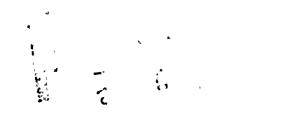


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# ELECTRICAL EQUIPMENT ENVIRONMENTAL QUALIFICATION REPORT FOR BROWNS FERRY NUCLEAR PLANT

TENNESSEE VALLEY AUTHORITY

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#### 1.0 Introduction

This report has been generated in response to the January 14, 1980, NRC IE Bulletin 79-01B and the NRC Memorandum and Order CLI-80-21 dated May 23, 1980. All information previously submitted in our April 30, 1980, and July 18, 1980, responses to Bulletin 79-01B is superseded by this report.

As directed, TVA has evaluated the environmental qualification of the safety-related electrical components which experience the harsh environment due to Loss of Coolant Accidents (LOCA's) and High Energy Line Break (HELB) accidents. Only that equipment either required to function for accident mitigation (Category a, as defined in NUREG-0588, Appendix E) or required not to fail (Category b, as defined in NUREG-0588, Appendix E) during accident mitigation, including those required for cold shutdown, are contained in this report.

The electrical equipment qualification evaluation was done in accordance with the requirements of Items 1 through 6 of IE Bulletin 79-01B as follows:

- 1. Item 1 of the bulletin required a "Master List" be provided to include all safety-related electrical components. In this report, the methods used to define this list are described in Section 2.0 and the complete list appears in Appendix A.
- 2. Item 2 of the bulletin required written evidence of environmental qualification of the components in the Master List to the requirements of Browns Ferry (1, 2, and 3) as licensed. Previous TVA submittals on Bulletin 79-01B have addressed this item.
- 3. Item 3 of the bulletin required profiles or tabulations of service conditions. Section 3.0 of this report defines the service conditions and how they were calculated. Appendix B also provides the profiles and tables used in the qualification evaluation.
- 4. Item 4 required evaluation of equipment qualification versus the "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors." The Evaluation Work Sheets (EWS) in Appendix C and their supporting appendixes provide documentation of qualification versus the "DOR Guidelines."
- 5. Item 5 of the bulletin required the evaluation of the maximum flood level as a result of LOCA/HELB inside containment and its effects on equipment which would be submerged. The EWS's in Appendix C provide the required information concerning submergence and qualification of equipment in this condition.
- 6. Item 6 of the bulletin required "Licenses Event Reports" (LER) be issued when a component is found not capable of performing its intended safety function. Section 5.2 of the report provides a Summary of Equipment Qualification Status which included the LER number issued when the above determination has been made.

In Section 5.0 of the report the results of the qualification investigation have been summarized.

Section 6.0 describes a qualification plan to be undertaken for those items not found to be fully qualified.

Section 7.0 of the report covers the quality assurance procedures used in the report preparation to comply with the 10 CFR 50 quality assurance requirements.

## SECTION 2.0

# DEFINITION OF EQUIPMENT LIST

#### 2.0 Definition of Equipment List

The equipment list for TVA's response to IE Bulletin 79-01B was compiled to meet the guidelines of IEB 79-01B and NUREG-0588 as described below. All work was performed in accordance with applicable TVA QA engineering procedures.

#### 2.1 Identification of Safety Systems and Components

The equipment necessary to mitigate an accident (LOCA, HELB inside or outside containment) that causes a harsh environment and to bring a unit to a cold shutdown condition has been identified. The identification process began by determining the safety functions listed as required in IE Bulletin 79-01B and its supplements that were pertinent to BFN. Plant-related documentation was reviewed to determine if additional safety functions were applicable to BFN. No additional safety functions were identified. Next, plant documentation was used to determine which systems had components involved with the defined safety functions. The specific components involved then were identified for each system.

Table 2.1 lists the systems and safety functions that were . identified. Several safety functions (main feedwater shutdown and isolation plus auxiliary feedwater) identified in IE Bulletin 79-01B and its supplements are not listed as these functions are applicable only to PWR's. Also, several BFN systems (automatic depressurization and reactor protection) are not listed as separate systems since these systems are purely logic networks that use components that belong to identified systems in the table. The notes to Table 2.1 offer additional clarification.

The following plant-related documentation was used to identify the safety functions, systems, and components:

- a. BFN Final Safety Analysis Report (through Amendment 70);
- b. "Concluding Report on the Effects of Postulated Pipe Failure Outside of Containment for Unit 1 of the Browns Ferry Nuclear Plant," TVA Report DED-TM-PF1 dated October 15, 1973;
- c. "Concluding Report on the Effects of Postulated Pipe Failure Outside of Containment for the Browns Ferry Nuclear Plant Units 2 and 3," TVA Report DED-TM-PF2 dated March 1, 1974;

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d. BFN Technical Specifications (safety bases);

e. BFN Emergency Operating Instructions; and

f. TVA Drawings Series 47W800's (flow diagrams), 47W610's (control diagrams), and 47W611's (logic diagrams).

In listing the equipment required, specific categories of components were excluded. Items that gave input to main control room annunciators were excluded if redundant indicators existed that monitored the same parameters as the annunciators. The components that supplied input to redundant indicators were identified and listed so that the operator can rely upon them. This was done to assure that a false annunciation could be identified. Components that supplied input to required annunciators that had no redundant indicators were identified and listed.

#### 2.2 Identification of Equipment in Harsh Environments

The items identified by the process described in Section 2.1 were reviewed to determine their location in the plant as the initial identification was based on function only with no regard given for location. Design documentation such as equipment layout drawings, cable routing schedules, and instrument panel locations were used to determine the location of each item identified. In some cases, particularly with hand switches, field surveys were conducted to verify location. The locations identified were compared to the areas defined in Section 3.1 as having potentially harsh environments following an accident. If an item's location was found to be outside these defined areas, the item was deleted from the list (although it still is required to be qualified for its nonaccident service environments). Before an item could be deleted, all associated items, especially cabling, was identified and their locations reviewed against the areas defined in Section 3.1. This assured that input or output associated with the original item was reviewed for qualification. For example, a cable carrying a signal to a main control room indicator may originate from an item that is not in any of the areas defined in section 3.1. However, the cable may be routed through such an area. To account for this the cable type was determined and the worst case environment possibly experienced by any cable of that type was then used for determining qualification. This assumed that the cable would be qualified for any area it may pass through.

#### 2.3 Categorization of Equipment

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During the process described in Section 2.1, each component identified was categorized as to its operability requirements and the type(s) of accident(s) for which it was required. As all of the items initially identified were based on review of their function without regard for environmental conditions, only two operating categories were used for classification. These were:

- a. Equipment that must function to mitigate the defined accident(s) including going to cold shutdown;
- b. Equipment that need not function to mitigate the defined accident(s) but that must not fail in a manner detrimental to plant safety or accident mitigation including going to cold shutdown.

These operating categories are equivalent to categories A and B defined in item 2 of Appendix E to NRC NUREG-0588. Categories C and D defined in item 2 of Appendix E were not used for this report as items in those categories either are not required to mitigate the defined accidents or are located where they will not experience the harsh environment resulting from the defined accidents.

The accidents considered for this report were identified as follows:

LOCA - The specific LOCA defined in BFN FSAR Chapter 14.

- HI High energy line break inside primary containment.
- HO High energy line break outside primary containment.
   If only one system was involved, then the acronym for that system was used (e.g., HPCI was used for an HO when only a HPCI system HELB was involved).

All - Includes all of the above accidents.

In some cases, a combination of accidents were identified. For these cases, the worst case environment was used to determine qualification.

#### 2.4 Definition of Equipment Operating Time Requirements

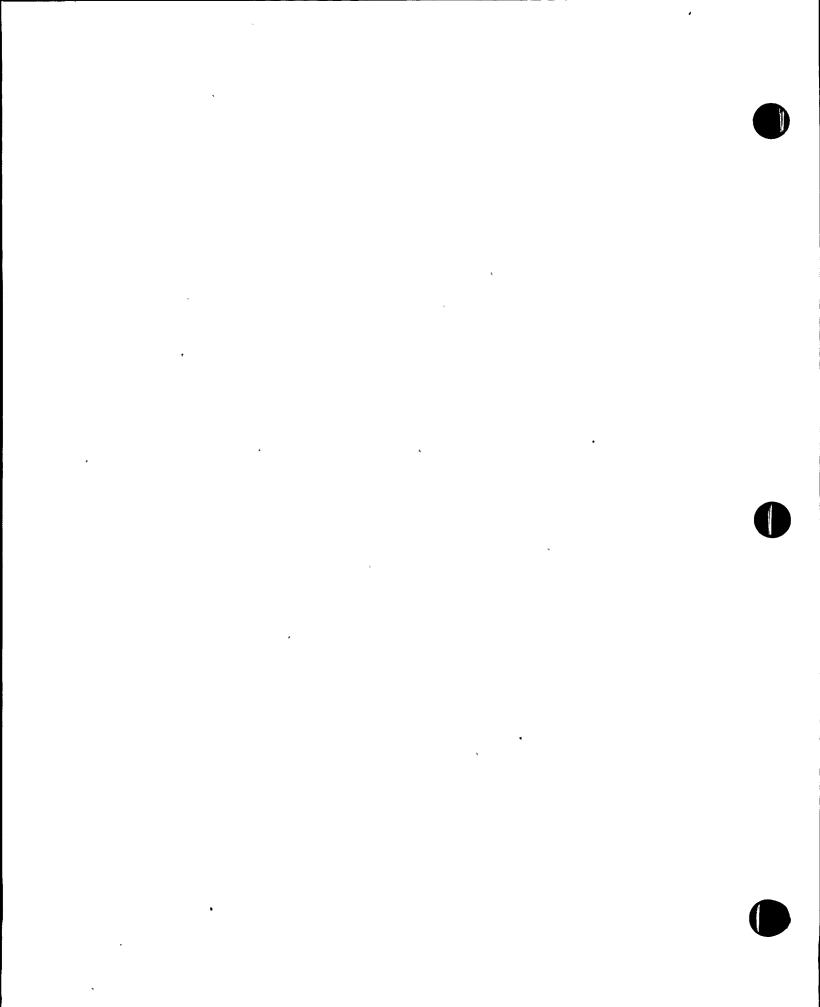
Once equipment was categorized per Section 2.3, the operating time for each item was determined. Operating time was defined as the time period during which a component must be available to perform its function. It was not considered to be the time actually required to perform an action (i.e., actual time required for a valve to close). An operating time category was defined as a <u>specified</u> time period starting at the accident initiation during which a component must be available to perform its function. This specified time period was given sufficient scope to incorporate all reasonable operating times required for the components in the category. Margin and accuracy for component operability is addressed in Section 4.1.

The following operating time categories were used:

- W One hour following accident initiation
- X One day following accident initiation
- Y Thirty days following accident initiation
- Z One year following accident initiation
- W-Z Items marked as "W-Z" are components that fit into operating category A for the first hour following accident initiation and then fit into operating category B for the duration of the event and recovery (taken to be one year for this report). Isolation valves fall into this situation. They are required to close and then to remain closed.
- X-Z Items marked as "X-Z" are components that fit into operating category A for the first 24 hours and then fit into operating category B for the year following the accident.
- Y-Z Items marked as "Y-Z" are components that fit into operating category A for the first 30 days and then fit into operating category B for the remainder of the year following the accident.

Operating time categories were assigned based upon the review of components' functions. For components that perform multiple functions, each function was considered and the worst case time requirement used for the components. General functions were defined as having the following operating times categories:

W & - Primary and secondary containment isolation (including W-Z SGTS initiation) following a LOCA or HELB inside primary containment; isolation for a HELB outside primary containment (i.e., the specific line that breaks); scram initiation (RPS), and scram following a LOCA or HELB inside primary containment or a HELB in the main steam line valve vault.





<u>Rationale</u>: The functions listed are automatic actions that should occur shortly after the events listed. The neverity of the events and the resultant harsh environmental profiles provided cover the "worse case." In these cases, the automatic actions will occur within a few minutes of the event initiation. If the events result in less severe environments, the actuation setpoints may be reached later. A one-hour band incorporates reasonably significant events and their environments while considering reasonable errors in the operating times for components involved with the automatic functions listed.

X & - Primary and secondary containment isolation for HELB'S X-Z outside primary containment (except for the line broken); scram initiation (RPS) and scram for HELB'S outside primary containment (except for a main steam line break in the valve vault).

<u>Rationale</u>: These automatic actions can be reasonbly expected to have occurred within 24 hours of the event initiation.

Y & - High pressure ECCS Y-Z

<u>Rationale</u>: It is highly unlikely that the reactor will remain at high pressures for 30 days. The reduction in the core decay heat combined with the necessity to depressurize for long term shutdown cooling assures that high pressures will not be maintained.

Z - All other functions

<u>Rationale</u>: It is impossible to predict the time required to fully recover from an event. One year is chosen to reflect a conservative average for the spectrum of events that could be experienced.

Components whose function did not fit into the general functions were reviewed individually to determine the appropriate operating time category. Typically, these were assigned to Category Z.

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NOLL SULLE	Ergincered fafeguirds . Acturtion (a)	Reactor Protection (b)	Contairment Isolation (c)	SteamLine Isolation	Emergency Power (d)	Containment Heat Removal (c)	Contalrament Fission Product Rearval (£)	Contairment Combustible Gas Control (K)	Contairme <del>nt</del> Ventilation (h)	Contuirment Fadiation Fonttoring (1)	Control Rocm Habitability	Ventilation Safety Faufp.	Component Coolding	Service Water	Eacrgency Ehutdoan	Prablug & Stapting & Brutturing	Eadlation Menitoring	Safety Related Display Instrumentation (j)	Energency Care Couling
Main Stoon	X	X	X	X			U M M IG	0000		0 4. 2.0		> 0	00	03		12 <u>12 12</u>	22	SGAU V	5.2
Feedwater	X	X	X									<u> </u>			$-\Delta_{-}$	j			
Fuel Oil		- ^	<u> </u>		X													X	<b> </b>
						X							<u> </u>	X	X	ļ		$\frac{X}{X}$	
Paw Cooling Water	X													<u> </u>		! 			X.
Ventilating								·····			X	$\overline{X}$							
Air Conditioning								-			$\hat{X}$	$\overline{X}$						$\frac{X}{X}$	
Control Air			X								- <u>``</u>	~							
_Staplin.;			X													X		$\frac{\Lambda}{X}$	<b>├</b> ───┤
Standoy Liquid Control						-									X			$\frac{\lambda}{X}$	
Frigary Containment	X	X	X						X			X						$\frac{X}{X}$	
Standby Gas Treatment	•						Χ.	X	X									$\frac{\lambda}{X}$	
<u>(5)</u>													X		X			$\frac{\lambda}{X}$	
<u>Reactor Fectroulation (3)</u>			X															$\frac{\lambda}{X}$	
Fractor Vater Cleanup			X															$\frac{x}{x}$	
EBCCW_(4)			X															$\frac{x}{X}$	
RCIC (5)			X <sup>.</sup>												X		<b> </b>	$-\frac{x}{x}$	X
HFCI (6)			Х							-					$\frac{x}{X}$			X	
Residual Heat Removal	X		_X_			X									X			X	$\hat{\mathbf{X}}$
Core Sprný	<u>_X</u>		X												X			X	XX
Contairment Inerting			X															$\overline{X}$	
Ridwaste			X												•			X	
Fuel Pool Cooling						-							X					X	
CAB (7)			<u>X</u>					X										X	
Control Rod Drive		X													X		[]	X	
Neutron Monitoring		X													X			$\frac{1}{X}$	
Radiation Monitoring	X	<u>X</u>		X						X							X	X	
Auxiliary Power					X										X				

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# TABLE 2.1

#### Notes for Table 2.1

Systems:

- (1) RHRSW-Residual Heat Removal Service Water
- (2) EECW-Emergency Equipment Cooling Water
- (3) The Reactor Recirculation System contains values that must close for the RHR Low Pressure Coolant Injection mode to function effectively. Thus it is marked as being associated with the Emergency Core Cooling function. The system also contains pressure switches that interlock with RHR values to maintain containment isolation until LPCI is required.
- (4) RBCCW-Reactor Building Closed Cooling Water
- (5) RCIC-Reactor Core Isolation Cooling
- (6) HPCI-High Pressure Coolant Injection
- (7) CAD-Containment Atmosphere Dilution

Functions:

- (a) There is not a separate Engineered Safeguards Actuation System for BFN. The systems marked contain components that send signals to actuate other systems so that a safety function may be performed.
- (b) The Reactor Protection System was not separated for this study. All items associated with initiating and achieving reactor scram were identified and are contained in the systems marked.
- (c) "Containment" here refers to both the Primary and Secondary Containment for BFN. The systems marked have components associated with initiating and achieving containment isolation.
- (d) Emergency Power was not separated as a separate system. When an item was identified as being required, the components associated with providing power to the item were identified and then treated as required components.
- (e) "Containment" here refers to the Primary Containment only. The Containment Spray and Torus Recirculation modes for the RHR System are used to remove heat from the Primary Containment. The RHRSW System then removes the heat from the RHR System.
- (f) "Containment" here refers to both the Primary and Secondary Containments at BFN.
- (g) "Containment" here refers to the Primary Containment only.
- (h) "Containment" here refers to the Secondary Containment only. There is not a safety-related ventilation system for the Primary Containment as one is not required in the FSAR.
- (i) "Containment" here refers to both the Primary and Secondary Containments at BFN.
- .(j) Safety Related Display Instrumentation is defined as those items associated with displaying information in the Main Control Room that an operator could use to detect and monitor an event, to verify the status of required components and systems, and to verify that safety functions have been achieved. If a system is not marked, there are no components involved with Main Control Room indications.

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#### 2.5 <u>Comparison of Field Generated Component Identification and EN DES</u> <u>Procurement Documentation</u>

A list, by identification number, of the electrical equipment required to function under postulated accident conditions was sent to the field for visual identification of each device. A walkthrough of areas outside the primary containment was conducted for all three units and inside the primary containment of unit 2.

The field list, generated by the walk through, provided the nameplate data consisting of the manufacturer, model number, and serial number of each device. Field data was not obtainable for some temperature elements, junction boxes, and terminal blocks because of inaccessibility or nonexistent identification numbers. These components had only plant identification numbers which correspond to procurement documents. It has been confirmed that these components are the same as originally installed and therefore accurately represented in design documentation data.

The field verification information was used to verify the equipment list developed from design documentation. When a discrepancy was found between the field generated list and design documentation, the information obtained from the field was or will be used as a basis of the qualification report. A subsequent update of this report will cover those discrepancies not presently resolved.

Since the identification of components for which qualification must be shown is a continuing process, some equipment has been added to the list too late to be field verified. The design documentation data was used for the basis of evaluation for these items. Any discrepancies uncovered in this field verification or the verification inside units 1 and 3 containments will be embodied in subsequent revisions of the report. .

# SECTION 3.0 SERVICE CONDITIONS

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#### 3.0. Service Conditions

The environmental conditions present in plant areas that can impact safety-related equipment have been established. The following categories were used to bound anticipated plant conditions.

- 1. Normal The temperature, pressure, humidity, and radiation ranges that are expected to be present when the plant is in any of the technical specification modes of operation.
- 2. Abnormal Conditions that could exist for all areas for a short period of time that may occur once or more a year.
- 3. Accident Environmental conditions that would be experienced as a result of high energy pipe breaks outside containment, or a large, intermediate or small LOCA or main steam line break inside containment.

All analyses performed to determine the service conditions were performed consistent with the guidelines of IE Bulletin 79-01B and NUREG-0588 and in accordance with either TVA quality assurance procedure EP 3.03 or General Electric's internal quality assurance program.

- 3.1 Areas Constituting a Harsh Accident Environment
- 3.1.1 Temperature and Pressure Inside Containment
  - 3.1.1.1 High Energy Line Breaks

The controlling breaks for the pressure response of the drywell and wetwell and the temperature response of the wetwell are the large LOCA Design Basis Accident (DBA) and the Intermediate Break Accident (IDA). The DBA and a 0.5 ft<sup>2</sup> steam leak produce the most severe temperature transient in the drywell. The pressure and temperature response of the drywell and wetwell are provided in figures C.1-1 through C.1-5. The containment pressure and temperature response for all breaks was evaluated by the methods discussed in General Electric Report No. NEDO-20533, June 1974. Mass and energy releases were calculated using the methods also discussd in the above General Electric report. Details of the analyses are provided in FSAR, section 14 and General Electric Report NEDO-24580.

#### 3.1.2 Outside Containment

#### High Energy Line Breaks

Plant areas outside containment were reviewed to determine areas where high energy piping was located and could potentially produce effects that would impact safety-related equipment. The areas affected by high energy line breaks are the reactor building and the main steam valve vaults.

#### 3.1.2.1 Reactor Building

The high energy lines located in the reactor building are:

- (1) High Pressure Coolant Injection (HPCI) steam supply to the pump turbine - 547 F, 1020 psia, quality - 1.
- (2) Reactor Core Isolation Cooling (RCIC) supply to the RCIC pump turbine - 547°F, 1020 psia, quality - 1.
- (3) Reactor Water Cleanup (RWCU) system -547°F, 1020 psia, quality - 0.

Single-ended circumferential ruptures at the fluid conditions listed above were postulated. Mass.and energy releases for all steam supply lines expect one break of the RWCU were generated using the Moody critical flow correlation assuming an fL/D equal to zero. Upstream pressure and temperture, and therefore mass flow rates, were assumed to remain constant until the line was isolated. These steam supply lines isolate automatically on high temperature in the reactor building. Temperature sensors are located in the vicinity of the line to assure rapid detection and isolation. Isolation times include signal process time, valve stroke time, and break detection time. The sensors used are redundant, class 1E, and electrically trained:

Mass and energy release of the remaining RHCU break was generated using the RETRAN computer code. Only this break requires operator action for isolation. Isolation was assumed to occur 10 minutes after the break. Detection of this break is based on high fluid temperature at the discharge of the nonregenerative heat exchangers. .

The steam valve vault was modeled using three nodes and were input into the COMPARE-MOD1 computer code. No heat sinks were considered.

The valve vaults at Browns Ferry were constructed with large blowout panels to provide pressure relief to the turbine building in the event of a pipe break. These paths were included in the model.

Figure C.2-35 presents the temperature and pressure results of the analysis for the main steam valve vaults in all three units.

#### 3.1.3 Radiation Environment

The radiation environments inside the drywell and in the reactor building after a design basis LOCA were calculated consistent with the requirements of IE Bulletin 79-01B and NUREG-0588.

Initial airborne sources in the drywell were calculated assuming an instantaneous release of 100 percent of the core inventory of noble gases and 50 percent of the core inventory of iodine. Transfer of iodine from the drywell free volume to the water in the torus was conservatively calculated as a function of time until the airborne concentration was reduced by a factor of 200 (considered to be at equilibrium). Sources in the water in the torus were calculated assuming an instantaneous release of 1 percent of the core inventory of the solid fission products and the iodine transferred from the drywell. Airborne activity in the reactor building was calculated based on a design basis leak rate from the primary containment and design flow of the SGTS.

Source terms were calculated at various times after an accident allowing for decay and dose rates were calculated with a point-kernel-with-buildup computer code. Radiation exposures in the reactor building due to recirculation of the torus water through the RHR and containment spray systems were also calculated. These dose rates were then integrated over the duration of the accident.

#### 3.2 Operational Environmental Conditions

An environmental listing of service conditions are tabulated in Table 1. The service conditions considered were pressure, temperature, huimidity, and radiation. Normal and abnormal space ambient temperatures for nonaccident conditions were obtained from information used in the initial design phase of the plant in conjunction with data accumulated at the plantsite in various spaces, for all units, under extreme outside temperature conditions (100°F outside atmosphere). Pressures . .

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In order to calculate the environmental conditions following a pipe break, a 20 node model was developed to represent the reactor building and used as input to the SPA Rev 2 computer code. SPA is a subcompartment code using a homogeneous equilibrium model and models two-component, two-phase flow. Evaluation of superheated steam conditions is also included in the code. No heat sinks were modeled. Figures C.2-1 through C.2-6 show the reactor building with the nodes outlined. Figures C.2-7 and C.2-8 are schematics of the model portraying the various flow paths for units 1 and 2, respectively. The modeling of unit 3 is the same as that of unit 2. Table C.2-1 provides the pipe breaks considered and the nodes where breaks were assumed to occur.

The results provided are a composite profile for each node representing the worst condition in the node at any point in time. Temperature profiles are provided in Figures C.2-9 through C.2-21 for unit 1 and Figures C.2-22 through C.2-34 for units 2 and 3. Table C.2-2 provides the pressure response versus time for the reactor building. The pressure and temperature response of the reactor building beyond the analysis times of Figures C.2-9 through C.2-34 and Table C.2-2 is conservatively assumed to linearly return to ambient in 24 hours. The humidity in all areas of the building as a result of any break is 100 percent during the blowdown phase of the transient and is then conservatively assumed to return to ambient 24 hours after the event.

#### 3.1.2.2 Main Steam Valve Vaults

The high energy lines in the valve vaults are the main steam lines and the main feedwater lines. Breaks in the main steam line are controlling from an environmental standpoint due to the large line size and the high energy associated with the steam. Conditions of the main steam are 550°F, 1050 psia, quality - 1.

A double-ended rupture of the main steam coincident with a break of the 4-inch RCIC steam line was evaluated. Mass and energy releases were provided by General Electric. Break flow was terminated by isolation of the main steam lines based on signals from safety-related sensors.

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and temperatures for accident conditions were obtained from transient curves and analysis which studies the effects of a LOCA on reactor zone spaces (see Section 3.1.2). Radiation doses are discussed under "Radiation Environment" (see Section 3.1.3). Environmental service conditions were only considered in the reactor zone and primary containment. The control bay and electrical board room were not considered since their atmospheres did not interface with the reactor zone environment. The environmental table of service conditions was developed for various plant conditions including the following: normal average day, abnormal conditions (outside temperature 96-100 F and maximum river water temperature exists), LOCA/HELB inside primary containment, HELB outside primary containment, and tornado (sudden pressure drop by 3 pounds per square inch).

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TABLE 1 BROWNS FERRY NUCLEAR PLANT SUMMARY OF OPERATIONAL ENVIRONMENTAL CONDITIONS

Plant Location	Elevation	Building Location	Operational <u>Condition</u>	Pressure Extreme (PSIA)	Peak Temperature ( <sup>O</sup> F)	Peak <u>Humidity (%)</u>	Total 40-Yr Integrated Dose (Rads)	Integrated Accident <u>Dose (Rads)</u>
Outside			25.	ATM 11.4 -	96-100 Na	100 NA	<sup>5</sup> x 10 <sup>2</sup> NA	NA NA
Reactor Building	541.5	Drywell	1 2 .3	15.6 15.6 69.4	140 150 325	100 100 100	1 x 10 <sup>8</sup> 1 x 10 <sup>8</sup> NA	NA NA Center $_8$ 1 x 10 $_9$ 2 x 10 $^9$
	*			• •		·		Edge 4 x 10 4 x 10 9
¥		-	4 5 <b>c</b> o	NA 15.6	NA NA	NA , NA	NA NA	NA NA
	519.0	Wetwell	1 2 3 4 5	ATM ATM 43.2 NA ATM	95 105 158 NA NA	100 100 100 NA NA	NA NA NA NA NA	NA NA 2 x 10 <sup>8</sup> NS NA
•	519.0	HPCI Room	1 2 3 4 5	ATM* ATM* ATM* 15.7 11.4	95 105 150 300 NA	98 98 100 100 NA	2 x 10 <sup>4</sup> 2 x 10 NA NA NA	NA NA 3 x 10 <sup>4</sup> NS NA
	519.0	SW Pump Room	1 2 3 4 5	ATM# ATM# ATM# 15.0 11.4	95*** 105*** 160 292(U1) 158(U2&3) NA	98 98 100 100 NA	2 x 10 <sup>4</sup> 2 x 10 <sup>4</sup> NA NA NA	NA NA 3 x 10 <sup>7</sup> NS NA

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TABLE 1 BROWNS FERRY NUCLEAR PLANT SUMMARY OF OPERATIONAL ENVIRONMENTAL CONDITIONS

Plant Location	Elevation	Building Location	Operational <u>Condition</u>	Pressure Extreme (PSIA)	Peak <u>Temperature (<sup>O</sup>F)</u>	Peak Humidity (%)	Total 40-Yr Integrated Dose (Rads)	Integrated Accident Dose (Rads)
Reactor	519.0	NW Pump	1	ATM*	95	98	$2 \times 10^{4}_{4}$ 2 x 10^{4}_{4}	NA
Building		Room	2	ATM*	105	98	$2 \times 10^4$	310
			3	ATM*	160	100	NA	$3 \times 10^{7}$
			4	15.0 .	297	100	NA	NS ·
			5	11.4	NA	NA	NA	NA
	519.0	NE Pump	1	ATM*	95	98	$2 \times 10^{4}_{11}$	NA
		Room	2	ATM*	105	98	$2 \times 10^{4}$	214
			2 3 4	ATM*	160	100	NA	$3 \times 10^{7}$
				15.0	171(U1) 160(U2&3)	100	NA	NS
			5	11.4	NA	NA	NA	NA
	519.0	SE Pump	1	ATM*	95	98	$2 \times 10^{4}_{4}$	NA
		Room	2	ATM*	105	98	$2 \times 10^{4}$	114
		7	2 3	ATM	160	100	NA	$3 \times 10^{7}$
	-		4	15.0	139(U1) 294(U2&3)	100	NA	NS
			5	11.4	NA	NA	NA	NA
-	519.0	Pressure	1	ATM*	95***	98	1.5 x 10 <sup>5</sup> 1.5 x 10 <sup>5</sup>	NA
		Suppression	2 3	ATM*	105***	98	1.5 x 10 <sup>0</sup>	NA a
•		Chamber .	3	ATM	-170	100	NA	$3 \times 10^{7}$
			- 4	15.0	217(U1) 220(U2&3)	10 <b>0</b>	NA	NS
			5	11.4	NA	NA	NA	NA
-	565	Main Steam	1 -	ATM*	140	98	$2 \times 10_{6}^{6}$	NA
-	- a	Valve Vault	2	ATM <b>≭</b>	. 160	98	2 x 10°	NA n
			2 3 4	ATM	140 .	100	NA	$3 \times 10^{4}$
				21.5	308	` 100	NA .	NS
			5	11.4	NA	NA	NA	NA



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TABLE 1 BROWNS FERRY NUCLEAR PLANT SUMMARY OF OPERATIONAL ENVIRONMENTAL CONDITIONS

Plant Location	Elevation	Building Location	Operational Condition	Pressure Extreme (PSIA)	Peak <u>Temperature (<sup>O</sup>F)</u>	Peak <u>Húmidity (%)</u>	Total 40-Yr Integrated Dose (Rads)	Integrated Accident Dose (Rads)
Reactor	565	General Floor	1	ATM*	90	98	$1 \times 10^{5}_{5}$	NA
Building		Area	2	ATM* *	100	98	$1 \times 10^{5}$	NA
-			3	ATM	140	100	NA	2.1 x $10^{7}$ **
			4	15.0	147(U1) 157(U2&3) ·	100	NA	NS .
			5	11.4	NA	NA	NA	NA
	593 🕔	General Floor	1	ATM*	90	98	$2 \times 10^{4}$	NA
		Area	2	ATM¥	100	98	$2 \times 10^4$	NA _
			3	ATM	135	100	NA	$2.1 \times 10^7 **$
•			4	15.0	214(U1) 211(U2&3)	100	NA	NS
			5	11.4	NA	NA	NA	NA
-	593	.Reactor Water	1	ATM*	120	98	1.4 x $10^{7}_{7}$	NA
•		Cleanup Pump	2	ATM*	130	98	$1.4 \times 10^{7}$	NTA .
		Rooms	2 3	ATM	135	100	NA .	$3 \times 10^4$
			4	15.9	220	100	NA	NS
	•		5	11.4	NA	NA	NA	NA
	593	Heat Exchanger	1	ATM*	125	98	$1.4 \times 10^{7}_{7}$	NA
		Room	2	ATM*	135	98	$1.4 \times 10^{1}$	NA 7
			3	ATM	135	100	NA	<sup>NA</sup> 3 × 10 <sup>7.</sup>
-			- 4	18.2	227(U1) 221(U2&3) -	100	NA	NS
1			5	11.4	NA	NA	NA	NA
	621	General Floor	1	ATM <b>*</b>	90 .	. 98	$1 \times 10^{3}$	NA
		Area	2	ATM¥	100	98	$1 \times 10^{3}$	314
			2 3	ATM	185	100	NA	$3 \times 10^4$
	•		4.	15.0	174(U1) 199(U2&3)	.100	NA	NS
			. 5	11.4	NA	NA	NA	NA

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TABLE 1 BROWNS FERRY NUCLEAR PLANT SUMMARY OF OPERATIONAL ENVIRONMENTAL CONDITIONS

						•			
	Plant Location	Elevation	Building Location	Operational Condition	Pressure Extreme (PSIA)	Peak <u>Temperature (<sup>O</sup>F)</u>	Peak <u>Humidity (%)</u>	Istal 40-Yr Integrated <u>Isse (Rads)</u>	Integrated Accident Dose (Rads)
	Reactor	639	General Floor	1	ATM*	90	98	$1 \times 10^{3}$	NA
	Building		Area (South)		ATM*	100	98	$10^{3}$	31.4
	Dattating		mea (boutin)	3	ATM	130	· 100	X4	$3 \times 10^{10}$ .
				2 3 4	15.0	135(U1) 178(U2&3)	100	N4	NS ·
				5	11.4	NA	NA	X1	NA
		639	General Floor	1	ATM*	90	98	$10^{3}$	NA
		. 0.5	Area (North)		ATM*	100	98	$10^{3}$	NTA.
			meu (nor on)	3	ATM	130	100	NA NO	$3 \times 10^4$
			2 3 4	15.0	153(U1) 174(U2&3)	100	NL NL	NS	
				5	11.4	NA	NA .	N4	NA
		664	Refueling Floor	1	ATM*	- 90	98	$\frac{1}{x} \frac{10^3}{10^3}$	NA
			•	2	ATM*	100	98	• x 10 <sup>3</sup>	
				2 • 3 4	15.0	120	100	N.A.	$3 \times 10^4$
					NA	NA	NA	N.L.	NS
				5	11.4	NA	NA	XI	NA
		593.0	RWCU BW	1	ATM*	95	98	5.3 x 107 5.3 x 107 5.3 x 107	NA
			Receiving Tank	2 3 4	ATM*	105	.98	5.3 x 10'	NA h
			Room	3	ATM	135	100		$3 \times 10^4$
<b>`</b>	5		4	15.0	214(U1) 211(U1&2)	100	NA	ns	
				5	11.4	NA	NA	n4	NA
	•	639.0	RWCU	1	ATM*	90	90	2.: x 10 <sup>8</sup> 2.: x 10	NA
		•	Demineralizer	2	ATM*	100	- 90	2.7 x 10°	NA Ji
			A	2 3 4	ATM	100	90	N4	3 x 10 <sup>4</sup>
		•			ATM	105	90	NŁ	NS
			•	5	11.4	NA	NA	NA	NA

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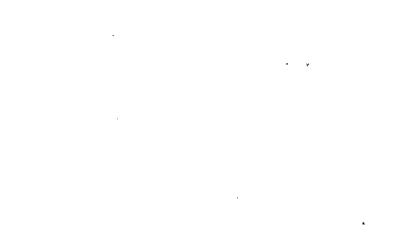
TABLE 1BROWNS FERRY NUCLEAR PLANTSUMMARY OF CPERATIONAL ENVIRONMENTAL CONDITIONS

Plant Location	<u>Elevation</u>	Building Location	Operational _Condition_	Pressure Extreme (PSIA)	Peak Temperature	( <sup>0</sup> F)	Peak <u>Humidity (%)</u>	Total 40-Yr Integrated Dose (Rads)	Integrated Accident Dose (Rads)
Reactor Building	639.0	RWCU Demineralizer B	1 2 3 4 5	ATM* ATM* ATM ATM 11.4	90 100 100 105 NA		90 90 90 90 AN	2.1 x 10 <sup>8</sup> 2.1 x 10 <sup>8</sup> NA NA NA	NA NA 3 x 10 <sup>4</sup> NS · · NA
	£2°.5	Cleanup Demineralizer Valve Room	1 2 3 4 5	ATM¥ ATM¥ ATM ATM 11.4	95 105 105 110 NA		90 90 90 90 NA	1.7 x 10 <sup>5</sup> 1.7 x 10 <sup>5</sup> NA NA NA	NA NA 3 x 10 <sup>4</sup> NS NA

A. Operational condition definitions:

- 1. Normal average day.
- 2. Abnormal conditions, outside temperature 96-100°F and maximum river water temperature exists. The maximum duration for this condition is 8 hours during a 24-hour period but may occur on a daily basis for a 2- or 3-week period. (Outside design temperature is 95°F.)
- 3. LOCA/HELB inside primary containment.
- 4. HELB outside primary containment.
- 5. Tornado (sudden pressure drop of 3.0 pounds per square inch).
- B. ATM indicates a pressure equal to atmospheric pressure will be present. Normal atmospheric pressure at the Browns Ferry site is 14.4 pounds per square inch.
- C. ATM\* indicates a pressure slightly below atmospheric.
- D. All dose rates and integrated dose rates shown are upper limits for the summation of the gamma and beta contributions unless otherwise indicated. All dose rates are for LOCA; HELB is not significant (denoted NS). Maximum dose rates for these elevations are indicated by \*\*. Actual valves may vary significantly depending on location. Total radiation dose rates can be obtained by adding the 40-year integrated and accident dose rates.
- E. Normal humidity is 30 to 80 percent.
- F. For operational condition 3, the drywell and wetwell pressure and temperature values are peak values. For transient conditions, see attachment 1.
- G. For operational condition 4, temperatures shown are peak values for transient conditions (see attachment 2).
- H. Pressure, humidity, and radiation parameters apply to units 1-3. Temperatures are applicable to all units unless otherwise indicated. \*\*\* indicates space temperatures may reach 150°F during normal shutdown mode.
- I. Primary containment areas are not subject to a chemical spray.
- J. Reactor building equipment is not subject to submergence.
- K. NA indicates not appleiable for this operating condition.

