition of environment. Higher concentration attributed to absence of Diesel Generator Building Isolation.
(6) Only Electrical parts are subject to Class 1E qualifications.

TABLE 3-2

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values[3]					
			Temp.	Pressure	Humidity[4]	Rad.	Chemical	
System 25A								
25ADK341A	"A" Emerg. Supply Fan Motor	DGB511	120	-NA-	30%	-NA-	(5)	
25ADK341B	"A" Emerg. Supply Fan Motor	DGB511	↓	↓	↓	↓	↓	
25ADK342A	"B" Emerg. Supply Fan Motor	DGB512						
25ADK342B	"B" Emerg. Supply Fan Motor	DGB512						R5
25ADK343	Day Tank Cell Exhaust Fan Motor	DGB511						
25ADK344	Day Tank Cell Exhaust Fan Motor	DGB512						

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.
(5) Class 1E components in these locations are subjected to the following higher than normal sodium aerosol concentrations:

First Minute	14 gms/cubic meter ($8.26 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)
Next Four Minutes	5 gms/cubic meter ($2.95 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)
Total Deposit	30 gms/square meter($17.69 g/m^3$ equiv. sodium)	equiv. sodium perioxide (Na_2O_2)

R6

See paragraph 3-1 for definition of environment. Higher concentration attributed to absence of Diesel Generator Building Isolation.

TABLE 3-2

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values[3]					
			Temp.	Pressure	Humidity[4]	Rad.	Chemical	
System 44								
44SRHV033B	Valve Operator, Containment Iso.	105BC	2-1	2-2		2-3	2-4	R6
44SRHV069A	Valve Operator, Containment Iso.	105BC	2-1	2-2		2-3	2-4	R6

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-2

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values[3]				
			Temp.	Pressure	Humidity[4]	Rad.	Chemical
System 53							
53SGV001	SGB Main Feedwater Valve (Operator)	241,242,243	2-7	2-8	100%		
53SGV002	Main Feedwater Control Val. (Oper.)	241,242,243	2-7	2-8	100%		
53SGV003	Startup Feedwtr Control Val (Oper)	241,242,243	2-7	2-8	100%		
53SGV012	Superheater Outlet Val. (Operator)	241,242,243	2-7	2-8	100%		
53SGV014	Steam Drum Drain Valve (Operator)	241,242,243	2-7	2-8	100%		
53SGV015	Steam Drum Drain Valve (Operator)	241,242,243	2-7	2-8	100%		

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)					
			Temp.	Pressure	Humidity(4)	Rad.	Chemical	
System 56								
56PRK201A	PHTS Na Pump Pony Motor,	RCB161C	2-1	2-2		2-3	2-4	
56PRK201B	Loops 1, 2, 3	RCB161D	2-1	2-2		2-3	2-4	
56PRK201C		RCB161E	2-1	2-2		2-3	2-4	
56PRK112A	PHTS Na Pump Drive ARD	RCB161C	2-1	2-2		2-3	2-4	
56PRK112B	Bearing Fan Motor, Loops 1, 2, 3	RCB161D	2-1	2-2		2-3	2-4	
56PRK112C		RDB161E	2-1	2-2		2-3	2-4	R5
56PRST103AP, BP, CP	PHTS Na Pump Tachometer	RCB161C	2-5			2-6		
56PRST203AP, BP, CP	Loops 1, 2, 3, Channels A, B, C	RCB161D	2-5			2-6		
56PRST303AP, BP, CP		RCB161E	2-5			2-6		
56SGB097A	SGS Primary PPS Instrument Rack Channel A, Loop 1	SGB241	2-7	2-8	100%			
56SGB097B	SGS Primary PPS Instrument Rack, Channel B, Loop 1	SGB242	2-7	2-8	100%			
56SGB097C	SGS Primary PPS Instrument Rack, Channel C, Loop 1	SGB243	2-7	2-8	100%			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-2

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 56							
56SGB098A	SGS Primary PPS Instrument Rack, Channel A, Loop 2	SGB241	2-7	2-8	100%		
56SGB098B	SGS Primary PPS Instrument Rack, Channel B, Loop 2	SGB242	2-7	2-8	100%		
56SGB098C	SGS Primary PPS Instrument Rack, Channel C, Loop 2	SGB243	2-7	2-8	100%		
56SGB099A	SGS Primary PPS Instrument Rack, Channel A, Loop 3	SGB241	2-7	2-8	100%		
56SGB099B	SGS Primary PPS Instrument Rack, Channel B, Loop 3	SGB242	2-7	2-8	100%		
56SGB099C	SGS Primary PPS Instrument Rack, Channel C, Loop 3	SGB243	2-7	2-8	100%		
56SGB094A	SGS Secondary PPS Instrument Rack, Channel A, Loop 1	SGB241	2-7	2-8	100%		
56SGB094B	SGS Secondary, PPS Instrument Rack, Channel B, Loop 1	SGB242	2-7	2-8	100%		
56SGB094C	SGS Secondary PPS Instrument Rack, Channel C, Loop 1	SGB243	2-7	2-8	100%		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-2

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)					
			Temp.	Pressure	Humidity(4)	Rad.	Chemical	
System 56								
56SGB095A	SGS Secondary PPS Instrument Rack, Channel A, Loop 2	SGB241	2-7	2-8	100%			
56SGB095B	SGS Secondary PPS Instrument Rack, Channel B, Loop 2	SGB242	2-7	2-8	100%			
56SGB095C	SGS Secondary PPS Instrument Rack, Channel C, Loop 2	SGB243	2-7	2-8	100%			
56SGB096A	SGS Secondary PPS Instrument Rack, Channel A, Loop 3	SGB241	2-7	2-8	100%			
56SGB096B	SGS Secondary PPS Instrument Rack, Channel B, Loop 3	SGB242	2-7	2-8	100%			
56SGB096C	SGS Secondary PPS Instrument Rack, Channel C, Loop 3	SGB243	2-7	2-8	100%			R5
56INB111AP	IHTS Primary PPS Panel Channel A	SGB207	2-7	2-8	100%			
56INB111BP	IHTS Primary PPS Panel Channel B	SGB208	2-7	2-8	100%			
56INB111CP	IHTS Primary PPS Panel Channel C	SGB209	2-7	2-8	100%			

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 56							
56INB111AS	IHTS Secondary PPS Panel Channel A	SGB207	2-7	2-8	100%		
56INB111BS	IHTS Secondary PPS Panel Channel B	SGB208	2-7	2-8	100%		
56INB111CS	IHTS Secondary PPS Panel Channel C	SGB209	2-7	2-8	100%		
56SGPSH108AS	Superheater Inlet SWRPRS Vent	SGB244	2-7	2-8	100%		
56SGPSH108BS	Line Pressure Sensors, Loop 1,	SGB244	2-7	2-8	100%		
56SGPSH108CS	Channels A, B, C	SGB244	2-7	2-8	100%		
56SGPSH208AS	Superheater Inlet SWRPRS	SGB245	2-7	2-8	100%		
56SGPSH208BS	Vent Line Pressure Sensors,	SGB245	2-7	2-8	100%		
56SGPSH208CS	Loop 2, Channels A, B, C	SGB245	2-7	2-8	100%		
56SGPSH308AS	Superheater Inlet SWRPRS	SGB246	2-7	2-8	100%		
56SGPSH308BS	Vent Line Pressure Sensors,	SGB246	2-7	2-8	100%		
56SGPSH308CS	Loop 3, Channels A, B, C	SGB246	2-7	2-8	100%		
56SGPSH109AS	West Evaporator SWRPRS	SGB224	2-7	2-8	100%		
56SGPSH109BS	Vent Line Pressure Sensors,	SGB224	2-7	2-8	100%		
56SGPSH109CS	Loop 1, Channels A, B, C	SGB224	2-7	2-8	100%		