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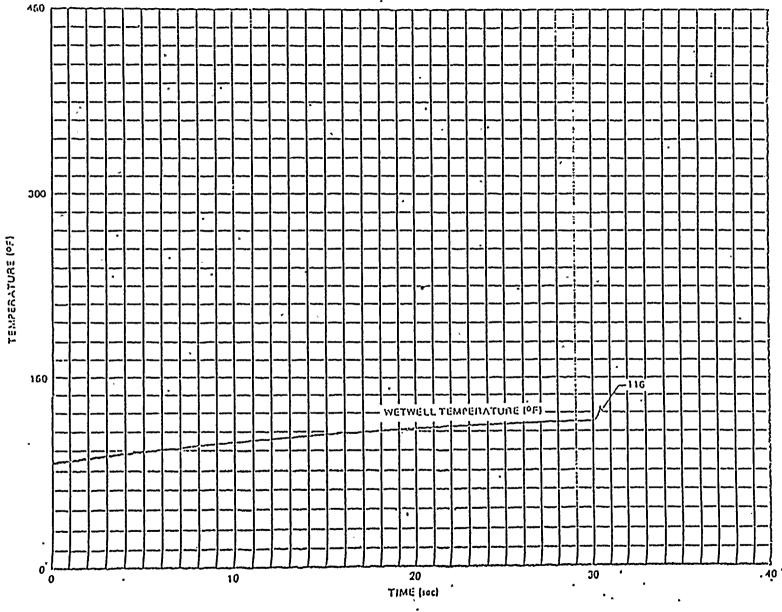
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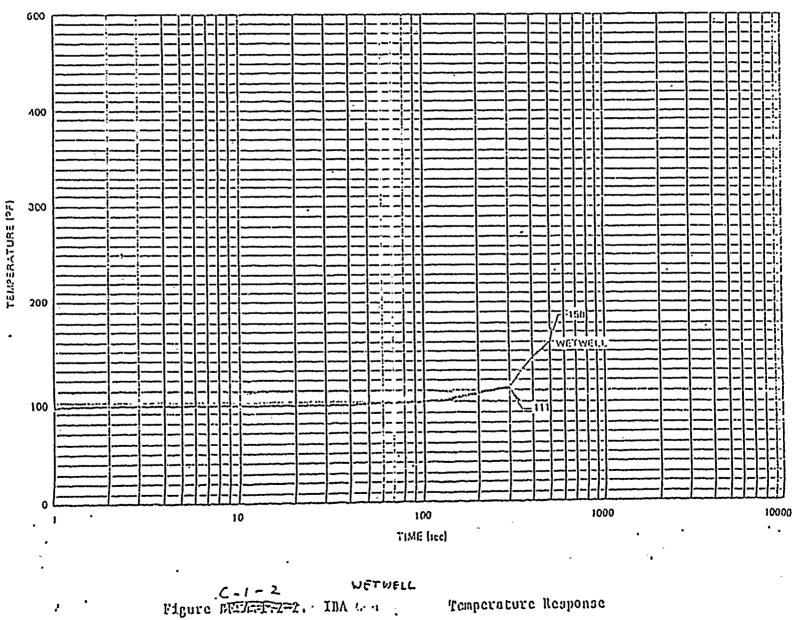


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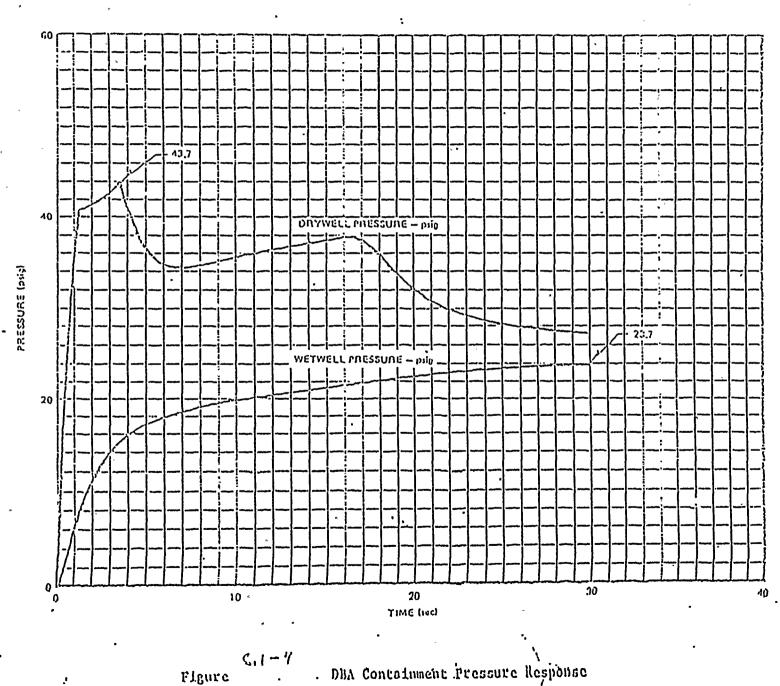




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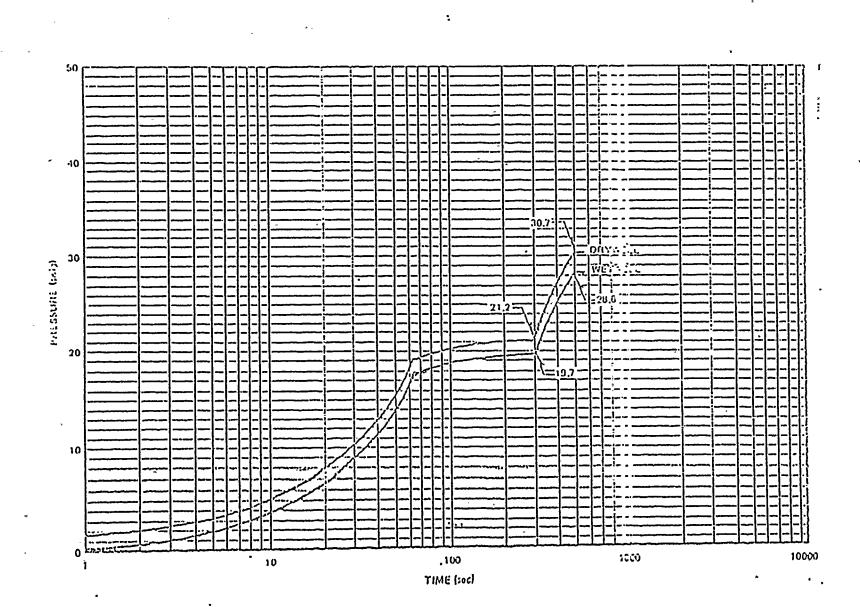
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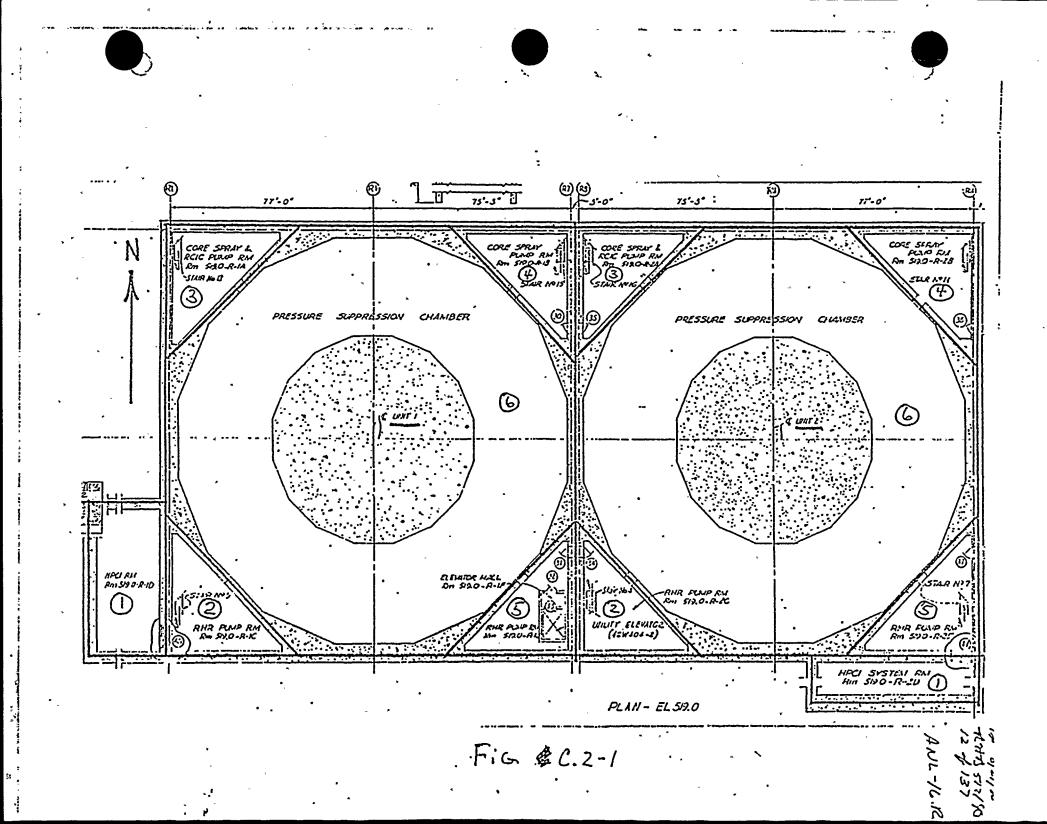
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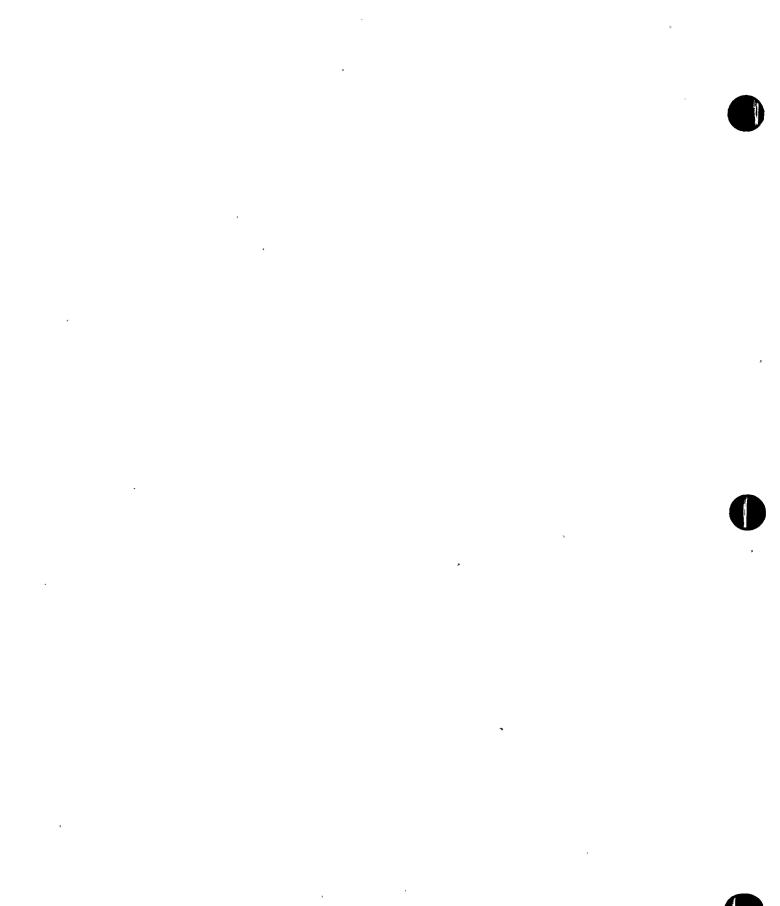
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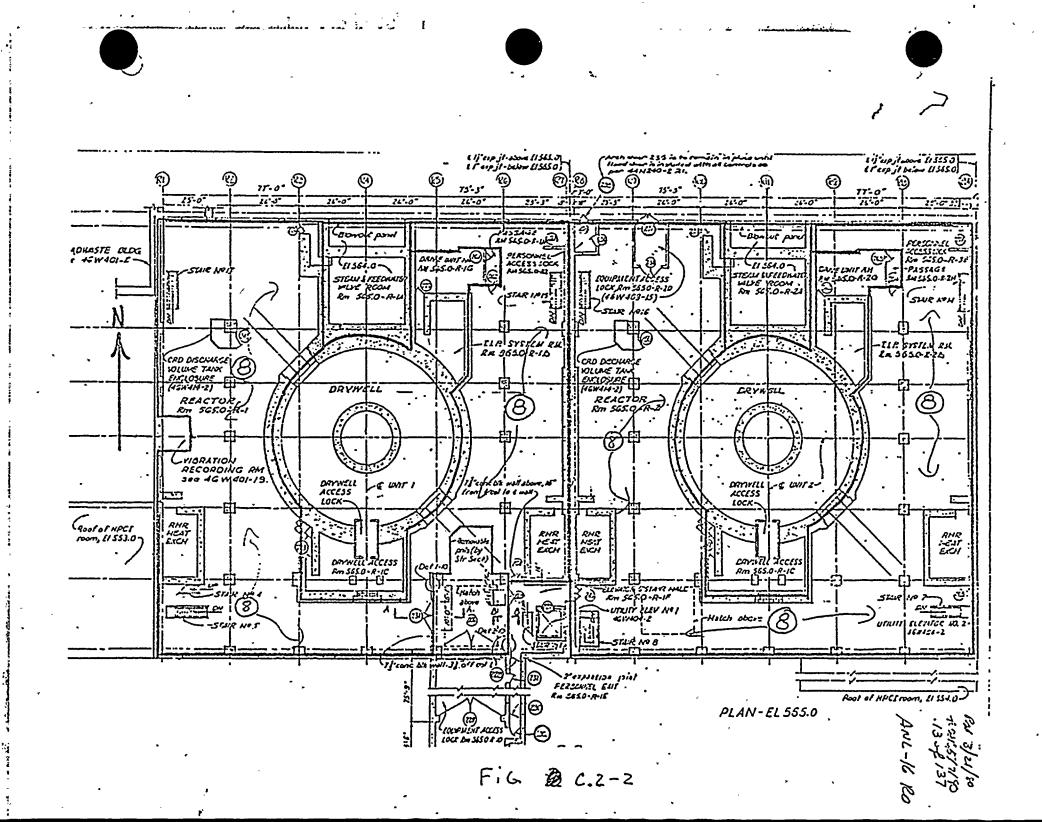
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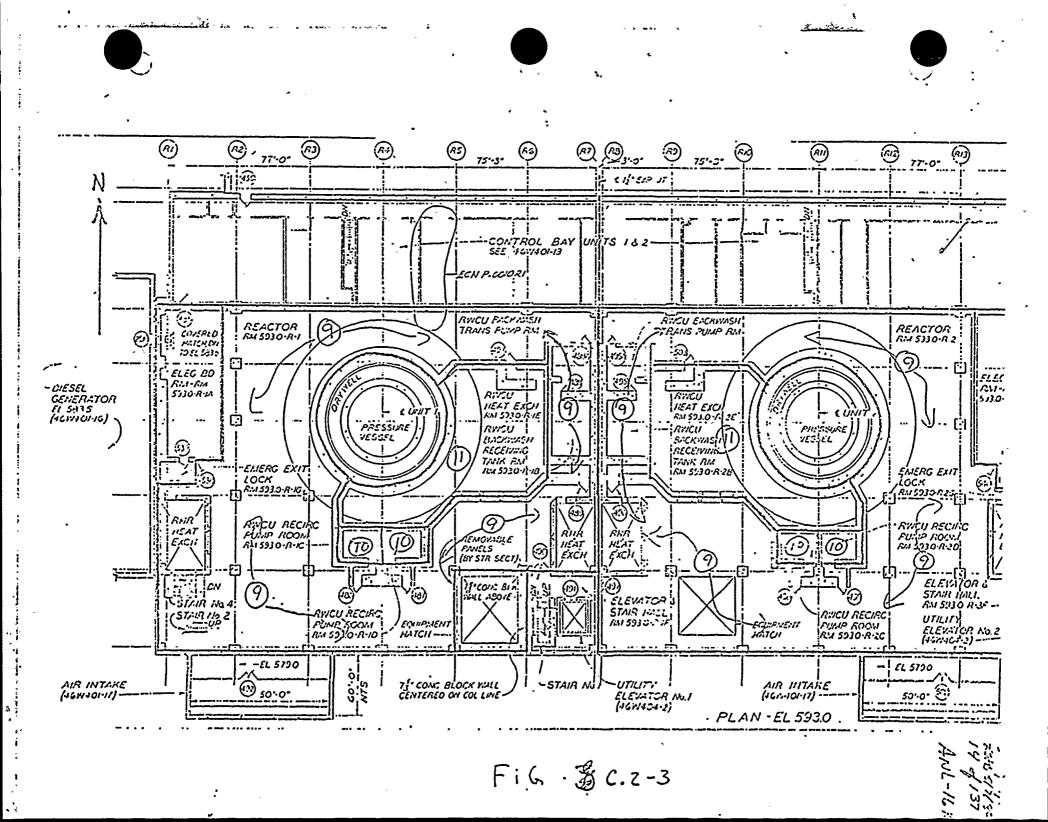
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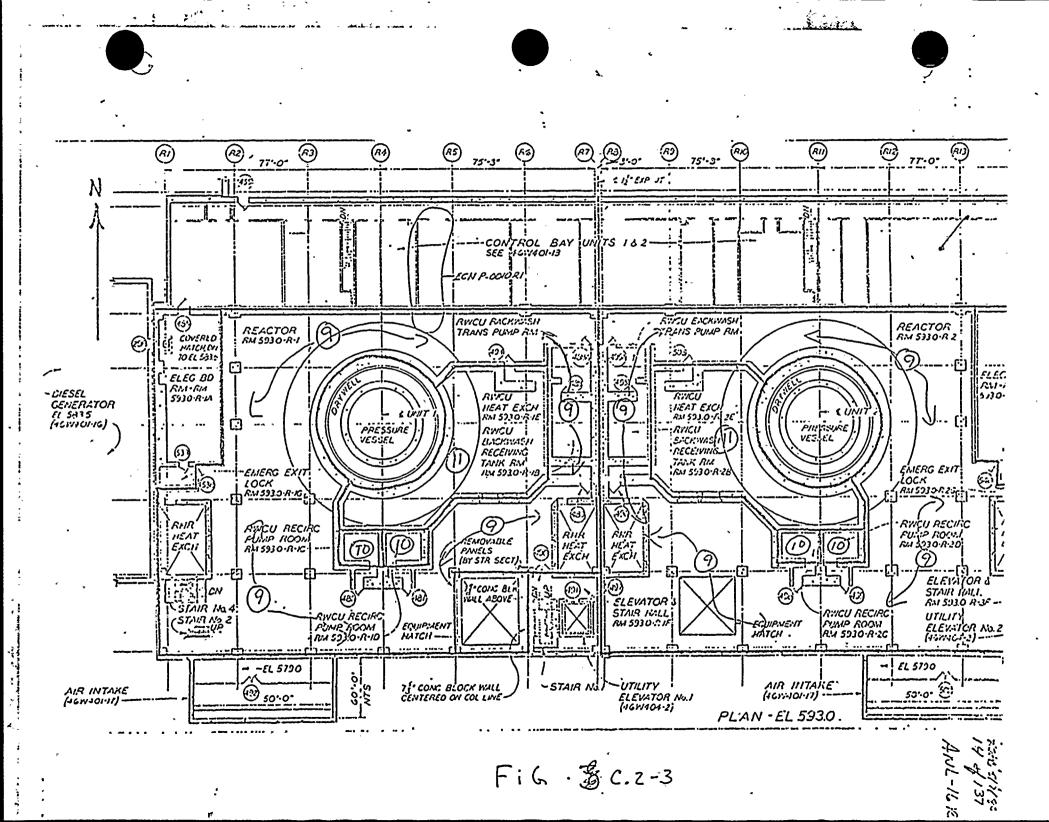
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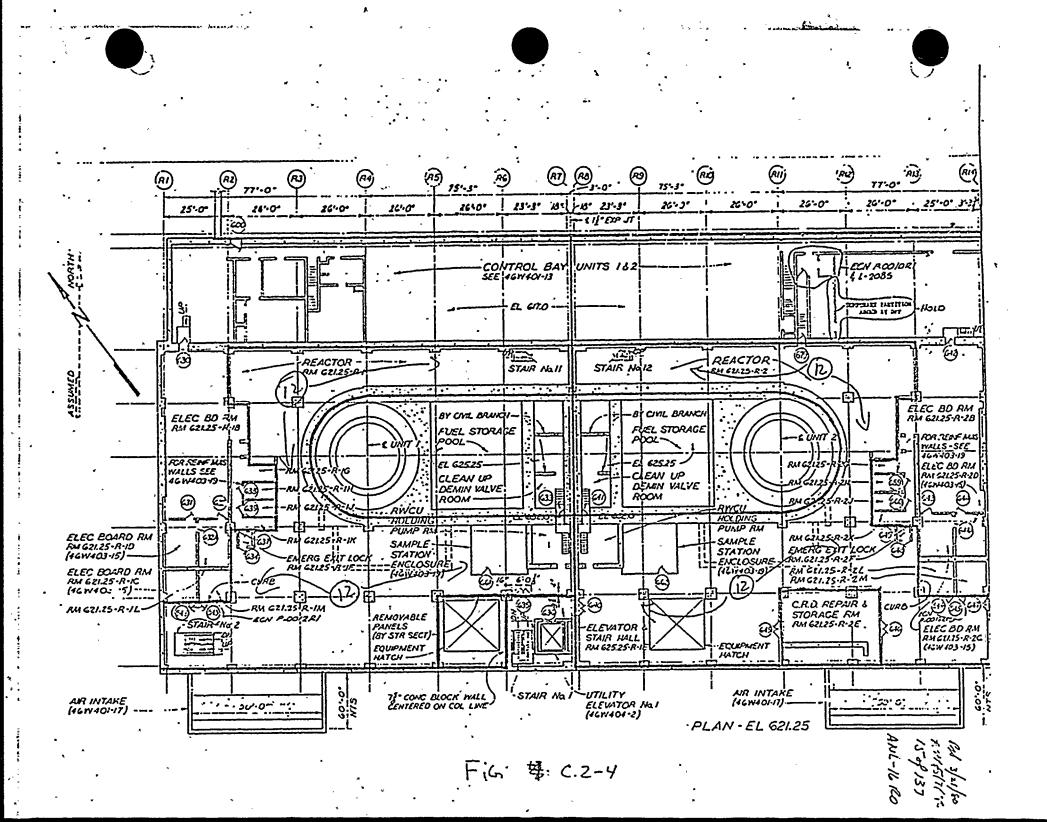
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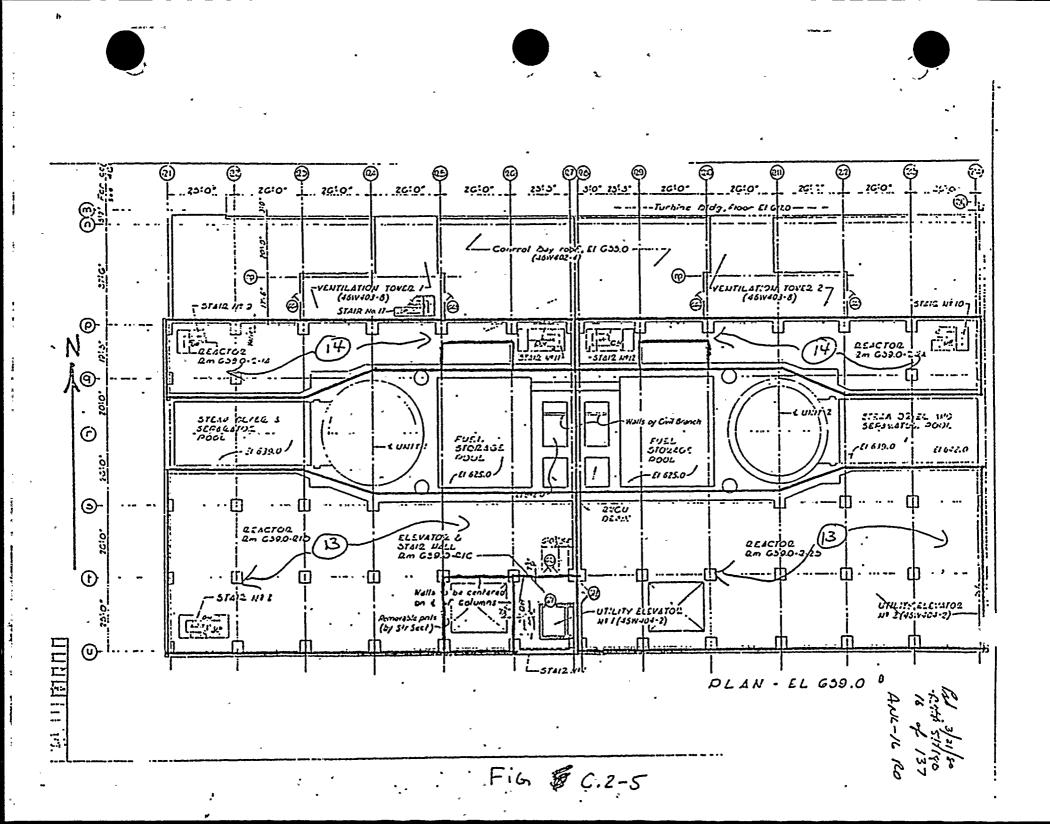




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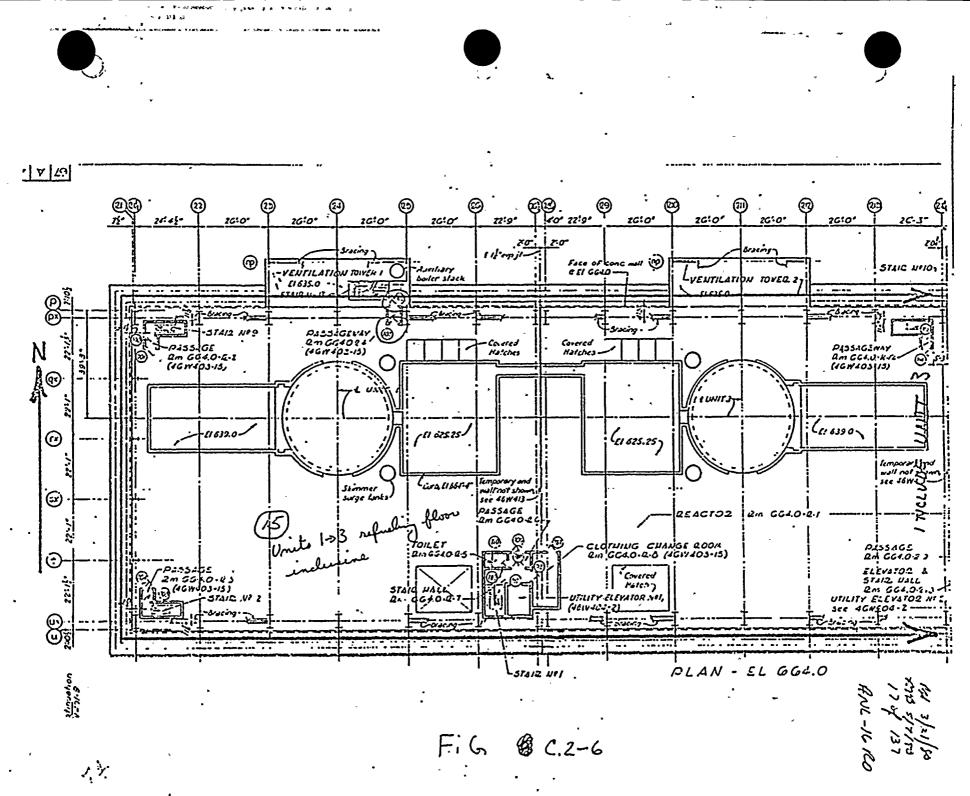
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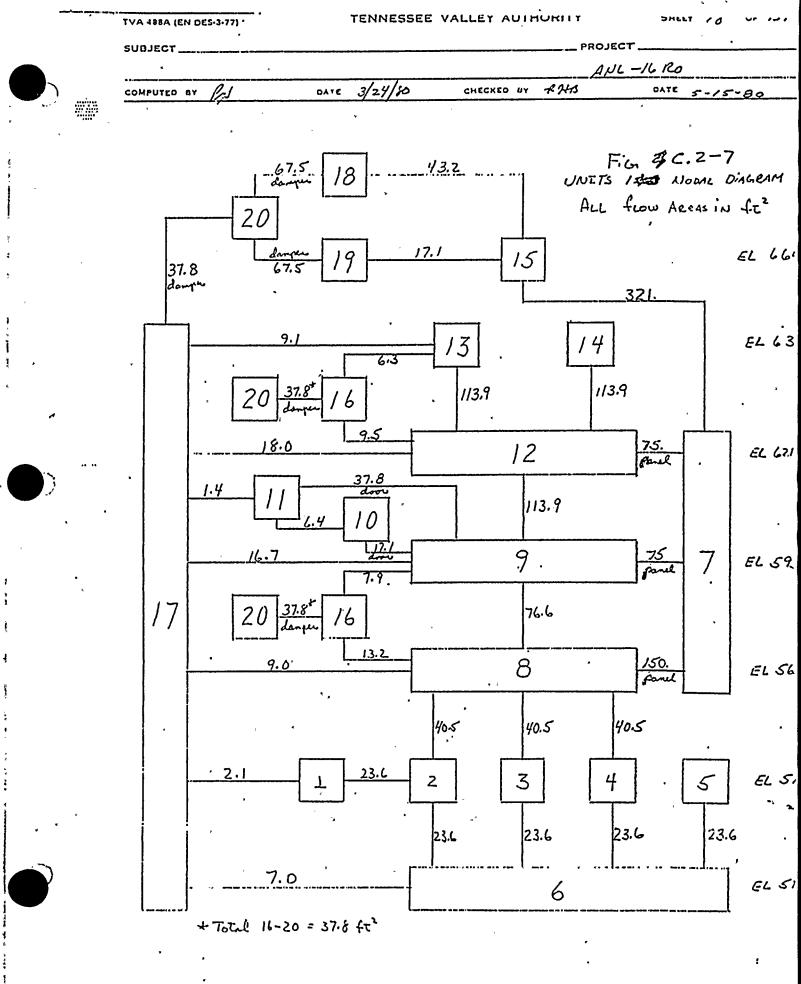
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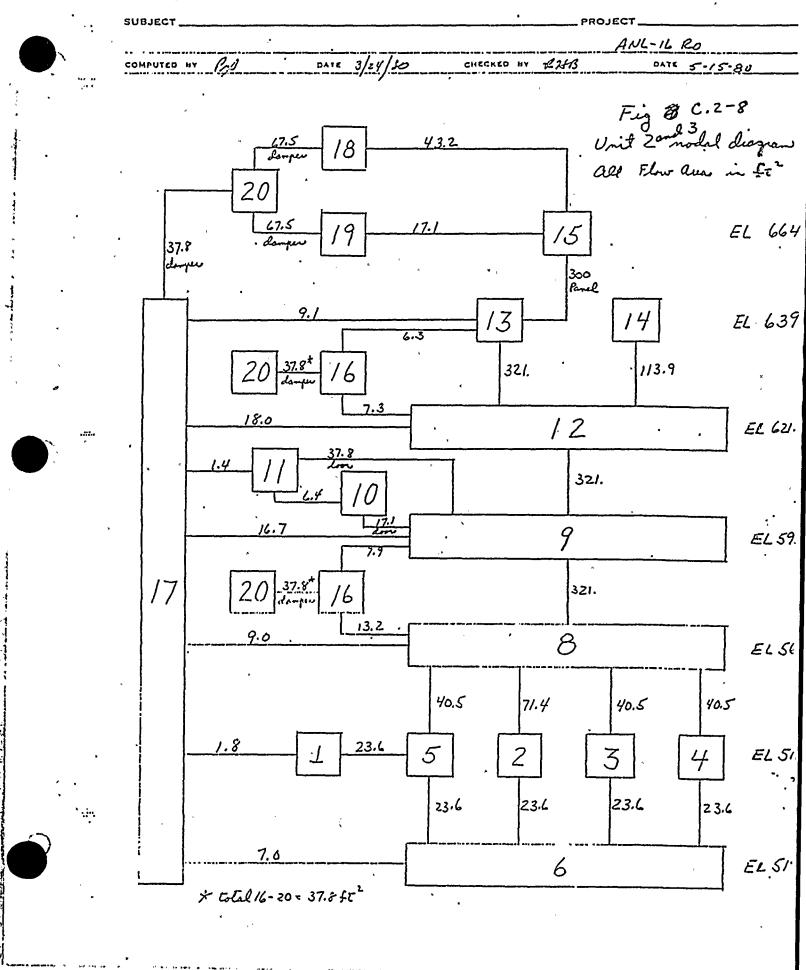
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Table C.2-1

# Breaks Considered

S.E. \*HPCI S.E. RCIC S.E. RWCU

#### Main Steam

\*Single-ended

#### Break Nodes

1, 6 3, 6 10, 11, 8<sub>.</sub>

Steam Valve Vault

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## Table C.2-2

### Time Vs Pressure

<u> </u>	Unit 1		Jnit 2 & 3
Time	Compartment (1)	Time	Compartment (1),(10),&(11)
2 sec 5 " 11 "	1.3 psig 1.1 " .8 "	Same	as for unit 1
30 " 50 "	•1 " 0• "	<b>``</b>	
Time	<u>Compartment (10)</u>	Time	All Remaining Area
.02 sec	2.4 psig	1 sec	.1 psig
•6 " "	.8 "	30 "	•5 <sup>°</sup> "
5 "	1.3 "	45 "	•5 <sup>n</sup>
45 "	1.3 "	50 "	•1 <sup>n</sup>
47 "	•2 "	120 "	Ο, π

1 sec 10 "	2.4 psig 3.4 "	All	Units
45 " 47 " 55 "	3.8 " .4 " .1 "	Time	Steam Valve Vault
120 "	0. "	.1 sec 3 4 "	1.7 psig 7.1 " 4.5 "
Time	All Remaining Areas	5 " 6 "	2.7 " 2.0 "
1 " 30 " 45 "	.1 psig .5 " .6 "	10 " 150 "	1.8 " 1.8 "
50 " 120 "	.2 " 0. "		

Compartment (11)

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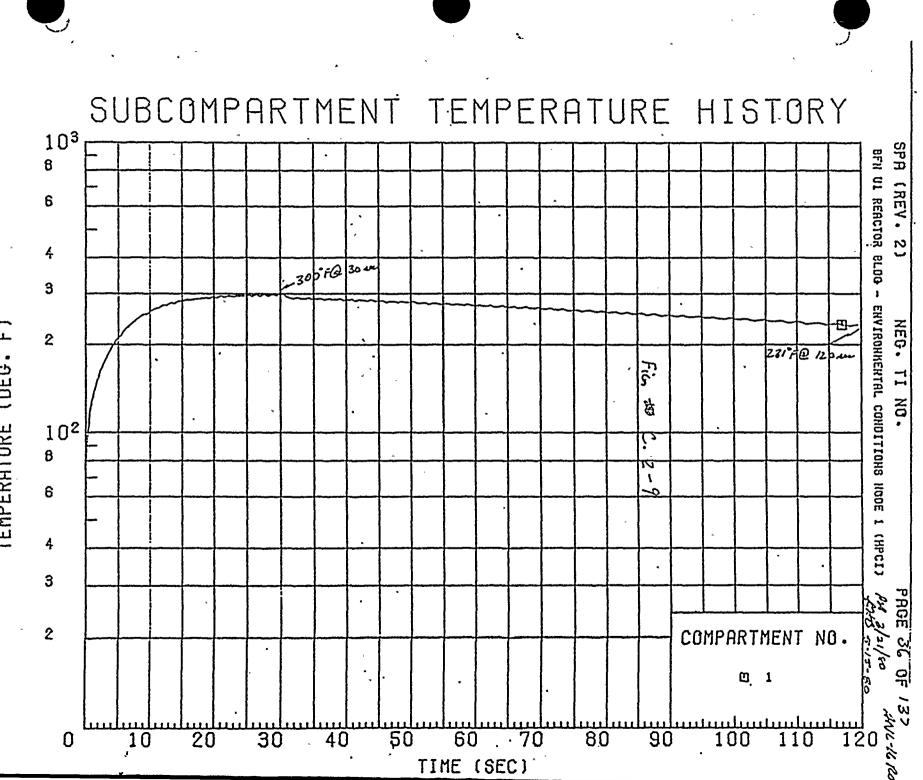
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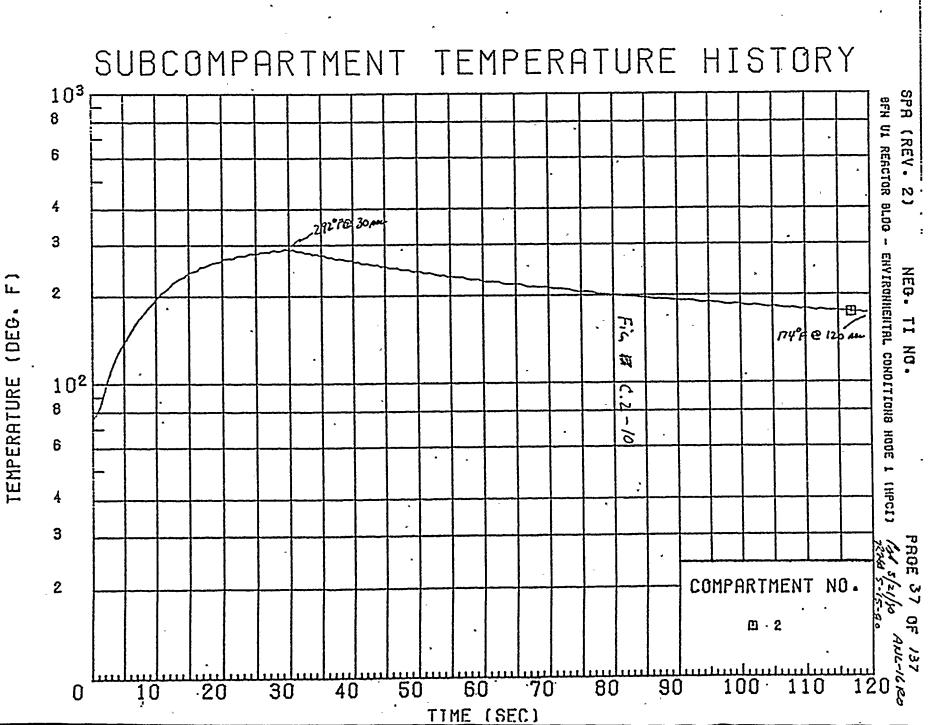
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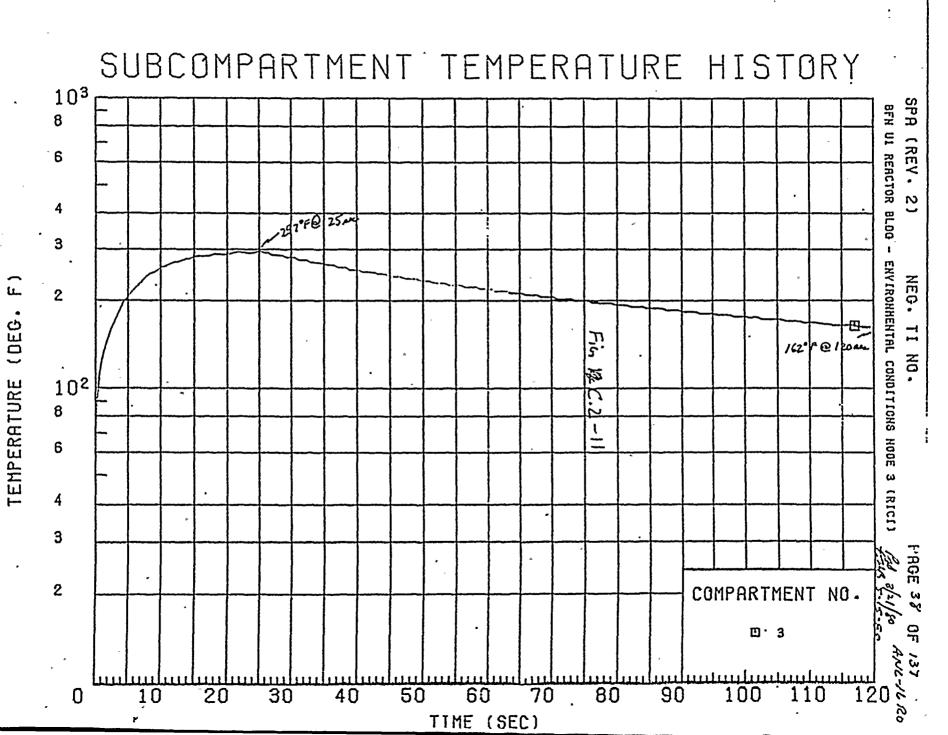
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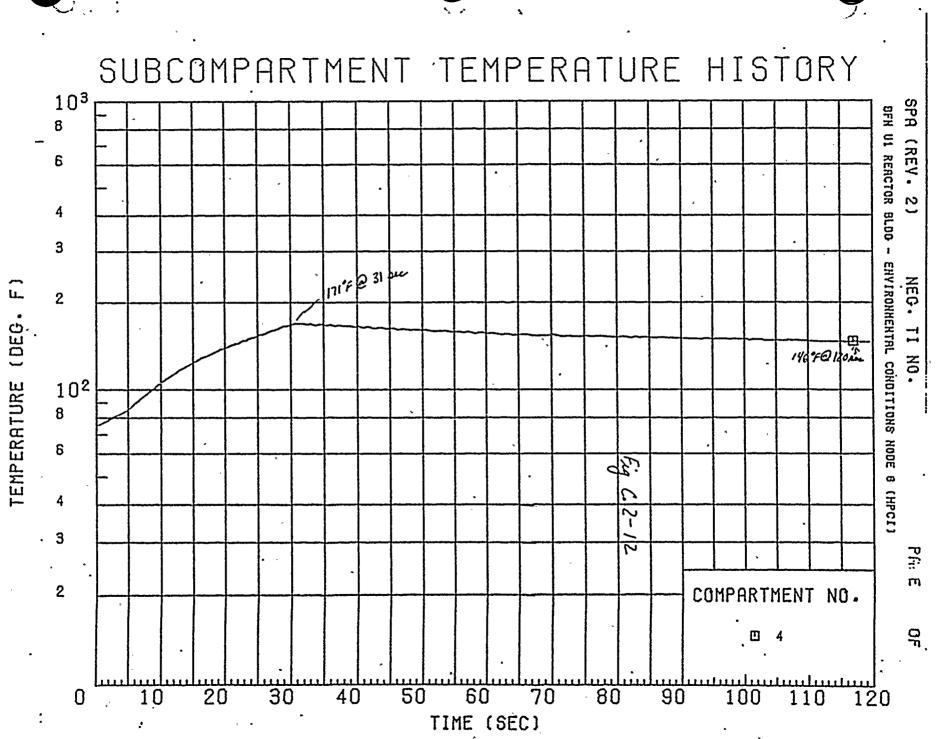
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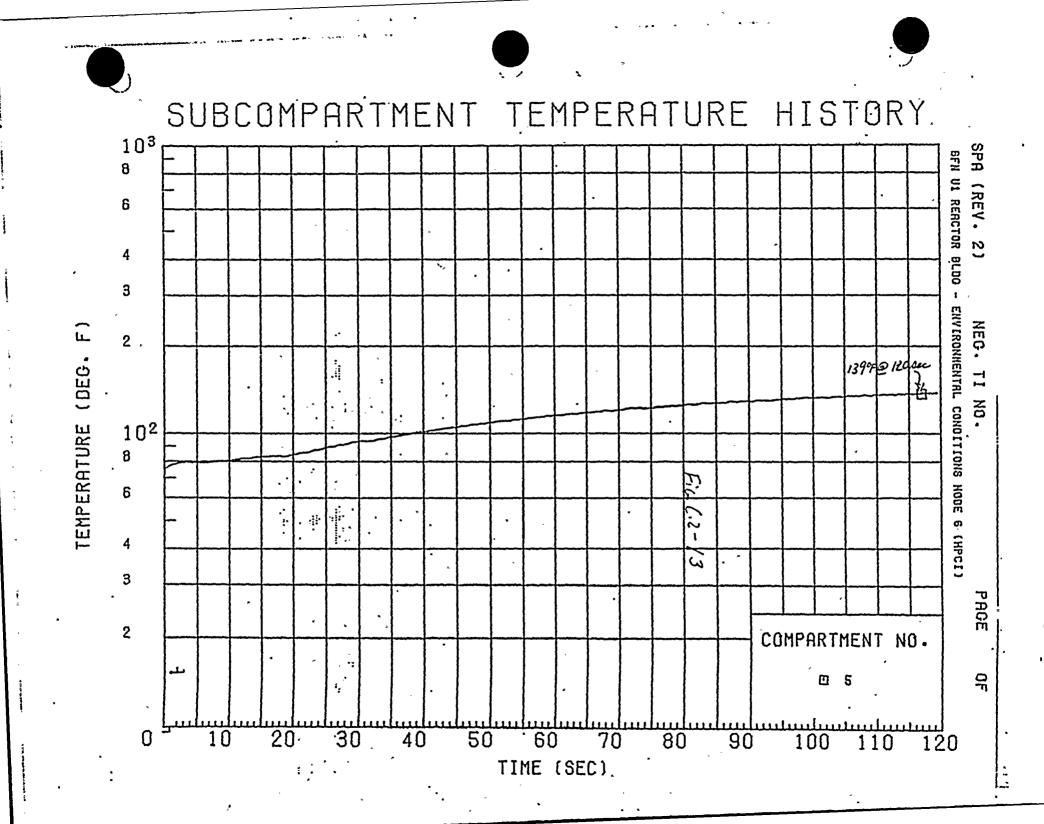
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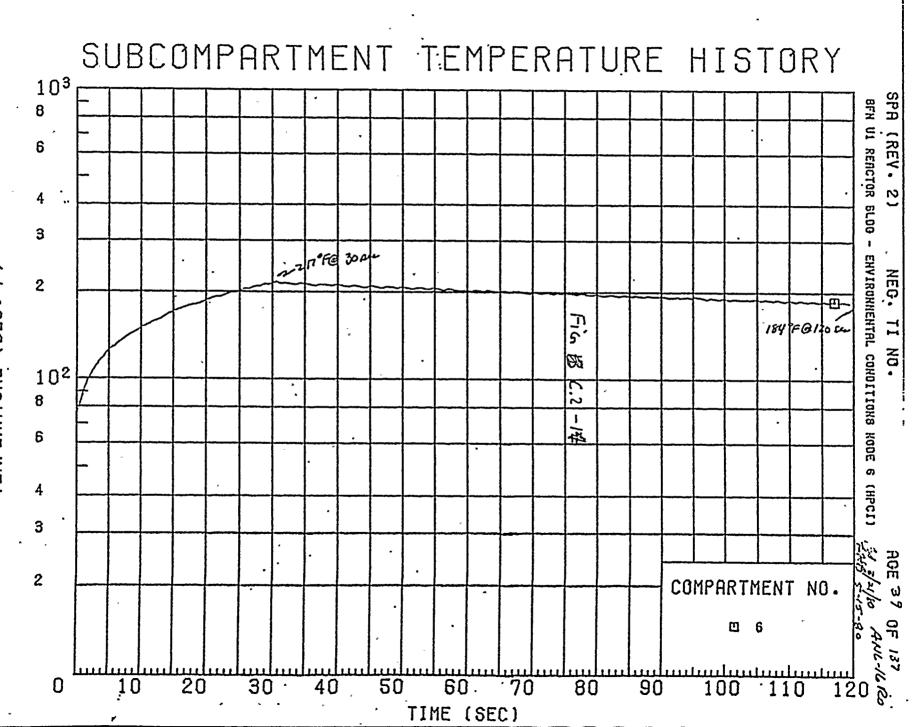


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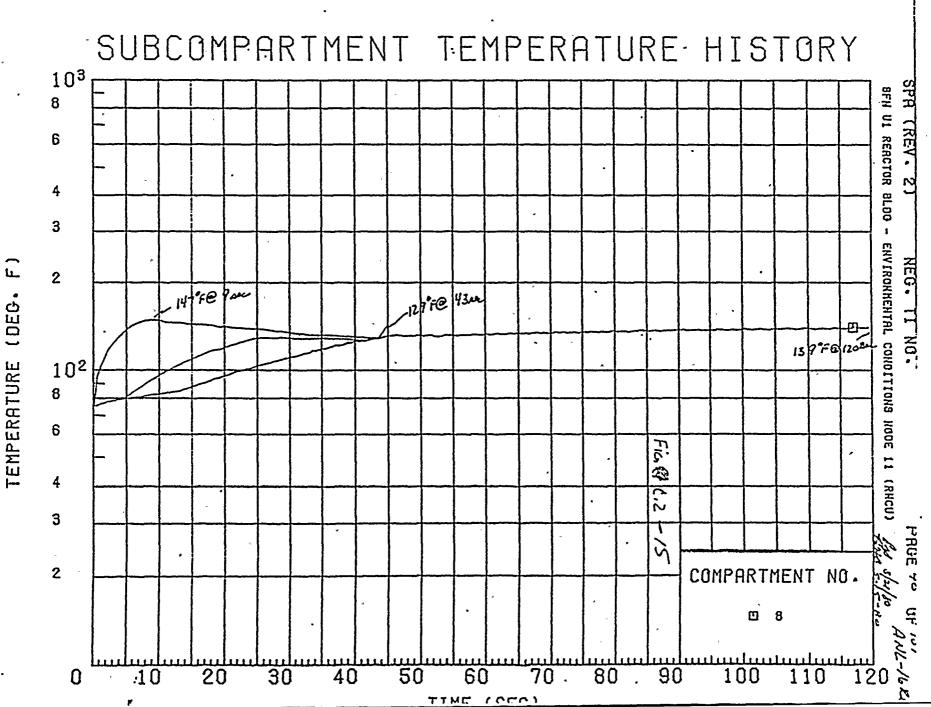
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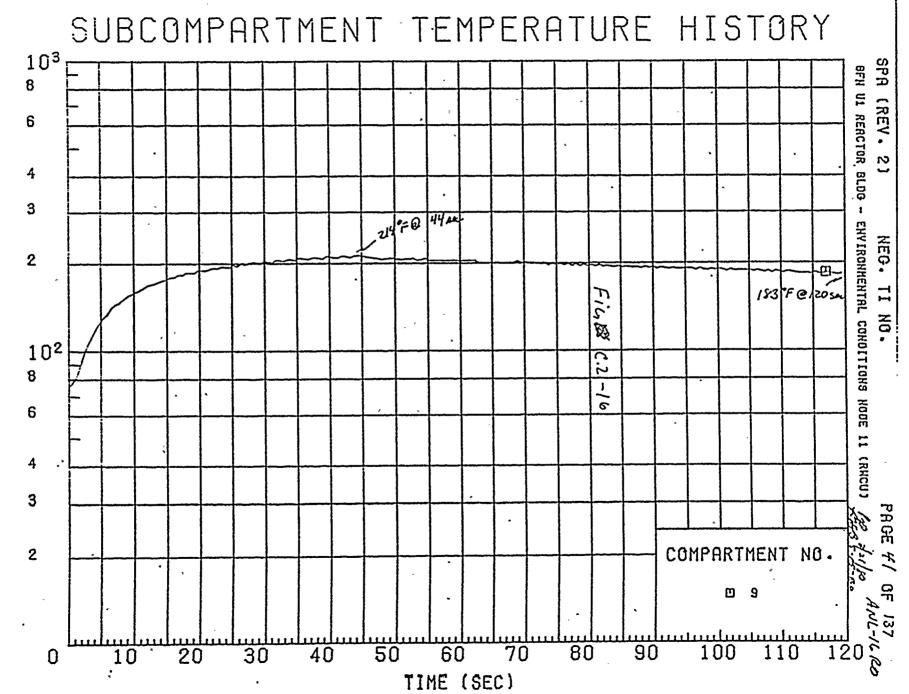


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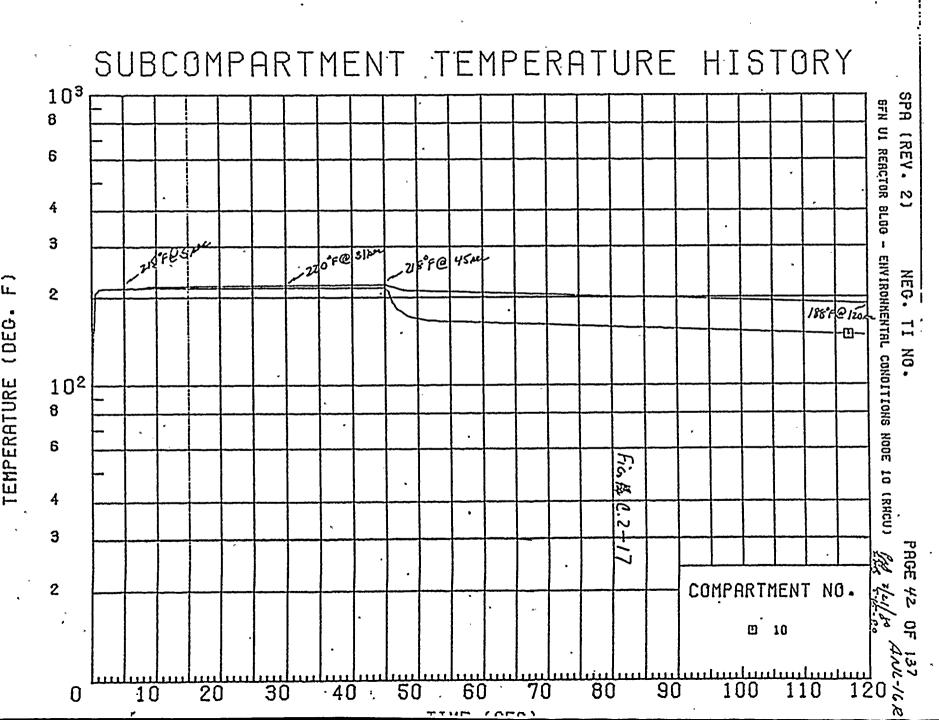
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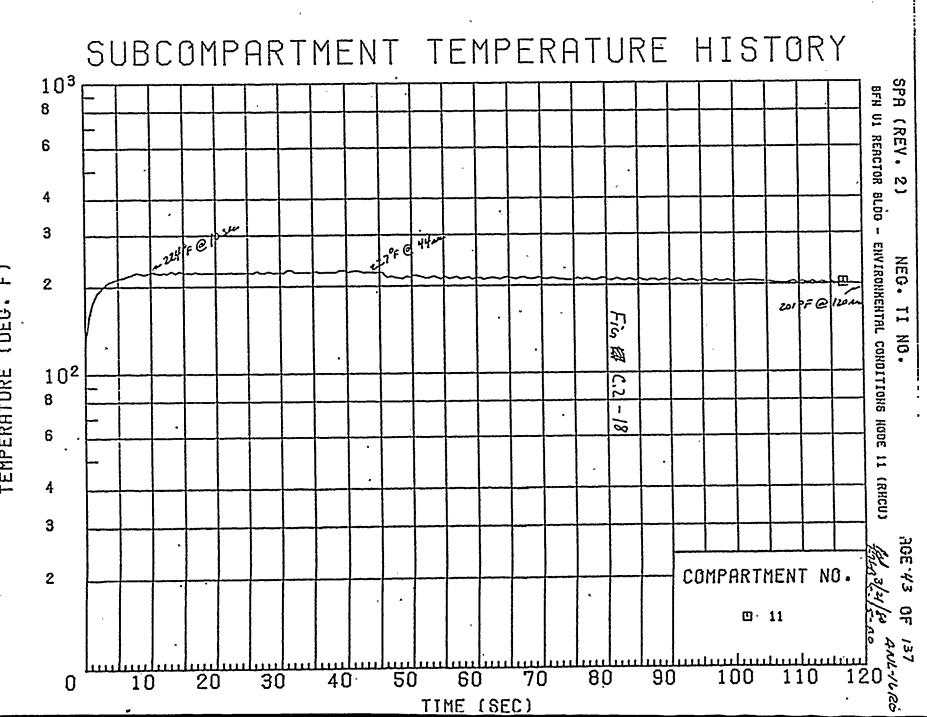
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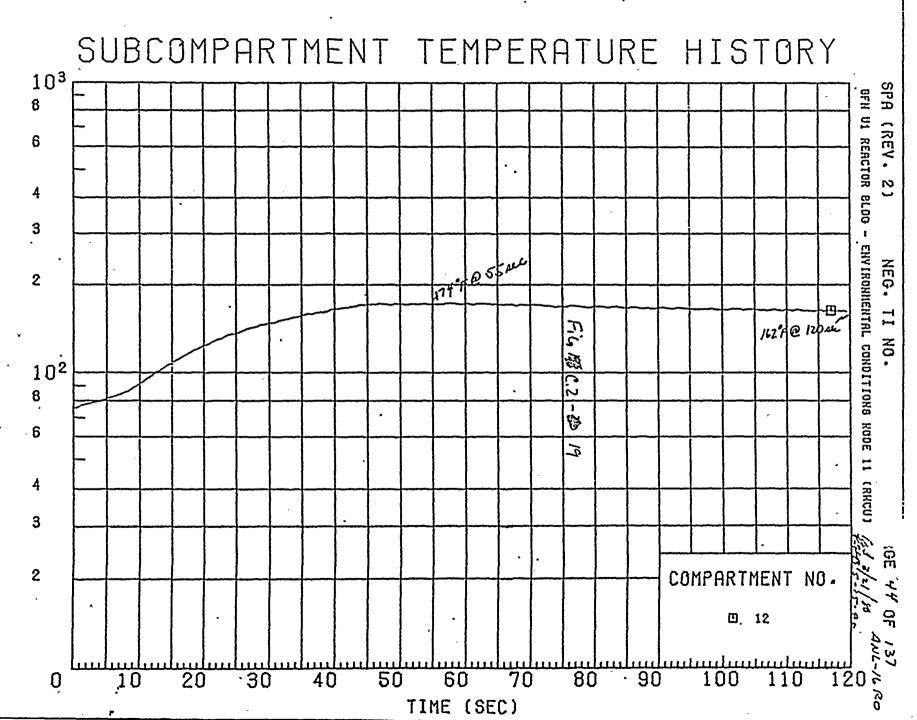


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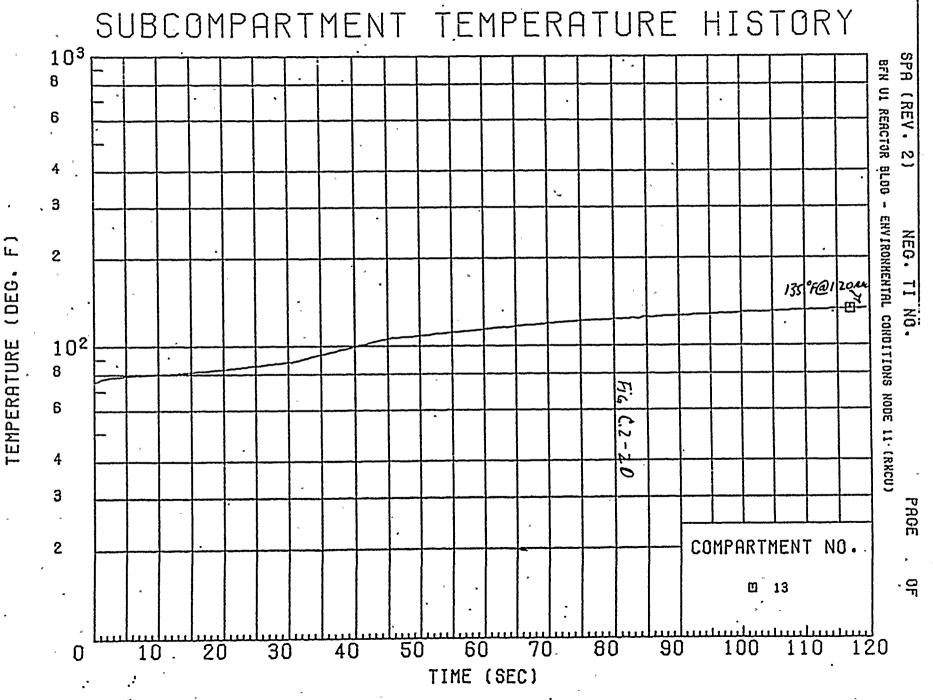
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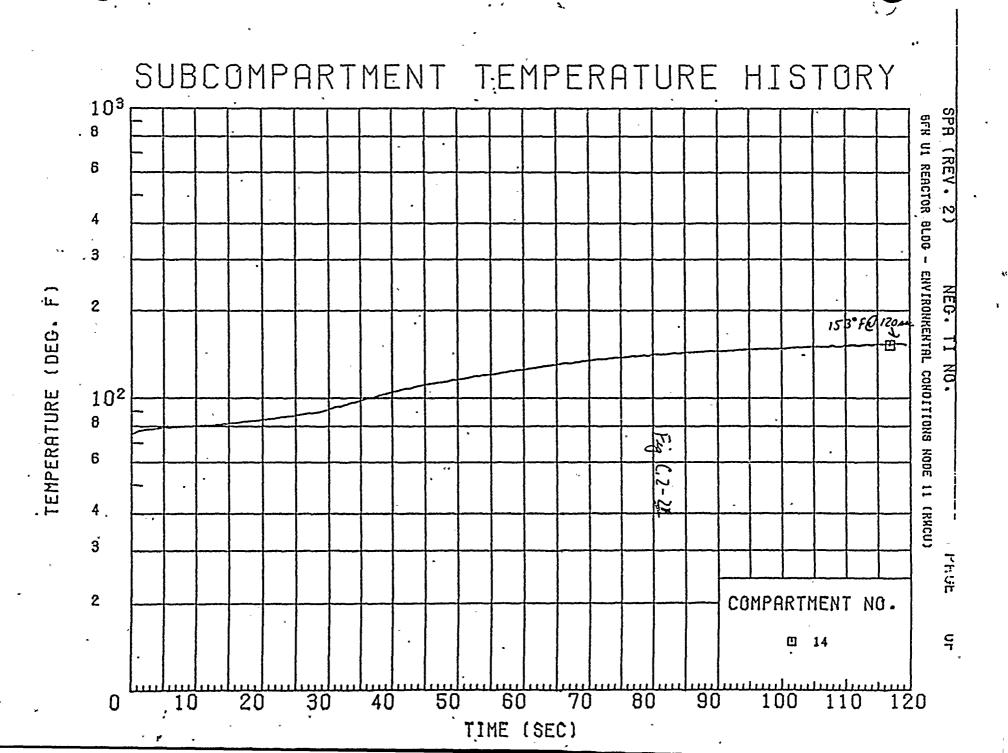
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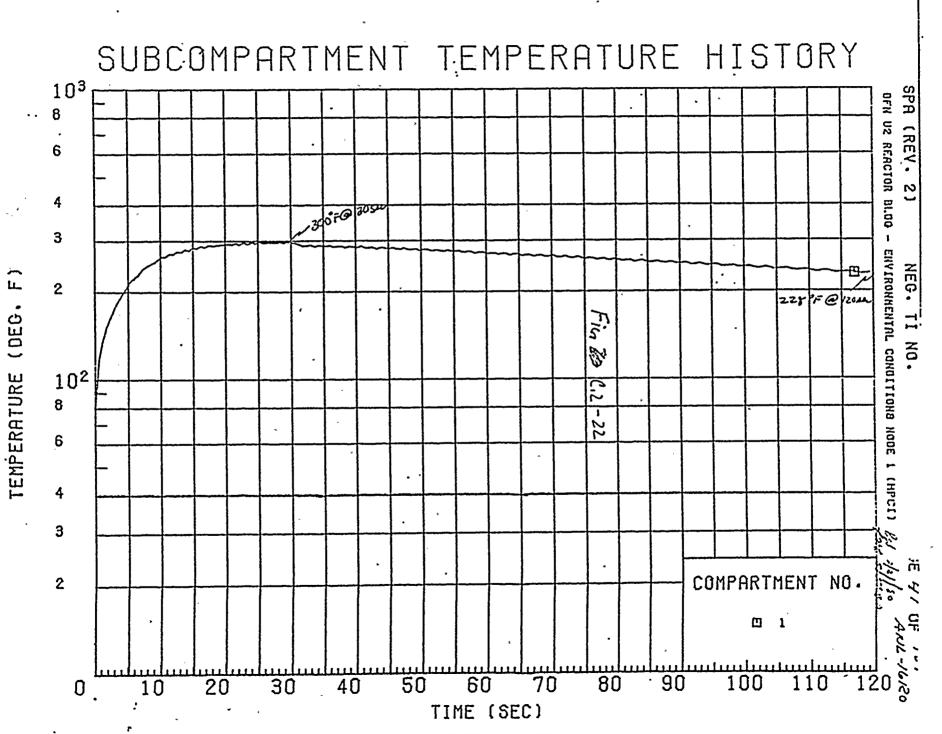
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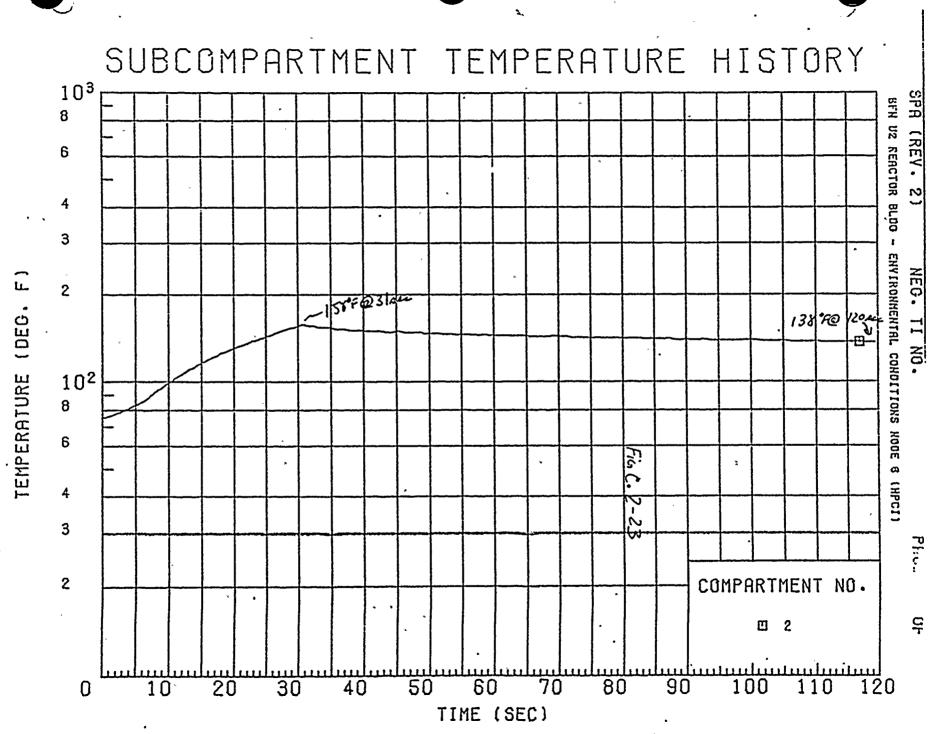
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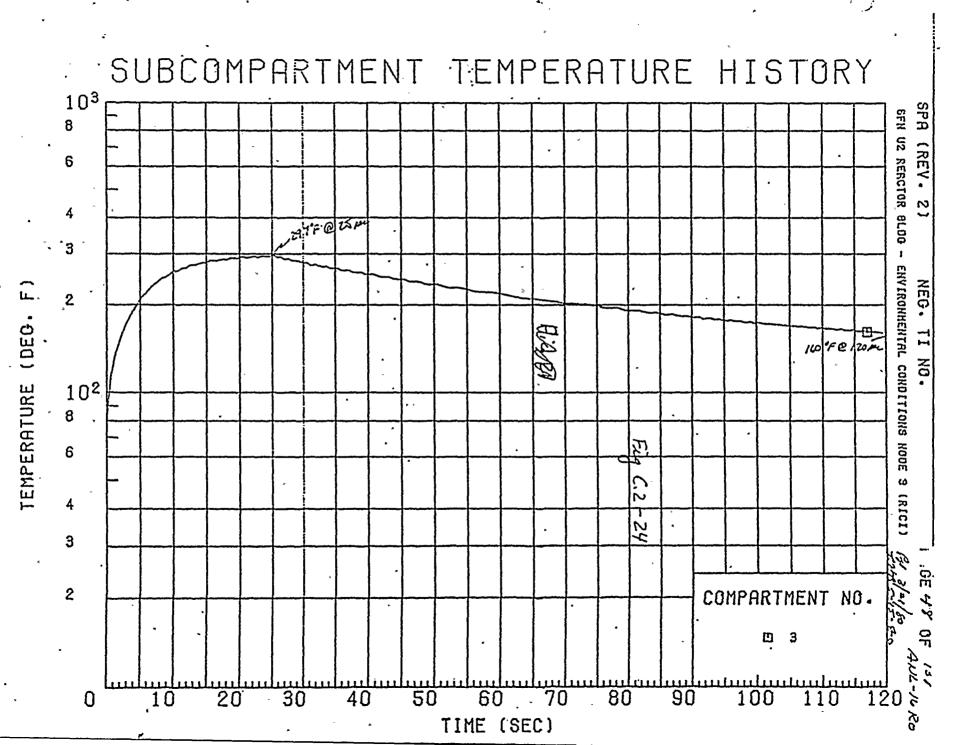
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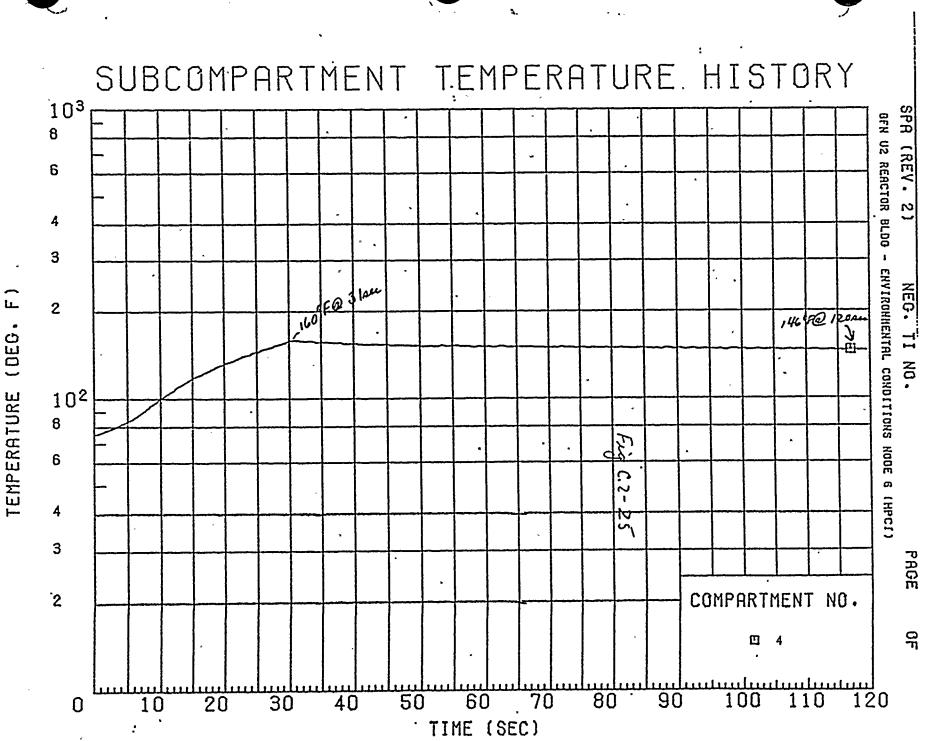
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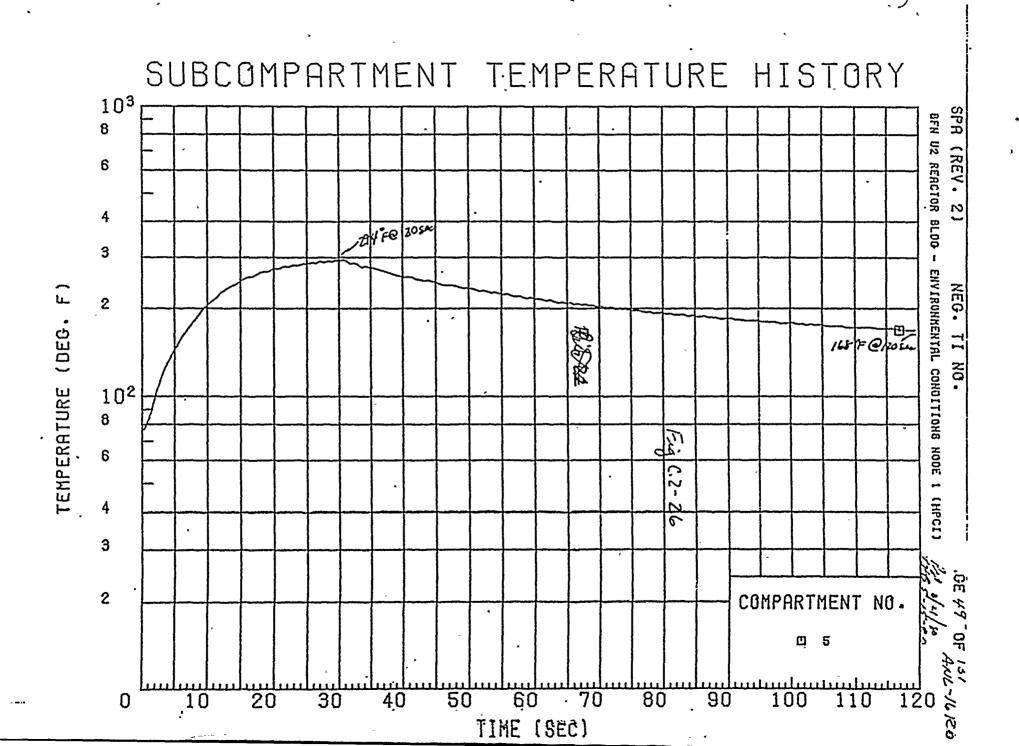
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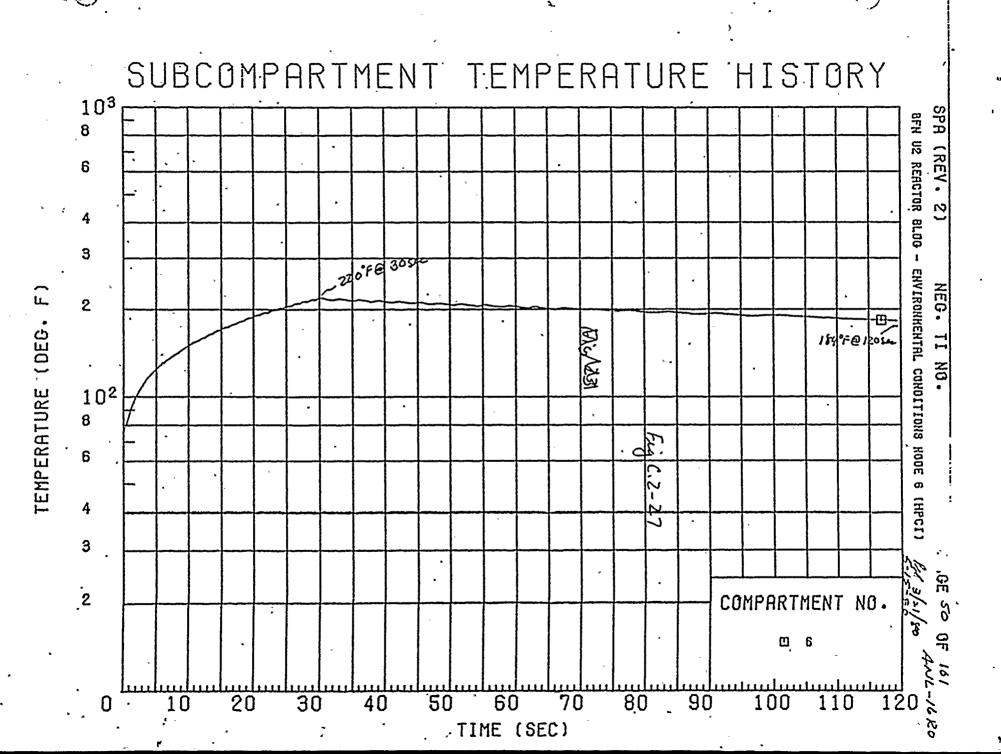
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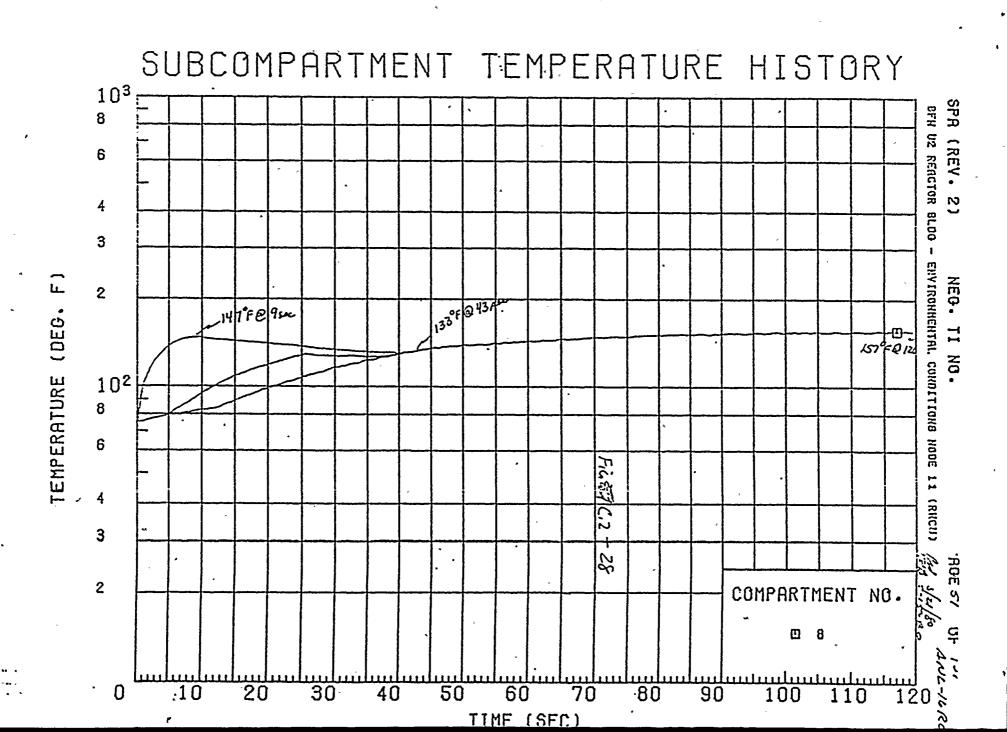
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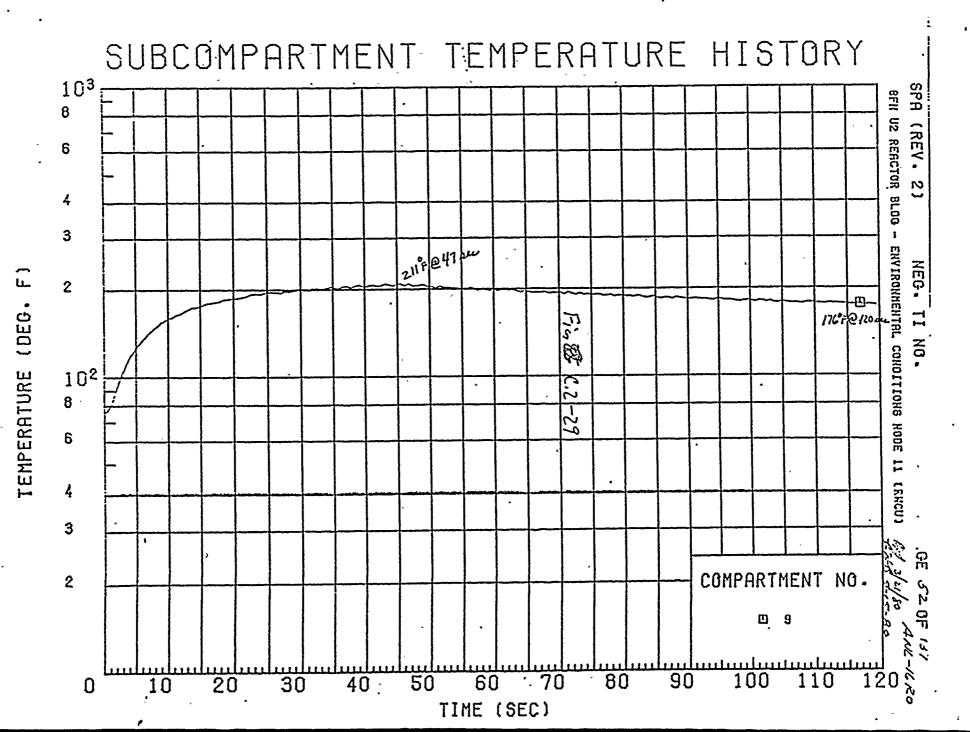
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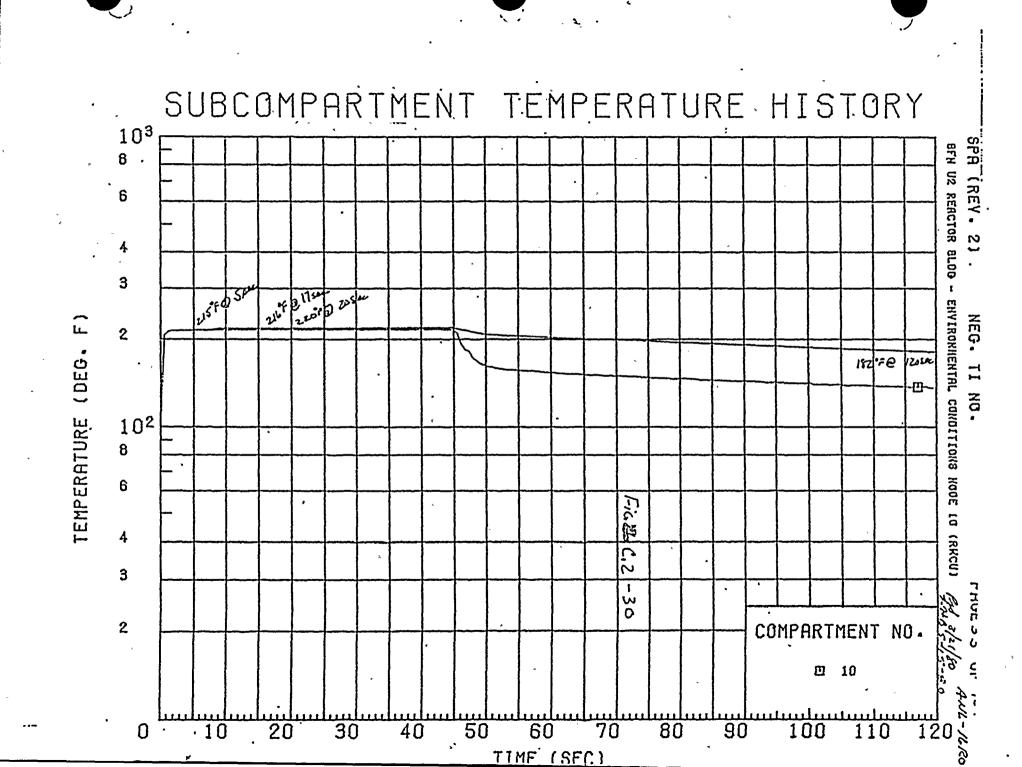
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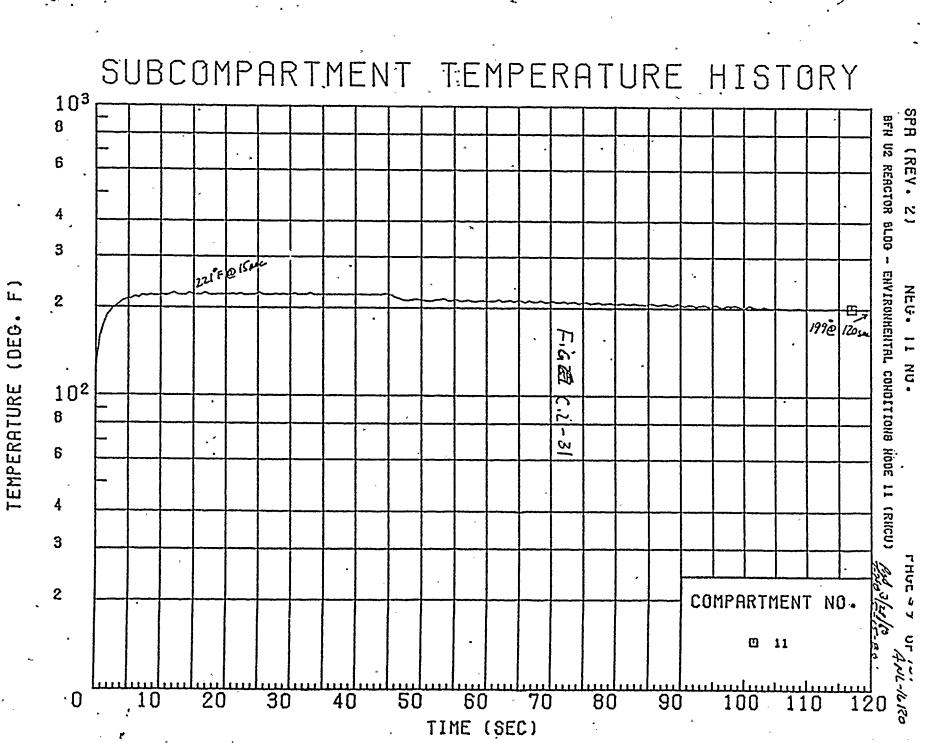
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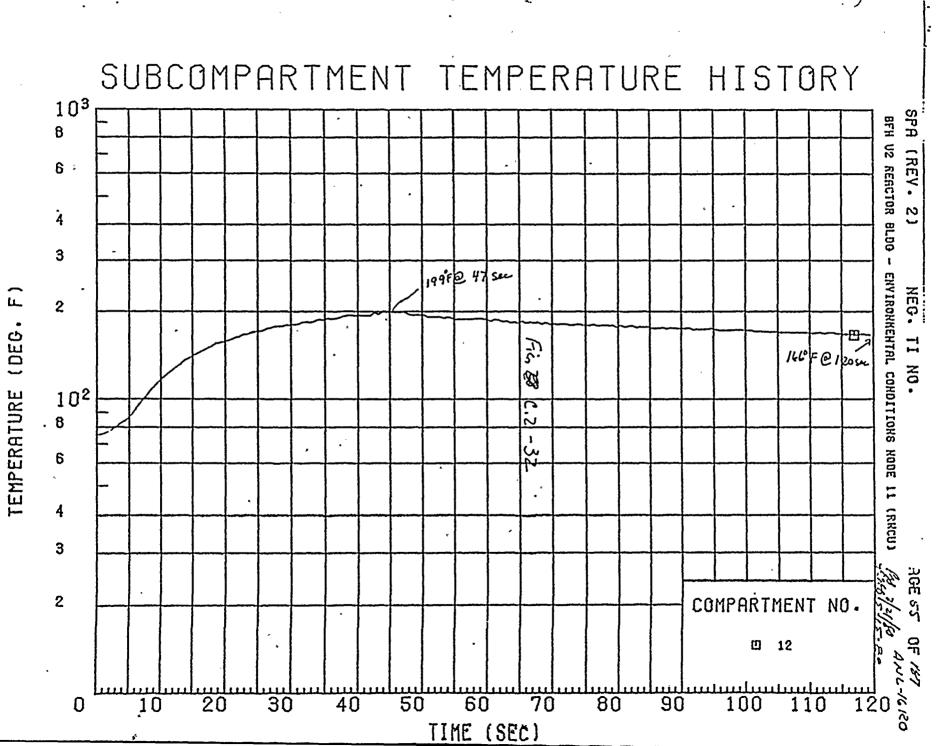
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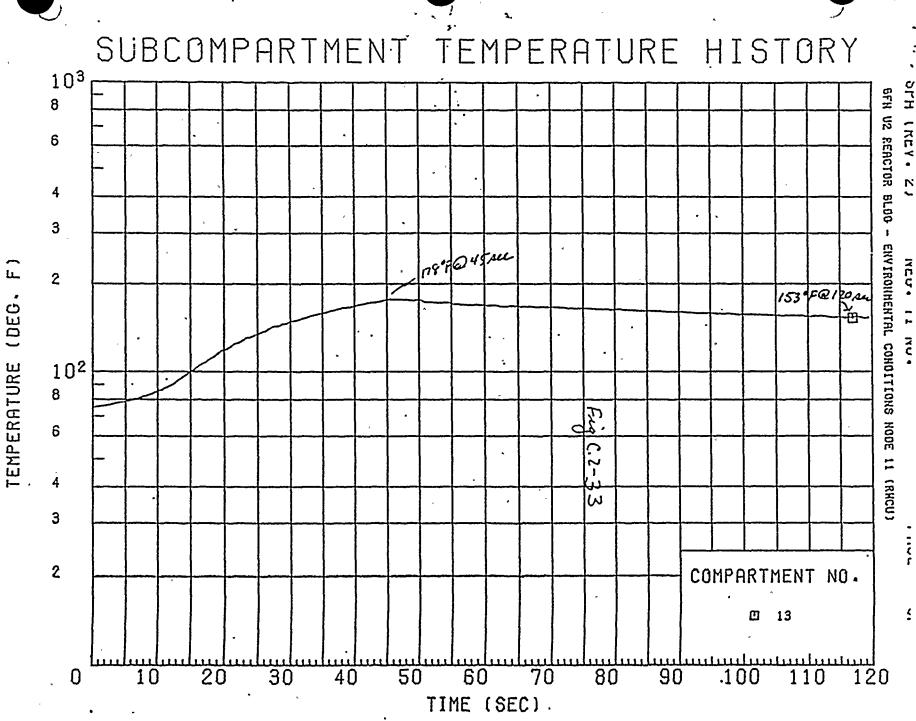
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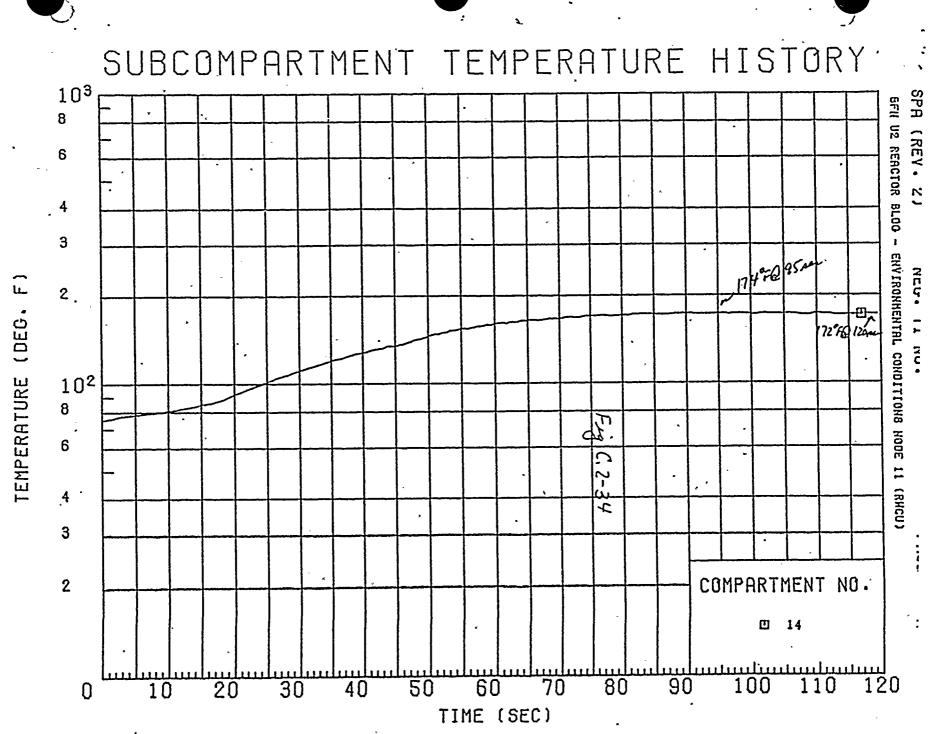
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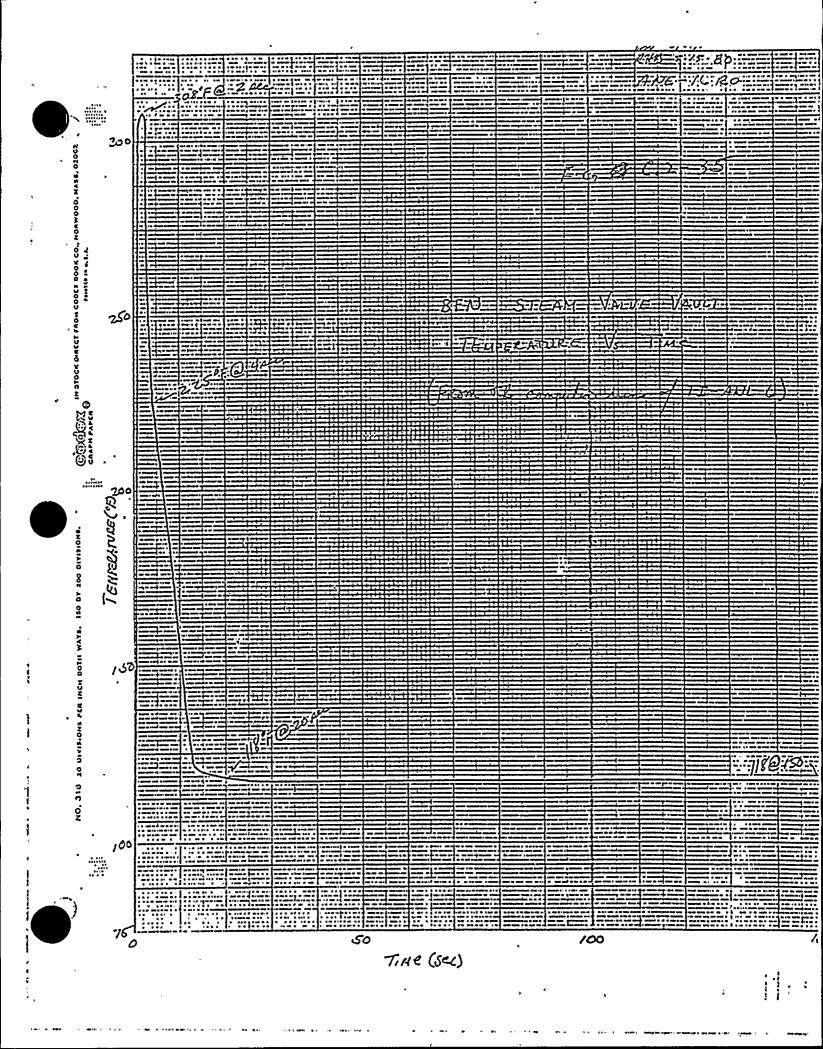
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SECTION 4.0 DESCRIPTION OF PROCEDURES FOR QUALIFICATION EVALUATION •

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#### 4.1 Definition of Generic Positions and Comparison to the DOR Guidelines

The following are the generic positions which were taken on any electrical equipment in the qualification evaluation (EWS's) when no analysis or test results provide qualification information for a particular parameter (e.g. aging). If a reference is made in the Environment Qualification column to this section, it should be assumed that the specific generic position has been taken.