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

R5

TABLE 3-

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 56							
56SGPSH209AS	West Evaporator SWRPRS	SGB225	2-7	2-8	100%		
56SGPSH209BS	Vent Line Pressure Sensors,	SGB225	2-7	2-8	100%		
56SGPSH209CS	Loop 2, Channels A, B, C	SGB225	2-7	2-8	100%		
56SGPSH309AS	West Evaporator SWRPRS	SGB226	2-7	2-8	100%		
56SGPSH309BS	Vent Line Pressure Sensors,	SGB226	2-7	2-8	100%		
56SGPSH309CS	Loop 3, Channels A, B, C	SGB226	2-7	2-8	100%		
56SGPSH110AS	East Evaporators SWRPRS	SGB224	2-7	2-8	100%		
56SGPSH110BS	Vent Line Pressure Sensors,	SGB224	2-7	2-8	100%		
56SGPSH110CS	Loop 1, Channels A, B, C	SGB224	2-7	2-8	100%		
56SGPSH210AS	East Evaporators SWRPRS	SGB225	2-7	2-8	100%		
56SGPSH210BS	Vent Line Pressure Sensors,	SGB225	2-7	2-8	100%		
56SGPSH210CS	Loop 2, Channels A, B, C	SGB225	2-7	2-8	100%		
56SGPSH310AS	East Evaporators SWRPRS	SGB226	2-7	2-8	100%		
56SGPSH310BS	Vent Line Pressure Sensors,	SGB226	2-7	2-8	100%		
56SGPSH310CS	Loop 3, Channels A, B, C	SGB226	2-7	2-8	100%		
56SGTE151A, B, C	Cell Temp. and Moisture Sensors,	SGB241	2-7	2-8	100%		
56SGME151A, B, C	Steam Drum Cell, Loop 1,	SGB241	2-7	2-8	100%		
	Channels A, B, C	SGB241	2-7	2-8	100%		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3(2)

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 56							
56SGTE251A, B, C	Cell Temperature and Moisture	SGB242	2-7	2-8	100%		
56SGME251A, B, C	Sensors, Steam Drum Cell, Loop 2,	SGB242	2-7	2-8	100%		
	Channels A, B, C	SGB242	2-7	2-8	100%		
56SGTE351A, B, C	Cell Temperature and Moisture	SGB243	2-7	2-8	100%		
56SGME351A, B, C	Sensors, Steam Drum Cell, Loop 3,	SGB243	2-7	2-8	100%		
	Channels A, B, C	SGB243	2-7	2-8	100%		
56SGTE152A, B, C	Cell Temperature and Moisture	SGB221	2-7	2-8	100%		
56SGME152A, B, C	Sensors, Recirc. Pump Cell,	SGB221	2-7	2-8	100%		
	Loop 1, Channels A, B, C	SGB221	2-7	2-8	100%		
56SGTE252A, B, C	Cell Temperature and Moisture	SGB222	2-7	2-8	100%		
56SGME252A, B, C	Sensors, Recirc. Pump Cell,	SGB222	2-7	2-8	100%		
	Loop 2, Channels A, B, C	SGB222	2-7	2-8	100%		
56SGTE352A, B, C	Cell Temperature and Moisture	SGB223	2-7	2-8	100%		
56SGME352A, B, C	Sensors, Recirc. Pump Cell,	SGB223	2-7	2-8	100%		
	Loop 3, Channels A, B, C	SGB223	2-7	2-8	100%		
56SGTE153A, B, C	Cell Temperature and Moisture	SGB224	2-7	2-8	100%		
56SGME153A, B, C	Sensors, Steam Generator Cell,	SGB224	2-7	2-8	100%		
	Loop 1, Channels A, B, C	SGB224	2-7	2-8	100%		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values[3]				
			Temp.	Pressure	Humidity[4]	Rad.	Chemical
System 56							
56SGTE253A, B, C	Cell Temperature and Moisture	SGB225	2-7	2-8	100%		
56SGME253A, B, C	Sensors, Steam Generator Cell,	SGB225	2-7	2-8	100%		
	Loop 2, Channels A, B, C	SGB225	2-7	2-8	100%		
56SGTE353A, B, C	Cell Temperature and Moisture	SGB226	2-7	2-8	100%		
56SGME353A, B, C	Sensors, Steam Generator Cell,	SGB226	2-7	2-8	100%		
	Loop 3, Channels A, B, C	SGB226	2-7	2-8	100%		
56SGTE154A, B, C	Cell Temperature and Moisture	SGB207	2-7	2-8	100%		
56SGME154A, B, C	Sensors, Na Dump Tank Cell,	SGB207	2-7	2-8	100%		
	Loop 1, Channels A, B, C	SGB207					
56SGTE254A, B, C	Cell Temperature and Moisture	SGB208	2-7	2-8	100%		
56SGME254A, B, C	Sensors, Na Dump Tank Cell,	SGB208	2-7	2-8	100%		
	Loop 2, Channels A, B, C						
56SGTE354A, B, C	Cell Temperature and Moisture	SGB209	2-7	2-8	100%		
56SGME354A, B, C	Sensors, Na Dump Tank Cell,	SGB209	2-7	2-8	100%		
	Loop 3, Channels A, B, C	SGB209	2-7	2-8	100%		
56HRTE145	PACC Return Water Temperature	SGB241	2-7	2-8	100%		
56HRFT144	Sensor and Flow Transmitter,	SGB241	2-7	2-8	100%		
	Loop 1						

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3(2)

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number(1)	Figure numbers of enveloping environmental transients or maximum values(3)				
			Temp.	Pressure	Humidity(4)	Rad.	Chemical
System 56							
56HRTE245	PACC Return Water Temperature	SGB242	2-7	2-8	100%		
56HRFT244	Sensor and Flow Transmitter, Loop 2	SGB242	2-7	2-8	100%		
56HRTE345	PACC Return Water Temperature	SGB243	2-7	2-8	100%		
56HRFT344	Sensor and Flow Transmitter, Loop 3	SGB243	2-7	2-8	100%		

R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3-1

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values(3)					
			Temp.	Pressure	Humidity[4]	Rad.	Chemical	
System 82		HOLD 1002006						
82CGHV154A	Containment Iso. Valve Operator	102A	2-1	2-2		2-3	2-4	R5
82CGPV501B	Containment Iso. Valve Operator	105S	2-1	2-2		2-3	2-4	
82CGPV351B	Containment Iso. Valve Operator	105S	2-1	2-2		2-3	2-4	
82CGHV153B	Containment Iso. Valve Operator	173	2-1	2-2		2-3	2-4	
82RPHV137A	Containment Iso. Valve Operator	173	2-1	2-2		2-3	2-4	
82RPHV138A	Containment Iso. Valve Operator	173	2-1	2-2		2-3	2-4	
82APHV001	Containment Iso. Valve Operator	173	2-1	2-2		2-3	2-4	R5

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.