- 4.1.1 <u>Margin</u> In Section 6.0 of the DOR guidelines it is stated that margin only applies to type testing and that the guidelines in Section 4.0 for establishing service conditions include conservatisms which assure margins between the service conditions specified and the actual conditions which could realistically be expected in a design basis event. Based upon the above statements and the fact that all calculations for establishing service conditions meet or exceed the DOR Guidelines given in Section 4.0, no additional margin was considered for qualification by analysis. As stated in DOR Guidelines, Section 6.0, additional margin for the service conditions for type testing needs to be considered only if Section 4.0 and Section 5.2 of the DOR Guidelines are not met; since the guidelines of Section 4.0 are met, margin was considered only if Section 5.2 was not met.
- 4.1.2 Aging At the time of procurement of the equipment, documented evidence of aging effects was not a requirement; however, TVA intends to meet the DOR guidelines in Section 7.0. If the equipment contains material subject to aging degradation (the guidelines require that this determination be made), an analysis was done to determine the maintenance or change out interval. When there was insufficient documentation to determine the thermal or radiation aging effects on a piece of equipment, a program of either further analysis of materials, (when a detailed list of materials is obtained), or type testing was instituted. If neither of these options were available, a replacement or relocation plan was established. In general, the procurement specification required equipment whose intended service, determined either by repairs or replacements, was for the design life of the plant for 40 years; therefore, in our engineering judgement the device will be able to perform its safety function in the interim time period required for completely documenting qualification.
- 4.1.3 <u>Accuracy</u> As stated in Enclosure 3 to IE Bulletin 79-01B, specified and demonstrated accuracies of all instruments for their trip functions and/or post-accident requirement must be provided. When the documentation did not clearly demonstrate the specified accuracy during the environmental extremes resulting from a DBE, a program of either further search for documentation that address accuracy or type testing was instituted. In our engineering judgement, the following two statements provide justification for continued operation during the interim time period required to obtain completely documented qualification: (1) in general, the procurement specifications required and the vendor's demonstrated accuracies are much more stringent than system requirements, (2) surveillance tests are conducted periodly as required by the technical specifications to confirm the validity of the manufacturer's stated accuracy.



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- 4.1.4 <u>Beta Radaition</u> According to Section 4.1 of the DOR Guidelines, beta radiation has low penetrating power in comparison to gamma rays of equivalent energy. Of the general classes of electrical equipment in the plant containment (e.g., cables, instrument transmitters, valve operators, containment penetrations), electrical cable is considered the most vulnerable to damage from beta radiation. For other equipment whose enclosure provides adequate shielding, beta radiation need not be considered. For any equipment that is determined unshielded (e.g., cable) or is shielded by sheet metal of 20 gauge or less, an analysis of the qualification of the equipment related to beta radiation was included as attachments to the EWS's.
- 4.1.5 <u>Gamma Radiation</u> From Table C-1 in Appendix C in the DOR Guidelines and reference 1 and 2 below, there is substantial test data available to demonstrate that most conventional material used in electrical equipment has gamma radiation threshold exceeding 104 rads; the exception is solid-state devices containing N-MOS integrated circuits which have a threshold of 10<sup>3</sup> rads (see Table C-1). Teflon has a threshold for damage of approximately 3.5 x 10<sup>4</sup> rads (for 20 percent decrease in elongation). Electrical properties (e.g., resistivity) of these materials are sufficiently conservative initially, such that substantial changes can be tolerated without causing equipment failures or malfunction.

Threshold is defined from the above referenced table as the radiation exposure required to change at least one physical property of the material. The threshold is <u>not</u> a point of failure or end of useful life, therefore, there is a band of tolerance from the threshold point to the failure point which may vary by an order of magnitude or more.

On the above basis and the existing test data, it is not considered necessary to perform qualification tests or analysis on electrical equipment for radiation of less than  $10^4$  rads except in clearly identified cases where radiation less than  $10^4$  rads would degrade the safety function of the equipment.

#### References:

- R. K. Thatcher, et. al. REIC Report No. 36, October 1, 1964 "The Effects on Nuclear Radiation on Electronic Components Including Semi-Conductors" Radiation Effects Information Center Battelle Memorial Institute Columbus, Ohio
- 2. W. W. Parkinson and L. Sisman Oak Ridge National Laboratory, Oak Ridge, Tennessee

Nuclear Engineering and Design 17 (1971) 247-280 "The Use of Plastics and Elastomess for Nuclear Radiation"

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- 4.1.6 Operating Data Substantial percentages of the systems components installed in plant locations other than inside primary containment, have well established industrial rating at or above the limits required for operation during and/or after the required DBE's. In cases where operating data is used as a justification for interim qualification. This qualification will be suplemented at a later date by either type testing and/or further analysis. If neither of these options are available, a replacement plant was instituted.
- .4.1.7 <u>Type Testing</u> In Section 5.1 of the DOR Guidelines type testing is preferred but not required for equipment subjected to severe temperature, pressure, and steam service condition. However, analysis is acceptable if supported by test data, for the other service conditions. At the time of equipment procurement type testing was not a required method of proving qualification. To the extent that an analysis is not conclusive to verify qualification per the DOR guidelines, a type testing program or a replacement plan was initiated. TVA will provide justification for the interim operation until adequate qualification information is available to meet the DOR Guidelines.
- 4.1.8 <u>Relative Humidity</u> The humidity ranges from 30 to 80 percent for area outside primary containment. The values given in Section 3.0, Table 1, note E of this report are peak values and probability of occurence is extremely low. There are redundant fans servicing areas where there is essential equipment. Most industrial grade electrical equipment can function properly in the reactor zone building ambient humidity.

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#### 4.2 Description of Specific Analysis Techniques and Assumptions

There were primarily four types of analysis techniques used for environmental qualification in this report. These techniques were used either as a supplement to type tests that lacked certain information on qualification, or they were used as the primary method of qualification, and/or justification for continued operation. Analysis techniques 1, 2, and 3 below were used to determine the effects of temperature or radiation on material, and analysis technique 4 was used to analyze the relationship of the component being qualified to the system function. The four analysis techniques used were (1) Arrhenius Equation, (2) Material Analysis, (3) 10° C Rule, and (4) System Analysis. A discussion of each techniques follows:

1. <u>Arrhenius Equation</u>. The use of the Arrhenius Model is a method used to evaluate the thermal behavior of electrical equipment under a variety of thermal environments (temperature and time). The use of this model is specified in IE Bulletin 79-01B, Enclosure 4, Page 12.

The significant aging mechanism for electrical equipment is thermal aging. The equivalent thermal aging was calculated from the total tested thermal exposure, as follows, using the Arrhenius Equation, as given in the reference below.

- The total tested thermal exposure was converted to an equivalent time at normal service termperature. This time was called t<sub>total</sub>.
- (2) The required accident (LOCA or HELB) exposure was converted to an equivalent time at normal service temperature (t<sub>accident</sub>).
- (3) The duration of equivalent thermal aging (t<sub>age</sub>) was defined as follows:

 $t_{aqe} = t_{total} - t_{accident}$ 

Unless specific activation energies are known, a value of 0.5 eV was assumed. This is conservative in that 0.5 is the minimum activation energy found for typical insulation materials.

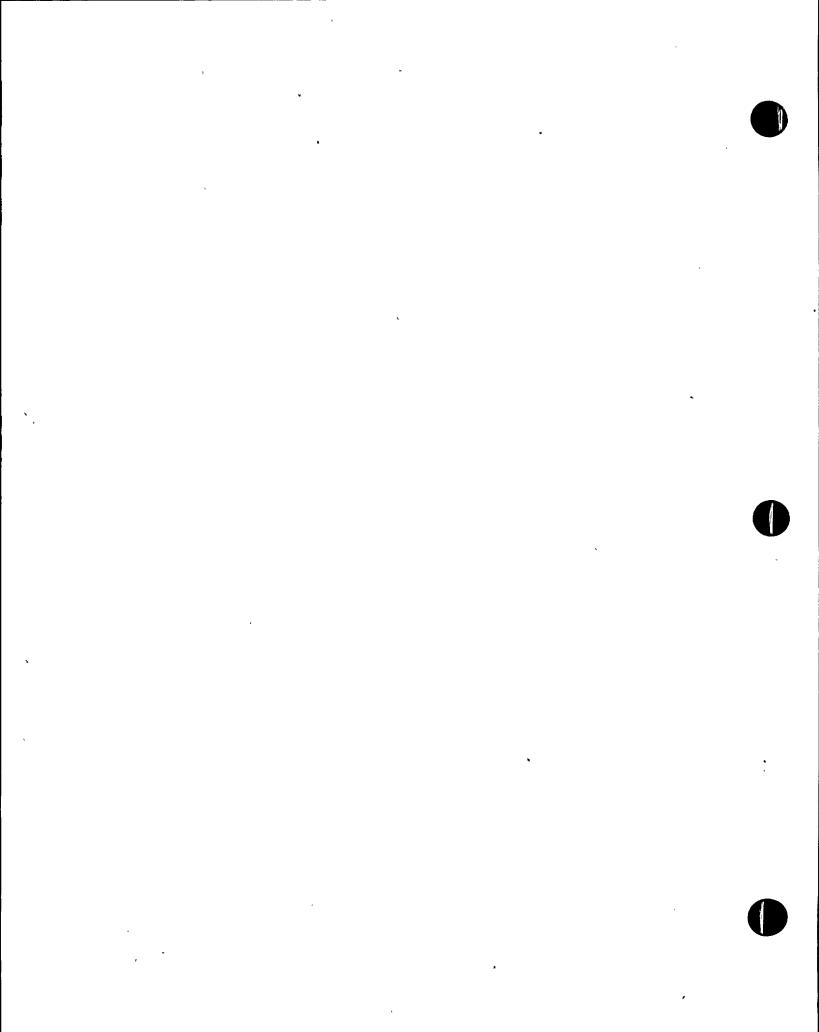
Reference: Z. D. Jastrgebsky, <u>The Nature and Properties of</u> <u>Engineering Materials</u>, II - end Edition, John Willey and Sons, 1976.

 <u>Material Analysis</u>. In this analysis technique, a material list was developed for the component being qualified, and an analysis was done for the thermal and radiation effects on the most sensitive components. This analysis may have included use of the Arrhenius Equation, 10° C Rule, or a reference to list of materials, as per Table C-1, Appendix C, IE Bulletin 79-01B, which gives thermal and radiation effects on individual materials.

3.  $10^{\circ}$  C Rule. The  $10^{\circ}$  C rule is an approximation of Arrhenius's Law as applied to insulation material. The Rule was based upon the assumption that for each  $10^{\circ}$  C rise in temperature above some reference temperature, the useful life is reduced by one-

half. This rule was used in the qualification of several motors.

4. <u>System Analysis</u>. In this method, an analysis was done on the component being qualified as to how this component interfaces with its related system and in the performance of the system function. From this analysis, a determination was made to see if the system function can be performed without the component under qualification, or can be indirectly performed by another device in a system.



### SECTION 5.0

# SUMMARY OF RESULTS

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#### 5.1 <u>Discussion of the EWS, Supporting Information, and Justification for</u> <u>Continued Operation</u>

- 5.1.1 The System Component Evaluation Work Sheets (EWS) form and instructions were given in Enclosure 3 of IE Bulletin 79-01B to be used for the determination of the environmental qualification of safety-related electrical equipment. The EWS form and instructions were given by NRC to be used to present all the parameters to be considered for environmental qualification. In general, the guidelines for the EWS, as given in the Bulletin, were followed with some modification which further refined and expanded the flexibility of the EWS in defining the data needed for environmental qualification. Several changes were made to the sample EWS given in the bulletin due to the following reasons: 1) space limitations prevented placing all the information required for environmental qualification, 2) a numbering system was needed for organization of the EWS's and appendixes in an auditable form, and 3) quality assurance (QA) was needed to assure completeness and accuracy of the EWS. The most significant changes to the EWS were as follows: 1) use of appendixes, 2) use of permanent notes, 3) required signatures, and 4) use of unique numbering system for the EWS and their appendixes. These changes are discussed below with explanation of how they interface with the EWS later in this section.
  - <u>Appendixes</u> All information for environmental qualification that could not be placed on the EWS was placed on the appendixes to that EWS. These appendixes include one or more of the following: An environmental analysis, a discussion of a type test and how it qualifies a component, a temperature-pressure accident profile to which qualified (if appropriate), a discussion of outstanding items, and a justification for continued operation in these cases where appropriate.
  - Permanent Note Due to the similarity of certain specification requirements for all equipment, permanent references have been placed in the documentation reference specification column with notes at the bottom of the EWS giving appropriate sections of this report.
  - 3. <u>Required Signatures</u> To ensure completeness and accuracy of the EWS signatures of a preparer, reviewer, and quality assurance engineer are required on each of the EWS. Any appendixes for which the preparer or reviewer of the EWS was not directly reponsible will also contain preparer and reviewer signatures.
  - 4. <u>Unique Numbering System of EWS and Appendix</u> Due to the volume of the EWS's and their appendixes, a unique numbering system has been developed to be placed in the upper left-hand corner next to the sheet number. This numbering is discussed in more detail in section 5.1.2.

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#### 5.1.2 Discussion of the Use of the EWS

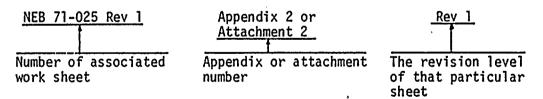
To elaborate on the uses of the appendixes attached to the EWS, one of the most important uses, as stated previously, was the justification of continued operation. For those EWS in which there are outstanding items that could directly affect the operation of the plant, an NCR was written and its number placed on the EWS in the outstanding item column and on the referenced appendix. The appendixes provide justification for continued operation, which may be by a system analysis of the equipment functions, an environmental qualification analysis for interim qualification, or a comparison to similar components previously qualified. The parameters placed in the various columns of the EWS are those that are the most recently calculated values documented by design calculation and are not necessarily in the last amendment FSAR. The evaluations done on the EWS and its appendixes are made per Enclosure 4 (DOR Guidelines) of the IE Bulletin 79-01B for performing item 4 of the Bulletin.

The detailed changes to the EWS are as follows:

- 1. Revision 2 in the title to the EWS refers to the EWS printed sheet, whereas the revision number in the upper right-hand corner refers to the revision of the environmental data placed on the printed EWS sheet.
- 2. <u>Sheet No</u>. The EWS and its associated appendixes has been given a unique numbering system as follows:

EWS	NEB 71-	025 <u>Rev 01</u>	`
Branch responsible for contract	System number	Sequential number assigned by each branch	The revision level of that particular sheet

Appendixes and/or Attachments



3. <u>Category</u> has been placed in the Equipment Description column'as per NUREG-0588, Appendix E, definitions, to clarify the components function. <u>Location</u> given in this column will be by room number which is in section 3.0 of this report as given by note'3 on the EWS. The temperature-pressure values or references given in the Environment Specification column are directly related to the room number.

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- 4. In the <u>Environment Specification</u> column the following changes were made:
  - a. <u>Temperature-Pressure</u>. A maximum value was given here or a reference to the figure or table in the report which defined temperature-pressure conditions.
  - b. <u>Chemical Spray</u> Chemical spray is not applicable (N/A) for this report (This is a permanent note) because no chemical injection is used.
  - c. <u>Aging</u>. Aging was not a required qualification parameter in the FSAR and therefore is N/A (This is a permanent note); however, TVA addresses the DOR Guideline requirement for aging as described in the introduction to Appendix C of this report.
  - d. <u>Submergence</u>. Submergence was not a required parameter in the FSAR; therefore, N/A was entered. (This is permanent note.) For the few devices where submergence was a consideration, the EWS addresses it.
- In the <u>Environment Qualification</u> column the guidelines below were followed:
  - a. <u>Temperature-Pressure</u>. A maximum value was given in this column or a reference was made to an appendix attached to the EWS.
  - b. <u>Chemical Spray</u>. Chemical Spray is N/A for this report since no chemical injection is used. (This is a permanent note.)
- 6. In the <u>Documentation Reference Specification</u> column permanent numbers have been placed refering to permanent notes at the bottom of the EWS which in turn refer to various sections of the report.

These are the only notes that were used on the EWS. All other references will be to appendixes or attachments to the EWS as mentioned above.

In general, in any of the columns on the EWS, parameters for environmental qualification or references to NCR's, appendixes or attachments were given to provide additional information.

Facility: Browns Ferry Nuclear Plant Unit: Docket:

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

	(3)
Sheet	
Revisi	ion 🗌
Date	

						Duce	
EQUIPMENT DESCRIPTION		ENVIRONMENT		DOCUMENT	TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	HE INDU	I I EPIS
System: Plant ID No.	Operating Time			.(1)			
Component							
Manufacturer:	Temperature (°F)			(4)			
Model Number:	Pressure (PSIA)		-	(4)		- -	• .
Function:	Relative Humidity (%)	1		(4)		5	
Accuracy: Req'd: Demon: Category:	Chemical Spray	N/A	N/A	(4)			
Service:							·
	Radiation (RAD)		-	(4)			
Location:	Aging	N/A		(2)			
Flood Level Elev: 552' Above Flood Level: Yes No	Submergence	N/A	N/A	(4)			• )

Notes: (1) See Section 2.4 in 79-01B report.

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(2) See Section 4.1.2 in 79-01B report.

(3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by:

Reviewed by:

QA Acceptance:

#### 5.2 Summary of Equipment Qualification Status

The summary of equipment qualification status in Table 5.2 lists each component from the "Master List" and its accompanying status. Column 1 is the TVA plant identification number. In most cases, this number identifies the component generically and the system number and control loop in which the device operates. Column 2 is the generic name which is descriptive of a general type of component. Column 3 is the category into which the present status of qualification falls. The following are the categories: 1) Category I - Components fall into this category if they are qualified by the "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors," 2) Category II -Components fall into this category if they lack documentation to prove qualification to the DOR Guideline, 3) Category III - This is the status of all items which will be requalified by either analysis or type testing or a combination of both of these methods, and 4) Category IV - This is the status representing those items which will be replaced rather than requalified.

Column 4 is the Nonconformance (NCR) Report number for those components which were found to not have adequate qualification documentation or documentation which does not fully demonstrate qualification to the "Guideline for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors." TVA's Division of Engineering Design Engineering Procedure 1.26 was used in the generation of these NCR's.

Column 5 is the Licensee Event Report (LER) number for the LER's which have been generated when a determination was made that reasonable assurance does not exist to ensure that the Class 1E electrical equipment component(s) can perform their safety-related function.

The Table 5.2 lists the components and their status information on a system basis with the exception of generic items. Generic items such as cable, control stations, junction boxes, and terminal blocks are listed with their status at the end of this table.

This table includes items which were identified too late in the evaluation process to be fully incorporated. These are presently being investigated and will be reported on as soon as possible.

5.2-1

Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

#### Table 5.2

#### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

#### GENERAL EQUIPMENT

TVA Plant Identification Number

Generic Name . Status

NCR No. LER No.

GE-7-104

Valve Assembly

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Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

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#### TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Auxiliary Power (APS)

	GENERAL EQUIPME	NT	······
TVA Plant dentification Number	Generic Name	<u>Status</u>	NCR NO. LER NO.
SIA (4160-480V)	Transformer	11	BFNEEB8051
SIE (4160-480V)	Transformer	II	BFNEEB8018
S1B (4160-480V)	Transformer	II	BFNEEB8051
BOV Reactor MOV BD 1C	480V MCC	III	BFNEEB8023
BOV Reactor MOV BD 1D	480V MCC	III	BFNEEB8022
otor-Generator Set 1D	NM-GSet	II	BFNEEB8050
otor-Generator Set 1D/	A M-G Set	II	
otor-Generator Set 1E	I M-G Set	II	•
tor-Generator Set 1E/	A M-G Set	11	۵. ۲
-G Set 1DN Voltage egulator Box	Voltage Regulator Box	*	
G Set 1DA Voltage gulator Box	Voltage Regulator Box	*,	•
G Set IEN Voltage gulator Box	Voltage Regulator Box	: *	
G Set 1EA Voltage gulator Box	Voltage Regulator Box	*	1
S2A (4160-480V)	Transformer	II	BFNEEB8051
2E (4160-480V)	Transformer	II	BFNEEB8018
2B (4160-480V)	Transformer	II	BFNEE88051
NOV Reactor MOV BD 2C	480V MCC	III	BFNEEB8023
	tor Box has been relocate		

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#### SYSTEM: Auxiliary Power (APS)

	GENERAL EQUIPME	NT		•
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
480V Reactor MOV BD 2D 480V	MCC .	111 ·	BFNEEB8022	
480V Reactor MOV BD 2E. 480V	MCC	II	BFNEEB8021	
Motor Generator Set 2DN M-G S	et ·	- II	BFNEEB8050	•
Motor-Generator Set 2DA M-G S	et.	ĬI	н	*
Motor-Generator Set 2EN M-G S	et	- II	11	
Motor-Generator Set 2EA M-G S	et	II	u	
M-G Set 2DN Voltage Volta Regulator Box	ge Regulator Box	*		
M-G Set 2DA Voltage Voltag Regulator Box	ge Regulator Box	*		
M-G Set 2EN Voltage Voltag Regulator Box	ge Regulator Box	*		
M-G Set 2EA Voltage Voltag Regulator Box	ge Regulator Box	`*	K	
480V Reactor MOV BD 3C 480V I	MCC	ĪII	BFNEEB8019	-
480V Reactor MOV BD 3D 480V I	чсс .	II	BFNEEB8020	
Motor-Generator Set 3DN M-G Set	et	, II	BFNEEB8050	•
Motor-Generator Set 3DA M-G Se	et	II		•
Motor-Generator Set 3EN M-G Set	et	, II		u
Motor-Generator Set 3EA M-G Se	et	II	н	
M-G Set 3DN Voltage Voltag Regulator Box	ge Regulator Box	*		
M-G Set 3DA Voltage Volta Regulator Box	ge Regulator Box	*	e.	• , •
M-G Set 3EN Voltage Voltag Regulator Box	ge Regulator Box	* .		,
M-G Set 3EA Voltage Voltag Regulator Box	ge Regulator.Box	*		*

\*M-G Set Voltage Regulator Box has been relocated to a nonharsh environment. 3

## SYSTEM: Auxiliary Power (APS)

#### GENERAL EQUIPMENT

TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
480V Reactor MOV BD 1E	480V MCC	II	BFNEEB8021	-
480V Reactor MOV BD 3E	480V MCC .	II .	BFNEEB8020	
TS3A (4160V-480V)	Transformer	II	BFNEEB8052	
TS3B (4160V-480V)	Transformer	11	BFNEEB8052.	•
TS3E (4160V-480V)	Transformer	11.	BFNEEB8017	ч

Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

TABLE 5.2

# SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Main Steam Supply (1)

	GENERAL EQUIPMENT	r		
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.
FSV-1-15A	Flow Solenoid Valve	III	BFNNEB8018	•
FSV-1-15B	Flow Solenoid Valve	III	n	
FSV-1-15C	Flow Solenoid Valve	III		
FSV-1-27A	Flow Solenoid Valve	III		
FSV-1-27B.	Flow Solenoid Valve	III	н	•
FSV-1-27C	Flow Solenoid Valve	III	u	
FSV-1-38A	Flow Solenoid Valve	. 111	n	•
FSV-1-38B	Flow Solenoid Valve	III	, U	
FSV-1-38C	Flow Solenoid Valve	III		
FSV-1-52A	Flow Solenoid Valve	III	II	
FSV-1-52B	Flow Solenoid Valve	i III	u	
FSV-1-52C	Flow Solenoid Valve	III '	11	
FCV-1-56	Flow Control Valve	III '	BFNNEB8034	
TS-1-17A	Temperature Switch	III	BFNNEB8009	
TS-1-17B	Temperature Switch		11	
TS-1-17C	Temperature Switch	III	. B	
TS-1-17D	, Temperature Switch	III	n	
PSV-1-4.	Pressure Solenoid Valve	III	BFNNEB8013	

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# SYSTEM: Main Steam Supply (1)

	GENERAL EQUIPMENT	•		
TVA Plant . Identification Number	Generic Name	<u>Status</u>	<u>NCR No</u> .	LER No.
PSV-1-5	Pressure Solenoid Valve	III	BFNNEB8013	
PSV-1-18	Pressure Solenoid Valve	III	BFNNEB8031	
• <del>PSV-1-18</del>	Pressure-Solenoid-Valve		· · · · ·	
PSV-1-19	Pressure Solenoid Valve	III	BFNNEB8013	•
PSV-1-22	Pressure Solenoid Valve	III		
PSV-1-23	Pressure Solenoid Valve	III	• "	¥
PSV-1-30	Pressure Solenoid Valve	III .	BFNNEB8031	
PSV-1-30				
PSV-1-31	Pressure Solenoid Valve	III	BFNNEB8013	
PSV-1-31		!		
PSV-1-34	Pressure Solenoid Valve	III	BFNNEB8013	
PSV-1-41	Pressure Solenoid Valve	i III	11	
PSV-1-41	-Pressure-Solenoid-Valve	v 		·····
PSV-1-42	Pressure Solenoid Valve	III	"	
PSV-1-179	Pressure Solenoid Valve	_		
PSV-1-180	Pressure Solenoid Valve	•	- -	
FSV-1-14A	Flow Solenoid Valve	III	BFNNEB8018	
FSV-1-14B	Flow Solenoid Valve	. III		
FSV-1-14C	Flow Solenoid Valve	III.	, II	•
FSV-1-26A	Flow Solenoid Valve	III		
FSV-1-26B	Flow Solenoid Valve	III	u	•
FSV-1-26C	Flow Solenoid Valve	III	ni 1	
FSV-1-37A	Flow Solenoid Valve	III	l N	
FSV-1-37B	Flow Solenoid Valve	III	"	

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# • SYSTEM: Main Steam Supply. (1)

	GENERAL EQUIPME	NT	3	
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.
FSV-1-37C .	· Flow Solenoid Valve	· • III	BFNNEB8018	•
FSV-1-51A	Flow Solenoid Valve	III	Ш	
FSV-1-51B	Flow Solenoid Valve			
FSV-1-51C	Flow Solenoid Valve	JIII	н `	•
FCV-1-55	Flow Control Valve	, III	BFNNEB8034	
PS-1-4	Pressure Switch			
PS-1-5	Pressure Switch			
PS-1-18	Pressure Switch			
PS-1-19	Pressure Switch			
PS-1-22	Pressure Switch			
PS-1-23	Pressure Switch		•	
PS-1-30	Pressure Switch			*
PS-1-31 .	Pressure Switch	1		
PS-1-34	Pressure Switch	•		
PS-1-41	Pressure Switch		,	
PS-1-42	Pressure Switch	:		
PS-1-179	Pressure Switch			
PS-1-180	Pressure Switch			
<del>-FCV-1-14</del>	-Flow-Control-Valve	4		
FGV-1-15		••••••••••••••••••••••••••••••••••••••		
PDIS-1-13A	Pressure Differential Indicator Switch	III	BFNNEB8010	•
PDIS-1-13B	Pressure Differential Indicator Switch	III	31	
PDIS-1-13C	Pressure Differential Indicator Switch	, III	u .	

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# SYSTEM: Main Steam Supply (1)

	GENERAL EQUIPMEN	Т		
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
PDIS-1-13D	Pressure Differential Indicator Switch	III	BFNNEB8010	· ·
PDIS-1-25A	Pressure Differential Indicator Switch	III I	11	
PDIS-1-25B	Pressure Differential Indicator Switch	III v	u	
PDIS-1-25C	Pressure Differential Indicator Switch	III	11	
PDIS-1-25D	Pressure Differential Indicator Switch	III	n`,	
PDIS-1-36A	Pressure Differential Indicator Switch .	III I	и	
PDIS-1-36B	Pressure Differential Indicator Switch	· III	. 11	• 、
PDIS-1-36C	Pressure Differential Indicator Switch	III	11	•
PDIS-1-36D	Pressure Differential Indicator Switch	III	N .	<b>,</b>
PDIS-1-50A	Pressure Differential ` Indicator Switch		<b>11</b>	
PDIS-1-50B	Pressure Differential Indicator Switch	III .	11	
PDIS-1-50C	Pressure Differential Indicator Switch	III	u	•
PDIS-1-50D	Pressure Differential Indicator Switch	III	u	•
F <del>CV-1-26</del>	Flow-Control-Valve			۱ هر 
FGV-1-27	Flow-Control-Valve			,
FCV-1-37		•		,
F <del>GY-1-38</del>	-Flow-Control-Valve			
FCY-1-51	-Flow-Control-Valve			

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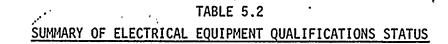
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## SYSTEM: Main Steam Supply (1)

Generic Name	Status	NCR No.	LER No.
	<u></u>	<u></u>	<u></u> ,
Zone Switch	, . I		
Zone Switch	ŗ		·
Flow-Solenoid-Valve			•
Flow-Solenoid-Valve	!		······
Pressure Solenoid Valv	5 '		
Zone Switch	I	-	
Zone Switch	I		• •
Zone Switch	I		*
Zone Switch	I		
Zone Switch	I		· ·
Zone Switch	, I		,
	Zone Switch Flow Solenoid Valve Flow Solenoid Valve Pressure Solenoid Valve Zone Switch Zone Switch Zone Switch Zone Switch Zone Switch	Flow Control ValveZone SwitchIZone SwitchIZone SwitchIFlow Solenoid Valve	Flow Control Valve         Zone Switch       I         Zone Switch       I         Flow Solenoid Valve       I         Flow Solenoid Valve       I         Pressure Solenoid Valve       I         Zone Switch       I



SYSTEM: Raw Cooling Water (24)

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• • •	GENERAL EQUIPM	ENT		
,	•	فمحيد معتين		
TVA Plant Identification Number	Generic Name	Status	NCR No.	LER No.
PS-24-133B	Pressure Switch		•	• •
PS-24-133A .	Pressure Switch	•		





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#### TABLE 5.2

### TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Control Air System (32)

······································	GENERAL EQUIPM	IENT		······································
	<b>s</b> ,	<sup>ور</sup> هو ودر مر <sub>مو</sub>	· · ·	т. г. н. Т
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.
FSV-32-62	Solenoid Valve	III	BFNEEB8042	
FSV-32-63	Solenoid Valve	III	BFNEEB8042	





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#### TABLE 5.2 TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Reactor Feedwater System (3)