TABLE 3[2]

Class 1E: Equipment Subject to Severe Environments

Number	Description	Cell Number[1]	Figure numbers of enveloping environmental transients or maximum values[3]					
			Temp.	Pressure	Humidity[4]	Rad.	Chemical	
System 96								R6
96PMB001A	Head Access Area Monitors	151	2-1	2-2	100%	2-3	2-4	
96PMB001B	Head Access Area Monitors	151	2-1	2-2	100%	2-3	2-4	
96PMB001C	Head Access Area Monitors	151	2-1	2-2	100%	2-3	2-4	
96PMB002A	RCB Exhaust Monitors	161A	2-1	2-2	100%	2-3	2-4	R5
96PMB002B	RCB Exhaust Monitors	161A	2-1	2-2	100%	2-3	2-4	
96PMB002C	RCB Exhaust Monitors	161A	2-1	2-2	100%	2-3	2-4	
96PPB043	RCB High Range Annulus Monitor	169A	(5)	(5)	(5)	(5)	(5)	
96PPB044	" " " " "	169A	(5)	(5)	(5)	(5)	(5)	R6
96PPB045	" " " " "	169A	(5)	(5)	(5)	(5)	(5)	

(1) Location of cell numbers within each building may be readily determined from the General Arrangement Drawings.
(2) Identification of Class 1E equipment and equipment location shall be under the change control of the system responsible for designing that equipment.
(3) Components which will be qualified to vibration environments will be indicated on this table at a later date.
(4) Condensation will occur on equipment under test at 100% humidities.
(5) TMBDB equipment refer to WARD-D-0156 for Environmental Conditions. R6

4. QUALIFICATION PROCEDURES

4.1 CRBRP Class 1E Equipment

The design basis accident environment is significantly different from the normal environment in selected cells affected strongly by accidents. Consequently, Class 1E equipment located in these cells must be aged and qualified to the severe accident environments per paragraph 4.2.2. Other Class 1E equipment which is not subjected to severe accident environments must be evaluated for aging effects and qualified by any one or an appropriate combination of the several ways of meeting the requirements of IEEE 323, such as type testing, (Sections 4.2.1, 4.2.2) operating experience (Section 4.2.3) or analysis (Section 4.2.4). If, due to practicality or cost considerations, a piece of Class 1E equipment cannot be qualified using any one or an appropriate combination of procedures specified in Section 4.2, then the RM or AE cognizant engineer shall propose procedures and obtain Project Office approval for testing the equipment as single components or as completed assemblies that are at least as severe as the requirements of IEEE 323-1974. The results of the qualification procedure are to be recorded per IEEE 323-1974 (see Appendix A for an illustration of format). R6

The cognizant engineer preparing an Equipment Specification for any piece of Class 1E equipment will determine whether it is to be qualified according to paragraph 4.2.1, 4.2.2, 4.2.3 or 4.2.4. Each piece of Class 1E equipment must be qualified for operation during that portion of the applicable transients during which it must perform its safety function. The cognizant engineer must specify the choices, if any, which are being passed to the vendor. In each instance the cognizant engineer must specify the requirements for qualification. He must determine the time interval during which the particular Class 1E equipment must perform its safety function. IEEE 323 requires that 10% be added to this time interval for margin. If (for example), the equipment appears in Table 3-1 and will be qualified by type test, the cognizant engineer must specify this type test in accordance with the procedures of paragraph 4.2.1. Where equipment is qualified by type testing, the item being qualified must be either identical to the plant hardware or all differences existing must be identified and justification provided that the differences do not affect the qualification validity. He must also specify that the records of these tests be prepared in such form as to meet the auditable documentation requirements of IEEE 323-1974. An illustration of acceptable documentation is given in Appendix A. R6

4.2 Specific Procedures

4.2.1 QUALIFICATION PROCEDURES FOR CLASS 1E EQUIPMENT NOT SUBJECTED TO SEVERE ACCIDENT ENVIRONMENTS

Class 1E equipment in this category is not subject to severe accident environment qualification. This equipment will be qualified to the temperature, humidity, voltage and frequency conditions defined in Figure 4-1 by operating experience (4.2.3) analysis (4.2.4) or the type test described in this paragraph. When size or other practical requirements limit type tests, this part of the qualification may be completed by a combination of

partial type test with extrapolation or analysis. If the equipment is a large rotating machine, it may be qualified by a combination of analysis, motorette testing and type testing. Where testing is required the motorettes will be thermally aged and subjected to the appropriate accident environments as shown in Figure 4-1. Equipment subjected to this type test shall have first passed all other E-Spec acceptance tests. R6

The type tests shall be performed in numerical order to meet the requirements of IEEE 323 paragraph 6.3.2. Also, any item being type tested shall undergo the complete set of tests described below.

1. Pre-Operational Tests: Visual examination, dieletric and insulation resistance tests followed by interconnection to function as a complete working system. Dummy input signals and loads shall be provided as required to perform simulated system operation. Electrical interference tests shall be performed as defined in equipment specification.

2. Functional Tests: Verify that the equipment performs its safety function; e.g.: Inject test signals and determine that logic computation is correct; relay operates; bistable operates and set-points are correct.

3. Aging: The aging effects on Class 1E equipment in non-severe environments shall be evaluated and the results are to be documented as part of the Equipment Qualification Data Package. Equipment and components may be excluded from the simulated aging requirements of Section 4.2.2.1, based on documented demonstration of no significant degradation of pertinent properties during its projected installed service life (in the specific Class 1E equipment) assuming scheduled maintenance surveillance and inspection is properly performed. If such demonstration cannot be made, then aging of the equipment or component is required. R6

4. Burn-In Test (Determination and evaluation of infant mortality): After completion of the initial system tests, the system shall be energized for a minimum of 100 hours at nominal voltage under room temperature conditions to assist in the detection and elimination of components subject to early failure. The operation of the system shall be checked during the burn-in test as outlined below, and by complete operational test performed at the completion of the test.

   Periodically, during the burn-in tests, functional performance of the equipment shall be verified. The time between periodic tests shall not exceed 25 hours. Any malfunction observed during this test shall be cause to interrupt the test, evaluate the cause of failure, and repair the malfunction. If the malfunction is repairable, the repair may be performed and the test continued. Any repaired component should be reinserted into the system at the next periodic check. The test time shall be extended beyond 100 hours as required to insure, at the completion of the test, that all components initially installed have been energized for at least 100 hours, and all components replaced as a result of malfunction have been energized for at least 50 hours. No requirement for design modification is anticipated in this phase of the qualification. However, if the need should occur, the modification will be in accordance with IEEE-Std. 323-1974, Section 6.8.

5. Operational Tests: Verify that the equipment meets the electrical requirements of its performance specifications, including static and dynamic calibration.

6. If required, a pressure test will be performed in accordance with Section 3.5.

7. Environmental Tests: Environmental testing shall be performed for temperature, humidity, and non-severe sodium aerosols environments as specified below. R6

   Temperature/Humidity - Environmental testing shall be performed according to Figure 4-1. Equipment shall be mounted in a manner and a position that simulates its expected installation when in actual use unless an analysis can be performed and justified to show that the equipment's performance would not be altered by other means of mounting. The equipment, with all electrical loads and inputs properly simulated, shall be placed in an environmental test chamber capable of providing concurrently the conditions defined by the curves. Complete instrumentation shall be used to permit continuous monitoring of the environmental conditions. The equipment shall be energized throughout each test cycle as indicated by the figure. Input/output simulation shall be used to provide the capability to test the equipment for proper operation during and after the test cycles. The test chamber conditions shall be stabilized for a minimum of two hours prior to the start of any test cycle. The tolerances on the steady state test chamber conditions are to be added to the temperature and relative humidity ranges with appropriate sign to be sure that the specified ranges are accomplished by the test. Functional tests (Test 2) shall be performed at the beginning of the test and at the end of each cycle. Eight hours (maximum) between cycles is recommended for testing, repair and to establish the new test chamber conditions for cycles 1 through 4. The test chamber conditions shall be established in 1.5 hours maximum except for the last cycle as defined below. After cycle 4 is completed, including the functional test the equipment is to cool slowly to room temperature and humidity.