#### GENERAL EQUIPMENT

``````````````````````````````````````		(	· ··· · ··· ··· ···	القنيم المحالة والجارية ومرجعة الحالية	
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.	,
PS-3-22A	Pressure Switch	III ·	BFNNEB8011		
PS-3-22B	Pressure Switch	III	,		
PS-3-22C	Pressure Switch	III	11	_	
PS-3-22D	Pressure Switch	III	11		
PS-3-57A	Pressure Switch	I			
PS-3-57B	Pressure Switch	I			
PS-3-57C	Pressure Switch	Ĩ		۸ _	
PS-3-57D	Pressure Switch	Į,	·		
LIS-3-203A	Level Indicator Switch	III	BFNNEB8010		
LIS-3-203B	Level Indicator Switch	III	11		
LIS-3-203C	Level Indicator Switch	III	<b>18</b> 1911		
LIS-3-203D	Level Indicator Switch	. III	"		
LIS-3-208A	Level Indicator Switch	) III	'nì		
LIS-3-208B	Level Indicator Switch	i III	Ш ,	a'	-
LIS-3-208C	Level Indicator Switch	III	II   -		
LIS-3-208D	Level Indicator Switch	III	11.		
LIS-3-58C	Level Indicator Switch	III	BFNNEB8017		
LIS-3-56A	Level Indicator Switch		n	4	
LIS-3-56B	Level Indicator Switch	III	"\	,	
LIS-3-56C	Level Indicator Switch	III	"		

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## SYSTEM: Reactor Feedwater System (3).

GEN	IERAL	EQUI	IPMENT

TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.	
LIS-3-56D	Level Indicator Switch	. 111	BFNNEB8017		
LITS-3-46B	Level Indicator Temperature Switch	III	11		• .
LIS-3-184	Level Indicator Switch	- 111		•	
LIS-3-185	Level Indicator Switch	! III	ĸ		
LIS-3-58A	·Level Indicator Switch	III	н		
LITS-3-46A	Level Indicator Temperature Switch	. 111	n		
L1TS-3-58B	Level Indicator Temperature Switch		11	•	
LITS-3-58D	Level Indicator Temperature Switch				
PS-3-74A	Pressure Switch	III	BFNNEB8011	•	
PS-3-74B	Pressure Switch	, III	BFNNEB8010		•
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#### TABLE 5.2

#### TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: .RHR Service Water System (23)

	GENERAL EQUIP	PMENT	4	
•		به عمد مد مد مد مدر ب	y t - <sup>f</sup> ennen <b>a</b> arra	ه معنور معنوری ماری کار م
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
TE-23-32	Temperature Element	I III	BFNNEB8015	•
FCV-23-34	Flow Control Valve	III	BFNNEB8035	
TE-23-35	Temperature Element	III	BFNNEB8015	•
FT-23-36	Flow Transmitter	III	BFNNEB8012	
TE-23-38	Temperature Element	III	BFNNEB8015	
FCV-23-40	Flow Control Valve	, 111	BFNNEB8034	
TE-23-41	Temperature Element	III	BFNNEB8015	
FT-23-42	Flow Transmitter	III	BFNNEB8012	
TE-23-44	Temperature Element	III	BFNNEB8015	
FCV-23-46	Flow Control Valve	` III	BFNNEB8034	
TE-23-47	Temperature Element		BFNNEB8015	
FT-23-48	Flow Transmitter	, III	BFNNEB8012	
TE-23-50	Temperature Element	III	BFNNEB8015	
FCV-23-52	Flow Control Valve	III	BFNNEB8034	1
TE-23-53	Temperature Element	III	BFNNEB8015	
FT-23-54	Flow Transmitter	III	BFNNEB8012	
FSV-23-56	Flow Solenoid Valve	. 111	BFNEEB8031	۰,
FCV-23-57	Flow Control Valve	III	BFNNEB8034	•

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## TABLE 5.2

GENERAL EQUIPMENT

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TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Sampling and Water Quality (43)

				•	
TVA Plant Identification Number	<u>Generic Name</u>		<u>Status</u>	NCR No.	LER No.
FSV-43-14	Flow Solenoid Valve	•	I		
FIS-43-13A	Flow Indicator Switch		III	BFNEEB8048	
FIS-43-13B	Flow Indicator Switch		III	BFNEEB8048	
FSV-43-13	Flow Solenoid Valve·	i ,	III	BFNNEB8031	
FCV-43-13	Flow Control Valve	ļ	III .	BFNNEB8006	
FCV-43-14	Flow Control Valve	;	III	BFNNEB8006	
	•	1			

# TABLE 5.2 TABLE OF ELECTRICAL EQUIPMENT QUALIFICATIONS STATUS

SYSTEM: Standby Liquid Control System (63)

#### GENERAL EQUIPMENT

T110 03		and the second s	* ***	
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
TE-63-2	Temperature Element	III .	BFNNEB8009	•
PT-63-7	Pressure Transmitter			
FCV-63-8A	Flow Control Valve	I		
FCV-63-8B	Flow Control Valve	I	r	
FIS-63-11 '	Flow Indicator Switch			
TIC-63-2	Temperature Indicator Control		BFNNEB8009	
SLC Pump Motor A	Pump Motor	III	BFNNEB8034	
SLC Pump Motor B	Pump Motor	III	BFNNEB8034	
PI-63-7A	Pressure Indicator	r -		
TC-63-5A	Temperature Control		•	
TC-63-5B	Temperature Control	e e	×	

## TABLE 5.2 TABLE OF ELECTRICAL EQUIPMENT QUALIIFICATIONS STATUS

SYSTEM: Primary Containment System (64)

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#### GENERAL EQUIPMENT

				· · · · · · · · · · · · · · · · · · ·
TVA Plant. Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
FSV-64-9	Flow Solenoid Valve	III	BFNEEB8039	• . •
FSV-64-10	Flow Solenoid Valve	i III	BFNEEB8039	-
FSV-64-17	Flow Solenoid Valve	<sup>1</sup> I	Y	
FSV-64-18	Flow Solenoid Valve	I	~	
FSV-64-19	Flow Solenoid Valve	Î		
FSV-64-20	Flow Solenoid Valve	Ţ	۰ ۲	
FSV-64-21	Flow Solenoid Valve	' I	- 8	
FSV-64-29	Flow Solenoid Valve	I	•	•
FSV-64-30	Flow Solenoid Valve	Ì I		
FSV-64-31	Flow Solenoid Valve	I I		
FSV-64-32	Flow Solenoid Valve	III	BFNNEB8031	
FSV-64-33	Flow Solenoid Valve	III	<b>u</b>	ł
FSV-64-34	Flow Solenoid Valve	III	. H - 1	
FSV-64-36	Flow Solenoid Valve	III	BFNEEB8039	
FSV-64-40	Flow Solenoid Valve	; III	8	
FSV-64-41	Flow Solenoid Valve	• III	, II	
FSV-64-42	Flow Solenoid Valve	III	, 11	ı
FSV-64-43	Flow Solenoid Valve	III	n	
. •		1		۶

SYSTEM: Primary Contai	inment System (64)		•	
	GENERAL EQUIPMEN			·····
TVA Plant Identification Number.	Generic Name	<u>Status</u>	NCR No.	LER No.
FSV-64-44	Flow Solenoid Valve	, 'III	BFNEEB8036	
FSV-64-45	,Flow Solenoid Valve	III	! <u>.</u> .	•
TE-64-52B	Thermocouple	III I	BFNEEB8033	• •
LT-64-54	Level Transmitter	III	BFNNEB8023	,
TE-64-55A	Temperature Element	, III	BFNNEB8034	•
TE-64-55B	Temperature Element	III ·	BFNNEB8016	•
TE-64-55C	Temperature Element	III	BFNNEB8016	
TE-64-55D	Temperature Element	III	BFNNEB8034	
TE-64-55E	Temperature Element	III	*	
TE-64-55F	Temperature Element	III	<b>11</b>	
FC0-64-60A	Flow Control Operator	-	,	
FCO-64-60B	Flow Control Operator .	1		•
FC0-64-60C	Flow Control Operator		-	
FC0-64-60D	Flow Control Operator		т. •	
LT-64-66	Level Transmitter	<sup>!</sup> III	BFNNEB8023	
TS-64-68	Temperature Sensor		BFNMEB8001	
TS-64-69	Temperature Sensor	111	n A A A A A A A A A A A A A A A A A A A	
TS-64-70	Temperature Sensor	III	i N <sup>i</sup>	
TS-64-71	Temperature Sensor	III	۳.	
TS-64-72	Temperature Sensor	III .	. 1	
FSV-64-139	Flow Solenoid Valve	III	BFNEEB8037	•
FSV-64-140	Flow Solenoid Valve	III	BFNEEB8037	ι,
FSV-64-141	Flow Solenoid Valve	III	BFNEEB8037	
PT-64-51	Pressure Transmitter	ĨV	BFNNEB8012	. · ·
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#### SYSTEM: Primary Containment System (64)



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## SYSTEM: Primary Containment System (64)

	GENERAL EQUIPME	NT		
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
PX-64-51	Power Supply	. III	BFNNEB8005	
PDIS-64-20	Pressure Differential Indicator Switch	I	•	
PDÌS-64-21	Pressure Differential Indicator Switch	Ī	• •	
PS-64-57D	Pressure Switch	, III .	BFNNEB8020	
PS-64-58A	Pressure Switch	III	<b>`</b> #	
PS-64-58B	Pressure Switch	III	11	
PS-64-58C	Pressure Switch	III	н	÷
PDS-64-15	Pressure Differential Switch	III	BFNEEB8029	
PDM-64-16	Pressure Differential Switch	III	BFNEEB8028	• •
PDIC-64-16	Pressure Differential Indicator Switch	III	BFNEEB8030	
PDT-64-16	Pressure Differential Transmitter	III	BFNEEB8026	
TE-64-52A	Temperature Element	<sup>1</sup> III	BFNEEB8033	\$
TE-64-52C	Temperature Element	III	BFNEEB8033	*
PDS-64-62A	Pressure Differential Switch		BFNEEB8029	
PDS-64-62C	Pressure Differential Switch	III	BFNEEB8029	
FCV-64-20	Flow Control Valve			•
FCV-64-21	Flow Control Valve			
FCV-64-19	Flow Control Valve			
FCV-64-18	Flow Control Valve			
FC0-64-43	Flow Control Operator	ł		

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## SYSTEM: Primary Containment System (64)

	GENERAL EQUIPME	NT		
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER NO
PDS-64-62B .	Pressure Differentia] Switch	III.	BFNEEB8029	
PDS-64-62D	Pressure Differential Switch	III	BFNEEB8029	
TS-64-73	Temperature Switch	III	BFNMEB8001	
PDS-64-63	Pressure Differential Switch	III į	BFMEEB8029	
PDS-64-61A	Pressure Differential Switch	111	BFNEEB8029	
PDS-64-61C	Pressure Differential Switch		BFNEEB8029	
PDT-64-64	Pressure Differential Switch	III	BFNEEB8026	
PDM-64-64	Pressure Differentiaİ Switch	III	BFNEEB8028	
PDT-64-8	Pressure Differential Transmitter	. 111	BFNEEB8026	
PDM-64-8	Pressure Differential Monitor	III	BFNEEB8028	
PDIC-64-8	Pressure Differential Indicator Control	III	BFNEEB8030	
PDS-64-61B	Pressure Differential Switch		BFNEEB8029	
PDS-64-61D	Pressure Differential Switch	III	BFNEEB8029	
PDS-64-7	Pressure Differential Switch	III	BFNEEB8029	•
PS-64-56A	Pressure Switch	III	BFNNEB8020	
PS-64-56B	Pressure Switch	III+	BFNNEB8020	

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	GENERAL EQUIPMEN	1		8
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR: No.	LER No
PS-64-56C	Pressure Switch	- 111	BFNNEB8020	
PS-64-56D	Pressure Switch	III	BFNNEB8020	
PS-64-58D	Pressure Switch	IÌI	BFNNEB8020	-
FC0-64-65D	Flow Control Operator	1 4		
FC0-64-65A	Flow Control Operator	1	•	
FCO-64-65B	Flow Control Operator	ų.		-
FC0-64-65C	Flow Control Operator		•	
PS-64-57A	Pressure Switch	III	BFNNEB8020	·
PS-64-57B	Pressure Switch	III	BFNNEB8020	
PS-64-57C	Pressure Switch	III	BFNNEB8020	
PT-64-67	Pressure Transmitter	IV	BFNNEB8012	
PDIC-64-64	Pressure Differential	III	BFNEEB8030	
FC0-64-40	Flow Control Operator		*	٠
FC0-64-41	Flow Control Operator		,	
FC0-64-44	Flow Control Operator	1		
FC0-64-45	Flow Control Operator	ηt		
FC0-64-36	Flow Control Operator	I	- 1	
FCV-64-29	Flow Control Valve		1	
FCV-64-30	Flow Control Valve			
FCV-64-31	Flow Control Valve		Į	
FCV-64-32 .	Flow Control Valve		,	• •
FCV-64-33	Flow Control Valve		1	
FCV-64-34	Flow Control Valve			
FCV-64-139	Flow Control Valve			

SYSTEM: Primary Containment System (64)

	GENERAL EQUIPMEN	J		·
TVA Plant Identification Number	Generic Name	: <u>Status</u>	<u>NCR No</u> .	LER No.
FCV-64-140	Flow Control Valve	[		
FCV-64-141	Flow Control Valve '	•		•
PX-64-54	Power Supply			
FSV-64-139	Flow Solenoid Valve	·		
FSV-64-140	Flow Solenoid Valve			
FSV-64-141 ·	Flow Solenoid Valve			•
PDS-64-62A/C	Pressure Differential Swi	tchIII	BFNEEB8029	
PDS-64-62B/D	Pressure Differential Swi	tch	-	
PDS-64-61 B/D	Pressure Differential Swi	i tch		
PDS-64-61B	Pressure Differential Swi	tch	٩	
PDS-64-61 A/C	Pressure Differential Swi	tch		
PT-64-51	Pressure Transmitter	IV	BFNEEB8012	•
FCV-64-18	Flow Control Valve	III	BFNNEB8006	
FCV-64-19	Flow Control Valve	III	t)	
FCV-64-29	Flow Control Valve	III		
FCV-64-30	Flow Control Valve	1 111	11	
FCV-64-31	Flow Control Valve	III	11	
ECV-64-32	.Flow Control Valve		11	
FCV-64-33	Flow Control Valve	III	n	
FCV-64-34 `	Flow Control Valve	III		

SYSTEM: Primary Containment System (64)



TABLE 5.2

SUMMARY OF ELECTRICAL	EQUIPMENT_QUAL	IEICATION_ST	TATUS	
				•

SYSTEM: Standby Gas Treatment (65)

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•				محمدة عبدها عار عب الماسي
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No
FT-65-1	Flow Transmitter	111 `	BFNEEB8049	
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SYSTEM: Emergency Equipment Cooling Water System (67).

· · · · · · · · · · · · · · · · · · ·	GENERAL EQUIP	1ENT			
		-	, 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 199	un 199 4 4 4 4 4 4 4	
TVA Plant Identification Number	Generic Name		<u>Status</u>	NCR No.	<u>LER No</u>
PT-67-15	Pressure Transmitter	1	III	BFNEEB8044	
PT-67-16	Pressure Transmitter	;	III	It	
FCV-67-17	Flow Control Valve		III		
FCV-67-18	Flow Control Valve		III	BFNMEB8001	
PT-67-19	Pressure Transmitter		ŀH	BFNEEB8044	
PT-67-20	Pressure Transmitter		HI .	1	
FCV-67-21	Flow Control Valve '		I	,	
FCV-67-22	Flow Control Valve		III	BFNMEB8001	
PT-67-23	Pressure Transmitter		.ILI	BFNEEB8044	
PT-67-24	Pressure Transmitter	1	111	18	
FCV-67-25	Flow Control Valve	ł	I		•
FCV-67-26	Flow Control Valve	3	III	BFNMEB8001	,
PX-67-12B	Power Supply	۰			
FSV-67-53	Solenoid Valve	{	· III	BFNEEB8040	1
FCV-67-53	Control Valve	<b>'</b> 1	ų		
FSV-67-50	Flow Solenoid Valve		III	BFNEEB8041	
FSV-67-51	Flow Solenoid Valve .	;	III	11	

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SYSTEM:	Emergency	Equipment	Cooling	Water S	System (	l
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TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR_No.	LER No.
FM-67-3B	Signal Modifier			
РХ-67-3В	Power Supply	•		
FT-67-9A	Flow Transmitter	III	BFNEEB8047R1	
FT-67-9B.	Flow Transmitter		r	٠
FM-67-9B	Flow Modifier	· ,		
PX-67-9B	Power Supply			
FM-67-12B	Flow Modifier	•		
FM-67-6B	Flow Modifier			
PX-67-6B	Power Supply			
FS-67-12B	Flow Switch	4	,	
FT-67-12A	Flow Transmitter			•
FT-67-12B	Flow Transmitter			
FCV-67-50	Flow Control Valve			
FCV-67-51	Flow Control Valve	*		



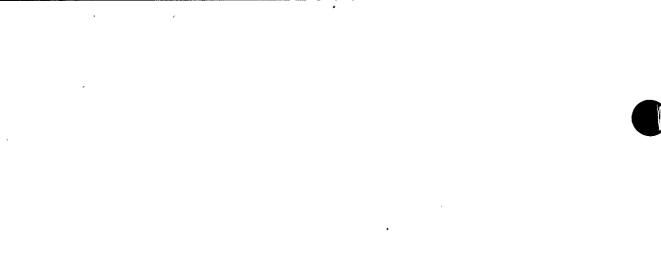
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TABLE 5.2

#### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Reactor Water Recirculation (68) GENERAL EQUIPMENT TVA Plant Identification Number Generic Name Status NCR No. LER No. FCV-68-1 Flow Control Valve III BFNNEB8034 FCV-68-3 Flow Control Valve III BFNNEB8034 PS-68-93 Pressure Switch PS-68-94 Pressure Switch FCV-68-77 Flow Control Valve III BFNNEB8034 FCV-68-79 III Flow Control Valve BFNNEB8034 PS-68-95 Pressure Switch PS-68-96 BFNNEB8010 Pressure Switch IΠ





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> TABLE 5.2 SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

> > GENERAL EQUIPMENT

SYSTEM: Reactor Water Cleanup System (69)

			. بر میں میں ایک	•
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
FCV-69-2	Control Valve	III	BFNNEB8034	-
TE-69-29A	Temperature Element	III	BFNNEB8022	
TE-69-29B -	Temperature Element	. 111	н	
TE-69-29C	Temperature Element	III	11	
TE-69-29D	Temperature Element	III	u	
TE-69-29E	Temperature Element	III	, <b>n</b>	
TE-69-29F	Temperature Element	III		*
TE-69-29G	Temperature Element	III	U	
TE-69-39H	Temperature Element	III	11	•
TS-69-30A	Temperature Sensor	III	BFNEEB8027	,
TS-69-30B	Temperature Sensor	III	u	
TS-69-30C	Temperature Sensor	' III	II	
TS-69-30D	Temperature Sensor	: III	81	
TS-69-30E	Temperature Sensor	III	н	
TS-69-30F	Temperature Sensor	, III	u	
TS-69-30G	Temperature Sensor	111	н	
TS-69-30H	Temperature Sensor	III	n	
ZS-69-1 ·	Zone Switch	1	,	·



SYSTEM:	Reactor	Water	Cleanup	System	(69)
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	GENERAL EQUIPME	NT		······
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR_No.	LER No.
TS-69-29J	Temperature Switch	III	BFNNEB8009	
TS-69-29K	Temperature Switch	III	II	
TS-69-29L	Temperature Switch	III	II ¢	
TS-69-29M	Temperature Switch	III	u	
FCV-69-1	Flow Control Valve	III	BFNNEB8034	

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SYSTEM: Reactor Build				
STSTEM: Reactor Build	ing Classic Cli Sustan (70	)	·····	
	GENERAL EQUIPME		· [	
	GENERAL EQUIPHI		······	
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LERN
FCV-70-47 ·	Flow Control Valve	III .	BFNNEB8034	
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#### TABLE 5.2

SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: 'Reactor Core Isolation Cooling (71).

#### GENERAL EQUIPMENT

				2 a anom
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	<u>NCR No.</u>	LER No.
FCV-71-2	Flow Control Valve	i III	BFNNEB8034	<b>,</b>
PS-71-11C	Pressure Switch	III	BFNNEB8011	
PS-71-11D	Pressure Switch	. III	n	
FCV-71-25	Flow Control Valve	III	BFNMEB8001	
SE-71-42A .	Speed Sensor	t III	BFNNEB8025	
SE-71-42B	Speed Sensor .	, III	n	•
TS-71-2A	Temperature Sensor	' III	BFNNEB8009	,
TS-71-2B	Temperature Sensor	III	н	-
TS-71-2C	Temperature Sensor	III	II	
TS-71-2D	Temperature Sensor	III	11	
TS-71-2E	Temperature Sensor 、	III	н	
TS-71-2F	Temperature Sensor	III	"	
TS-71-2G	Temperature Sensor	iii	41 <sup>1</sup>	
TS-71-2H	Temperature Sensor	III	и.	
TS-71-2J	Temperature Sensor	III	n.	×
TS-71-2K	Temperature Sensor	III	U.	
TS-71-2L	Temperature Sensor	; ; · = ,III	n :	·
TS-71-2M	Temperature Sensor	III	н	v
TS-71-2N	Temperature Sensor	III	"	•
	•		1	



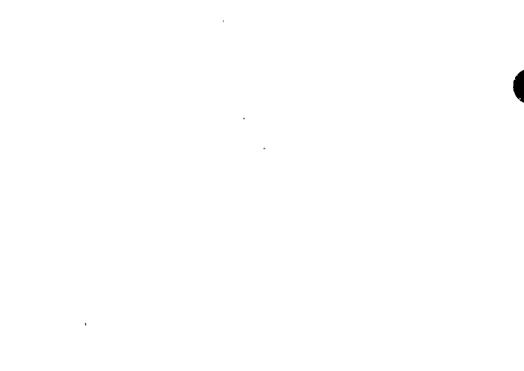
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	GENERAL EQUIPMEN	r		·····
TVA Plant Identification Number	Generic Name	 <u>Status</u>	NCR' No.	LER No.
TS-71-2P	Temperature Sensor .	. III .	BFNNEB8009	
TS-71-2R	Temperature Sensor	III	, u	٠
TS-71-2S	Temperature Sensor	III	η, ,	•
FCV-71-3	Flow Control Valve	III	BFNNEB8034	
PT-71-4	Pressure Transmitter		BFNNEB8012	
FCV-71-8	Flow Control Valve	ш	BFNNEB8034	
FCV-71-9	Flow Control Valve		Ŧ	
FCV-71-10	Flow Control Valve	III	BFNNEB8034	
SC-71-10	Speed Control	III	BFNNEB8025	
PT-71-12	Pressure Transmitter	III	BFNNEB8012	
PS-71-13A	Pressure Switch	III	BFNNEB8021	•
PS-71-138	Pressure Switch	III		
FCV-71-17	Flow Control Valve	111	BFNNEB8034	
FCV-71-18 ~	Flow Control Valve	III	0	
FCV-71-19	Flow Control Valve	III	18	
PT-71-20	Pressure Transmitter	III	BFNNEB8012	
PS-71-21	Pressure Switch	III	BFNNEB8011	
PS-71-21-1	Pressure Switch	III	BFNNEB8020	
FCV-71-34	Flow Control Valve	III	BFNMEB8001	• .
PT-71-35	Pressure Transmitter	ĸ		
	'n			•

SYSTEM: Reactor Core Isolation Cooling (71)



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	GENERAL EQUIPMEN	T		
TVA Plant Identification Number	Generic Name	 <u>Status</u>	NCR No.	LER No
FS-71-36	Flow Switch	III	BFNNEB8005	
FT-71-36	Flow Transmitter	III	BFNNEB8012	
FCV-71-37	Flow Control Valve	III	BFNNEB8034	
FCV-71-38	Flow Control Valve	III	<b>'</b> 11	
FCV-71-39	Flow Control Valve	, III	BFNNEB8034	
TE-71-41A	Temperature Element	111	BFNNEB8022	
TE-71-41B	Temperature Element			
TE-71-41C	Temperature Élement	III	· BFNNEB8022	
TE-71-41D	Temperature Element	III	11	
PS-71-44	Pressure Switch	III	BFNNEB8025	b
TIS-71-45	Temperature Indicator Switch	III + -	u	: •
TIS-71-46	Temperature Indicator Switch	III	BFNNEB8025	
FSV-71-6B	Flow Solenoid Valve	III.	BFNEEB8035	L.
PS-71-1A	Pressure Switch	III	BFNNEB8011	
PS-71-1B	Pressure Switch	ÍII	н	
PS-71-1C .	Pressure Switch	III	11	
PS-71-1D	Pressure Switch	. 111	BFNNEB8011	
PDIS-71-1A	Pressure Differential Indicator Switch	III	BFNNEB8011	
PDIS-71-1B	Pressure Differential Indicator Switch	III	BFNNEB8011	

## SYSTEM: Reactor Core Isolation Cooling (71)



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	GENERAL EQUIPMEN	•	• •	
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No
PS-71-11A	Pressure Switch	III	BFNNEB8011	•
PS-71-11B ·	Pressure Switch	III,		
FCV-71-59 ·	Flow Control Valve	III	BFNNEB8034	
FIC-71-36A	Flow Indicator Control		4	
FM-71-36	Signal Modifier	in .	BFNNEB8005	ĸ
PX-71-4	Power Supply	III	BFNNEB8005	
FT-71-1A	Flow Transmitter	t		
FT-71-18	Flow Transmitter	1	•	
FSV-71-6A	Flow Solenoid Valve	1		
PX-71-35 ·	Power Supply			
PX-71-36A	Power Supply	1		
PX-71-12	Power Supply	· .		
FR-71-36	Flow Recorder		42 X	
TS-71-2A	Temperature Sensor			
TS-71-2B	Temperature Sensor		b	:
TS-71-2C	Temperature Sensor	i (		
TS-71-2C	Temperature Sensor			•
PT-71-48	'Pressure Transmitter	III	BFNNEB8012	
FSV-71-6A	Flow Solenoid Value	ļ		
TS-71-9	Temperature Switch		-	•
•		ł		•

SYSTEM: Reactor Core Isolation Cooling (71)

# TABLE 5.2 SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: High Pressure Core Injection (73) .

	GENERAL EQUIPME	INT		· · · · · · · · · · · · · · · · · · ·
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	<u>LER No</u> .
FCV-73-3	Flow Control Valve	1 111	BFNNEB8034	
FCV-73-2	Flow Control Valve	III	BFNNEB8034	
FCV-73-27	Flow Control Valve	III	BFNNEB8034	
PT-73-4	Pressure Transmitter			
SE-73-5	Speed Sensor	III	BFNNEB8025	
SC-73-19	Speed Control		BFNNEB8025	÷
PT-73-21	Pressure Transmitter	' III	BFNNEB8012	·
FS-73-33	Flow Switch	III	BFNNEB8010	
PS-73-22A	Pressure Switch	III	BFNNEB8021	
PS-73-22B	Pressure Switch	III	n	
PS-73-20B	Pressure Switch	III	BFNNEB8011	
PS-73-20C	Pressure Switch	III	89	
PS-73-20D	Pressure Switch	III	• ti	
PS-73-20A	Pressure Switch	III ,	88	
HPCI Aux Oil Pump Mtr	Pump Motor			
TIS-73-52	Temeprature Indicator Switch	, III	BFNNEB8025	
PS-73-1A	Pressure Switch		BFNNEB8011	
HPCI Tube Oil Cooler *Outside containment e	xcept for HPCI	III	BFNNEB8025	



## SYSTEM: High Pressure Core Injection (73)

	GENERAL EQUIPMEN	T		
TVA Plant . Identification Number	Generic Name	<u>Status</u>	NCR! No.	LER No.
PS-73-18	Pressure Switch	t III	BFNNEB8011	, L
PS-73-1C	Pressure Switch	III	. "	
PS-73-1D	Pressure Switch		", • , •	
PDIS-73-1A	Pressure Differential Indicator Switch	III	н` <i>•</i>	•
PDIS-73-1B	Pressure Differential Indicator Switch	III	н ′ ′	· .
FT-73-33	Flow Transmitter	III	BFNNEB8012	
TS-73-2A	Temperature Sensor	I		
TS-73-2B	Temperature Sensor.	I		
TS-73-2C	Temperature Sensor	I		
TS-73-2D	Temperature Sensor	I		
TS-73-2E	Temperature Sensor	III	BFNNEB8009	
TS-73-2F	Temperature Sensor	111		
TS-73-2G	Temperature Sensor	III	•	
TS-73-2H	Temperature Sensor	III		, € &
TS-73-2J	Temperature Sensor	] III		
TS-73-2K	Temperature Sensor	III	BFNNEB8009	
TS-73-2L	Temperature Sensor		,	
TS-73-2M	Temperature Sensor	III	BFNNEB8009	
TS-73-2N	Temperature Sensor			
TS-73-2P	Temperature Sensor	III	BFNNEB8009	•
TS-73-2R	Temperature Sensor		7	
TS-73-2S	Temperature Sensor		l l	¥

	GENERAL EQUIPMEN	T		
TVA Plant Identification Number	Generic Name	l Status	NCR No.	LER No.
FCV-73-16	Flow Control Valve		•	•
PCV-73-18B ·	· Pressure Control Valve			
FCV-73-26	Flow Control Valve	III	BFNNEB8034	
FCV-73-30	Flow Control Valve	I .	,	
FCV-73-34	Flow Control Valve	III	BFNNEB8034	*
FCV-73-35	Flow Control Valve	III	• ·	
FCV-73-36	Flow Control Valve	III		
FCV-73-40	Flow Control Valve	III		
FCV-73-44	Flow Control Valve	III		
TE-73-55A	Temperature Element			
TE-73-55B	Temperature Element	IV .	BFNEEB8053	
TE-73-55C	Temperature Element	Į	н	•
TE-73-55D	Temperature Element	111	BFNNEB8022	
LS-73-56A	Level Switch	III	BFNEEB8053	
LS-73-56B	Level Switch	111	BFNEEB8053	
LS-73-57A	Level Switch	111	BFNNEB8004	
LS-73-57B ·	Level Switch	III ·	98	
FCV-73-64	Flow Control Valve	• I		
PT-73-65	Pressure Transmitter			
-CV-73-18	Flow Control Valve	III	BFNNEB8025	
CV-73-19	Flow Control Valve	III	BFNNEB8025	•

SYSTEM: High Pressure Core Injection (73)

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TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u> .	NCR No.	<u>LÊR No</u> .
PDS-73-53	Pressure Differential	ь «		
PX-73-65	Power Supply		,	
PS-73-47A	Pressure Switch	III	BFNNEB8025	
PS-73-47B	Pressure Switch	III	BFNNEB8025	•
PT-73-31	Pressure Transmitter	, III	'BFNNEB8012	
PS-73-29-1	Pressure Switch	•		
TS-73-2F	Temperature Sensor	; I		
тѕ-73-2н	Temperature Sensor	Ţ	٢	
FCV-73-18	Flow Control Valve	2		
FCV-73-19 .	Flow Control Valve			

SYSTEM: High Pressure Core Injection (73)

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TABLE 5.2

SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Residual Heat Removal (74)

· · · · · · · · · · · · · · · · · · ·	GENERAL ECUIPME	INT		
	•			ت منع وجد وجه عدم ال
TVA Plant Identification Number	Generic Name	Status	NCR No.	LER No.
FCV-74-1	Flow Control Valve	III	BFNEEB8034	
FCV-74-2	Flow Control Valve		p	
FCV-74-7 .	Flow Control Valve	I		*
PS-74-8A PS-74-8B TE-74-9	Pressure Switch Pressure Switch Temperature Element	III III III III	BFNNEB8020 BFNNEB8020 BFNNEB8022	
FCV-74-12	Flow Control Valve	III	BFNNEB8034	
FCV-74-13	Flow Control Valve ·	ĮI		
PS-74-19A PS-74-318 TE-74-21	Pressure Switch Pressure Switch Pressure Switch	III III III	BFNNEB8020 BFNNEB8020 BFNNEB8022	
FCV-74-24	Flow Control Valve	III	BFNNEB8034	
FCV-74-25	Flow Control Valve	I		
FCV-74-30 .	Flow Control Valve	i I		2
PS-74-31A	Pressure Switch	III III	BFNNEB8020	
TE-74-32	Temperature Element	III	BFNNEB8022.	-
FCV-74-35	Flow Control Valve	III	BFNNEB8034	
FCV-74-36 ·	Flow Control Valve	- I		
PS-74-42A PS-74-42B TE-74-43	Pressure Switch Pressure Switch Temperature Element	- III III III	BFNNEB8020 BFNNEB8020 BFNNEB8022	
FCV-74-47	Flow Control Valve		BFNNEB8034	
FT-74-50	Flow Transmitter	IY.	BFNNEB8012	

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TVA Plant Identification Numb	oer <u>Generic Na</u>	me <u>Status</u>	NCR No.	LER No.
PT-74-51	• Pressure Transmit	ter IV .	BFNNEB8012	
FCV-74-52	• Flow Control Valv	e., III	BFNNEB8034	
FCV-74-53	Flow Control Valv	e III	BFNNEB8034	
FCV-74-60	Flow Control Valv	e <sup>:</sup> III	BFNNEB8034	•
FCV-74-61	Flow Control Valv	e IV	BFNNEB8034	
FT-74-64	Flow Transmitter			
PT-74-65	Pressure Transmit	ter IV	BFNNEB8012	
FCV-74-66	Flow Control Valv	e	,	
FCV-74-67	Flow Control Valv	e III	BFNNEB8034	ŧ
FT-74-70	Flow Transmitter	IV	BFNNEB8012	
FCV-74-74	Flow Control Valv	e III	BFNNEB8034	
FCV-74-75	Flow Control Valv	e III	II	
FCV-74-77	Flow Control Valv	e III	51	
TE-74-81	Temperature Eleme	nt, III	BFNNEB8015	
TE-74-82	. Temperature Eleme	nt III	16	
TE-74-83	Temperature Eleme	nt III	ы <sup>т</sup>	
TE-74-84	• Temperature Eleme	nt III	, II.,	
PT-74-94	Pressure Transmit	ter IV	, N	-
FCV-74-98 1&2	Flow Control Valv	e į		-
FCV-74-99 1&2	Flow Control Valv	e I		
FCV-74-1011&2	Flow Control Valv	e I		•
FSV-74-102	Flow Solenoid Val	ve III	BFNEEB8040	
FSV-74-103	Flow Solenoid Val	ve III	BFNEEB8040	-
FSV-74-119 ·	Flow Solenoid Val	ve III	BFNEEB8040	

SYSTEM: Residual Heat Removal (74)



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## SYSTEM: Residual Heat Removal (74)

	GENERAL EQUIPMEN	Ĩ		
TVA Plant Identificatión Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.
FCV-74-57	Flow Control Valve .	· III	BFNNEB8034	
FCV-74-58	Flow Control Valve	лп	u .	
FCV-74-59	Flow Control Valve	III	"	
FCV-74-71	Flow Control Valve	III	u <sup>r</sup>	
FCV-74-72	Flow Control Valve	111	и '	•
FCV-74-73	Flow Control Valve	111	, ,u	
FCV-74-78	Flow Control Valve		•	*
FT-74-56	Flow Transmitter	IV	BFNNEB8012	
TTS-74-136A	Temperature Transmitter Switch			
TTS-74-136B	Temperature Transmitter Switch		•	¥
FCV-74-102	Flow Control Valve			
FCV-74-103	Flow Control Valve			
FCV-74-119	Flow Control Valve			
FCV-74-120	Flow Control Valve		*	
TE-74-95A	Temperature Element	III	BFNNEB8022	۰ –
TE-74-95B	Temperature Element	III	n ,	
IE-74-95C	Temperature Element	III	5 ' 34	
TE-74-95D	Temperature Element	, AII	<b>88</b>	
TE-74-95E	Temperature Element	111	în Ş	
TE-74-95F	Temperature Element	11	1 11	•
TE-74-95G	Temperature Element	п	11 <i>i</i>	
те-74-95н	Temperature Element	III	. \	

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## SYSTEM: Residual Heat Removal (74)

TVA Plant Identification Number	Generic Name	Status	NCR No. LER No
FSV-74-120	Flow Solenoid Valve .	• III	BFNEÉB8040
ME-74-137A	Moisture Element	٩	;
ME-74-137B	Moisture Element		. •
MIS-74-137A	Moisture Indicator Switch	1	• ÷
MIS-74-137B	Moisture Indicator Switch	า	
RHR Pump Motor 1A	Pump Motor	111	BFNNEB8008
RHR Pump Motor 1B	Pump Motor	III	n
RHR Pump Motor 1C	Pump Motor	· 111	u
RHR Pump Motor 1D	Pump Motor	III	н
RHR Pump Motor 2A	Pump Motor	III	24
RHR Pump Motor 2B	Pump Motor	III	11
RHR Pump Motor 2C	Pump Motor	III	н,
RHR Pump Motor 2D	Pump Motor	111	11
RHR Pump Motor 3A	Pump Motor	III ·	. 11
RHR Pump Motor 3B	Pump Motor	III	<b>13</b>
RHR Pump Motor 3C	Pump Motor	III	11
RHR Pump Motor 3D	Pump Motor	III	H ·
FIS-74-50	Flow Indicator Switch	1	,
FIS-74-64	Flow Indicator Switch	III	BFNNEB8012
FIS-74-69 FCV-74-96 2&3	" Flow Control Valve	III I	BFNNEB8010
FCV-74-97 2&3	Flow Control Valve	I	
FCV-74-100 2&3	Flow Control Valve	¥ I	1
FCV-74-48	Flow Control Valve	III	BFNNEB8034

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SYSTEM: Residual Heat Removal (74)

	·····	GENERAL EQU	
	TVA Plant Identification	Number <u>Generic Name</u>	
	PS-74-8B	Pressure Switch	·
	PS-74-19B	. Pressure Switch	्र के के के को का स्था स्था स्था स्था स्था स्था स्था स्थ
	PS-74-31B	Pressure Switch	
	PS-74-42B	Pressure Switch	
	FCV-74-60	Flow Control Valve	100 A 415
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#### TABLE 5.2

### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Core Spray System (75)

·····	GENERAL EQUIPMEN	NT		
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
FCV-75-2	·Flow Control Valve	III	BFNNEB8034	
PS-75-7	Pressure Switch	III	BFNNEB8021	
FCV-75-9	Flow Control Valve	III	BFNNEB8034	
FCV-75-11	Flow Control Valve	III	BFNNEB8034	
FIS-75-21	Flow Indicator Switch	III	BFNNEB8010	, N
FCV-75-22	Flow Control Valve	III	BFNNEB8034	٠,
FCV-75-23	Flow Control Valve	III	BFNNEB8034	
PS-75-24	Pressure Switch	· ·		
FCV-75-25	Flow Control Valve	III	BFNNEB8034	
PDIS-75-28	Pressure Differential Indicator Switch	. 111	BFNNEB8010 .	,
FCV-75-30	Flow Control Valve	' III	BFNNEB8034	-
PS-75-35	Pressure Switch	. IIÎ	BFNNEB8021	
FCV-75-37	Flow Control Valve	III	BFNNEB8034	
FCV-75-39	Flow Control Valve	III	BFNNEB8034	-
PS-75-44	Pressure Switch	. 111	BFNNEB8021	

## SYSTEM: Core Spray System (75)

k	GENERAL EQUIPMENT	•		1 1 1
TVA Plant Identification Number	Generic Name	: <u> Status</u>	NCR No.	LER No.
PT-75-48	Pressure Transmitter		•	<b>•</b>
FT-75-49	Flow Transmitter	· IV	BFNNEB8012	,
FIS-75-49	Flow Indicator Switch	III	BFNNEB8010	•
FCV-75-50	Flow Control Valve	, III	BFNEEB8034	
FCV-75-51	Flow Control Valve	III	BFNNEB8034	•
PS-75-52	Pressure Switch		-	
FCV-75-53	Flow Control Valve	III	BFNNEB8034	۵
PDIS-75-56	Pressure Differential Indicator Switch	III	BFNNEB8010	
FSV-75-57	Flow Solenoid Valve	ÎII	BFNEEB8059	•
FSV-75-58 .	Flow Solenoid Valve	III	BFNEEB8059	,
1IS-75-70A	Moisture Indicator Switch	III	BFNEEB8059	
1E-75-70A	Moisture Element		•	
1IS-75-70B	Moisture Indicator Switch		<i>*</i> '	
1E-75-70B	Moisture Element .		×	
PS-75-16	Pressure Switch	III	BFNNEB8021	
PT-75-20	Pressure Transmitter			
T-75-21	Flow Transmitter	IV	BFNNEB8021	
Core Spray Pump Notor 1A	Pump Motor	III	BFNNEB8008	
Core Spray Pump Notor 1B	Pump Motor	JII	, н ,	, •
ore Spray Pump lotor 1C	Pump Motor	111	u	•
ore Spray Pump lotor 1D	Pump Motor	III	.88 *	

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## SYSTEM: Core Spray System (75)

1	GENERAL EQUI	PMENT :		· · · · · · · · · · · · · · · · · · ·
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.
Core Spray Pump Motor 2A	Pump Motor	. 111	BFNNEB8008	•
Core Spray Pump Motor 2B	Pump Motor	III	, II	
Core Spray Pump Motor 2C	Pump Motor	III	II ×	
Core Spray Pump Motor 2D	Pump Motor	III	II	
Core Spray Pump Motor 3A	Pump Motor	'III	11	
Core Spray Pump Motor 3B	Pump Motor	III	II	
Core Spray Pump Motor 3C	Pump Motor		11	•
Core Spray Pump Motor 3D	Pump Motor .	, III,	11	
FSV-75-57	Flow Solenoid Valve	. 111	BFNEEB8059	
TTS-75-69A	Temperature Transmit Switch	ter		1
TTS-75-698	Temperature Transmit	ter		
FSV-75-71	Flow Solenoid Valve		,	ĸ
FSV-75-72	Flow Solenoid Valve			
FSV-75-58	Flow Solenoid Valve	III	BFNEEB8059	*
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#### TABLE 5.2

### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Containment Inerting HPCI Torus Room (76)

	GENERAL EQUIPM	ENT	·····	
TVA Diant	•	ی بیندی مد به مدوند از ا	لامعى ان ق	* ** * *
TVA Plant Identification Number	Generic Name	<u>Status</u>	<u>NCR No</u> .	LER No.
FSV-76-56	Flow Solenoid Valve	I		
FSV-76-58	Flow Solenoid Valve	I		•
FSV-76-60 .	Flow Solenoid Valve			
FSV-76-66	Flow Solenoid Valve	I		
FSV-76-68	Flow Solenoid Valve	i I		
FSV-76-49	Flow Solenoid Valve	I ·		
FSV-76-51	Flow Solenoid Valve $\cdot$	I		
FSV-76-55	Flow Solenoid Valve	, I		
FSV-76-57	Flow Solenoid Valve			۴
FSV-76-59	Flow Solenoid Valve	I	•	•
FSV-76-63	Flow Solenoid Valve	• I		
FSV-76-65	Flow Solenoid Valve	I		·
FSV-76-67	Flow Solenoid Valve	Î Î		
H <sub>2</sub> E-76-37	Hydrogen Analyzer			
H <sub>2</sub> E-76-37A	Hydrogen Analyzer			
H <sub>2</sub> E-76-38	Hydrogen Analyzer			
H <sub>2</sub> E-76-38A	Hydrogen Analyzer	i ·		·
1 <sub>2</sub> E-76-39	Hydrogen Analyzer			×
1 <sub>2</sub> E-76-39A	Hydrogen Analyzer	<u>.</u>		
4 <sub>2</sub> Ε-76-40	Hydrogen Analyzer 45			

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TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No
FSV-76-37A	Flow Solenoid Valve -	III.	BFNEEB8060R1	NA*
FSV-76-37B .	Flow Solenoid Valve	III	11	NA*
FSV-76-39A	Flow Solenoid Valve	III		NA*
FSV-76-39B	Flow Solenoid Valve	, III	11	NA*
FSV-76-40A	Flow Solenoid Valve	I III	11	NA*
FSV-76-40B	Flow Solenoid Valve	III	H *	NA*
FSV-76-41A	Flow Solenoid Valve			•
FSV-76-41B ·	Flow Solenoid Valve			
FSV-76-43A	Flow Solenoid Valve			
FSV-76-38A	Flow Solenoid Valve			
FSV-76-38B	Flow Solenoid Valve		ŧ	
FSV-76-42A	Flow Solenoid Valve	-111	BFNEEB8060R1	NA* .
FSV-76-42B	Flow Solenoid Valve	· III	BFNEEB8060R1	NA*
FSV-76-17	Flow Solenoid Valve	Ι.,		
FCV-76-17	Flow Control Valve	III	BFNNEB8019	
FSV-76-18	Flow Solenoid Valve	; I		
FSV-76-19	Flow Solenoid Valve	I		
FSV-76-24 ·	Flow Solenoid Valve	; I		
FSV-76-44A	Flow Solenoid Valve	i	, · ·	Ā
FSV-76-44B	Flow Solenoid Valve	, j,	_	
FSV-76-50	Flow Solenoid Valve	•	•	、 '
FSV-76-61	Flow Solenoid Valve			
FSV-76-52	Flow Solenoid Valve	•		

SYSTEM: Containment Inerting HPCI Torus Room (76)

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## SYSTEM: Containment Inerting HPCI Torus Room (76)

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••••••••••••••••••••••••••••••••••••••	GENERAL EQUIPMENT			•
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR' No.	LER No.
FSV-76-53	Flow-Solenoid-Valve	*		
F\$V-76-54	-Flow-Solenoid-Valve	•	<b>.</b> . <b>.</b>	
FSV-76-64	-Flow-Solenoid Valve	· ·		
FCV-76-18	Flow Control Valve	III	BFNNEB8019	
FCV-76-19 ,	Flow Control Valve	III	н	
FCV-76-24	Flow Control Valve	Í III	. 11	•

## TABLE 5.2

### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Radwaste System (77)

	GENERAL EQUIPMEN	1		
	•	· · · · · · · · · · · · · · · · · · ·		
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
LIS-77-1A	Level Indicator Switch	III	BFNNEB8024	
LIS-77-1B	Level Indicator Switch	III	. "	
LS-77-8A	Level Switch	III	BFNNEB8029	-
LS-77-8B	Level Switch	III	BFNNEB8029	
LIS-77-14A	Level Indicator Switch	III .	BFNNEB8024	•
LIS-77-14B	Level Indicator Switch	III	BFNNEB8024	•
FCV-77-17A	Flow Control Valve			
FCV-77-17B	Flow Control Valve	•		
_S-77-17A	Level Switch	III	BFNNEB8029	
_S-77-17B	Level Switch	III	BFNNEB8029	
re-77-17	Temperature Element	i III	BFNNEB8027	
fis-77-17	Temperature IndicatorSwit	ch		
_S-77-25A	Level Switch		•	
.S-77-25E	Level Switch	, ,		
S-77-25F	Level Switch	-		•
Reactor Building Equipment Drain Sump Pump A	Pump Motor	III	BFNMEB8001	

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## SYSTEM: Radwaste System (77)

## GENERAL EQUIPMENT

TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
Reactor Building Equipment Drain Sump Pump B	Pump Motor		BFNMEB8001	
Reactor Building Floor Drain Sump Pump A	Pump Motor	III	BFNMEB8001	*
Reactor Building Floor Drain Sump Pump A	PUmp Motor ^	III	BFNMEB8001	•
Reactor Building Floor Drain Sump Pump B	Pump Motor	III	BFNMEB8001	
Reactor Building Floor Drain Sump Pump B	Pump Motor		BFNMEB8001	
LT-77-1A	Level Transmitter	III	BFNNEB8024	
LT-77-1B	Level Transmitter	III	BFNNEB8024	
LT-77-14A	Level Transmitter	·III	u .	
LT-77-14B	Level Transmitter	III	11	
TE-77-14 .	Temperature Element	III	BFNNEB8027	
FSV-77-2A	Flow Solenoid Valve ·	III	BFNNEB8026	
FSV-77-2B	Flow Solenoid Valve	III	11	
FSV-77-15A	Flow Solenoid Valve	III	11	
FSV-77-15B ·	Flow Solenoid Valve	III	U • • •	
ZS-77-2A	-Zone Switch			
Z <del>S-77-2B</del>	-Zone Switch			
ZS-77-15A	-Zone-Switch		*	

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SYSTEM: Radwaste System (77)

	GENERAL EQUIPME	NT	~	L
TVA Plant Identification Number	<u>Generic Name</u>	<u>Status</u>	NCR: No.	LER No.
LS-77-25B	Level Switch	:		
LS-77-25C	Level Switch			
FSV-77-17 .	Level Switch	IV	BFNEEB8036	
FSV-77-17	Level Switch	IV	BFNEEB8036	•
FSV-77-17	Level Switch	IV	BFNEEB8036	
FCV-77-2A	Flow Control Valve	, 111	BFNNEB8006	
FCV-77-2B	Flow Control Valve	III	BFNNEB8006	
LS-77-25D	Level Switch	•		
FCV-77-15A	Flow Control Valve			
FCV-77-15B	Flow Control Valve	i		

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> TABLE 5.2 SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Fuel Pool Cooling and Demineralizing System (78)

	GENERAL EQU	JIPMEN	<u>T</u>	······································	
TVA Plant Identification Numb	er <u>Generic Name</u>		<u>Status</u>	NCR No.	LER No.
LS-78-1A	Level Switch		III	BFNNEB8028	
LS-78-1B	Level Switch		III	u	
LS-78-1C	Level Switch		III	11	
LS-78-1D .	Level Switch	e 1, 4	III	и	
LS-78-1E	Level Switch	•	- III	u	
LS-78-1F	. Level Switch	:.	. 111	n	
LS-78-1G	Level Switch	•••	III	n c	•
_S-78-2A	Level Switch	.,			
LS-78-2B	Level Switch	• ,			
FCV-78-61 1-3 .	Flow Control Valve		Ī		
FCV-78-62 1-3	Flow Control Valve	•	-;  I		
FCV-78-63 1-3	. Flow Control Valve		; I		
FCV-78-64 1-3	Flow Control Valve	•	I		-1 -
FCV-78-65 1-3	Flow Control Valve		I	•	
FCV-78-66 1-3	Flow Control Valve		I		,
FCV-78-67 1-3	Flow Control Valve		I		'н 1
FCV-78-68 1-3	Flow Control Valve		I,		
FIS-78-5		<del>.ch</del>	<u> </u>	<u>ما التي معاند اليون و الحريق من ومحمد ال</u>	
F <del>S-78-51</del>	Flow-Indicator-Swit	ch			, <b></b>

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SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Containment Atmosphere Dilution System (84)

······································	GENERAL EQUI	PMENT		
		a yana ny santa A		•••
TVA Plant Identification Number	Generic Name	<u>Status</u>	NCR No.	LER No.
FSV-84-8A	Flow Solenoid Valve	I	N/A	
FSV-84-88 1	Flow Solenoid Valve	ł	*	
FSV-84-8C	Flow Solenoid Valve	4 1		
FSV-84-8D	Flow Solenoid Valve			
FT-84-19	Flow Transmitter	III	BFNEEB8047	
FSV-84-19	Flow Solenoid Valve	IV	BFNEEB8038	
FT-84-20	Flow Transmitter	.ĮII	BFNEEB8047	
FSV-84-20	Flow Solenoid Valve	İII	BFNEEB8038	
FM-84-20B	Flow Modifier		BFNEEB8055	
PS-84-21	Pressure Switch	III	BFNEEB8045	
PS-84-22	Pressure Switch		BFNEEB8045	
FSV-84-19	Flow Solenoid Valve	IV	BFNEEB8032	• •
FM-84-19B	Flow Modifier			•
FCV-84-19	Flow Control Valve			
FCV-84-20	Flow Control Valve			4 <b>y</b>
FSV-84-20	Flow Solenoid Valve			
M-84-198	1/P Converter	III	BFNEEB8055	

## TABLE 5.2

### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: CRD Hydraulic System (85)

	GENERAL EQUIF	THEN		
TVA Plant Identification Number	Generic Name		<u>Status</u>	<u>NCR No. LER No</u> .
FSV-85-39A	Flow Solenoid Valve	1	III	BFNNEB8031
FSV-85-39B	Flow Solenoid Valve	÷	-	
LS-85-45A	Level Switch		III	BFNNEB8004
LS-85-45B	Level Switch		III	u
LS-85-45C	Level Switch		III	u
LS-85-45D	Level Switch		III	u
LS-85-45E	Level Switch	1	III	n
FCV-85-37C	Flow Control Valve	1	III	BFNNEB8031
FSV-85-35A	Flow Solenoid Valve		III	μ ,
FSV-85-35B	Flow Solenoid Valve		111	n
FSV-85-37A	Flow Solenoid Valve			
FSV-85-37B	Flow Solenoid Valve			
FSV-85-70A	Flow Solenoid Valve		III	BFNEEB8043
FSV-85-70B	Flow Solenoid Valve	ļ	III	Ш
FCV-85-37A	Flow Control Valve	י נ	III	BFNNEB8031&8019
FCV-85-37B	Flow Control Valve		III	U U .
FCV-85-39A	Flow Control Valve	•	III	BFNNEB8006
FCV-85-39B	Flow Control Valve		<b>III.</b> 3	BFNNEB8006

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#### TABLE 5.2

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#### SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

SYSTEM: Radiation Monitoring System (90)

· · · · · · · · · · · · · · · · · · ·	GENERAL EQUIP	MENT		
TVA Plant Identification Number	Generic Name	<u>Status</u>	<u>NCR No</u> .	LER No
RE-90-133	Primary Element			
RE-90-133A	Primary Element	; III	BFNEEB8005	
RE-90-134	Primary Element			
RE-90-134A ,	Primary Element	III	BFNEEB8005	
RE-90-136	Primary Element	III	BFNNEB8005	
RE-90-137	Primary Element	III		
RE-90-138	Primary Element	III		
RE-90-139	Primary Element	III	38	
RE-90-140	Primary Element	III	84	
RE-90-141	Primary Element	III	'n	· ,
RE-90-142	Primary Element	III	38	
RE-90-143	Primary Element	III	"	
FCV-90-254A	Flow Control Valve			
FCV-90-254B	Flow Control Valve			, •
FCV-90-255	Flow Control Valve	r c		
FCV-90-257A	Flow Control Valve			
FCV-90-257B	Flow Control Valve	• .	• *	
RE-90-272A	Primary Element	; ` ·		
RE-90-272B	Primary Element	;		

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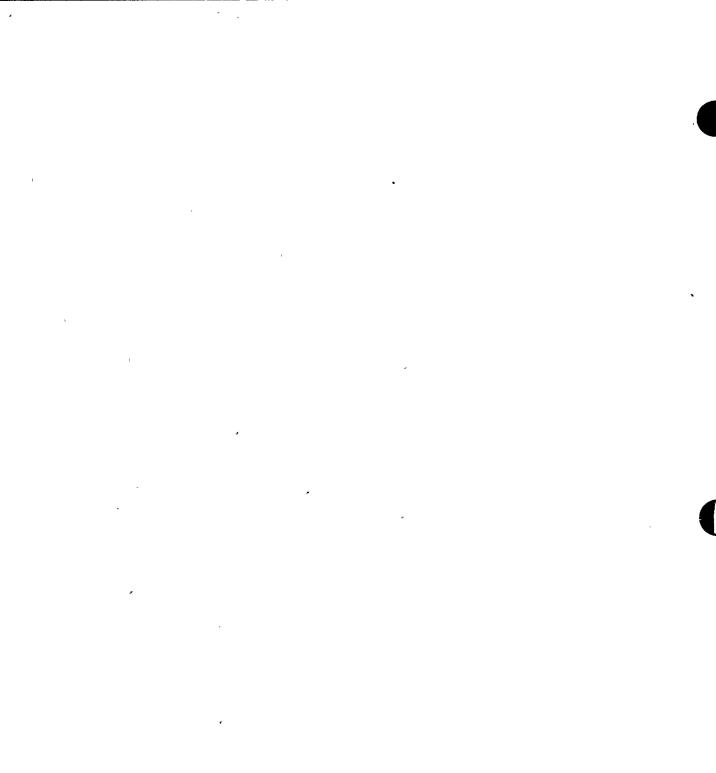
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RE-90-273BPrimary Element.IIIBFNNEB8005RE-90-133APrimary ElementIIIBFNNEB8005RE-90-133APrimary ElementIIIBFNNEB8005RE-90-134APrimary ElementIIIBFNEEB8055RE-90-131APrimary ElementIIIBFNEEB8055RE-90-131APrimary ElementIIIBFNEEB8055RE-90-131APrimary ElementIIIBFNEEB8055RE-90-131APrimary ElementIIIBFNEEB8055RE-90-283APrimary ElementIIIBFNNEB8005RE-90-283BPrimary ElementIIIIIIRE-90-283BPrimary ElementIIIIII	TVA Plant dentification Number	Generic Name	<u>Status</u>	<u>NCR No</u> .	LER No
RE-90-133APrimary ElementRE-90-134APrimary ElementRE-90-134APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementIIIBFNNEB8005	E-90-273B	Primary Element.	· III	BFNNEB8005	
RE-90-134APrimary ElementRE-90-134APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-283APrimary Element	E-90-133A	Primary Element	, III	BFNNEB8005	
RE-90-134APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-283APrimary Element	E-90-133A	Primary Element	, a		
RE-90-131APrimary ElementIIIBFNEEB8055RE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-283APrimary ElementIIIBFNNEB8005	E-90-134A	Primary Element	•	•	
RE-90-131APrimary ElementRE-90-131APrimary ElementRE-90-283APrimary ElementIIIBFNNEB8005	E-90-134A	Primary Element	ł,	• •	•
RE-90-131A Primary Element RE-90-283A Primary Element III BFNNEB8005	E-90-131A	Primary Element	. 111	BFNEEB8055	p,
RE-90-283A Primary Element III BFNNEB8005	E-90-131A	Primary Element	», « >	•	<b>н</b>
	E-90-131A	Primary Element	: • •		
RE-90-283B Primary Element iii "	E-90-283A	Primary Element	·III	BFNNEB8005	
	E-90-2838	Primary Element	iii	н .	

SYSTEM: Radiation Monitoring System (90)



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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Cables (PN, PJ, PNJ, PJJ) Located on HELB areas

	GENE	RAL EQUIPMENT		
Generic Name	<u>Status</u>	NCR No.	LER No.	
Cable (PNJ, PJJ) " (PN, PJ)	II III	EEB8005 EEB8006		•



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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Cable - Polyethylene insulated signal cable in HELB areas

······	GENE	RAL EQUIPMENT		
Generic Name	<u>Status</u>	NCR No.	LER No.	
Cable .	111	EEB8007		•

## Table 5.2

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## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Cable - CP, CPJ, CPJJ, PXJ cable in all environments

	GEN	ERAL	EQUIPMENT	، 	۹ 
Generic Name	<u>Status</u>	•	NCR No.	LER No.	•
Cable	I		None		•



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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Cable - SROAJ (silicone-rubber insulated cable in all environments

الله الا من من من مراجع المناطقة والمسالية المحمومة على الله بقد من من من من من من من من من من من من من	GENEI	RAL EQUIPMENT		لاه ۵۰۰۵ ، باشته جمعیوم میرود و د
<u>Generic Name</u>	Status	NCR No.	LER No.	۰ ۴
Cable	I	None	•	-

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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Cable - COAX, triax, and signal cables of cross-linked polyethylene construction in all environments

GENERAL EQUIPMENT				
<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.	,
Cable	I	None		•



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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

**Control Stations** 

GENERAL EQUIPMENT Generic Name Status <u>NCR No. LER No.</u>				
Generic Name	Status	NCR No.	LER No.	
Control Switches	III	EEB8008	٠	•

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## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Junction Boxes

	GENE	RAL EQUIPMENT	······		
Generic Name	<u>Status</u>	NCR No.	LER No.		
Junction Boxes	III	EEB8009		*	•





## Table 5.2

## SUMMARY OF ELECTRICAL EQUIPMENT QUALIFICATION STATUS

Terminal Blocks

	GENEI	RAL EQUIPMENT			
5	v				
<u>Generic Name</u>	<u>Status</u>	NCR No.	LER No.		
Terminal Blocks	II	EEB8010	•	¢	•

# SECTION 6.0 DESCRIPTION OF QUALIFICATION REPLACEMENT PLAN

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## 6.0 Description of Qualification/Replacement Plan

It is TVA's intention to comply fully with the requirements of Bulletin 79-01B. This section addresses the requirements stated in item 4 of the bulletin for "outstanding items." It is not possible to submit a detailed qualification/replacement plan at this time.

The following items have a great impact on our inability to supply a detailed schedule at this time:

- a) Limitations on industry's capability for testing large numbers of components.
- b) Availability of qualified replacement equipment.
- c) Unit outage schedules.

TVA has a contract with Wyle Laboratories to do any testing that is required to prove qualification of any questionable equipment. Wyle will also provide TVA a detailed schedule of all tests they plan to conduct for TVA.

When we receive schedules of testing from Wyle Lab, we will inform the NRC as stated in your letter dated October 1, 1980, from D. G. Eisenhut to licensees of operating plants. TVA will make a best faith effort to test equipment as soon as possible. However, if problems are encountered with either the testing or qualifiability of the equipment, the justification for continued operation will be reviewed as well as a safety review. It is our plan to schedule first the items that have the greatest impact on safety.

The qualification status of all equipment is listed in Table 5.2. The status of all items fall into one of four categories as listed below.

Category I - Components qualified to DOR quidelines.

Category II - Components for which analysis indicating qualification but that lack documentation to prove qualification to DOR guidelines.

Category III - Items that will be qualified by either analysis or type testing or a combination of these methods.

Category IV - Equipment to be replaced.

For Category IV equipment checks were made to determine the availability of qualified equipment on the market. In general, even if qualified equipment is available the delivery has a long and indefinite lead time.

TVA will submit a detailed schedule for qualifying or replacing all open items by February 1, 1981. This schedule will be developed in conjunction with Wyle Labs.

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SECTION 7.0 DISCUSSION OF QUALITY ASSURANCE PROGRAM FOR REPORT DEVELOPMENT

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7.0 Discussion of the Quality Assurance Program Used for Report Development

The Electrical Equipment Environmental Qualification Report has been prepared under the requirements of the present TVA QA program. TVA QA Topical Report (TVA-TR75-1) provides a description of the inplace QA program. TVA-EN DES engineering procedures applicable to activities involved in the preparation of the qualification report were utilized. Also, some additional QA requirements were applied in preparing the response to IEB 79-01B.

Activities during the preparation of this report were required to be performed in accordance with the procedure, "Electrical Equipment Environmental Qualification Report for Browns Ferry Nuclear Plant - Preparation and Handling." The following has been achieved:

- 1. A portion of the Equipment Evaluation Worksheets (EWS) and their attachments were reviewed by TVA-EN DES Quality Assurance Branch (QAB) for "QA acceptance." This review was made to ensure that applicable QA program requirements were adequately documented on the EWS and its attachments. Due to the November 1, 1980, deadline for issuance of this report, the QA review of all EWS's was not completed. The QA review is ongoing and any discrepancies or errors will be resolved and discussed in subsequent supplemental responses to IEB 79-01B to NRC.
- 2. Qualification information used in the preparation of the report was independently reviewed by the responsible contract engineering branch to determine its acceptability for use. Verbal information obtained from a vendor was required to be confirmed by the vendor in writing.
- 3. TVA-EN DES nonconformance reports were required to be written for all equipment where sufficient qualification data was not presently available to ensure that the equipment would operate in its postulated environment.

The preparation of this report is being continually audited under TVA-EN DES Internal Audit 80-BF1 to verify compliance with applicable procedures and to assure information was correctly obtained and presented in the report. Any audit findings will be resolved promptly.

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APPENDIX A COMPONENT MASTERLIST

COMPONENT PROTERLIST

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### MASTER LIST

The "Master List" provides a listing of the electrical equipment required to function under postulated accident conditions and has been compiled in accordance with action item 1 of IE Bulletin 79-01B. The following information is also provided on the "Master List":

<u>TVA-Plant Identification Number</u>: In most cases this number identifies the component generically, the system number and the control loop the device is in. For components such as pump motors an ID number is not given; therefore, these devices are listed by description.

<u>Generic Name</u>: This name is a general term which describes the component generically.

Location: The location is given in reference to either inside containment (IC) or outside containment (0C). Each device is found in all three units except where noted by the specific unit number (i.e., 0C(1,2) for outside containment in units 1 and 2). For components providing common service to all three units, the designation (CS) is used. Actual room location for the component can be found on the EWS Sheet for that item.

<u>Accident Type</u>: This column designates the following type of accident the component is used for:

	Accident	<u>Abbreviation</u>
- ,	All design basis accidents High energy line break inside containment High energy line break outside containment Loss of coolant accident Other:	A11 DBA HI HO LOCA
	Reactor core isolation cooling system High pressure core injection system Reactor water cooling unit system	RCIC HPCI RWCU

EWS Sheet No.: Complete information on the component is found on the corresponding evaluation work sheet (EWS).

Rev: 0 Date: 10/29/80

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Neutron Monitoring System (NM)

a.	GENERAL EQUIPMENT	, 		
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS <u>Sheet No.</u>
GE-7-104	Valve Assembly	OC	A11 DBA	NEB-NM-287

Rev: 0 Date: 10/29/80

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Auxiliary Power (APS)

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## GENERAL EQUIPMENT

TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS <u>Sheet No.</u>
TS1A (4160-480V)	Transformer	OC (1)	A11 DBA	EEB-APS-0203
TS1E (4160-480V)	Transformer	OC (1)	A11 DBA	EEB-APS-0207
TS1B (4160-480V)	Transformer	OC (1)	ATT DBA	EEB-APS-0204
480V Reactor MOV BD 1C	480V MCC	OC (1)	A11 DBA	EEB-APS-0204
480V Reactor MOV BD 1D	480V MCC	OC (1)	ATT DBA	EEB-APS-0007
Motor-Generator Set 1DN	IM-G Set	OC (1)	A11 DBA	EEB-APS-0191
Motor-Generator Set 1DA	M-G Set	OC (1)	A11 DBA	EEB-APS-0192
Motor-Generator Set 1EM	IM-GSet	OC (1)	A11 DBA	EEB-APS-0193
Motor-Generator Set 1EA	M-G Set	OC (1)	A11 DBA	EEB-APS-0194
M-G Set 1DN Voltage Regulator Box	Voltage Regulator Box	OC (1)	A11 DBA	EEB-APS-0191
M-G Set 1DA Voltage Regulator Box	Voltage Regulator Box	OC (1)	A11 DBA	EEB-APS-0192
M-G Set IEN Voltage Regulator Box	Voltage Regulator Box	OC (1)	A11 DBA	EEB-APS-0193
M-G Set 1EA Voltage Regulator Box	Voltage Regulator Box	OC (1)	A11 DBA	EEB-APS-0194
TS2A (4160-480V)	Transformer	OC (2)	A11 DBA	EEB-APS-0205
TS2E (4160-480V)	Transformer	OC (2)	A11 DBA	EEB-APS-0208
TS2B (4160-480V)	Transformer	OC (2)	A11 DBA	EEB-APS-0206
480V Reactor MOV BD 2C	480V MCC	OC (2)	AII DBA	EEB-APS-0210

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# SYSTEM: Auxiliary Power (APS)

	GENERAL EQUIPMENT			»
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
480V Reactor MOV BD 2D	480V MCC	OC (2)	A11 DBA	EEB-APS-000
480V Reactor MOV BD 2E	480V MCC	OC (2)	A11 DBA	EEB-APS-001
Motor Generator Set 2DN	M-G Set	OC (2)`	A11 DBA	EEB-APS-019
Motor-Generator Set 2DA	M-G Set	0C (2)	A11 DBA	EEB-APS-019
Motor-Generator Set 2EN	M-G Set	OC (2)	A11 DBA	EEB-APS-019
Motor-Generator Set 2EA	M-G Set	OC (2)	A11 DBA	EEB-APS-019
M-G Set 2DN Voltage Regulator Box	Voltage Regulator Box	OC (2)	A11 DBA	EEB-APS-019
M-G Set 2DA Voltage Regulator Box	Voltage Regulator Box	OC (2)	A11 DBA	EEB-APS-019
M-G Set 2EN Voltage Regulator Box	Voltage Regulator Box	OC (2)	A11 DBA	EEB-APS-019
M-G Set 2EA Voltage Regulator Box	Voltage Regulator Box	OC (2)	A11 DBA	EEB-APS-019
480V Reactor MOV BD 3C	480V MCC	OC (3)	A11 DBA	EEB-APS-000
480V Reactor MOV BD 3D	480V MCC	OC (3)	A11 DBA	EEB-APS-005
Motor-Generator Set 3DN	M-G Set	OC (3)	A11 DBA	EEB-APS-019
Motor-Generator Set 3DA	M-G Set	OC (3)	A11 DBA	EEB-APS-020
Motor-Generator Set 3EN	M-G Set	OC (3)	A11 DBA	EEB-APS-020
Motor-Generator Set 3EA	M-G Set	OC (3)	A11 DBA	EEB-APS-020
M-G Set 3DN Voltage Regulator Box	Voltage Regulator Box	OC (3)	A11 DBA	EEB-APS-019
M-G Set 3DA Voltage Regulator Box	Voltage Regulator Box	OC (3)	A11 DBA	EEB-APS-020
M-G Set.3EN Voltage Regulator Box	Voltage Regulator Box	OC (3)	ATT DBA	EEB-APS-020
M-G Set 3EA Voltage Regulator Box	Voltage Regulator Box	OC (3)	A11 DBA	EEB-APS-020

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## SYSTEM: Auxiliary Power (APS)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
480V Reactor MOV BD 1E	480V MCC	OC (3)	A11 DBA	EEB-APS-0009
480V Reactor MOV BD 3E	480V MCC	OC (3)	A11 DBA	EEB-APS-0006
TS3A (4160V-480V)	Transformer	OC (3)	A11 DBA	EEB-APS-0001
TS3B (4160V-480V)	Transformer	OC (3)	A11 DBA	EEB-APS-0002
TS3E (e160V-480V)	Transformer	° 0C (3)	A11 DBA	EEB-APS-0003

<u>Note</u>:

Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

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# MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Main Steam Supply (1)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS <u>Sheet No.</u>
FSV-1-15A	Flow Solenoid Valve	0C	ATT DBA	NEB-1-007
FSV-1-15B	Flow Solenoid Valve	· 0C	A11 DBA	NEB-1-007
FSV-1-15C	Flow Solenoid Valve	00	A11 DBA	NEB-1-007
FSV-1-27A	<ul> <li>Flow Solenoid Valve</li> </ul>	00	· All DBA	NEB-1-007
FSV-1-27B	Flow Solenoid Valve	00	A11 DBA	NEB-1-007
FSV-1-27C	Flow Solenoid Valve	<b>0C</b> .	A11 DBA	NEB-1-007
FSV-1-38A	Flow Solenoid Valve	. 00	A11 DBA	NEB-1-007
FSV-1-38B	Flow Solenoid Valve	00	A11 DBA	NEB-1-007
FSV-1-38C	Flow Solenoid Valve	00	A11 DBA	NEB-1-007
FSV-1-52A	Flow Solenoid Valve	00	A11 DBA	NEB-1-007
FSV-1-52B	Flow Solenoid Valve	00	ATT DBA	NEB-1-007
FSV-1-52C	Flow Solenoid Valve	° 00	A11 DBA	NEB-1-007
FCV-1-56	Flow Control Valve	00	A11 DBA	NEB-1-013
TS-1-17A	Temperature Switch	00	A11 DBA	NEB-1-008
TS-1-17B	Temperature Switch	0C	A11 DBA	NEB-1-008
TS-1-17C	Temperature Switch	00 -	A11 DBA	NEB-1-008
TS-1-17D	Temperature Switch	0C ·	A11 DBA	NEB-1-008
PSV-1-4	Pressure Solenoid Valve	IC	A11 DBA	NEB-1-002

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SYSTEM: Main Steam Supply (1)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
PSV-1-5	Pressure Solenoid Valve	ĬC	A11 DBA	NEB-1-002
PSV-1-18 .	Pressure Solenoid Valve	IC(1,2)	A11 DBA	NEB-1-002A
PSV-1-18	Pressure Solenoid Valve	IC(3)	A11 DBA	NEB-1-002A
PSV-1-19	Pressure Solenoid Valve	IĊ	ATT DBA	NEB-1-002
PSV-1-22	Pressure Solenoid Valve	IC	ATT DBA	NEB-1-002
PSV-1-23	Pressure Solenoid Valve	IC	A11 DBA ·	NEB-1-002
PSV-1-30	Pressure Solenoid Valve	IC(1,2)	A11 DBA	NEB-1-002A
PSV-1-30	Pressure Solenoid Valve	IC(3)	A11 DBA	NEB-1-002A
PSV-1-31	Pressure Solenoid Valve	IC(1,2)	A11 DBA	NEB-1-002
PSV-1-31	Pressure Solenoid Valve	IC(3)	A11 DBA	NEB-1-002
PSV-1-34	Pressure Solenoid Valve	IC	A11 DBA	NEB-1-002
PSV-1-41	Pressure Solenoid Valve	IC(1,2)	A11 DBA	NEB-1-002
PSV-1-41	Pressure Solenoid Valve	IC(3)	A11 DBA	NEB-1-002
PSV-1-42	Pressure Solenoid Valve	IC	A11 DBA	NEB-1-002
PSV-1-179	Pressure Solenoid Valve	IC	A11 DBA	EEB-1-1001
PSV-1-180	Pressure Solenoid Valve	IC	A11 DBA	EEB-1-1002
FSV-1-14A	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005
FSV-1-14B	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005
FSV-1-14C	Flow Solenoid Valve	IC	ATT DBA	NEB-1-005
FSV-1-26A	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005
FSV-1-26B	Flow Solenoid Valve	IC	ATT DBA	NEB-1-005
FSV-1-26C	Flow Solenoid Valve	IC	ATT DBA	NEB-1-005
FSV-1-37A	Flow Solenoid Valve	IC	A11 DBA	'NEB-1-005
FSV-1-37B	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005

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SYSTEM: Main Steam. Supply (1)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FSV-1-37C	Flow Solenoid Valve	- IC	A11 DBA	NEB-1-005
FSV-1-51A	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005
FSV-1-51B	Flow Solenoid Valve	IC	ATT DBA	NEB-1-005
FSV-1-51C	Flow Solenoid Valve	IC	A11 DBA	NEB-1-005
FCV-1-55	Flow Control Valve	, IC	A11 DBA	NEB-1-012
PS-1-4	Pressure Switch	IC	A11 DBA	
PS-1-5	Pressure Switch	IC	A11 DBA	
PS-1-18	Pressure Switch	IC	'All dba	-
·PS-1-19	Pressure Switch	IC	A11 DBA	
PS-1-22 .	Pressure Switch	IC	A11 DBA	
PS-1-23	Pressure Switch	IC	A11 DBA	
PS-1-30	Pressure Switch	IC	ATT DBA	
PS-1-31	Pressure Switch	IC	ATT DBA	
PS-1-34 .	Pressure Switch	IC	ATT DBA	
PS-1-41	Pressure Switch	IC	A11 DBẠ	
PS-1-42	Pressure Switch	IC	A11 DBA	
PS-1-179	Pressure Switch	IC	ATT DBA	
PS-1-180.	Pressure Switch	IC	A11 DBA	
FCV-1-14				
FCV-1-15	Flow Control Valve			
PDIS-1-13A	Pressure Differential Indicator Switch	OC	ATT DBA	NEB-1-003
PDIS-1-13B	Pressure Differential Indicator Switch	<b>)00</b>	A11 DBA	NEB-1-003
PDIS-1-13C	Pressure Differential Indicator Switch	oc	A11 DBA	NEB-1-003

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# SYSTEM: Main Steam Supply (1)

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	GENERAL EQUIPMEN	ſ		
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS Sheet No.
PDIS-1-13D	Pressure Differential Indicator Switch	, OC	A11 DBA	NEB-1-003