   Non-Severe Sodium Aerosols - Environmental testing shall be performed to simulate the non-severe sodium aerosol environment described in paragraph 3.1. The equipment, with all electrical loads and inputs properly simulated, shall be placed in an environmental test chamber capable of conservatively simulating the non-severe aerosol enviornment while exposed to the maximum equipment temperature specified in Table 3.1 plus 15°F margin and humidity condition in agreement with Table 4-1. Testing with any one or a combination of the Na compounds described in paragraph 3.1 is acceptable provided that the test performer can analytically support that the other sodium compounds which could be present as described in paragraph 3.1 will not result in a more severe environment. The suspended sodium aerosol concentration shall be simulated by the injection of sodium aerosol until the specified peak R6

concentration is reached. After this time injection of sodium aerosol suspended concentrations shall be terminated and the equipment must be operated for the time period for which the equipment must operate while exposed to this environment. Functional tests shall be performed at the beginning and conclusion of this test. R6

8. Seismic Tests: After completion of the applicable portion of the above tests, the Class 1E equipment shall be seismically qualified in accordance with IEEE Standard 344-1975 and WARD-D-0037. Performance shall be monitored during the seismic qualification and the functional tests performed to demonstrate that the equipment can perform its safety function.

9. At the conclusion of each test series, any malfunctioning components shall be examined to determine the cause of malfunction by a complete failure analysis. Replacement of the component with one having suitable characteristics or redesign of the assembly shall be pursued if shown to be necessary by the failure analysis.

10. The test report shall contain the technical information required to satisfy IEEE Std. 323-1974.

11. In the evaluation of the qualification test results, any sample equipment is considered to have failed when the equipment does not perform the Class 1E functions required by the equipment specifications.

4.2.2

CLASS 1E EQUIPMENT SUBJECTED TO SEVERE ACCIDENT ENVIRONMENTS

Class 1E equipment which is subjected to severe accident environments during the time interval in which it must perform its safety function, will be qualified per paragraph 4.2.3, 4.2.4 or by type test as described in the following paragraphs, or a combination of those methods to the environments defined in Table 3-2. When size or other practical requirements limit type tests, this part of the qualification may be completed by a combination of partial type tests with extrapolation or analysis.

If the equipment is a large rotating machine, it may be qualified by a combination of analysis, motorette testing and type testing. The procedure will meet the requirements of IEEE 117-1974 for random wound coils or IEEE 275-1966 for form wound coils, and will conform to the requirements of IEEE 323-1974 and IEEE 334-1974, and will meet the applicable requirements of Regulatory Guide 1.40. The motorettes will be thermally aged, irradiated and subjected to the appropriate accident environments as shown in Figure 4-2.

Qualification requirements for valve operators, in addition to those defined in this document, are defined in Regulatory Guide 1.73 and IEEE 382-1972. | P

Equipment subjected to this type test shall have first passed Equipment Specification acceptance tests. The type tests shall be performed in numerical order to meet the requirements of IEEE 323-1974, paragraph 6.3.2. Also, any item being type tested shall undergo the complete set of tests described below:

Type Test Procedures are as follows:

1. Pre-operational Tests: Visual examination, dielectric and insulation resistance tests followed by interconnection to function as a complete working system. Dummy input signals and loads shall be provided as required to perform simulated system operation. Electrical interference tests shall be performed, where applicable, according to the equipment specification.

2. Functional Tests: Verify that the equipment performs its safety function; e.g.: Inject test signals and determine that logic computation is correct; relay operates, bistable operates and set-points are correct.

3. Thermal Aging: Operate the equipment (or motorette representing motor windings) at elevated temperature for at least 100 hours as shown in Figures 4-2 and 4-3 and explained in paragraph 4.2.2.1.

4. If required, a pressure test will be performed in accordance with Section 3.5.

5. Operational Tests: Verify that the equipment still meets the electrical requirements specified in Figure 4-1 or those specified in its performance specification (whichever is most conservative), including static and dynamic calibration (if applicable).

6. Seismic and Radiation Tests: Class 1E equipment shall be seismically qualified in accordance with IEEE Standard 344-1975 and WARD-D-0037.

   The Equipment Specification shall specify the seismic frequencies and accelerations plus the IEEE 323-1974 margins for acceleration. If the specific equipment is subjected to vibration due to fluid turbulence or machine unbalance, this information is to be provided and a vibration test included with the seismic and radiation tests providing the equipment cannot be shown by analysis or operating experience to be unaffected by the vibration.

   Performance shall be monitored during these tests and the functional tests performed to demonstrate that the equipment can perform its safety function. The radiation dose shall be applied at this point in the test sequence unless it can be shown that a more severe test results from a different sequence.

   The dose shall be the sum of normal exposure for 30 years (from Table 2-1) plus the dose resulting from the DBE (from Table 3-2) plus 10% of the DBE dose (per the dotted curve). The details of seismic and radiation tests shall be included in the Equipment Specification for the specific Class 1E equipment.

7. Margin Transient: The Class 1E equipment will be mounted in a temperature controlled test chamber and subjected to a transient to the peak accident temperature plus the IEEE 323-1974 temperature margin of 15°F. The accident temperature will be the maximum temperature to which the equipment is exposed (according to Table 3-2) during the time interval in which it must perform its safety function. This information shall be supplied in the Equpment Specification for specific Class 1E equipment.

8. DBE Transient: Maximum temperature, pressure, humidity, and chemical values as applicable (Table 3-2) will be taken from the appropriate portion of the (dotted curve) parameter transients (Figures 2-1 to 2-11). The Class 1E equipment shall be exposed to that portion of the accident transient (from Table 3-2) during which the equipment must perform its safety function for a time of 110% of this interval (the IEEE 323-1974 time margin).

9. At the conclusion of each test series, any malfunctioning components shall be examined to determine the cause of malfunction by a complete failure analysis. Replacement of the component with one having suitable characteristics or redesign of the assembly shall be pursued if shown necessary by the failure analysis.

10. The test report shall contain the technical information required to satisfy IEEE Std. 323-1974.

11. Post Accident Aging: Some Class 1E equipment will be required to operate for a significant time interval following the termination of the accident. Figure 4-2 shows that the Class 1E equipment will next be exposed to this aging condition for a minimum of 100 hours at a temperature to be determined from Figure 4-3. The temperature and time for post accident aging are to be specified in the Equipment Specification if this function is required.

12. In the evaluation of the qualification test results, any sample equipment is considered to have failed when the equipment does not perform the Class 1E functions required by the Equipment Specifications.

4.2.2.1 Simulated Aging

This sub-section applies to Class 1E equipment subjected to severe accident environments.

The CRBRP Project aging method assumes that the assemblies of components which make up each piece of equipment will be, in effect, many different insulation systems. Each of these systems will have some aging characteristics (dependent upon its insulation material) which will range from the "non-aging" characteristics of some ceramics to the characteristics of electrolytes in capacitors which double their aging rate for 6.9°F increase in temperature. When testing an assembly, the increase in temperature to double the aging rate will be taken from the insulator in the assembly which requires the largest temperature increase to double its aging rate. If insulators are involved in one assembly that have very different aging characteristics, it may be necessary to remove some components, "age" them separately, and then reassemble.

The aging simulation for mechanical stress, electrical stress and cyclic operations will be conducted and evaluated as follows. An arbitrary normal life for the module or assembly will first be assumed (typically 30 years or as otherwise specified in the equipment specification. The module or assembly will be aged to this assumed normal life. If an assembly contains one or more items that are clearly in the category of replaceable elements (such as some electrolytic capacitors), the projected qualified life of these items is to be determined and they are to be listed as replaceable elements and their replacement schedule is to be specified in the EQDP. If the module or sub-assembly successfully completes the aging procedure and the following environmental tests without failure, the projected qualified life will be the assumed normal life. If the module or sub-assembly fails the simulated aging or the following environmental tests, attempts may be made to achieve a redesign which can pass the tests. If it is impractical to change the design, new "aging" tests may be run for a shorter "aging" interval and, if the following environmental tests are completed satisfactorily, the projected qualified life of the sub-assembly will be determined by the maximum "aging" interval achieved. Equipment modification, if required, will be in accordance with IEEE Std. 323-1974, Section 6.8. If this procedure proves to be impractical, the equipment may be aged by a combination of analysis, test, and available data concerning aging rates for specific types of insulating material.