PDIS-1-25A	Pressure Differential Indicator Switch	OC	A11 DBA	NEB-1-003
PDIS-1-25B	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
PDIS-1-25C	Pressure Differential Indicator Switch	00	A11 .DBA	NEB-1-003
PDIS-1-25D	Pressure Differential Indicator Switch	00	A11 DBA	·NEB-1-003
PDIS-1-36A	Pressure Differential Indicator Switch	OC	A11 DBA	NEB-1-003
PDIS-1-36B	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
PDIS-1-36C	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
PDIS-1-36D	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
PDIS-1-50A	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
PDIS-1-50B	Pressure Differential Indicator Switch	<b>)</b> 00	A11 DBA	NEB-1-003
PDIS-1-50C	Pressure Differential Indicator Switch	. OC	A11 DBA	NEB-1-003
PDIS-1-50D	Pressure Differential Indicator Switch	00	A11 DBA	NEB-1-003
FCV-1-26	Flow Control Valve	IC	A11_DBA	
FGV-1-27				4
F <del>GV-1-37</del>	Flow-Control-Valve	IC		
FCV-1-38	Flow-Control-Valve	00		
FCV-1-51	Flow-Control-Valve	IC		

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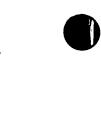
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SYSTEM: Main Steam Supply (1)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
FGV-1-52	Flow-Control-Valve			
ZS-1-14	Zone Switch	IC	A11 DBA	EEB-1-1004
ZS-1-15	Zone Switch	00	A11 DBA	EEB-1-1003
<del>FSV-1-38</del> B	Flow-Solenoid-Valve			······································
F <del>SV-1-386</del>	-Flow-Solenoid-Valve		-ATT DBA-	<u></u>
PSV-1-34	Pressure Solenoid Valve	IÇ	A11 DBA	`
ZS-1-26 (Qty 6)	Zone Switch	IC	A11 DBA	EEB-1-1005
ZS-1-27 (Qty 6)	Zone Switch	<b>OC</b>	ATT DBA	EEB-1-1006
ZS-1-37 (Qty 6)	Zone Switch	IC	A11 DBA	EEB-1-1007
ZS-1-38 (Qty 6)	Zone Switch	0C	A11 DBA	EEB-1-1008
ZS-1-51 (Qty 6)	Zone Switch	IC .	A11 DBA	EEB-1-1009
ZS-1-52 (Qty 6)	Zone Switch	00	ATT DBA	EEB-1-1010
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## MASTER LIST

# ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor Feedwater System (3)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
PS-3-22A	Pressure Switch	00	A11 DBA	NEB-3-015
PS-3-22B	Pressure Switch	00	A11 DBA	NEB-3-015
PS-3-22C	Pressure Switch	00	A11 DBA	NEB-3-015
PS-3-22D	Pressure Switch	00	A11 DBA	NEB-3-015
PS-3-57A	Pressure Switch	00	A11 DBA	NEB-3-018
PS-3-57B	Pressure Switch	00	A11 DBA	NEB-3-018
PS-3-57C	Pressure Switch	00	A11 DBA	NEB-3-018
PS-3-57D	Pressure Switch	00	A11 DBA	NEB-3-018
LIS-3-203A	Level Indicator Switch	00	A11 DBA	NEB-3-023
LIS-3-203B	Level Indicator Switch	00	ATT DBA	NEB-3-023
LIS-3-203C	Level Indicator Switch	OC <sup>`</sup>	A11 DBA	NEB-3-023
LIS-3-203D	Level Indicator Switch	00	A11 DBA	NEB-3-023
LIS-3-208A	Level Indicator Switch	00	A11 DBA	NEB-3-023
LIS-3-208B	Level Indicator Switch	-00	A11 DBA	NEB-3-023
LIS-3-208C	Level Indicator Switch	00	A11 DBA	NEB-3-023
LIS-3-208D	Level Indicator Switch	. 30	A11 DBA	NEB-3-023
LIS-3-58C	Level Indicator Switch	oc	A11 DBA	NEB-3-019
LIS-3-56A	Level Indicator Switch	00	A11 DBA	NEB-3-017
LIS-3-56B	Level Indicator Switch	00	ATT DBA	NEB-3-017
LIS-3-56C	Level Indicator Switch	ÓC -	A11 DBA	NEB-3-017

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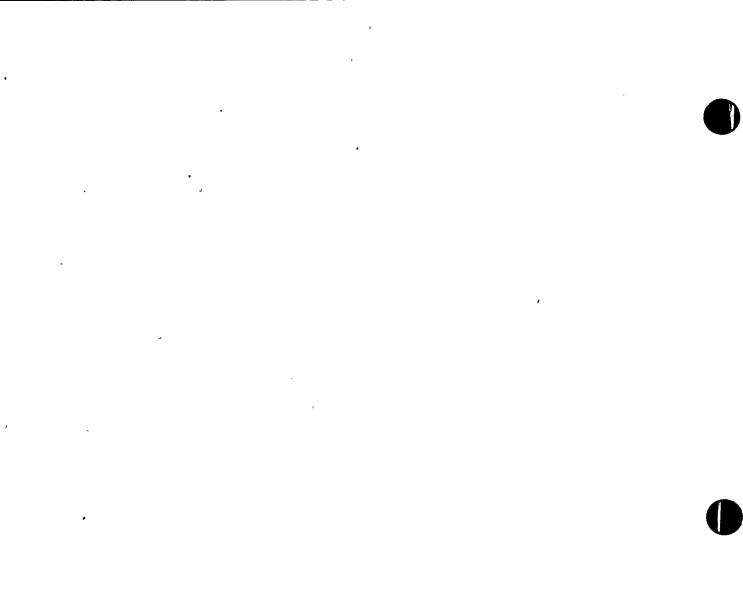
SYSTEM: Reactor Feedwater System (3)

GENERAL EQUIPMENT				
TVA Plant Identification Number	<u>Generic Name</u>	<u>Location</u>	Accident Type	EWS Sheet No.
LIS-3-56D	Level Indicator Switch	00	A11 DBA	NEB-3-017
LITS-3-46B	Level Indicator Temperature Switch	00	A11 DBA	NEB-3-016
LIS-3-184	Level Indicator Switch	0C	A11 DBA	NEB-3-022
LIS-3-185	Level Indicator Switch	00	A11 DBA	NEB-3-022
LIS-3-58A .	Level Indicator Switch	OC	A11 DBA	NEB-3-019
LITS-3-46A	Level Indicator Temperature Switch	00	A11 DBA	NEB-3-016
LITS-3-58B	Level Indicator Temperature Switch	00	A11 DBA	NEB-3-020
LITS-3-58D	Level Indicator Temperature Switch	00	A11 DBA	
PS-3-74A	Pressure Switch	00	A11 DBA	NEB-3-021
PS-3-74B	Pressure Switch	00	A11 DBA	NEB-3-021A

<u>Note</u>:

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: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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# MASTER LIST

# ELECTRICAL EQUIPMENT REQUIRED • TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: RHR Service Water System (23)

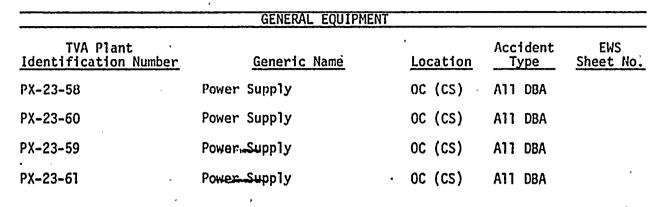
GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
TE-23-32	Temperature Element	00	A11 DBA	NEB-23-025
FCV-23-34	Flow Control Valve	00	A11 DBA	NEB-23-026
TE-23-35	Temperature Element	00	A11 DBA	NEB-23-027
FT-23-36	Flow Transmitter	. OC	A11 DBA	NEB-23-028
TE-23-38	Temperature Element	00	A11 DBA	NEB-23-025
FCY-23-40	Flow Control Valve	00	A11 DBA	NEB-23-026
TE-23-41	Temperature Element	<b>30</b> -	A11 DBA ·	NEB-23-027
FT-23-42	Flow Transmitter	00	A11 DBA	NEB-23-028
TE-23-44	Temperature Element	00	A11 DBA	NEB-23-025
FCV-23-46	Flow Control Valve	00	A11 DBA	NEB-23-026
TE-23-47	Temperature Element	00	A11 DBA	NEB-23-027
FT-23-48	Flow Transmitter	00	A11 DBA	NEB-23-028
TE-23-50	Temperature Element	00	A11 DBA	NEB-23-025
FCV-23-52	Flow Control Valve	00	A11 DBA	NEB-23-026
TE-23-53	Temperature Element	00	A11 DBA	NEB-23-027
FT-23-54	Flow Transmitter	00	A11 DBA	NEB-23-028
FSV-23-56	Flow Solenoid Valve	OC(1,2)	A11 DBA	NEB-23-1001
FCV-23-57	Flow Control Valve	OC(1,2)	A11 DBA	NEB-23-029



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SYSTEM: RHR Service Water System (23)



Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Raw Cooling Water (24)

GENERAL EQUIPMENT						
TVA Plant Identification Number	<u>Generic Name</u>	<u>Location</u>	Accident Type	EWS <u>Sheet No.</u>		
PS-24-133B	Pressure Switch	OC (3)	ATI DBA	EEB-24-1002		
PS-24-133A	Pressure Switch	OC (3)	A11 DBA	EEB-24-1001		



<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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# MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Control Air System (32)

# GENERAL EQUIPMENT

TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
FSV-32-62	Solenoid Valve	IC	A11 DBA	EEB-32-1001
FSV-32-63	Solenoid Valve	IC	A11 DBA	EEB-32-1002

Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers. Note:

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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Sampling and Water Quality (43)

GENERAL EQUIPMENT				
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS Sheet No.
FSV-43-14	Flow Solenoid Valve	0C	A11 DBA	NEB-43-032
FIS-43-13A	Flow Indicator Switch	00	A11 DBA	EEB-43-1002
FIS-43-13B	Flow Indicator Switch	<b>00</b>	A11 DBA	EEB-43-1001
FSV-43-13	Flow Solenoid Valve	IC	A11 DBA	NEB-43-030
FCV-43-13	Flow Control Valve	IC (1,2)	ATT DBA	NEB-43-031
FCV-43-14	Flow Control Valve	OC (1,2)	ATT DBA	NEB-43-033

<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

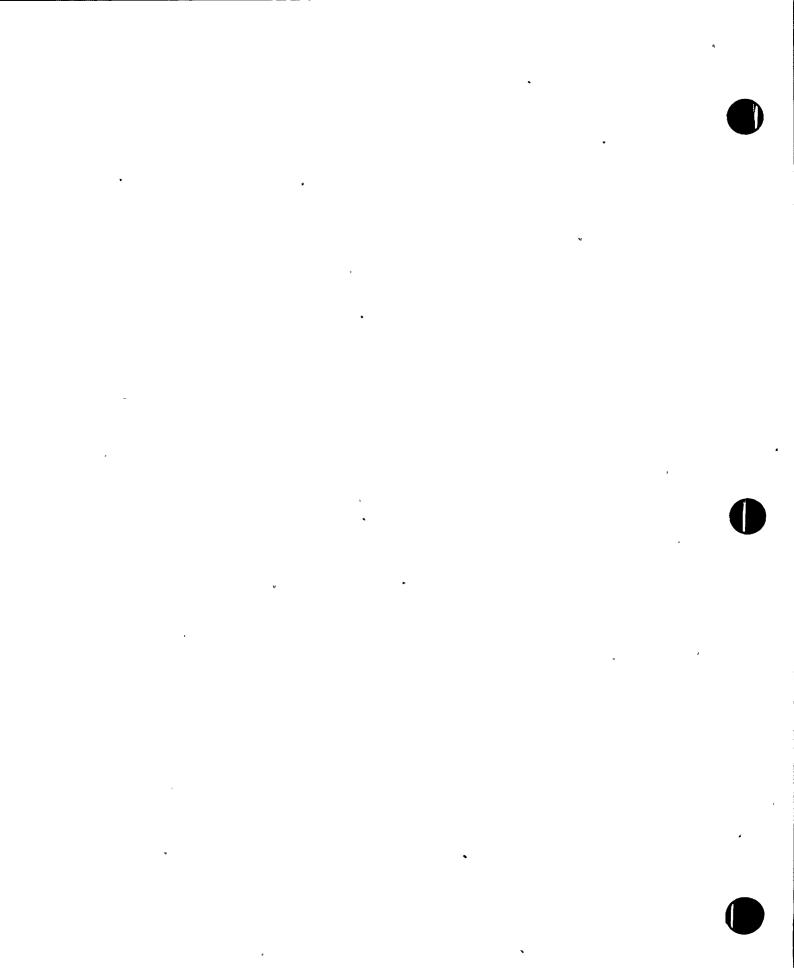
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SYSTEM: Standby Liquid Control System (63)

TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
TE-63-2	Temperature Element	. OC	A11 DBA	NEB-63-035
PT-63-7	-Pressure-Transmitter			· · · · · · · · · · · · · · · · · · ·
FCV-63-8A	Flow Control Valve	, DO	A11 DBA	NEB-63-068
FCV-63-8B	Flow Control Valve	00	A11 DBA	NEB-63-038
FIS-63-11	Flow Indicator Switch	oc	A11 DBA	
TIC-63-2	Temperature Indicator Control	OC	A11 DBA	NEB-63-034
SLC Pump Motor A	Pump Motor	00	A11 DBA	NEB-63-037
SLC Pump Motor B	Pump Motor	00	A11 DBA	NEB-63-03
PI-63-7A	Pressure Indicator	00	A11 DBA	
TC-63-5A	Temperature Control	. OC	A11 DBA	MEB-63-01
TC-63-5B	Temperature Control	OC	A11 DBA	MEB-63-01



<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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## MASTER'LIST

# ELECTRICAL EQUIPMENT REQUIRED . TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

# SYSTEM: Primary Containment System (64)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FSV-64-9	Flow Solenoid Valve	.30	A11 DBA	
FSV-64-10	Flow Solenoid Valve	00	A11 DBA	
FSV-64-17	Flow Solenoid Valve	່ວວ	A11 DBA	NEB-64-039
FSV-64-18	Flow Solenoid Valve		ATT DBA	NEB-64-040
FSV-64-19	Flow Solenoid Valve	00	A11 DBA	NEB-64-040
FSV-64-20	Flow Solenoid Valve	00	A11 DBA	NEB-64-040
FSV-64-21	Flow Solenoid Valve	00	A11 DBA	NEB-64-040
FSV-64-29	Flow Solenoid Valve	00	ATT DBA	NEB-64-047
FSV-64-30	Flow Solenoid Valve	00	A11 DBA	NEB-64-047
FSV-64-31	Flow Solenoid Valve	00	A11 DBA	NEB-64-047
FSV-64-32	Flow Solenoid Valve	00	A11 DBA	NEB-64-053
FSV-64-33	Flow Solenoid Valve	00	A11 DBA	NEB-64-053
FSV-64-34	Flow Solenoid Valve	00	A11 DBA	NEB-64-053
FSV-64-36	Flow Solenoid Valve	00	A11 DBA	EEB-64-102
FSV-64-40	Flow Solenoid Valve	00	A11 DBA	EEB-64-102
FSV-64-41	Flow Solenoid Valve	00	A11 DBA	EEB-64-102
FSV-64-42	Flow Solenoid Valve	00	A11 DBA	
FSV-64-43	Flow Solenoid Valve	OC	A11 DBA	

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SYSTEM: Primary Containment System (64)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS <u>Sheet No.</u>
FSV-64-44	Flow Solenoid Valve	OC (1)	A11 DBA	EEB-64-1029
FSV-64-45	Flow Solenoid Valve	OC (1)	A11 DBA	EEB-64-1030
TE-64-52B	Thermocouple	00	A11 DBA	EEB-64-1027
LT-64-54	Level Transmitter	` oc	A11 DBA	NEB-64-061
TE-64-55A	Temperature Element	00	ATT DBA	NEB-64-062
TE-64-55B	Temperature Element	oc	A11 DBA	NEB-64-063
TE-64-55C	Temperature Element	00	A11 DBA	NEB-64-063
TE-64-55D	Temperature Element	00	A11 DBA	NEB-64-062
TE-64-55E	Temperature Element	00	A11 DBA	NEB-,64-062
TE-64-55F	Temperature Element	· 0C	A11 DBA	NEB-64-062
FC0-64-60A	Flow Control Operator	OC (1,	B)A11 DBA	MEB-64-01
FC0-64-60B	Flow Control Operator	OC (1,	B)ATT DBA	MEB-64-01
FC0-64-60C	Flow Control Operator	OC (1,	B)ATI DBA	MEB-64-01
FC0-64-60D .	Flow Control Operator	OC (1)	A11 DBA	MEB-64-01
LT-64-66	Level Transmitter	00	ATT DBA	NEB-64-067
TS-64-68	Temperature Sensor	00	A11 DBA	MEB-64-02
TS-64-69	Temperature Sensor	00	A11 DBA	MEB-64-02
TS-64-70	Temperature Sensor	00	A11 DBA	MEB-64-02
TS-64-71	Temperature Sensor	00	A11 DBA	MEB-64-02
TS-64-72	Temperature Sensor	00	ATT DBA	MEB-64-02
FSV-64-139	Flow Solenoid Valve	00	A11 DBA	EEB-64-1034
FSV-64-140	Flow Solenoid Valve	00	A11 DBA	EEB-64-1022
FSV-64-141	Flow Solenoid Valve	00	A11 DBA	EEB-64-1033
PT-64-51	-Prossupe-Transmitter			

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GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
PX-64-51	Power Supply	00	ATI DBA	NEB-64-060
PDIS-64-20	Pressure Differential Indicator Switch	OC	A11 DBA	NEB-64-046
PDIS-64-21	Pressure Differential Indicator Switch	00	ATT DBA	NEB-64-046
PS-64-57D	Pressure Switch	00	A11 DBA	NEB-64-065
PS-64-58A	Pressure Switch	00	A11 DBA	NEB-64-066
PS-64-58B	Pressure Switch	00	A11 DBA	NEB-64-066
PS-64-58C	Pressure Switch	00	A11 DBA	NEB-64-066
PDS-64-15	Pressure Differential Switch	00	A11 DBA	EEB-64-1001
PDM-64-16	Pressure Differential Switch	- • OC	A11 DBA	EEB-64-1014
PDIC-64-16	Pressure Differential Indicator Switch	00	A11 DBA	EEB-64-1016
PDT-64-16	Pressure Differential Transmitter	, oc	A11 DBA	EEB-64-1019
TE-64-52A	Temperature Element	IC	ATT DBA	EEB-64-1039
TE-64-52C	Temperature Element	IC	A11 DBA	EEB-64-1040
PDS-64-62A	Pressure Differential Switch	OC	A11 DBA	EEB-64-1041
PDS-64-62C	Pressure Differential Switch	00	.A11 DBA	EEB-64-1005
FCV-64-20	Flow Control Valve	00	All DBA	
FCV-64-21	Flow Control Valve	0C.	A11 DBA	
FCV-64-19	Flow Control Valve	00	A11 DBA	
FCV-64-18	Flow Control Valve	00	A11 DBA	
FC0-64-43	Flow Control Operator	00	A11 DBA	

SYSTEM: Primary Containment System (64)



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# SYSTEM: Primary Containment System (64)

	GENERAL EQUIPMENT	ſ	<u></u>	
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident 	EWS Sheet No.
PDS-64-62B	Pressure Differential Switch	00	A11 DBA	EEB-64-1003
PDS-64-62D .	Pressure Differential Switch	oc	ATT DBA	EEB-64-1026
TS-64-73	Temperature Switch	00	A11 DBA	MEB-64-02
PDS-64-63 .	Pressure Differential Switch	0C (1)	A11 DBA	EEB-64-1012
PDS-64-61A	Pressure Differential Switch	OC (1)	A11 DBA	EEB-64-1006
PDS-64-61C	Pressure Differential Switch	OC (1)	A11 DBA	EEB-64-1008
PDT-64-64	Pressure Differential Switch	0C (1)-	A11 DBA	EEB-64-1021
PDM-64-64	Pressure Differential Switch	0C (1)	ATT DBA	EEB-64-1038
PDT-64-8	Pressure Differential Transmitter	OC (1)	A11. DBA	EEB-64-1020
PDM-64-8	Pressure Differential Monitor	0C (1)	A11 DBA	EEB-64-1015
PDIC-64-8	Pressure Differential Indicator Control	0C (1)	A11 DBA	EEB-64-1017
PDS-64-61B .	Pressure Differential Switch	0C (1)	ATT DBA	
PDS-64-61D	Pressure Differential Switch	OC (1)	ATT DBA	EEB-64-1009
PDS-64-7	Pressure Differential Switch	0C (1)	ATT DBA	EEB-64-1011
PS-64-56A	Pressure Switch	00	A11 DBA	NEB-64-064
PS-64-56B	Pressure Switch	OC	A11 DBA	NEB-64-064

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GENERAL EQUIPMENT Accident EWS TVA Plant Туре Sheet No. Generic Name Location Identification Number A11 DBA NEB-64-064 Pressure Switch **0C** PS-64-56C NEB-64-064 00 A11 DBA Pressure Switch PS-64-56D NEB-64-066 0C A11 DBA PS-64-58D Pressure Switch MEB-64-01 Flow Control Operator IC A11 DBA FC0-64-65D MEB-64-01 Flow Control Operator OC (1) A11 DBA FCO-64-65A MEB-64-01 0C(1)A11 DBA Flow Control Operator FCO-64-65B MEB-64-01 Flow Control Operator 00(1)A11 DBA FC0-64-65C NEB-64-065 00 A11 DBA Pressure Switch PS-64-57A NEB-64-065 0Ċ A11 DBA Pressure Switch PS-64-57B NEB-64-065 00 A11 DBA PS-64-57C Pressure Switch NEB-64-068 **0C** A11 DBA Pressure Transmitter PT-64-67 0C(1)A11 DBA EEB-64-1018 Pressure Differential PDIC-64-64 Flow Control Operator 00 A11 DBA FCO-64-40 **0**C A11 DBA Flow Control Operator FC0-64-41 **0C** A11 DBA Flow Control Operator FC0-64-44 **0C** A11 DBA Flow Control Operator FC0-64-45 00 A11 DBA Flow Control Operator FC0-64-36 Flow Control Valve 00 A11 DBA FCV-64-29 00 A11 DBA Flow Control Valve FCV-64-30 A11 DBA Flow Control Valve **0**C FCV-64-31 A11 DBA FCV-64-32 Flow Control Valve **0**C A11 DBA FCV-64-33 Flow Control Valve **0C** A11 DBA 00 FCV-64-34 Flow Control Valve FCV-64-139 Flow Control Valve 00 A11 DBA

SYSTEM: Primary Containment System (64)



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SYSTEM: Primary Containment System (64)

	GENERAL EQUIPME	NT		
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident	EWS Sheet No.
FCV-64-140	Flow Control Valve	00	A11 DBA	
FCV-64-141	Flow Control Valve	00	A11 DBA	
PX-64-54	Power Supply	-0C	AÌI DBA	
FSV-64-139	Flow Solenoid Valve	OC(1,2)	) A11 DBA	EEB-64-10
FSV-64-140	Flow Solenoid Valve	0C(1,2)	) A11 DBA	EEB-64-10
FSV-64-141	Flow Solenoid Valve	0C(3)	A11 DBA	EEB-64-10
PDS-64-62A/C	Pressure Differential S	witch OC	A11 DBA	EEB-64-10
PDS-64-62B/D	Pressure Differential S	witch OC	A11 DBA	EEB-64-10
PDS-64-61 B/D	Pressure Differential S	witch OC (1)	A11 DBA	EEB-64-10
PDS-64-61B	Pressure Differential S	witch OC (1)	ATT DBA	EEB-64-10
PDS-64-61 A/C	Pressure Differential Su	witch OC (1)	A11 DBA	EEB-64-10
PT-64-51	Pressure Transmitter	00	ATT DBA	NEB-64-05
FCV-64-18	Flow Control Valve	<b>`0C</b>	A11 DBA	NEB-64-04
FCV-64-19	Flow Control Valve	00	A11 DBA	NEB-64-04
FCV-64-29	Flow Control Valve	00	A11 DBA	NEB-64-04
FCV-64-30	Flow Control Valve	00	A11 DBA	NEB-64-05
FCV-64-31	Flow Control Valve	00	A11 DBA	NEB-64-05
FCV-64-32	Flow Control Valve	00	A11 DBA	NEB-64-05
FCV-64-33	Flow Control Valve	0C	A11 DBA	NEB-64-05
FCV-64-34	Flow Control Valve	00	A11 DBA	NEB-64-05
PT-64-50	Pressure Transmitter	ÖC	A11 DBA	NEB-64-058

<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

## SYSTEM: Standby Gas Treatment (65)

GENERAL EQUIPMENT				6.
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS Sheet No.
FT-65-1	Flow Transmitter	0C (CS)	A11 DBA	EEB-65-100

<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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# MASTER LIST

# ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Emergency Equipment Cooling Water System (67)

# GENERAL EQUIPMENT

•	TVA Plant Identification Number	Generic Name	_ Location	Accident Type	EWS Sheet No.
•	PT-67-15	Pressure Transmitter	OC (1)	A11 DBA	EEB-67-1006
	PT-67-16	Pressure Transmitter	OC (1)	A11 DBA	EEB-67-1011
	FCV-67-17	Flow Control Valve	OC (1)	A11 DBA	MEB-67-01
• •	FCV-67-18	Flow Control Valve	IC (1)	A11 DBA	MEB-67-02
	PT-67-19	Pressure Transmitter	0C (2)	ATT DBA	EEB-67-1010
	PT-67-20	Pressure Transmitter	OC (2)	A11 DBA	EEB-67-1009
*	FCV-67-21	Flow Control Valve	OC (2)	ATT DBA	MEB-67-01
	FCV-67-22	Flow Control Valve	IC (2)	ATT DBA	MEB-67-02
	PT-67-23	Pressure Transmitter	OC (3)	ATT DBA	EEB-67-1007
	PT-67-24	Pressure Transmitter	OC (3)	ATT DBA	EEB-67-1008
	FCV-67-25	Flow Control Valve	OC (3)	A11 DBA	MEB-67-01
	FCV-67-26	Flow Control Valve	IC (3)	A11 DBA	MEB-67-02
	PX-67-12B	Power Supply	OC (1)	ATI DBA	
	FSV-67-53	Solenoid Valve	0C (CS)	A11 DBA	EEB-67-1001
•	FCV-67-53	Control Valve	OC (1)	ATT DBA	
,	FSV-67-50	Flow Solenoid Valve	00	A11 DBA	EEB-67-1003
	FSV-67-51	Flow Solenoid Valve	00	A11 DBA	EEB-67-1002



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GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FM-67-3B	Signal Modifier	OC (1)	A11 DBA	
PX-67-3B	Power Supply	OC (1)	ATT DBA	
FT-67-9A	Flow Transmitter	OC (1)	A11 DBA	EEB-67-101
FT-67-98	Flow Transmitter	OC (1)	A11 DBA	
FM-67-9B	Flow Modifier	0C (1)	A11 DBA	•
PX-67-9B	Power Supply	OC (1)	A11 DBA	
FM-67-12B	Flow Modifier	OC (1)	A11 DBA	
FM-67-6B	Flow Modifier	OC (1)	A11 DBA	
PX-67-6B	Power Supply	OC (1)	ATT DBA	я
FS-67-12B	Flow Switch	00	A11 DBA	
FT-67-12A	Flow Transmitter	00	A11 DBA	*
FT-67-12B	Flow Transmitter	00	A11 DBA	
FCV-67-50	Flow Control Valve	00	A11 DBA	
FCV-67-51	Flow Control Valve	00	ATT DBA	

SYSTEM: Emergency Equipment Cooling Water System (67)



<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor Water Recirculation (68)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FCV-68-1	Flow Control Valve	IC	A11 DBA	NEB-68-069
FCV-68-3	Flow Control Valve	IC	A11 DBA	NEB-68-070
PS-68-93	Pressure Switch	OC (1,2)	A11 DBA	· · ·
PS-68-94	Pressure Switch	00	A11 DBA	
FCV-68-77	Flow Control Valve	IC	A11 DBA	NEB-68-069
FCV-68-79	Flow Control Valve	IC	A11 DBA	NEB-68-070
PS-68-95	Pressure Switch	. oc	A11 DBA	- ٦
PS-68-96	Pressure Switch	00 .	ATT DBA	NEB-68-072/

Note:

Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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# MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor Water Cleanup System (69)

GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FCV-69-2	Control Valve	00	A11 DBA	NEB-69-74
TE-69-29A	Temperature Element	OC	но .	NEB-69-76
TE-69-29B	Temperature Element	00	НО	NEB-69-77
TE-69-29C	Temperature Element	00	НО	NEB-69-78
TE-69-29D	Temperature Element	00	НО	NEB-69-78
TE-69-29E	Temperature Element	00	НО	NEB-69-79
TE-69-29F	Temperature Element	00	НО	NEB-69-80
TE-69-29G	Temperature Element	00	но	NEB-69-79
те-69-39н	Temperature Element	, DO	НО	NEB-69-79
TS-69-30A	Temperature Sensor	. DO	H0*	EEB-69-1002
TS-69-30B	Temperature Sensor	00	H0*	EEB-69-1003
TS-69-30C	Temperature Sensor	00	H0*	EEB-69-1004
TS-69-30D	Temperature Sensor	<b>0</b> 0	H0*	EEB-69-1001
TS-69-30E	Temperature Sensor	00	H0*	EEB-69-1007
TS-69-30F	Temperature Sensor	0C	H0*	EEB-69-1008
TS-69-30G	Temperature Sensor	<b>.</b> 0C	H0*	EEB-69-1006
TS-69-30H	Temperature Sensor	00	Н0*	EEB-69-1005
ZS-69-1	Zone Switch	IC	A11 DBA	

\*RWCU only

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SYSTEM: Reactor Water Cleanup System (69)

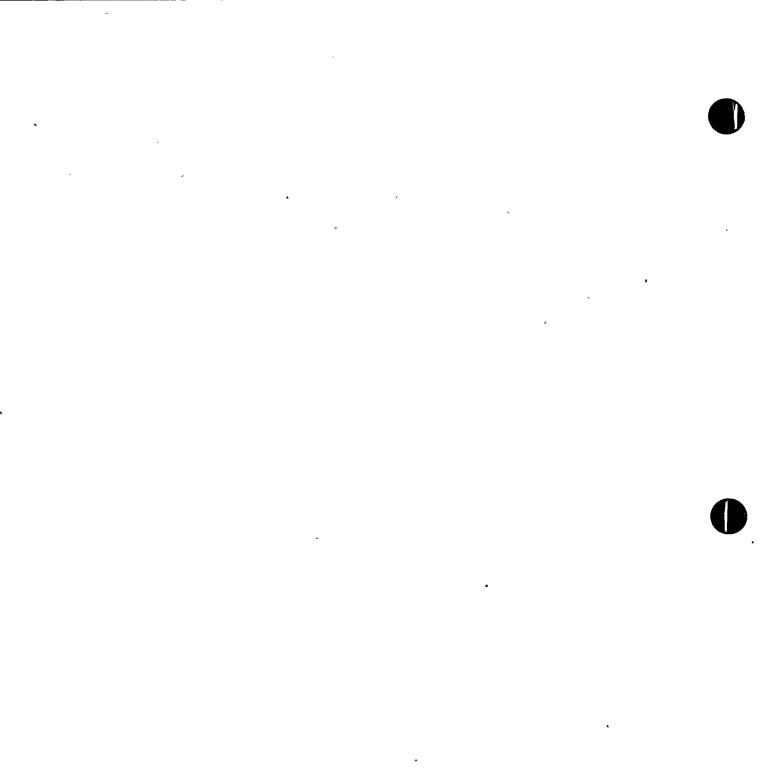
GENERAL EQUIPMENT					
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.	
TS-69-29J	Temperature Switch	00	H0*	NEB-69-81	
TS-69-29K	Temperature Switch	00	H0*	NEB-69-81	
TS-69-29L	Temperature Switch	00	H0*	NEB-69-81	
TS-69-29M	Temperature Switch	00	H0*	NEB-69-81	
FCV-69-1	Flow Control Valve	IC	A11 DBA	NEB-69-73	

\*RWCU only

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<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

## SYSTEM: Reactor Building Closed CW System (70)

	GENERAL EQUIPMENT			······
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS <u>Sheet No.</u>
FCV-70-47	Flow Control Valve	IC	A11 DBA	NEB-70-82

Note: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor Core Isolation Cooling (71)

## GENERAL EQUIPMENT

	TVA Plant Identification Number	Generic Name	Loc	<u>cation</u>	Accident Type	EWS Sheet No.
	FCV-71-2	Flow Control Valve		IC	A11 DBA	NEB-71-85
	PS-71-110	Pressure Switch		0C	HI-HO*	NEB-71-104
•	PS-71-11D	Pressure Switch		00	HI-HO*	NEB-71-104
	FCV-71-25	Flow Control Valve		OC(1,2,	3 <b>)</b> HI-HO*	MEB-71-02
	SE-71-42A	Speed Sensor		0C	HI-HO*	NEB-71-122
	SE-71-42B	Speed Sensor		0C	HI-HO*	NEB-71-122
	TS-71-2A	Temperature Sensor		0C(1)	RCIC	NEB-71-089A
	TS-71-28	Temperature Sensor		0C(1)	RCIC	NEB-71-089A
•	TS-71-2C	Temperature Sensor		0C(1)	RCIC	NEB-71-089A
	TS-71-2D	Temperature Sensor		0C(1)	RCIC	NEB-71-089A
	TS-71-2E	Temperature Sensor		00	RCIC	ŇEB-71-90
	TS-71-2F	Temperature Sensor		00	RCIC	NEB-71-90
	TS-71-2G	Temperature Sensor		00	RCIC	NEB-71-90
	TS-71-2H	Temperature Sensor		00	RCIC	NEB-71-90
	TS-71-2J	Temperature Sensor	-	00	RCIC	NEB-71-90
	TS-71-2K	Temperature Sensor		00	RCIC	NEB-71-90.
	TS-71-2L	Temperature Sensor		00	RCIC	NEB-71-90
	TS-71-2M	Temperature Sensor		00	RCIC	NEB-71-90
	TS-71-2N	Temperature Sensor		0Ç	RCIC	NEB-71-90
	*HELR outside containmo	nt avaant fan BCIC	•	•		

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SYSTEM:	Reactor	Core	Isolation	Cooling	(71)
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	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
TS-71-2P	Temperature Sensor	00	RCIC	NEB-71-90
TS-71-2R	Temperature Sensor	00	RCIC	NEB-71-90
TS-71-2S	Temperature Sensor	OC	RCIC	NEB-71-90
FCV-71-3	Flow Control Valve	00	A11 DBA	NEB-71-96 ,
PT-71-4	Pressure Transmitter	0C	HI-H0*	NEB-71-99
FCV-71-8	Flow Control Valve	00	HI-HO*	NEB-71-100
FCV-71-9	Flow Control Valve	. OC	HI-H0*	NEB-71-101
FCV-71-10	Flow Control Valve	00	HI-H0*	NEB-71-102
SC-71-10	Speed Control	00	HI~HO*	NEB-71-103
PT-71-12	Pressure Transmitter	00	HI-H0*	NEB-71-105
PS-71-13A	Pressure Switch	0C	HI-H0*	NEB-71-106
PS-71-138	Pressure Switch	00	HI-HO*	NEB-71-106
FCV-71-17 ·	Flow Control Valve	00	HI-HO*	NEB-71-107
FCV-71-18	Flow Control Valve	00	HI-HO*	NEB-71-108
FCV-71-19	Flow Control Valve	00	HI-HO*	NEB-71-109
PT-71-20	Pressure Transmitter	0C	HI-HO*	NEB-71-110
PS-71-21	Pressure Switch	0C	HI-HO*	NEB-71-104
PS-71-21-1	Pressure Switch	00	HI-HO*	NEB-71-112
FCV-71-34	Flow Control Valve	00	HI-HO*	MEB-71-02
PT-71-35	Pressure Transmitter	00	HI-HO*	70

\*HELB outside containment except for RCIC

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SYSTEM: Reactor Core Isolation Co	oling	(71)
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	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FS-71-36	Flow Switch	· 0C	HI-HO*	NEB-71-115
FT-71-36	Flow Transmitter	00	HI-HO*	NEB-71-116
FCV-71-37	Flow Control Valve	00	HI-HO*	NEB-71-117
FCV-71-38	Flow Control Valve	00	HI-HO*	NEB-71-118
FCV-71-39	Flow Control Valve	00	HI-HO*	NEB-71-119
TE-71-41A	Temperature Element	OC	RCIC	NEB-71-120
TE-71-418		<del></del>		•
TE-71-41C	Temperature Element	OC	RCIC	° NEB-71-121
TE-71-41D	Temperature Element	0C-	RCIC	NEB-71-121
PS-71-44	Pressure Switch	00	HI-HO*	NEB-71-123
TIS-71-45	Temperature Indicator Switch	00	HI-HO*	NEB-71-124
TIS-71-46	Temperature Indicator Switch	00	HI-HO*	NEB-71-125
FSV-71-6B	Flow Solenoid Valve	00	HI-HO*	EEB-71-1002
PS-71-1A	Pressure Switch	0C	A11 DBA	NEB-71-84
PS-71-1B	Pressure Switch	00	A11 DBA	NEB-71-84
PS-71-1C	Pressure Switch	<b>&gt; 0C</b>	A11 DBA	NEB-71-84
PS-71-1D	Pressure <sup>'</sup> Switch	0C	A11 DBA	NEB-71-84
PDIS-71-1A	Pressure Differential Indicator Switch	00	HO-RCIC	NEB-71-83
PDIS-71-1B	Pressure Differential Indicator Switch	0C(1,3)	HO-RCIC	NEB-71-83

\*HELB outside containment except for RCIC

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SYSTEM: Reactor Core Isolation Cooling (71)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
PS-71-11A	Pressure Switch	0C(1,3)	HI-HO*	NEB-71-104
PS-71-11B	Pressure Switch	0C(1,3)	HI-HO*	NEB-71-104
FCV-71-59	Flow Control Valve	OC(2,3)	HI-HO*	MEB-71-01
FIC-71-36A	Flow-Indicator-Control		<u>-HI-H0*</u>	<u> </u>
FM-71-36	Signal Modifier	00	HI-HO*	NEB-71-114
PX-71-4	Power Supply	00	HI-HO*	NEB-71-98
FT-71-1A	Flow Transmitter	00	HI-HO*	
FT-71-1B	Flow Transmitter	00	HI-HO*	
FSV-71-6A	Flow Solenoid Valve	00	HI-HO*	•
PX-71-35	Power Supply	00	HI-HO*	
PX-71-36A ·	Power Supply	00	HI-HO*	1
PX-71-12	Power Supply	. OC	HI-HO*	
FR-71-36	Flow Recorder	00	HI-HO*	
TS-71-2A	Temperature Sensor	OC(2,3)	RCIC	NEB-71-089
TS-71-2B	Temperature Sensor	0C(2,3)	RCIC	NEB-71-089
TS-71-2C	Temperature Sensor	0C(2,3)	RCIC	NEB-71-089
TS-71-2C	Temperature Sensor	. OC(2,3)	RCIC	NEB-71-089
PT-71-48	Pressure Transmitter	OC(3)	RCIC	NEB-71-97
FSV-71-6A	Flow Solenoid Value	00	HI-HO*	EEB-71-1001
TS-71-9	Temperature Switch	0C(3)	RCIC	NEB-71-101
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\*Outside containment except for RCIC

Note: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: High Pressure Core Injection (73)

	· GENERAL EQUIPMENT			·······
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FCV-73-3	Flow Control Valve	· 0C	A11 DBA	NEB-73-147
FCV-73-2	Flow Control Valve	IC	A11 DBA	NEB-73-130
FCV-73-27	Flow Control Valve	00	HI-HO	NEB-73-161
PT-73-4	Pressure Transmitter	00	A11 DBA	
SE-73-5	Speed Sensor	00	HI-HO*	NEB-73-148
SC-73-19	Speed Control	00	HI-H0*	NEB-73-154
PT-73-21	Pressure Transmitter	00	HI-HO*	NEB-73-154
FS-73-33	Flow Switch	00	HI-HO*	NEB-73-157
PS-73-22A	Pressure Switch	OC(2,3)	HI-HO*	NEB-73-164
PS-73-22B	Pressure Switch	0C(2,3)	) HI-HO*	NEB-73-158
PS-73-20B	Pressure Switch	00	HI-HO*	NEB-73-158
PS-73-20C	Pressure Switch	00	HI-HO*	NEB-73-156
PS-73-20D	Pressure Switch	00	HI-HO*	NEB-73-156
PS-73-20A	Pressure Switch	00	HI-HO*	NEB-73-156
HPCI Aux Oil Pump Mtr	Pump Motor	00	HI-H0*	NEB-73-156
TIS-73-52	Temperature Indicator Switch	OC	HI-HO*	NEB-73-173
PS-73-1A	Pressure Switch	OC(1,2)	A11 DBA	NEB-73-128

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\*Outside containment except for HPCI





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# SYSTEM: High Pressure Core Injection (73)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	<u>Generic Name</u>	<u>Location</u>	Accident	EWS Sheet No.
PS-73-1B	Pressure Switch	00	A11 DBA	NEB-73-128
PS-73-1C	Pressure Switch	00	A11 DBA	NEB-73-128
PS-73-1D	Pressure Switch	00	A11 DBA	NEB-73-12
PDIS-73-1A	Pressure Differential Indicator Switch	00	HO-HPCI	NEB-73-12
PDIS-73-1B	Pressure Differential Indicator Switch	00	HO-HPCI	NEB-73-12
FT-73-33	Flow Transmitter	00	HI-H0*	NEB-73-16
TS-73-2A	Temperature Sensor	00	HPCI	NEB-73-13
TS-73-2B	Temperature Sensor	00	HPCI	NEB-73-13
TS-73-2C	Temperature Sensor	00	HPCI	NEB-73-13
TS-73-2D	Temperature Sensor	00	HPCI	NEB-73-13
TS-73-2E	Temperature Sensor	0C (2,3	) HPCI	NEB-73-13
TS-73-2F	Temperature Sensor	• OC (2,3	) HPCI	NEB-73-13
TS-73-2G	Temperature Sensor	OC (2,3	) HPCI	NEB-73-13
TS-73-2H	Temperature Sensor	OC (2,3	) HPCI	NEB-73-13
TS-73-2J	Temperature Sensor	· 0C	HPCI	NEB-73-14
TS-73-2K	Temperature Sensor	00	HPCI	NEB-73-14
TS-73-2L	Temperature Sensor	00	HPCI	NEB-73-14
TS-73-2M	Temperature Sensor	OC	HPCI	NEB-73-14
TS-73-2N	Temperature Sensor	00	HPCI	NEB-73-14
TS-73-2P	Temperature Sensor	00	HPCI	NEB-73-14
TS-73-2R	Temperature Sensor	<b>OC</b> <sup>1</sup>	HPCI	NEB-73-14
TS-73-2S	Temperature Sensor	· 30	HPCI	NEB-73-14

\*Outside containment except for HPCI

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SYSTEM: High Pressure Core Injection (	(13)	Į.
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	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
FCV-73-16	Flow Control Valve	00	HI-HO*	•
PCV-73-18B		<del> 0C(1)</del>	HI-H0*	, 
FCV-73-26	Flow Control Valve	OC(1,2)	HI-HO	NEB-73-160
FCV-73-30	Flow Control Valve	0C(1)	HI-HO*	MEB-73-02
FCV-73-34	Flow Control Valve	00	HI-HO*	NEB-73-166
FCV-73-35	Flow Control Valve	00	HI-HO*	NEB-73-167
FCV-73-36	Flow Control Valve	OC(1)	HI-HO*	NEB-73-168
FCV-73-40	Flow Control Valve	00	HI-HO*	NEB-73-169
FCV-73-44	Flow Control Valve	00	HI-HO*	NEB-73-170
TE-73-55A	Temperature Element	00	HPCI	NEB-73-174
TE-73-55B	Temperature Element	, <b>OC</b>	HPCI	NEB-73-174
TE-73-55C	Temperature Element	00	HPCI	NEB-73-175
TE-73-55D	Temperature Element	00	HPCI	NEB-73-175
LS-73-56A	Level Switch	0C(2)	HI-HO	EEB-73-100
LS-73-56B	Level Switch	0C(2)	HI-HO	EEB-73-100
LS-73-57A	Level Switch	<b>0C</b>	HI-HO*	NEB-73-176
LS-73-57B	Level Switch	00	HI-HO*	NEB-73-176
FCV-73-64 ·	Flow Control Valve	0C(2,3)	HI-HO*	MEB-73-01
PT-73-65	Pressure Transmitter	00	HI-HO*	
FCV-73-18	Flow Control Valve	00	HI-HO*	NEB-73-151
FCV-73-19	Flow Control Valve	OC	HI-HO*	NEB-73-155

\*Outside containment except for HPCI

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## SYSTEM: High Pressure Core Injection (73)

	GENERAL EQUIPMENT	ſ		
TVA Plant Identification Number	<u>Generic Name</u>	<u>Location</u>	Accident Type	EWS <u>Sheet No.</u>
PDS-73-53	Pressure Differential	OC	HI-H0*	NEB-73-173
PX-73-65	Power Supply	00	HI-HO*	