4.2.3 Operating Experience

A very large amount of equipment qualified to earlier criteria is presently operating successfully in nuclear plants.

Another experience source is that of equipment features such as insulation systems, lubricants, bearings and so forth, previously qualified for application in PWR designs and BWR designs, but now designed into CRBRP equipment. The CRBRP Project plans to use this experience where available and applicable. Operating experience will apply to Class 1E equipment located throughout CRBRP buildings. Qualification by operating experience shall meet the requirements of IEEE 323-1974, paragraph 6.4.

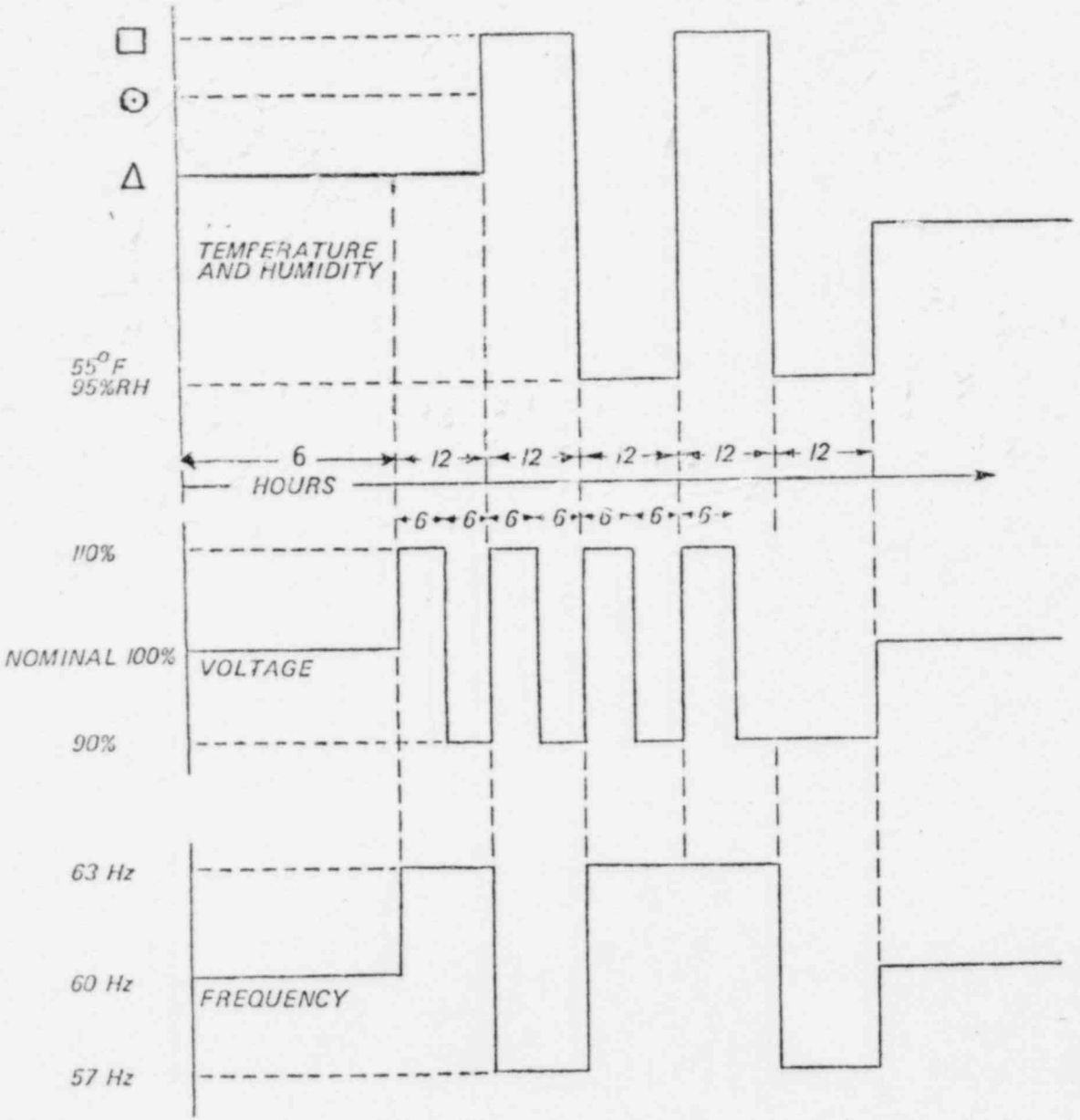
4.2.4 Analysis

Analysis can also be employed as the primary method or to supplement other methods as appropriate. In particular seismic analyses of large rotating apparatus will be employed. Analysis can apply to Class 1E equipment located throughout CRBRP buildings. Qualification by analysis shall consist of a mathematical or logical demonstration that Class 1E equipment can meet or exceed its safety requirements under worst case conditions. An analytical approach to qualification may be used when extensive operational experience and/or manufacturer test data, which is applicable to CRBRP DBE's or accident environment, exists for the same or similar equipment. Analysis may also be used to establish the aging characteristics of some types of Class 1E equipment whose components can be classified into groups such as ceramics, copper, pvc insulation, varnish or rubber (for example) whose aging characteristics are known from large quantities of research and development data. Qualification by analysis shall meet the requirements of IEEE 323-1974, paragraph 6.5.

4.3 Qualified Life

The CRBRP Project will determine a projected qualified life based on the results of the qualification procedures described throughout this report. The maintenance and refurbishing procedures employed, as well as many other factors, affect the useful life of the equipment under consideration. The projected qualified life validity will, therefore, also depend on these procedures. To enhance this validity, the CRBRP Project will also assure that its manuals, and operating and maintenance instructions are current, definitive and accurate.

FIGURE 4-1
ENVIRONMENTAL TEST
FOR EQUIPMENT NOT SUBJECTED
TO SEVERE ACCIDENT ENVIRONMENTS



NOTES:

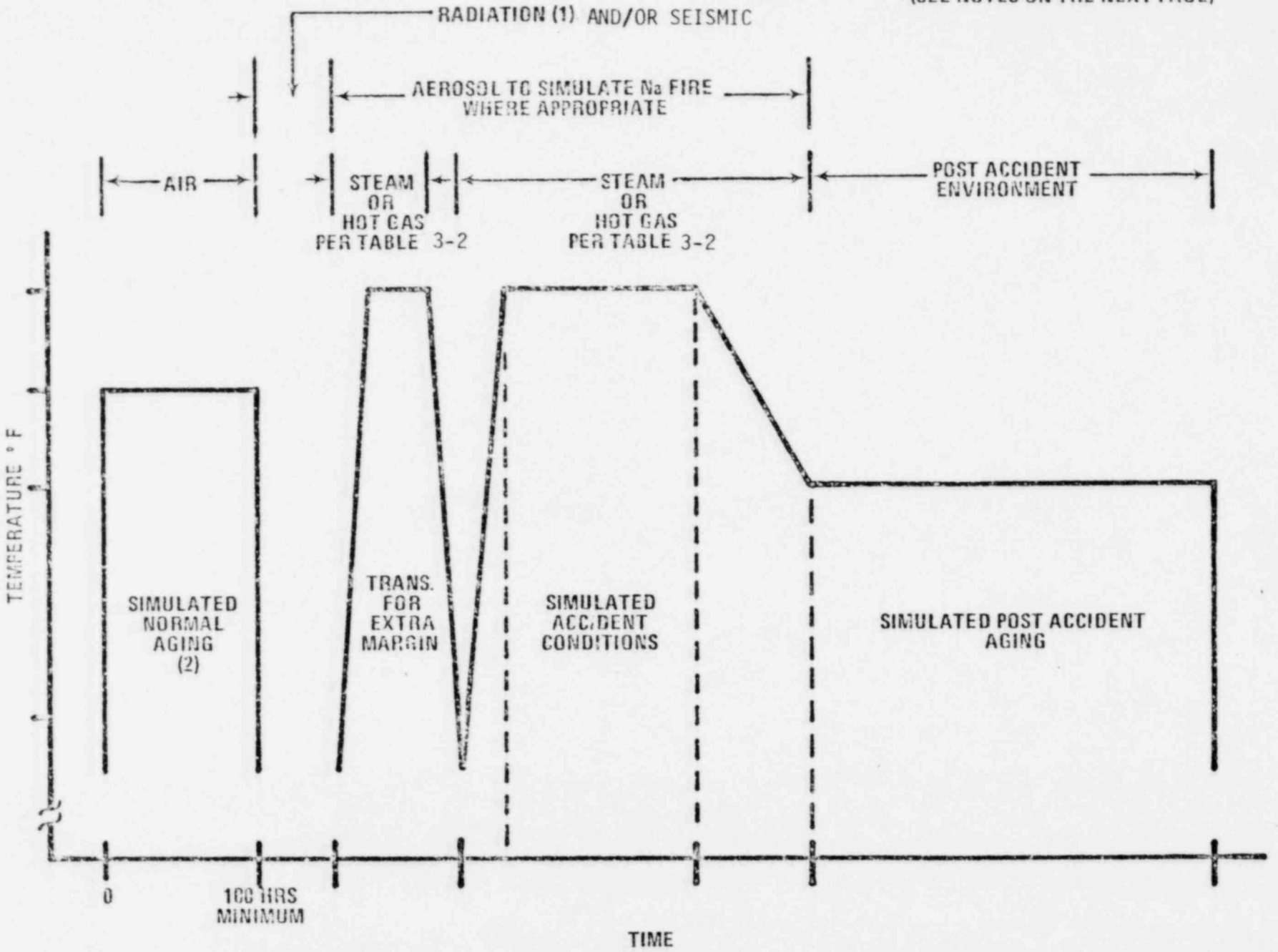
Δ = Simultaneous max. temp. at max. humidity-82°F at 95 per cent

⊙ =MAX VALUE FROM TABLE 3-I

□ =MAX VALUES FROM TABLE 3-I PLUS A MARGIN OF 15°F. HUMIDITY VALUES ARE GIVEN IN TABLE 4-I.

TYPE TEST PER PAR. 4.2.1 (OPERATION IN FOUR DIFFERENT STATES OF 60 HOUR TOTAL DURATION) WILL BE PERFORMED AS SHOWN. THE VERTICAL LINES BETWEEN THE FIVE DIFFERENT STATES MAY REPRESENT AS MUCH AS 8 HOURS FOR ANY NECESSARY REPAIR AND FOR TIME TO CHANGE TEST CHAMBER CONDITIONS. THE VERTICAL LINES MIDWAY THROUGH THE 12 HOUR STATES REPRESENTS A NEARLY INSTANTANEOUS CHANGE OF VOLTAGE ON THE VOLTAGE CURVE.

FIGURE 4-2
QUALIFICATION ENVELOPE FOR
EQUIPMENT LOCATED IN
SEVERE ACCIDENT ENVIRONMENTS
(SEE NOTES ON THE NEXT PAGE)



QUALIFICATION NOTES

(See Figure 4-2)

The following notes supplement the test sequence information shown in Figure 4-2.

1. The simulated normal aging time-temperature profile may optionally be modified according to the curve by Figure 4-3 which is a plot of the equation.

   $1/P = 2^X$

   P = simulated aging period (hours)

   X = number of Y^oF steps that the aging temperature is above normal ambient for the test item

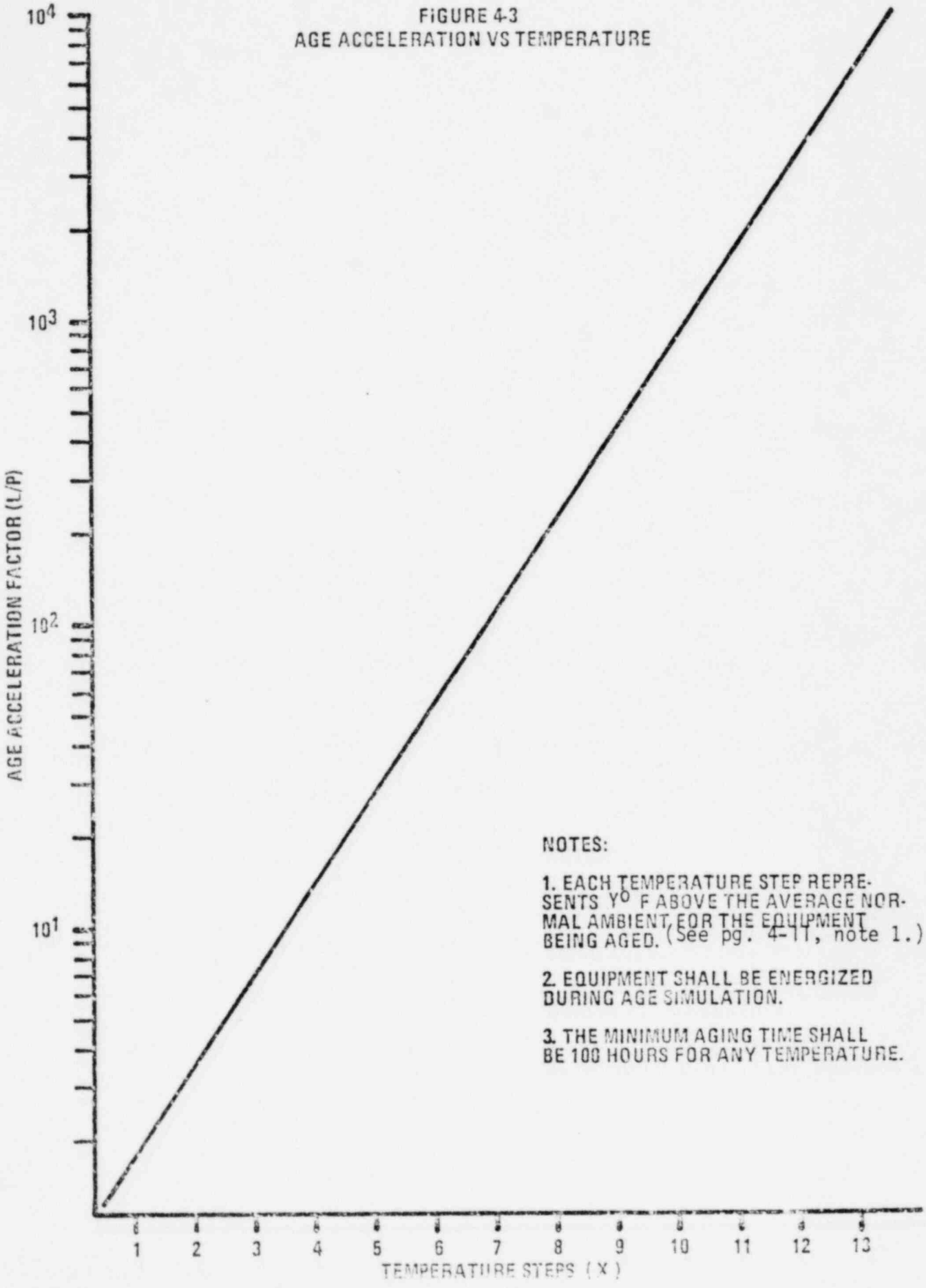
   Y = Change in temperature required to double the aging rate for the materials in the assembly which requires the largest temperature change to halve its life. (See Table - pg. 4-13)

   L = required test item life (hours)

   Simulated normal aging time shall not be less than 100 hours. Equipment shall be continually energized during the aging test unless it can be shown that aging in the deenergized state is more severe. Simulated post accident aging may also be optionally modified according to Figure 4-3.

2. Required by IEEE Std. 323-1974, page 16. The peak temperature dwell time shall be one minute minimum.

FIGURE 4-3
AGE ACCELERATION VS TEMPERATURE



NOTES:

1. EACH TEMPERATURE STEP REPRESENTS Y° F ABOVE THE AVERAGE NORMAL AMBIENT FOR THE EQUIPMENT BEING AGED. (See pg. 4-11, note 1.)

2. EQUIPMENT SHALL BE ENERGIZED DURING AGE SIMULATION.

3. THE MINIMUM AGING TIME SHALL BE 100 HOURS FOR ANY TEMPERATURE.

Table of "Y" Valves

for Typical Materials

of Class 1E Assemblies

SOURCE	DESCRIPTION	TEMPERATURE INCREASE TO HALVE COMPONENT LIFE (^{o}F)
MILHDBK 217A	Vinyl-Nylon Wire Type 1	11.1
	Silicone Wire	28.4
	FEP Wire Type K	13.7
McGrath, T. J. Aging of Class 1E Modules, Paper IEEE Nuclear Power System Symposium Dec. 12, 1974	Resistors	12.8
	Capacitors	6.9
	Transistors	25.0
T. W. Dakin, E.H. Henry, and G. A. Mullen "Life Testing of Electronic Power Transformers, Part II, IEEE Transactions on Electrical Insulation, Vol. E1-3, No. 1, Feb. 1963	Polyester Amide Wire Enamel, Kraft Paper Layer Insulation Power Transformers	28.0
AIEE Std. 1 (now IEEE-273) Standard Handbook for Electrical Engineers, ninth Edition, McGraw Hill Book Co. Section 4-382, 385 (6)	Transformers	12.6 to 18
	Class A Insulation	21.6

Table 4-1

Environmental Test

for Equipment Not Subjected to

Severe Accident Environments

Maximum Values from Table 3-1 Plus a Margin of 15°F	Humidity Values * Corresponding to Test Temperatures
Test Temperature °F	% Relative Humidity
55	95
60	95
65	95
70	95
75	95
80	95
85	85
90	72
95	62
100	53
105	46
110	39
115	35
120	30
125	26
130	23
135	19
140	18
145	15
150	13
155	12
160	11
165	10
170	9
175	8
180	7
185	6
190	6
195	5
200	5
205	4
210	4
215	4
220	3
225	3
230	3
235	3
240	2
245	2
250	2
255	2
260	2
265	2
270	2

* Values taken from B&R Letter BL00007 "CRBRP - Environmental Envelope Temperature/Humidity Conditions for Class IE Equipment Subjected to Non-Severe Environments", dated 1/21/80.

5. DOCUMENTATION OF QUALIFICATION

The overall documentation plan will consist of this generic interpretation parent document and a series of supplements, or "Equipment Qualification Data Packages." One date package supplement will be submitted for each piece of Class 1E equipment or system as applicable upon successful qualification of the candidate equipment. This package provides the "Auditable Link" required by IEEE Std. 323-1974.

The preferred Equipment Qualification Data Package format is illustrated in Appendix A.

Any format which meets the requirements of IEEE 323-1974 is acceptable.

ACRONYMS

ABHX	Air Blast Heat Exchanger
A/C	Air Conditioning
AFW	Auxiliary Feedwater
AFWS	Auxiliary Feedwater System
CAPS	Cell Atmosphere Processing System
CB	Control Building
CIC	Compensated Ion Chamber
CIS	Containment Isolation System
CRBRP	Clinch River Breeder Reactor Plant
DBE	Design Basis Event
DGB	Diesel Generator Building
EVST	Ex-Vessel Storage Tank
FHC	Fuel Handling Cell
HAA	Head Access Area
HVAC	Heating Ventilating and Air Conditioning
IEEE	The Institute of Electrical and Electronics Engineers, Inc.
IHTS	Intermediate Heat Transport System
PACC	Protected Air Cooled Condenser
PAM	Post Accident Monitoring
PPS	Plant Protection System
PHTS	Primary Heat Transport System
PWST	Protected Water Storage Tank
RAPS	Radioactive Argon Processing System
RCB	Reactor Containment Building
RSB	Reactor Service Building
RSS	Reactor Shutdown System

ACRONYMS

SGB	Steam Generator Building
SGAHRS	Steam Generator Auxiliary Heat Removal System
SSE	Safe Shutdown Earthquake
SSST	Site Suitability Source Term

LIST OF REFERENCES

(1) IEEE Std. 117-1974, "Systems of Insulation Materials for Random-Wound A/C Electric Machinery, Std. Test Procedure for Evaluation Of".

(2) IEEE Std. 275-1966 (R-1972), "Systems of Insulation Materials for A/C Electric Machinery Employing Form Wound Pre-Insulated Stator Coils, Test Procedure for Evaluation Of".

(3) IEEE Std. 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations", February 28, 1974.

(4) IEEE Std. 323A-1975, "Supplement to the Foreward of IEEE Std. 323-1974".

(5) IEEE Std. 334-1974, "Standard for Type Tests of Continuous Duty Class 1E Motors for Nuclear Power Generating Stations".

(6) IEEE Std. 344-1975, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations".

(7) IEEE Std. 382-1972, "Trial Use Guide for the Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations", April 10, 1973.

(8) IEEE Std. 383-1974, "Standard for Type Test of Class 1E Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations".

(9) Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants", November, 1974.

(10) Regulatory Guide 1.73, "Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants", (1/74).

(11) Regulatory Guide 1.40, "Qualification Tests of Continuous-Duty Motors Installed Inside the Containment of Water-Cooled Nuclear Power Plants", (3/16/73).

(12) Best, Brotts, McLean, and Lampart, "Determination and Application of Aging Mechanisms Data in Accelerated Testing of Selected Semi-Conductors, Capacitors, and Resistors, 'National Symposium on Reliability and Quality Control 1965'", p. 293-302.

(13) Reynolds, Fredrick H., "Thermally Accelerated Aging of Semi-Conductor Components", IEEE Proc. Vol. 62 No. 2, Feb. 1974

(14) Wakefield Engineering Inc., "Guideline on Component Burn-In Technology".

(15) Rabinowica, E., "McEntire R., and Sireklar B., "Technique for Accelerated Life Testing", ASME Transactions, August, 1970.

(16) Steck and Zimmer, Sandia Labs and New Mexico University, "Estimation of Acceleration and Aging Functions", 1972.

(17) Wiksten, D. et.al., Jet Propulsion Lab. "Accelerated Life Testing of Spacecraft Subsystems", November, 1972.

APPENDIX A

SAMPLE

EQUIPMENT QUALIFICATION DATA PACKAGE

CRBRP PROJECT
Oak Ridge, Tennessee

EQUIPMENT QUALIFICATION DATA PACKAGE COVER SHEET

This cover sheet shows the revision status of the other sheets of the qualification data package. It is revised when any other sheet of the package is revised.

PAGE	REVISION	APPROVALS		

EQUIPMENT _____

_____

ISSUED _____

LAST REVISION _____

PAGE _____ OF _____ PAGES

EQUIPMENT QUALIFICATION DATA PACKAGE

FORMAT

The "Equipment Qualification Data Package (EQDP's) is intended as an outline for the documentation of methods utilized to qualify safety related electrical equipment in a systematic and auditable form. The package is organized in five parts: (1) Equipment Identification; (2) Performance Specifications; (3) Qualification by Test; (4) Qualification by Experience; and (5) Qualification by Analysis. Parts 1 and 2 are required for each qualified safety class component (or component with attached safety class auxiliary devices). In addition, Parts 3, 4 and 5 should be completed as applicable.

EQUIPMENT QUALIFICATION DATA PACKAGE (PART 1 - IDENTIFICATION)

EQUIPMENT BEING QUALIFIED

Name: _____

_____

_____

Manufacturer's Identification Number: _____

_____

Design Specification Number: _____

_____ Rev. _____

Unusual Design Features of the Equipment (if any): _____

_____

If this equipment was qualified by type test and failures during the type test resulted in design changes, describe the failure analysis and the changes and provide the new manufacturer's Identification Number below:

_____

_____

_____

_____

_____

_____

EQUIPMENT QUALIFICATION DATA PACKAGE (PART 2 - SPECIFICATIONS)

1.0 PERFORMANCE SPECIFICATIONS

1.1 Electrical Requirements

1.1.1 Voltage _____

1.1.2 Frequency _____

1.1.3 Load _____

1.1.4 Electromagnetic Interference _____

1.1.5 Other _____

1.2 Installation Requirements _____

_____

1.3 Auxiliary Devices(1) _____

_____

1.4 Preventative Maintenance Schedule _____

_____

1.5 Design Life(2) _____

_____

1.6 Operating Cycles(3) _____

_____

1.7 Performance Requirements(4)

1.7.1 Normal _____

1.7.2 Abnormal _____

1.7.3 Containment Test _____

1.7.4 DBE _____

1.7.5 Post DBE _____

1.8 Environmental Conditions(5)

1.8.1 Temperature _____

1.8.2 Pressure _____

1.8.3 Humidity _____

1.8.4 Radiation _____

1.8.5 Chemical _____

1.8.6 Seismic _____

1.9 Projection Qualified Life(6) _____

_____

1.10 Remarks _____

_____

1.11 Part 1 Notes

(1) List auxiliary devices required for proper operation of the qualified equipment and reference Qualification data sheet for auxiliary devices if qualified separately.

(2) Main equipment; if required auxiliary devices design life is different, so state.

(3) Expected number of operational cycles including testing during design life.

(4) Accuracy, duration of requirement, etc., DBE is the Design Basis Event.

(5) Conditions and duration of each. Reference to standard curve may be used. Do not include margins.

(6) May be determined after qualification by test or analyses.

PAGE _____ OF _____

EQUIPMENT QUALIFICATION DATA PACKAGE (PART 3 - QUALIFICATION BY TESTS)

2.0 TEST PLAN

2.1 Equipment Description _____

_____

2.2 Number Tested _____

_____

2.3 Mounting _____

2.4 Connections _____

2.5 Aging Simulation Procedure _____

_____

2.6 Simulated Environmental Conditions(1)

2.6.1 Temperature _____

_____

2.6.2 Pressure _____

_____

2.6.3 Humidity _____

_____

2.6.4 Radiation _____

_____

2.6.5 Chemical _____

_____

2.6.6 Seismic _____

_____

2.7 Measured Variables

	Required	Not Required
2.7.1 Category I - Environment		
2.7.1.1 Temperature	_____	_____
2.7.1.2 Pressure	_____	_____
2.7.1.3 Moisture Content	_____	_____
2.7.1.4 Gas Composition	_____	_____
2.7.1.5 Vibration	_____	_____
2.7.1.6 Time	_____	_____
2.7.2 Category II - Input Electrical Characteristics		
2.7.2.1 Voltage	_____	_____
2.7.2.2 Current	_____	_____
2.7.2.3 Frequency	_____	_____
2.7.2.4 Power	_____	_____
2.7.2.5 Other	_____	_____
2.7.3 Category III - Fluid Characteristics		
2.7.3.1 Chemical Composition	_____	_____
2.7.3.2 Flow Rate	_____	_____
2.7.3.3 Spray	_____	_____
2.7.3.4 Temperature	_____	_____
2.7.4 Category IV - Radiological Features		
2.7.4.1 Energy Type	_____	_____
2.7.4.2 Energy Level	_____	_____
2.7.4.3 Dose Rate	_____	_____
2.7.4.4 Integrated Dose	_____	_____

2.7.5 Category V - Electrical Characteristics

2.7.5.1 Insulation Resistance	_____	_____
2.7.5.2 Output Voltage	_____	_____
2.7.5.3 Output Current	_____	_____
2.7.5.4 Output Power	_____	_____
2.7.5.5 Response Time	_____	_____
2.7.5.6 Frequency Characteristics	_____	_____
2.7.5.7 Simulated Load	_____	_____

2.7.6 Category VI - Mechanical Characteristics

2.7.6.1 Thrust	_____	_____
2.7.6.2 Torque	_____	_____
2.7.6.3 Time	_____	_____
2.7.6.4 Load Profile	_____	_____

2.7.7 Category VII - Auxiliary Equipment
(List Function and Required Measurements)

2.7.7.1 _____

_____

2.7.7.2 _____

_____

2.7.7.3 _____

_____

2.7.7.4 _____

_____

2.8 Test Sequence Preferred(2)

2.8.1 Inspection of Test Item

2.8.2 Operation (Normal Condition)

2.8.3 Operation (Performance Specifications Extremes, Section 1)

2.8.4 Simulated Aging(3)

2.8.5 Vibration(4)

2.8.6 Operation (Simulated DBE Conditions)(3)

2.8.7 Operation (Simulated Post DBE Conditions)(3)

2.8.8 Disassembly and Inspection

2.9 Test Sequence Actual(1)

	Step	Justification
2.9.1	____	_____
2.9.2	____	_____
2.9.3	____	_____
2.9.4	____	_____
2.9.5	____	_____
2.9.6	____	_____
2.9.7	____	_____
2.9.8	____	_____

2.10 Type Test Data

2.10.1 Objective _____

_____

2.10.2 Equipment Tested _____

_____

2.10.3 Features Demonstrated by the Test _____

_____

2.10.4 Description of the Test Facility _____

_____

2.10.5 Test Procedures _____

_____

2.10.6 Test Data and Accuracy _____

_____

2.10.7 Summary, Conclusions and Recommendations _____

_____

_____

_____

2.10.8 Supporting Data _____

_____

_____

_____ _____
(APPROVAL) (DATE)

2.11 Part 2 Notes

(1) Reference to Standard Curve may be used. Margins per IEEE-323-1974 have been added.

(2) Paragraph 2.8 shows the preferred test sequence. Show actual sequence and justify in Section 2.9

(3) Aging and radiation may be combined. If combined, DBE and post DBE conditions need not include radiation.

(4) Simulated Seismic and other Normal vibration seen in service

PAGE _____ OF _____

EQUIPMENT QUALIFICATION DATA PACKAGE (PART 4 - QUALIFICATION BY EXPERIENCE)

3.0 OPERATING EXPERIENCE DATA

3.1 Interface or Boundary Conditions _____

_____

_____

3.2 Qualification Features Demonstrated _____

_____

_____

3.3 Comparison of Experience and Specifications _____

_____

_____

3.4 Summary and Source of Experience _____

_____

_____

_____

_____

_____

3.5 Qualification Basis _____

_____

_____

_____

_____ _____
(APPROVAL) (DATE)

PAGE _____ OF _____

4.0 ANALYSIS

4.1 Interface or Boundary Conditions _____

_____

4.2 Specific Features Analyzed _____

_____

_____

_____

_____

_____

4.3 Assumptions and Models _____

_____

_____

_____

4.4 Analytical Methods and Computer Programs _____

_____

_____

_____

4.5 Summary _____

_____

_____

_____