PS-73-47A	Pressure Switch	00	HI-HO*	NEB-73-171
PS-73-47B	Pressure Switch	00	HI-HO*	NEB-73-172
PT-73-31	Pressure Transmitter	00	HI-HO*	NEB-73-172
PS-73-29-1	Pressure Switch	OC	HI-HO*	NEB-73-162
TS-73-2F	Temperature Sensor	OC (1)	HPCI `	NEB-73-136
TS-73-2H	Temperature Sensor	OC (1)	HPCI	NEB-73-136
FCV-73-26	Flow Control Valve	OC (3)	HI-HO	NEB-73-160
FCV-73-36	Flow Control Valve	OC (2)	HI-HO*	NEB-73-168
FCV-73-36	Flow Control Valve	OC (3)	HI-HO*	NEB-73-168
FCV-73-18	Flow Control Valve	00	HI-HO*	NEB-73-151
FCV-73-19	Flow Control Valve	OC	HI-HO*	NEB-73-155
FCV-73-19	Flow Control Valve	00	HI-HO*	



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<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296 Rev: 0 Date: 10/29/80

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Residual Heat Removal (74)

### GENERAL ECUIPMENT EWS Accident TVA Plant **Identification Number** Generic Name Location Type Sheet No. A11 DBA NEB-74-179 Flow Control Valve **0C** FCV-74-1 00 A11 DBA MEB-74-01 Flow Control Valve FCV-74-2 Flow Control Valve 00 A11 DBA MEB-74-01 FCV-74-7 PS-74-8A Pressure Switch 00 A11 DBA NEB-74-180 NEB-74-181 TE-74-9 **Temperature Element** 00 A11 DBA 00 A11 DBA NEB-74-179 FCV-74-12 Flow Control Valve FCV-74-13 Flow Control Valve 00 A11 DBA MEB-74-01 00 A11 DBA NEB-74-180 PS-74-19A Pressure Switch Pressure Switch 00 A11 DBA NEB-74-181 TE-74-21 Flow Control Valve 00 NEB-74-179 A11 DBA FCV-74-24 00 FCV-74-25 Flow Control Valve A11 DBA MEB-74-01 Flow Control Valve 00 A11 DBA FCV-74-30 MEB-74-01 00 A11 DBA PS-74-31A Pressure Switch NEB-74-184 TE-74-32 00 A11 DBA **Temperature Element** NEB-74-181 FCV-74-35 Flow Control. Valve 00 A11 DBA NEB-74-179 00 FCV-74-36 Flow Control Valve A11 DBA MEB-74-01 PS-74-42A Pressure Switch A11 DBA NEB-74-184A 00 TE-74-43 Temperature Element 00 ATT DBA NEB-74-181 FCV-74-47 Flow Control Valve IC A11 DBA NEB-74-186 FT-74-50 Flow Transmitter 00 A11 DBA NEB-74-189



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SYSTEM: Residual Heat Removal (74)

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	GENERAL EQUIPMENT		<u></u>	
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
PT-74-51	Pressure Transmitter	00	A11 DBA	NEB-74-190
FCV-74-52	Flow Control Valve	IC	A11 DBA	NEB-74-191
FCV-74-53	Flow Control Valve	00	A11 DBA	NEB-74-192
FCV-74-60	Flow Control Valve	0C(1,3)	A11 DBA	NEB-74-196
FCV-74-61	Flow Control Valve	00	A11 DBA	NEB-74-197
FT-74-64	Flow Transmitter	00	A11 DBA	NEB-74-199
PT-74-65	Pressure Transmitter	00	A11 DBA	NEB-74-200
FCV-74-66	Flow Control Valve	IC	A11 DBA	NEB-74-191
FCV-74-67	Flow Control Valve	IC	A11 DBA	NEB-74-202
FT-74-70	Flow Transmitter	00	A11 DBA	NEB-74-203
FCV-74-74	Flow Control Valve	0C	ATI DBA '	NEB-74-205
FCV-74-75	Flow Control Valve	00	A11 DBA	NEB-74-206
FCV-74-77	Flow Control Valve	00	A11 DBA	NEB-74-207
TE-74-81	Temperature Element	00	A11 DBA	NEB-74-209
TE-74-82	Temperature Element	00	A11 DBA	NEB-74-209
TE-74-83	Temperature Element	00	A11 DBA	NEB-74-209
TE-74-84	Temperature Element	-0C	A11 DBA	NEB-74-209
PT-74-94	Pressure Transmitter	00	A11 DBA	NEB-74-210
FCV-74-98	Flow Control Valve	OC(1,2)	A11 DBA	MEB-74-01
FCV-74-99	Flow Control Valve	0C(1,2)	A11 DBA	MEB-74-01
FCV-74-101	Flow Control Valve	0C(1,2)	A11 DBA	MEB-74-01
FSV-74-102	Flow Solenoid Valve	00	A11 DBA	EEB-74-100
FSV-74-103	Flow Solenoid Valve	00	A11 DBA	EEB-74-100
FSV-74-119	Flow Solenoid Valve	OC	A11 DBA	EEB-74-1002
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SYSTEM: Residual Heat Removal (74)

	GENERAL EQUIPMENT			
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS <u>Sheet No.</u>
FSV-74-120	Flow Solenoid Valve	00	A11 DBA	EEB-74-100]
ME-74-137A	Moisture Element	00	A11 DBA	
ME-74-137B	Moisture Element	00	A11 DBA	
MIS-74-137A	Moisture Indicator Switch	00	A11 DBA	
MIS-74-137B	Moisture Indicator Switch	<b>30</b> ,	A11 DBA	
RHR Pump Motor 1A	Pump Motor	OC (1)	A11 DBA	NEB-74-212
RHR Pump Motor 1B	Pump Motor	OC (1)	A11 DBA	NEB-74-211
RHR Pump Motor 1C	Pump Motor	OC (1)	A11 DBA	NEB-74-212
RHR Pump Motor 1D	Pump Motor	OC (1)	A11 DBA	NEB-74-211
RHR Pump Motor 2A	Pump Motor	OC (2)	A11 DBA	NEB-74-212
RHR Pump Motor, 2B	Pump Motor	OC (2)	A11 DBA	NEB-74-211
RHR Pump Motor 2C	Pump Motor	OC (2)	ATT DBA	NEB-74-212
RHR Pump Motor 2D	Pump Motor	0Ç (2)	ATT DBA	NEB-74-211
RHR Pump Motor 3A	Pump Motor	OC (3)	A11 DBA	NEB-74-212
RHR Pump Motor 3B	Pump Motor	OC (3)	A11 DBA	NEB-74-211
RHR Pump Motor 3C	Pump Motor	OC (3)	A11 DBA	NEB-74-212
KHR Pump Motor 3D	Pump Motor	OC (3)	A11 DBA	NEB-74-211
FIS-74-50	Flow Indicator Switch	OC (1)	A11 DBA	NEB-74-188
FIS-74-64	Flow Indicator Switch	00	A11 DBA	NEB-74-198
FCV-74-96	Flow Control Valve	OC (2)	A11 DBA	MEB-74-01
FCV-74-97	Flow Control Valve	OC (2)	ATT DBA	MEB-74-01
FCV-74-100	Flow Control Valve 、	00	A11 DBA	MEB-74-01
FCV-74-48	Flow Control Valve	IC	A11 DBA	NEB-74-187

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SYSTEM: Residual Heat Removal (74)

	1			
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FCV-74-57	Flow Control Valve	00	A11 DBA	EB-74-193
FCV-74-58	Flow Control Valve (	00	A11 DBA	NEB-74-194
FCV-74-59	Flow Control Valve	OC	A11 DBA	NEB-74-195
FCV-74-71	Flow Control Valve	, OC	A11 DBA	NEB-74-204
FCV-74-72	Flow Control Valve	00	A11 DBA	NEB-74-194
FCV-74-73	Flow Control Valve	. 30	A11 DBA	NEB-74-195
FCV-74-78	Flow Control Valve	IC	A11 DBA	
FT-74-56	Flow Transmitter	· 0C	ATT DBA	NEB-74-190A
TTS-74-136A	Temperature Transmitter Switch	OC	A11 DBA	
TTS-74-136B	Temperature Transmitter Switch	00	A11 DBA	
FCV-74-102	Flow Control Valve	<b>00</b>	A11 DBA	
FCV-74-103	Flow Control Valve	00	A11 DBA	
FCV-74-119	Flow Control Valve	00	A11 DBA	
FCV-74-120	Flow Control Valve	00	ATT DBA	
TE-74-95A	Temperature Element	00	ATI DBA	NEB-74-213
TE-74-95B	Temperature Element.	1 OC	ATT DBA	NEB-74-213/
TE-74-95C	Temperature Element	00	A11 DBA	NEB-74-2130
TE-74-95D	Temperature Element	00	A11 DBA	NEB-74-213
TE-74-95E	Temperature Element	00	A11 DBA	NEB-74-2130
TE-74-95F	Temperature Element	00	A11 DBA	NEB-74-2130
TE-74-95G	Temperature Element	00	A11 DBA	NEB-74-213
те-74-95н	Temperature Element	00	A11 DBA	NEB-74-213



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SYSTEM: Residual Heat Removal (74)

	GENERAL EQUIPMENT				
	TVA Plant Identification Number	<u>Generic Name</u>	<u>Location</u>	Accident Type	EWS <u>Sheet No.</u>
	PS-74-8B	Pressure Switch	00	A11 DBA	NEB-74-180-A
-	PS-74-19B	Pressure Switch	00	A11 DBA	NEB-74-180-A
	PS-74-31B	Pressure Switch	00	A11 DBA	NEB-74-184A
*	PS-74-42B	Pressure Switch	00	ATI DBA	NEB-74-1841
	FCV-74-60	Flow Control Valve	0€(2)	A11 DBA	NEB-74-196A

<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296 Rev: 0 Date: 10/29/80

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Core Spray System (75)

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GENERAL EQUIPMENT				
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FCV-75-2 ·	Flow Control Valve	00	A11 DBA	NEB-75-21
PS-75-7	Pressure Switch	<b>0</b> 0	ATT DBA	NEB-75-21
FCV-75-9	Flow Control Valve	00	A11 DBA	NEB-75-21
FCV-75-11	Flow Control Valve	00	A11 DBA	NEB-75-214
FIS-75-21	Flow Indicator Switch	0C(1,3)	A11 DBA	NEB-75-219
FCV-75-22	Flow Control Valve	00	A11 DBA	NEB-75-22
FCV-75-23	Flow Control Valve	00	A11 DBA	NEB-75-222
PS-75-24	Pressure Switch	_ 0C	A11 DBA	•
FCV-75-25	Flow Control Valve	00	A11 DBA	NEB-75-224
PDIS-75-28	Pressure Differential Indicator Switch	OC	A11 DBA	NEB-75-226
FCV-75-30	Flow Control Valve	00	A11 DBA	NEB-75-222
PS-75-35	Pressure Switch	00	A11 DBA	
FCV-75-37	Flow Control Valve	00	A11 DBA	NEB-75-229
FCV-75-39	Flow Control Valve	00	A11 DBA	NEB-75-22
PS-75-44	Pressure Switch	OC	A11 DBA	NEB-75-229

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EWS

Sheet No.

NEB-75-233

NEB-75-232

NEB-75-234

NEB-75-235

NEB-75-237

NEB-75-226

EEB-75-1001

EEB-75-1003

## SYSTEM: Core Spray System (75)

TVA Plant

Identification Number

PT-75-48	Pressure Transmitter	00	A11	DBA
FT-75-49	Flow Transmitter	0C(1,3)	A11	DBA
FIS-75-49	Flow Indicator Switch	00	A11	DBA
FCV-75-50	Flow Control Valve	00	A11	DBA
FCV-75-51	Flow Control Valve	00	A11	DBA
PS-75-52	Pressure Switch	0C(1,3)	A11	DBA
FCV-75-53	Flow Control Valve	00	A11	DBA
PDIS-75-56	Pressure Differential	0C(1,3)	A11	DBA

Indicator Switch

Flow Solenoid Valve

Flow Solenoid Valve

Moisture Element

Moisture Element

Pressure Switch

Flow Transmitter

Pump Motor

**Pressure Transmitter** 

Moisture Indicator Switch

Moisture Indicator Switch

Generic Name

GENERAL EQUIPMENT

FSV-75-57
FSV-75-58
MIS-75-70A
ME-75-70A
MIS-75-70B
ME-75-70B
PS-75-16
PT-75-20
FT-75-21

Core Spray Pump Motor 1A

**Core Spray Pump** Motor 1B

Core Spray Pump Motor 1C

Core Spray Pump Motor ID

Pump Motor Pump Motor Pump Motor

00 A11 DBA **0**C A11 DBA **0**C A11 DBA 00 A11 DBA NEB-75-216 OC(1,3) A11 DBA : OC(1,3) A11 DBA NEB-75-220 OC (1) A11 DBA NEB-75-238A OC (1) A11 DBA NEB-75-238 OC (1) A11 DBA NEB-75-238A OC (1) A11 DBA NEB-75-238

Accident

Type

A11 DBA

A11 DBA

OC(1,2) AT1 DBA

Location

**0**C

**0**C



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## SYSTEM: Core Spray System (75)

	GENERAL EQUIPMENT	······		
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
Core Spray Pump Motor 2A	Pump Motor	OC (2)	A11 DBA	NEB-75-238A
Core Spray Pump Motor 2B	Pump Motor	OC (2)	A11 DBA	NEB-75-238
Core Spray Pump Motor 2C	Pump Motor	OC (2)	A11 DBA	NEB-75-238A
Core Spray Pump Motor 2D	Pump Motor	OC (2)	A11 DBA	NEB-75-238
Core Spray Pump Motor 3A	Pump Motor	OC (3)	A11 DBA	NEB-75-238A
Core Spray Pump Motor 3B	Pump Motor	OC (3)	A11 DBA	NEB-75-238
Core Spray Pump Motor 3C	Pump Motor	OC (3)	A11 DBA	NEB-75-238A
Core Spray Pump Motor 3D	Pump Motor	OC (3)	A11 DBA	NEB-75-238
FSV-75-57	Flow Solenoid Valve	OC (3)	A11 DBA	EEB-75-1002
TTS-75-69A	Temperature Transmitter Switch	00	A11 DBA	k
TTS-75-69B	Temperature Transmitter Switch	<b>00</b>	A11 DBA	
FSV-75-71	Flow Solenoid Valve	OC	A11 DBA	
FSV-75-72	Flow Solenoid Valve	OC	A11 DBA	
FSV-75-58	Flow Solenoid Valve	OC (3)	ATT DBA	EEB-75-1004



<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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Facility: Browns Ferry Nuclear Generating Plant Unit: 1, 2, and 3 Docket: 50-259, -260, and -296

Rev: 0 Date: 10/29/80

## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Containment Inerting HPCI Torus Room (76)

## GENERAL EQUIPMENT

	71/6 D3		•		-
	TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS <u>Sheet No.</u>
•	FSV-76-56	Flow Solenoid Valve	00	A11 DBA	EEB-76-1001
	FSV-76-58	Flow Solenoid Valve	0C	A11 DBA	EEB-76-1005
	FSV-76-60	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1009
	FSV-76-66	Flow Solenoid Valve	<b>00</b>	A11 DBA	EEB-76-1007
a	FSV-76-68	Flow Solenoid Valve	00	A11 DBA	EEB-76-1004
	FSV-76-49 .	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1008
	FSV-76-51	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1010
•	F <u>.</u> SV-76-55	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1013
	FSV-76-57	Flow Solenoid Valve	IC	A11, DBA	EEB-'76-1012
	FSV-76-59	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1011
	FSV-76-63	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1003
	FSV-76-65	Flow Solenoid Valve	IC	A11 DBA	EEB-76-1002
	FSV-76-67	Flow Solenoid Valve	ÌIC	A11 DBA	EEB-76-1006
	H <sub>2</sub> E-76-37	Hydrogen Analyzer	IC	A11 DBA	NEB-76-243
	H <sub>2</sub> E-76-37A	Hydrogen Analyzer	IC	A11 DBA	NEB-76-243
	H <sub>2</sub> E-76-38	Hydrogen Analyzer	IC	ATT DBA	NEB-76-243
	H <sub>2</sub> E-76-38A	Hydrogen Analyzer	IC	A11 DBA	NEB-76-243
	H <sub>2</sub> E-76-39	Hydrogen Analyzer	IC	A11 DBA	NEB-76-243
	H <sub>2</sub> E-76-39A	Hydrogen Analyzer	IC	ATI DBA	NEB-76-243
	H <sub>2</sub> E-76-40	Hydrogen Analyzer	IC	A11 DBA	· NEB-76-243



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	GENERAL EQUIPMEN	T		·····
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
FSV-76-37A	Flow Solenoid Valve	OC (1,3)	A11 DBA	EEB-76-1018
FSV-76-37B	Flow Solenoid Valve	OC (1,3)	A11 DBA	EEB-76-1019
FSV-76-39A	Flow Solenoid Valve	OC (1,2)	A11 DBA	EEB-76-1016
FSV-76-39B	Flow Solenoid Valve	OC (1,2)	A11 DBA	EEB-76-1017
FSV-76-40A	Flow Solenoid Valve	OC (1,2)	A11 DBA	EEB-76-1014
FSV-76-40B	Flow Solenoid Valve	OC (1,2)	A11 DBA	EEB-76-1015
FSV-76-41A	Flow Solenoid Valve	OC (1,3)	A11 DBA	
FSV-76-41B	Flow Solenoid Valve	OC (1,3)	A11 DBA	
FSV-76-43A	Flow Solenoid Valve	OC (1,2)	A11 DBA	
FSV-76-38A	Flow Solenoid Valve	OC (1)	A11 DBA	
FSV-76-38B	Flow Solenoid Valve	OC (1)	A11 DBA	
FSV-76-42A	Flow Solenoid Valve	(1) 00	ATT DBA	EEB-76-1020
FSV-76-42B	Flow Solenoid Valve	OC (1)	ATI DBA	EEB-76-1021
FSV-76-17	Flow Solenoid Valve	. <b>OC</b>	A11 DBA	NEB-76-240
FCV-76-17	Flow Control Valve	OC (1,2)	A11 DBA	NEB-76-239
FSV-76-18	Flow Solenoid Valve	00	A11 DBA	NEB-76-241
FSV-76-19	Flow Solenoid Valve	00	A11 DBA	NEB-76-241
FSV-76-24	Flow Solenoid Valve	00	AT1 DBA	NEB-76-242
FSV-76-44A	Flow Solenoid Valve	IC	All DBA	
FSV-76-44B	Flow Solenoid Valve	IC	A11 DBA	
FSV-76-50	Flow Solenoid Valve	00	A11 DBA	
FSV-76-61	Flow Solenoid Valve	IC	A11 DBA	
FSV-76-52	Flow Solenoid Valve	0C	A11 DBA	
FSV-76-62	Flow Solenoid Valve	00	A11 DBA	

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SYSTEM: Containment Inerting HPCI Torus Room (76)



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## SYSTEM: Containment Inerting HPCI Torus Room (76)

	GENERAL EQUIPMENT			<del></del>
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.
FSV-76-53	Flow-Solenoid-Valve		-ATT-DBA	
FSV-76-54				
FSV-76-64				
FCV-76-18	Flow Control Valve	00	A11 DBA	NEB-76-239A
FCV-76-19	Flow Control Valve	00	A11 DBA	NEB-76-239B
FCV-76-24	Flow Control Valve	00	A11 DBA	NEB-76-239C

<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Radwaste System (77)

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GENERAL EQUIPMENT				
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS Sheet No.
LIS-77-1A	Level Indicator Switch	IC	A11 DBA	NEB-77-244
LIS-77-1B	Level Indicator Switch	IC	A11 DBA	NEB-77-244
LS-77-8A	Level Switch	0C	A11 DBA	NEB-77-250
LS-77-8B	Level Switch	00	A11 DBA	NEB-77-251
LIS-77-14A	Level Indicator Switch	IC a	A11 DBA	NEB-77-244
LIS-77-14B .	Level Indicator Switch	IC	A11 DBA	NEB-77-244
FCV-77-17A	Flow Control Valve	00	A11 DBA	e
FCV-77-17B	Flow Control Valve	00	ATT DBA	
LS-77-17A	Level Switch	.00	A11 DBA	NEB-77-260
LS-77-17B	Level Switch	00	ATT DBA	NEB-77-261
TE-77-17	Temperature Element	00	A11 DBA	NEB-77-259
TIS-77-17	Temperature IndicatorSwitch	0C	A11 DBA	
LS-77-25A	Level Switch	0C	НО	
LS-77-25E	Level Switch	0C	но	
LS-77-25F	Level Switch	00	НО	
Reactor Building Equipment Drain Sump Pump A	Pump Motor	OC (1)	A11 DBA	MEB-77-01

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## SYSTEM: Radwaste System (77)

GENERAL EQUIPMENT						
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.		
Reactor Building Equipment Drain Sump Pump B	Pump Motor	<b>0C</b> .	A11 DBA ·	MEB-77-03		
Reactor Building Floor Drain Sump Pump A	Pump Motor	OC (1,2)	A11 DBA	MEB-77-04		
Reactor Building Floor Drain Sump Pump A	PUmp Motor	OC (3)	A11 DBA	MEB-77-05		
Reactor Building Floor Drain Sump Pump B	Pump Motor	0C (1,2)	A11 DBA	MEB-77-06		
Reactor Building Floor Drain Sump Pump B	Pump Motor	OC (3)	A11 DBA	MEB-77-07		
LT-77-1A *	Level Transmitter	IC	A11 DBA	NEB-77-244		
LT-77-1B	Level Transmitter	IC	A11 DBA	NEB-77-244		
LT-77-14A	Level Transmitter	IC	A11 DBA	NEB-77-244		
LT-77-14B	Level Transmitter	IC	A11 DBA	NEB-77-244		
TE-77-14	Temperature Element	IC	A11 DBA	NEB-77-252		
FSV-77-2A	Flow Solenoid Valve ·	00	A11 DBA	NEB-77-249		
FSV-77-2B	Flow Solenoid Valve	00	A11 DBA	NEB-77-249		
FSV-77-15A	Flow Solenoid Valve	00	A11 DBA	NEB-77-249		
FSV-77-15B	Flow Solenoid Valve	00	A11 DBA	NEB-77-249		
Z <del>S-77-2A</del>	Zone-Switch					
2 <del>5-77-28</del>	Zone-Switch					
2 <del>S_77-15A</del>			ATT DBA			





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SYSTEM: Radwaste System (77)

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GENERAL EQUIPMENT						
TVA Plant Identification Number	Generic Name	<u>Location</u>	Accident Type	EWS Sheet No.		
<del>ZS-77-158</del>	Zone-Switch					
LS-77-25B	Level Switch	00	НО			
LS-77-25C	Level Switch	00	НО			
FSV-77-17	Level Switch	OC (1)	A11 DBA	EEB-77-100		
FSV-77-17	Level Switch	OC (2)	A11 DBA	EEB-77-100		
FSV-77-17	Level Switch	OC (3)	A11 DBA	EEB-77-100		
FCV-77-2A	Flow Control Valve	00	A11 DBA	NEB-77-249		
FCV-77-2B	Flow Control Valve	00	A11 DBA	NEB-77-249		
LS-77-25D	Level Switch	OC	HO			
FCV-77-15A	Flow Control Valve	00	A11 DBA	NEB-77-249		
FCV-77-15B	Flow Control Valve	ŐČ	A11 DBA	· NEB-77-249		

<u>Note</u>:

te: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.



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## MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Fuel Pool Cooling and Demineralizing System (78)

GENERAL EQUIPMENT .						
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.		
LS-78-1A	Level Switch	00	A11 DBA	NEB-78-262		
LS-78-1B	Level Switch	00	A11 DBA	NEB-78-262		
LS-78-1C	Level Switch	00	A11 DBA	NEB-78-262		
LS-78-1D .	Level Switch	. OC	A11 DBA	NEB-78-265		
LS-78=1E	Level Switch	00	A11 DBA	NEB-78-265		
LS-78-1F	Level Switch	00	A11 DBA	NEB-78-265		
LS-78-1G	Level Switch	00	A11 DBA	NEB-78-265		
LS-78-2A	Level Switch	0C	A11 DBA			
LS-78-2B	Level Switch	00	A11 DBA			
FCV-78-61	Flow Control Valve	00	A11 DBA	MEB-78-01		
FCV-78-62	Flow Control Valve	 0C	A11 DBA	MEB-78-01		
FCV-78-63	Flow Control Valve	00	A11 DBA	MEB-78-01		
FCV-78-64	Flow Control Valve	0C	A11 DBA	MEB-78-01		
FCV-78-65	Flow Control Valve	00	A11 DBA	MEB-78-01		
FCV-78-66	Flow Control Valve	00	A11 DBA	MEB-78-01		
FCV-78-67	Flow Control Valve	00	A11 DBA	MEB-78-01		
FCV-78-68	Flow Control Valve	OC	A11 DBA	MEB-78-01		
FIS-78-5	-Flow-Indicator-Switch					

FS-78-51 Flow Indicator Switch OC All DBA Note: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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#### MASTER LIST

#### ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Containment Atmosphere Dilution System (84)

	GENERAL EQUIPMENT		·····	· · · · · · · · · · · · · · · · · · ·
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FSV-84-8A	Flow Solenoid Valve	OC (1,2)	A11 DBA	EEB-84-0110
FSV-84-8B	Flow Solenoid Valve	Í	A11 DBA	EEB-84-1002
FSV-84-8C	Flow Solenoid Valve	IC	A11 DBA	EEB-84-1003
FSV-84-8D	Flow Solenoid Valve	0C	A11 DBA	EEB-84-1013
FT-84-19	Flow Transmitter	00	A11 DBA	EEB-84-1008
FSV-84-19	Flow Solenoid Valve	OC (2,3)	A11 DBA	EEB-84-1005
FT-84-20	Flow Transmitter	OC (1)	A11 DBA	EEB-84-1004
FSV-84-20 ·	.Flow Solenoid Valve	00	A11 DBA	EEB-84-1007
FSV-84-19	Flow Solenoid Valve	00 (1)	All DBA ·	EEB-84-1004
FM-84-20B	Flow Modifier	00	A11 DBA	EEB-84-1009
PS-84-21	Pressure Switch	00	A11 DBA	EEB-84-1012
PS-84-22	Pressure Switch	00	A11 DBA	EEB-84-1011
FSV-84-19	Flow-Solenoid-Valve			
FM-84-19B	Flow Modifier	00	ATT DBA	EEB-84-1010
FCV-84-19	Flow Control Valve	<b>0</b> 0	A11 DBA	
FCV-84-20	Flow Control Valve	• <b>00</b>	A11 DBA	
FSV-84-20	Flow Solenoid Valve	00	A11 DBA	EEB-84-1006

Note:

<u>e</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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### MASTER LIST

## ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: CRD Hydraulic System (85)

	GENERAL EQUIPMEN	ŕ	······	
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
FSV-85-39A	Flow Solenoid Valve	00	A11 DBA	NEB-85-274
FSV-85-39B	Flow Solenoid Valve	00	A11 DBA	NEB-85-273
LS-85-45A	Level Switch	00	A11 DBA	NEB-85-276
LS-85-45B	Level Switch	00	A11 DBA	NEB-85-276
LS-85-45C	Level Switch	00	A11 DBA	NEB-85-276
LS-85-45D	Level Switch	00	A11 DBA	NEB-85-276
LS-85-45E	Level Switch	00	A11 DBA	NEB-85-276
FCV-85-37C	Flow Control Valve	00	A11 DBA	NEB-85-268/
FSV-85-35A	Flow Solenoid Valve	OC(1,2)	A11 DBA	NEB-85-267
FSV-85-35B	Flow Solenoid Valve	OC(1,2)	A11 DBA	NEB-85-267
FSV-85-37A	Flow Solenoid Valve	0C(1,2)	A11 DBA	NEB-85-268
FSV-85-37B	Flow Solenoid Valve	OC(1,2)	ATI DBA	NEB-85-268
FSV-85-70A	Flow Solenoid Valve	OC(1,2)	A11 DBA	EEB-85-1001
FSV-85-70B	Flow Solenoid Valve	OC(1,2)	A11 DBA	EEB-85-1002
FCV-85-37A	Flow Control Valve	00	A11 DBA	NEB-85-2684
FCV-85-37B	Flow Control Valve	00	ATT DBA	NEB-85-268/
FCV-85-39A	Flow Control Valve	00	A11 DBA	NEB-85-272
FCV-85-39B	Flow Control Valve	00	A11 DBA	NEB-85-273
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Note:

Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers

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### MASTER LIST

# ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Radiation Monitoring Sýstem (90)

	GENERAL EQUIPMEN	IT		
TVA Plant Identification Number	<u>Generic Name</u>	Location	Accident Type	EWS Sheet No.
RE-90-133	Primary Element	00	A11 DBA	
RE-90-133A	Primary Element	OC (2)	A11 DBA	EEB-90-0005
RE-90-134	Primary Element	OC	A11 DBA	
RE-90-134A	Primary Element	OC (1)	A11 DBA	EEB-90-0007
RE-90-136	Primary Element	00	ATI DBA	NEB-90-279
RE-90-137	Primary Element	00	A11 DBA	NEB-90-280
RE-90-138	Primary Element	00	A11 DBA	NEB-90-281
RE-90-139	Primary Element	. 00	ATI DBA	NEB-90-282
RE-90-140	Primary Element	00	A11 DBA	NEB-90-283
RE-90-141	Primary Element	00	A11 DBA	NEB-90-283
RE-90-142	Primary Element	00	A11 DBA	NEB-90-284
RE-90-143	Primary Element	00	A11 -DBA	NEB-90-284
FCV-90-254A	Flow Control Valve	00	HI, LOCA	
FCV-90-254B	Flow Control Valve	00	HI, LOCA	• •
FCV-90-255	Flow Control Valve	OC(1,2)	HI, LOCA	
FCV-90-257A	Flow Control Valve	OC(1,2)	HI, LOCA	,
FCV-90-257B	Flow Control Valve	00	HI, LOCA-	
RE-90-272A	Primary-Element	IC	- A11- DBA-	
<del>RE-90-2728</del>	Primary-Element			

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	GENERAL EQUIPMENT		· · · · · · · · · · · · · · · · · · ·	
TVA Plant Identification Number	Generic Name	Location	Accident Type	EWS Sheet No.
RE-90-273B	Primary Element	<u> </u>		NEB-90-286A
RE-90-133A	Primary Element	OC (3)	A11 DBA	EEB-90-0006
RE-90-133A	Primary Element	OC (1)	A11 DBA	EEB-90-0004
RE-90-134A	Primary Element	OC (3)	A11 DBA	EEB-90-0009
RE-90-134A	Primary Element	OC (2)	A11 DBA	EEB-90-0008
RE-90-131A	Primary Element	OC (1)	A11 DBA	EEB-90-0001
RE-90-131A	Primary Element	OC (2)	A11 DBA	EEB-90-0002
RE-90-131A	Primary Element	0C (3) <sup>,</sup>	A11 DBA	EEB-90-0003
RE-90-273A	Primary Element	IC	A11 DBA	NEB-90-286
RE-90-273B	Primary Element	0C	ATT DBA	NEB-90-286A

SYSTEM: Radiation Monitoring System (90)



<u>Note</u>: Cable, penetrations, handswitches, control stations, junction boxes, and terminal blocks have been handled generically. See appropriate System Index in Appendix C for the EWS numbers.

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### APPENDIX B TEMPERATURE - PRESSURE PROFILES AND TABLES

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#### APPENDIX B\*

#### TEMPERATURE - PRESSURE PROFILES AND TABLES

This appendix contains temperature-pressure profiles or tables that are referenced in the "Environment Specification" column on the EWS. There are three tables in this appendix that are used to locate the appropriate figure or table which defines the temperature-pressure values for each room. The temperatures-pressures given in either figures or tables is assumed to linearly return to ambient in 24 hours. The three tables are as follows:

#### Table B.O (1,2,3), Room Number, Name, and Plant Location-

This table relates the room number to a room name and to a specific plant location (See attached sheets 1 - 6 for plant locations).

Table B.00 (1,2,3) - Environmental Temperature/Pressures

Curves - Room Number Designation-

This table relates to various room numbers to figures or Table B.1 (1,2,3) which are in this appendix for temperature and pressure.

Table B.1 (1,2,3) - Temperature/Pressure (Selected Areas)-

This table gives selected temperature-pressure values for selected areas that are not contained in a profile.

\*The figures and Table B.1 (1, 2, 3) giving temperature, pressure curves, or values in this section correspond to Section 3.0, except for a different numbering sequence. . . .

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### TABLE B.O (1,2,3)

### Room Number, Name, and Plant Location

Room No.	Room Name	Plant Location* (Sheet 1-6)
0.	Inside Primary Containment (Drywell)	Sheet 2
00	Inside Primary Containemnt (Wetwell)	Wetwell
1	HPCI Pump (or Turbine) Room; elevation 519.0'	Sheet 1
2	S. W. RHR Pump Room; elevation 519.0'	Sheet 1
3	N. W. RICI and Core Spray Pump Room; elevation 519.0'	Sheet 1
4	N. E. Core Spray Pump Room; elevation 519.0'	Sheet 1
5	S. E. RHR Pump Room; elevation 519.0'	Sheet 1
6 .	Pressure Suppression Chamber (HPCI Torus Room); elevation 519.0'	Sheet 1
7	Main Steam Vault Room	Sheet 2
8	Open Area; elevation 565.0'	Sheet 2
9	Open Areas; elevation 593.0'	Sheet 3
10	RWCU Pump Room; elevation 593.0'	Sheet 3
11	RWCW Heat Exchange Room; elevation 593	' Sheet 3
12	Open Areas; elevation 621.25	Sheet 4
13	South Open Areas; elevation 639.0'	Sheet 5
14	North Open Area; elevation 639.0'	Sheet 5
15	Units 1-3 Refueling Floor; elevation 664.0'	Sheet 6
16	Unit 1-3; elevation 593; RWCU BW receiving tank rm	Sheet 3

\*Unit 1 locations same as Unit 3.

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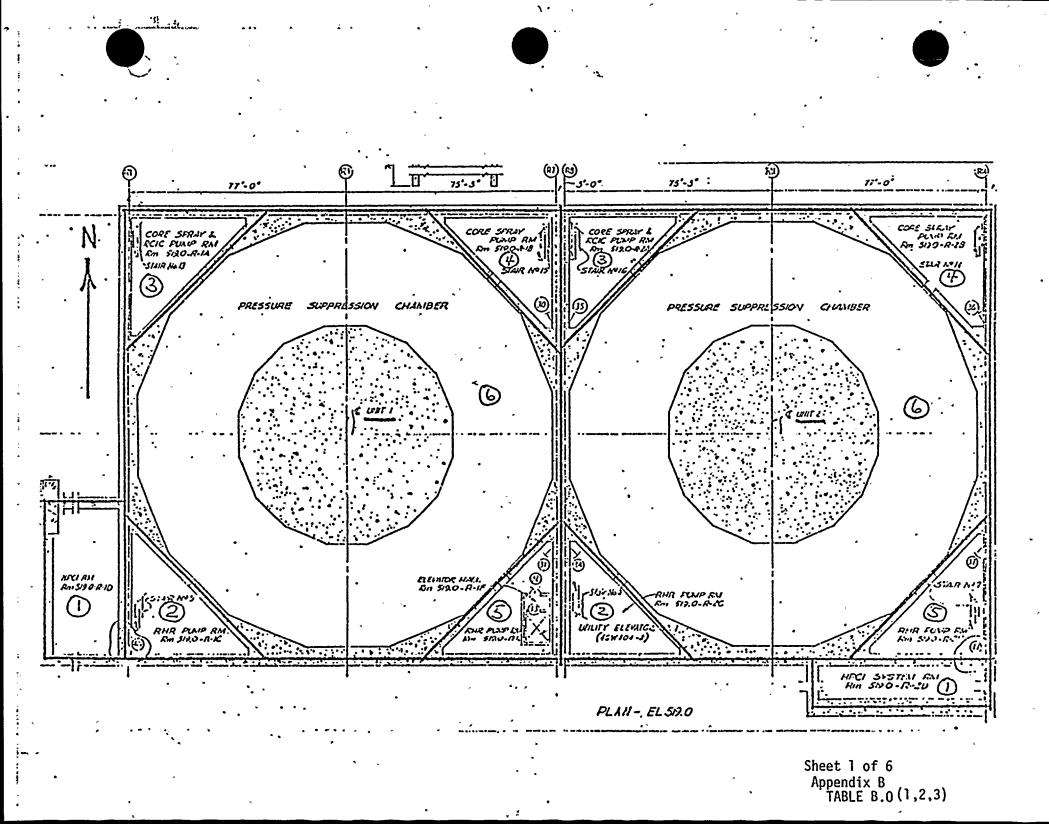
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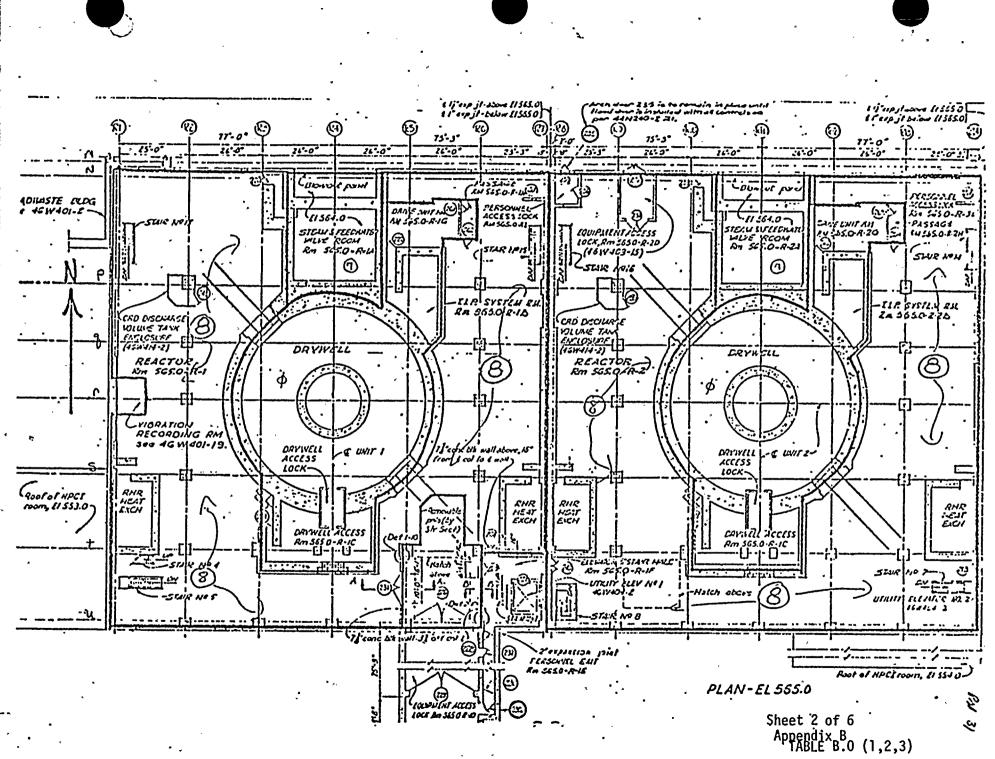
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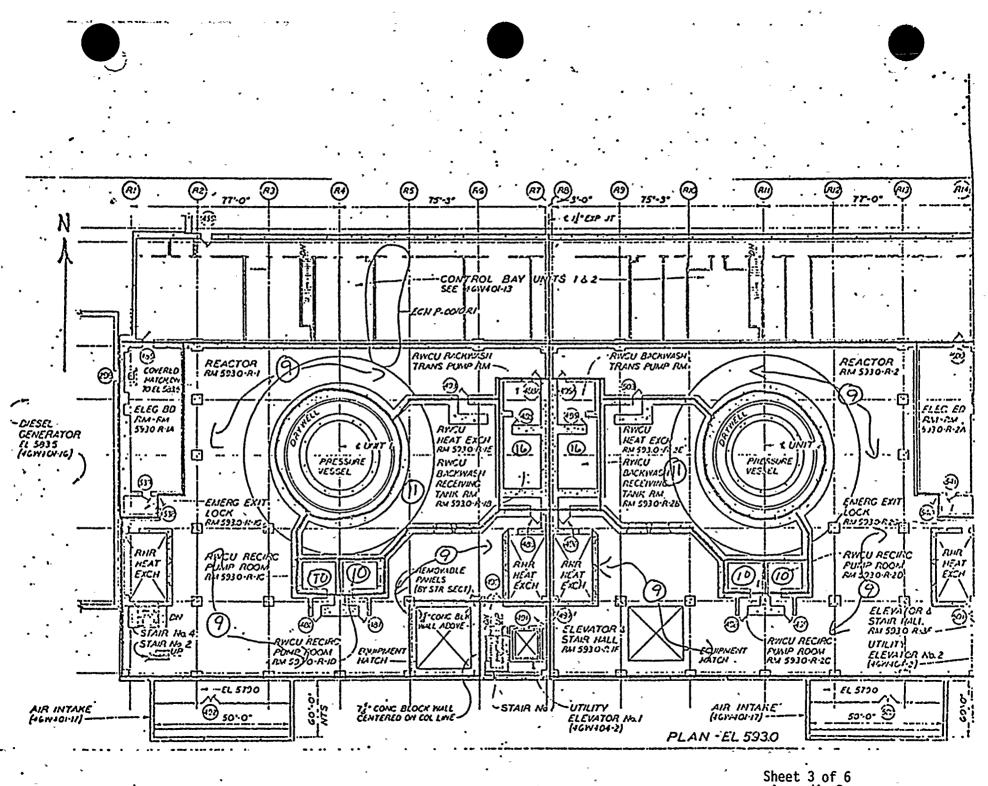
## TABLE B.O (1,2,3) (continued)

### Room Number, Name, and Plant Location

Room No.	Room Name	Plant Location (Sheet 1-6)
17A	Unit 1-3; elevation 639; RWCU Demineralizer A	Sheet 5
17B	Unit 1-3; elevation 639; RWCU Demineralizer B	Sheet 5
18	Unit 1-3; elevation 621.25; Clean up Demin Vlv Rm	Sheet 4







Appendix B TABLE B.0 (1,2,3)



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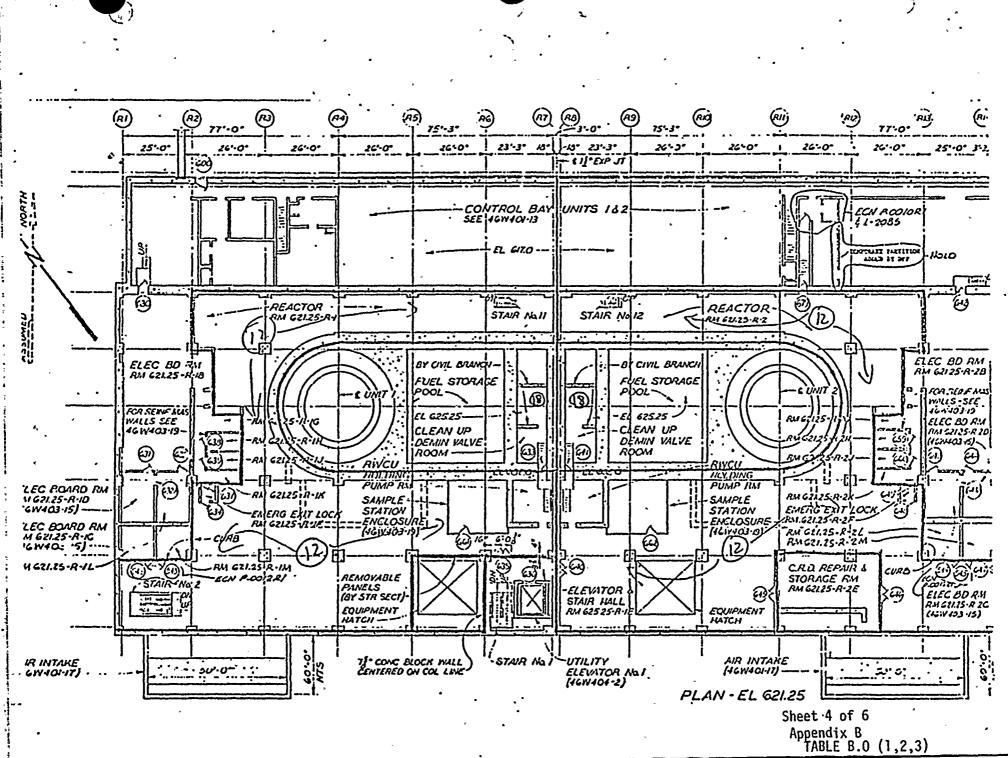
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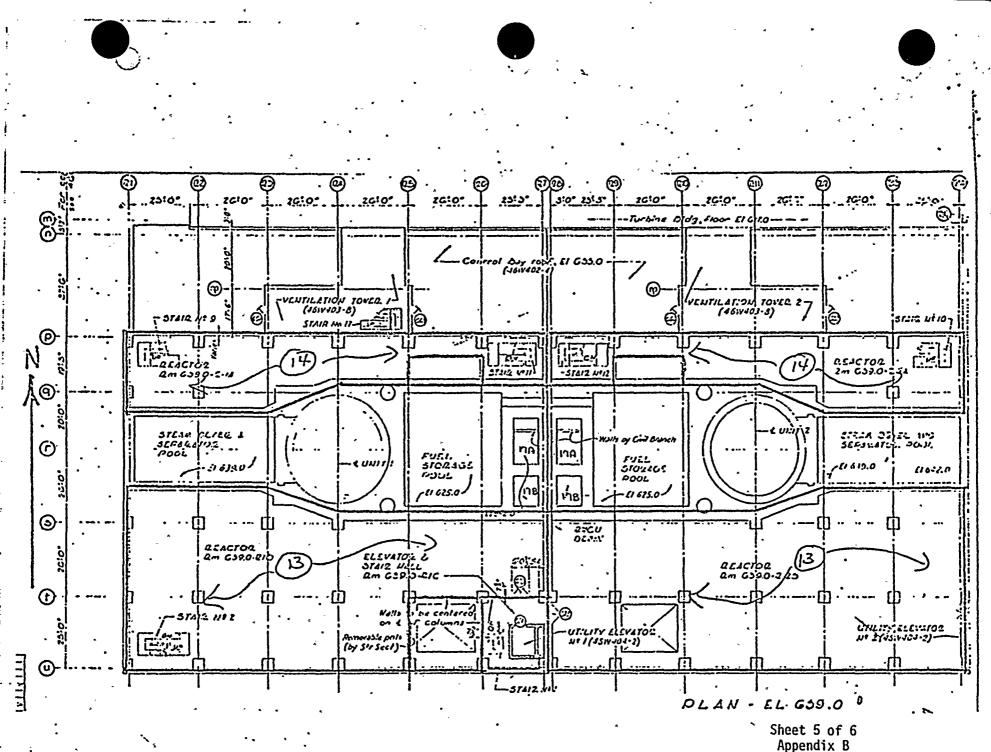


TABLE B.0 (1,2,3)



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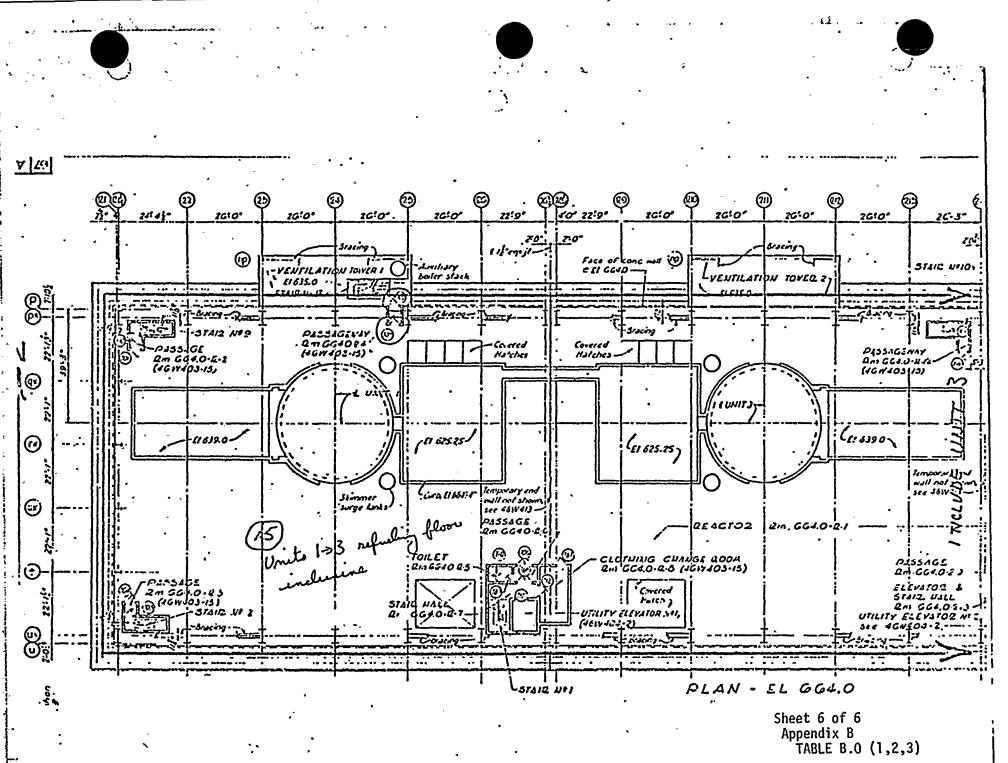


TABLE B.00 (1,2,3)

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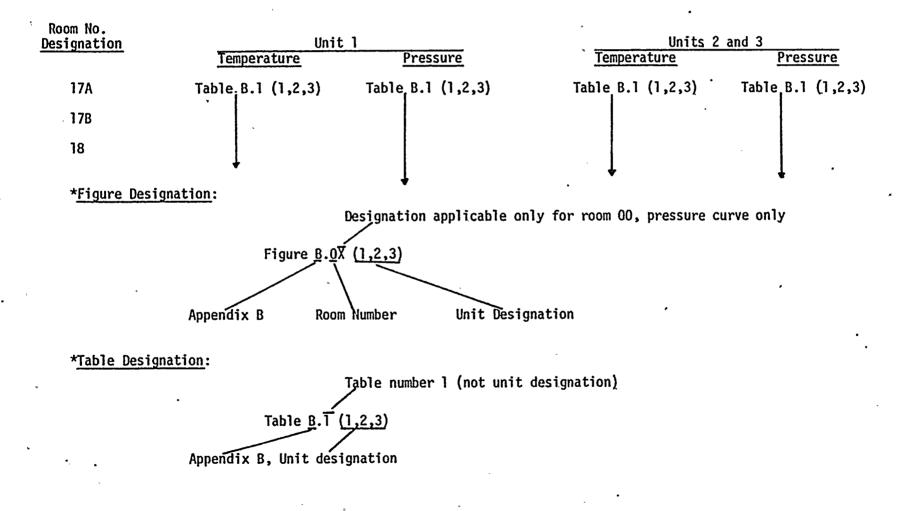
### ENVIRONMENTAL TEMPERATURE/PRESSURE CURVES - ROOM NUMBER DESIGNATIONS\*

Room No. Designation	. Unit	1	Units 2	and 3
	Temperature	Pressure	Temperature	Pressure
Ó	Figure B.O (1,2,3)	Figure B.0 (1,2,3)	Figure B.0 (1,2,3)	Figure B.0 (1,2,3)
00 (Wetwell)	B.00 (1,2,3)	B.00.0 (1,2,3)	B.00 (1,2,3)	B.00.0 (1,2,3)
j	B.1 (1)°	Table B.1 (1,2,3)	B.1 (2,3)	Table B.1 (1,2,3)
2	B.2 (1)		B.2 (2,3)	
3	B.3 (1)		B.3 (2,3)	
4	B.4 (1)		B.4 (2,3)	
5	B.5 (1)		B.5 (2,3)	
6	B.6 (1)		B.6 (2,3)	
7	B.7 (1)	·.	B.7 (2,3)	
8	B.8 (1)		B.8 (2,3)	
9	B.9 (1)		B.9 (2,3)	
10	B.10 (1)		B.10 (2.3)	<i>v</i>
11	B.11 (1)		B.11 (2,3)	
12	B.12 (1)		B.12 (2,3)	
13	B.13 (1)	j .	B.13 (2,3)	
14	B.14 (1)		B.14 (2,3)	
15	Table B.1 (1,2,3)		Table B.1 (1,2,3)	
16	B.16 (1)**		B.16 (2,3)**	Ļ
		•		•

\*\*Same as room 9 for units 1, 2, and 3

### TABLE B.00 (1,2,3)

### ENVIRONMENTAL TEMPERATURE/PRESSURE CURVES - ROOM NUMBER DESIGNATIONS\* (Continued)



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### TABLE B.1 (1,2,3)

	TEMPERATURE -	PRESSURE (Selec	cted Areas)
	Unit 1	t	Jnit 2 & 3
Time	<u>Compartment (1)</u>	Time	Compartment (1),(10),&(11)
2 sec 5 ". 11 "	1.3 psig 1.1 " .8 "	Same	as for unit 1 .
30 " 50 "	.1 " 0. "	•	
Time	<u>Compartment (10)</u>	Time	All Remaining Area
.02 sec	2.4 psig	1 sec	.1 psig
•6 <sup>n</sup>	.8 "	30 <sup>n</sup>	•5 "
5 <sup>n</sup>	1.3 "	45 <sup>11</sup>	•5 <sup>n</sup>
45 " 47 "	1.3 " .2 "	50 " 120 "	.1 " 0. "
Time 1 sec	<u>Compartment (11)</u> 2.4 psig		
10 "	3.4 "	All	Units Compartment 7
45 "	З.8 п		
47 "	<u>,</u> ц п	Time	Steam Valve Vault
55 "	. <u>1</u> n		
120 "	0. "	.1 sec	1.7 psig
	· .	3 4 n	7.1 " 4.5 "
Time	All Remaining Areas		4.5 ··· 2.7 ··
TIME	ALL Remaining Areas	6 "	2.0 "
<b>1</b> "	.1 psig	10 !!	1.8 <sup>n</sup>
30 "	•5 4	150 "	<b>1.8</b> <sup>1</sup> <sup>π</sup>
45 <sup>n</sup>	•6 <sup>n</sup>		
50 "	•5 u		
120 "	0 <b>.</b> "	•	
Tomponati	ure-Pressure (Compartmen	t 15, 17A, 17B,	18) - All Units
Temperat			
	n No. Temp	erature ( <sup>0</sup> F)	<u>Pressure (PSIA)</u>
<u>Roo</u> 1	5	120	15.0
<u>Roo</u> 1 1	5 7A	120 105	15.0 Atm.
<u>Roo</u> 1 1	5 7A 7B	120	15.0

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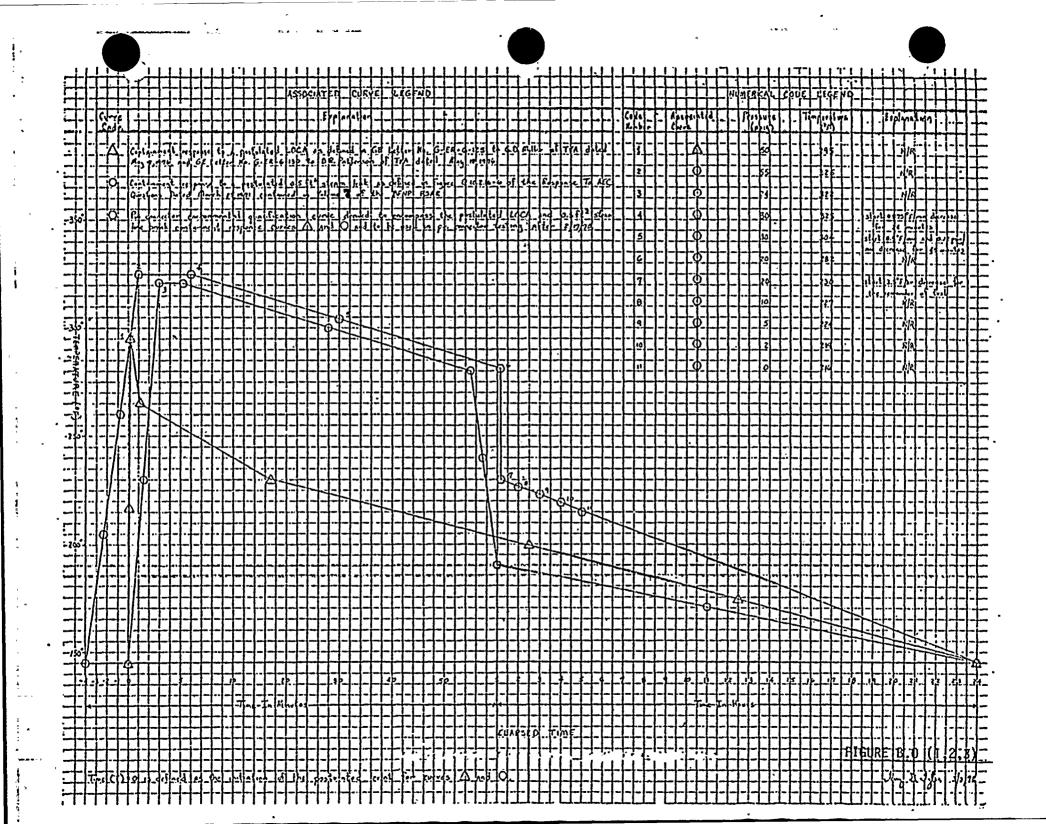
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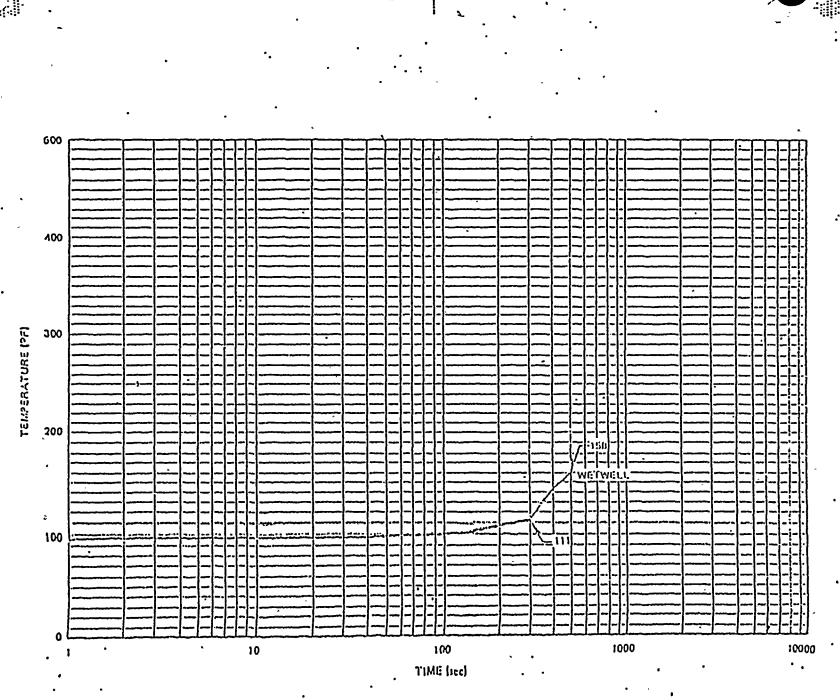
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Figure B.00 (1, 2, 3). IBA Wetwell

Temperature Response

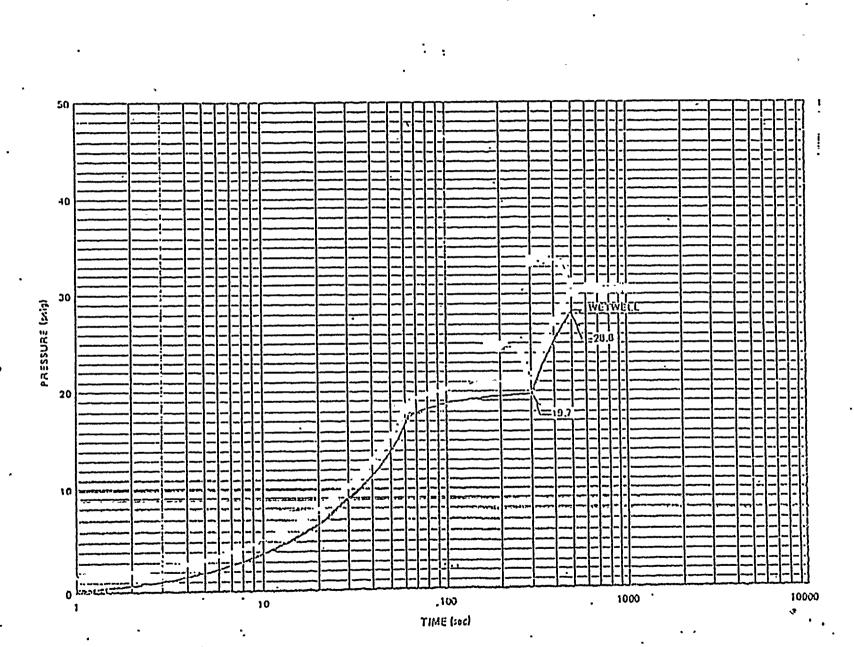
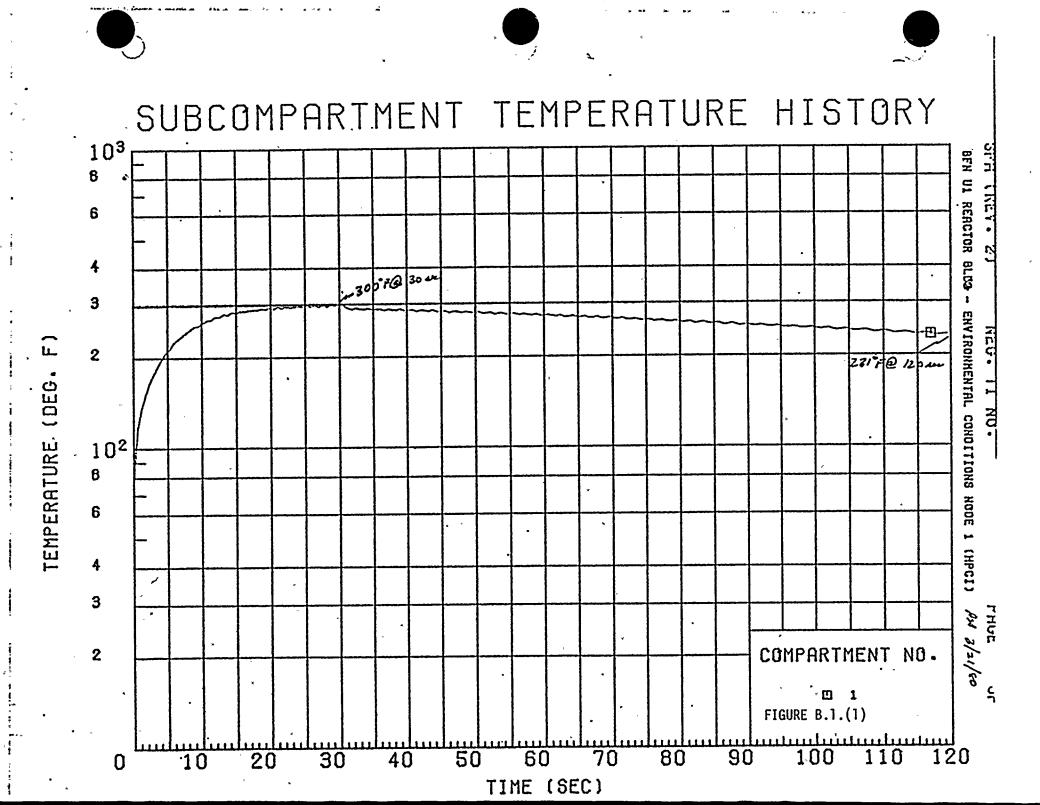


Figure B.00.0(1,2,3) IBA Containment Pressure Response

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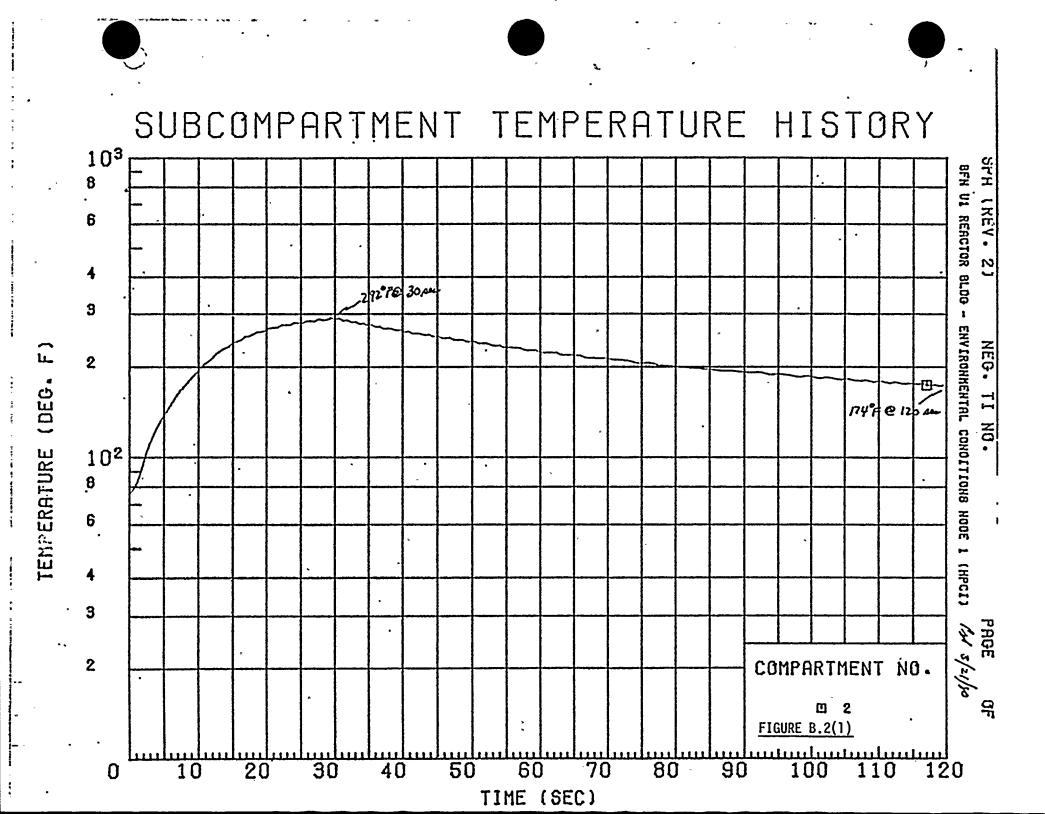




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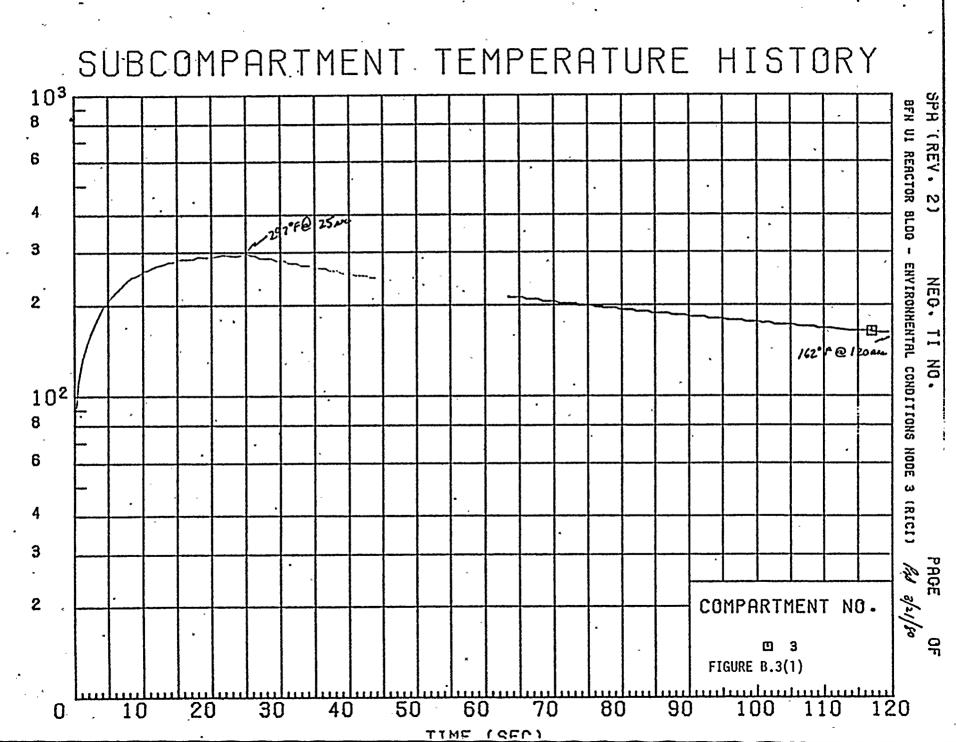
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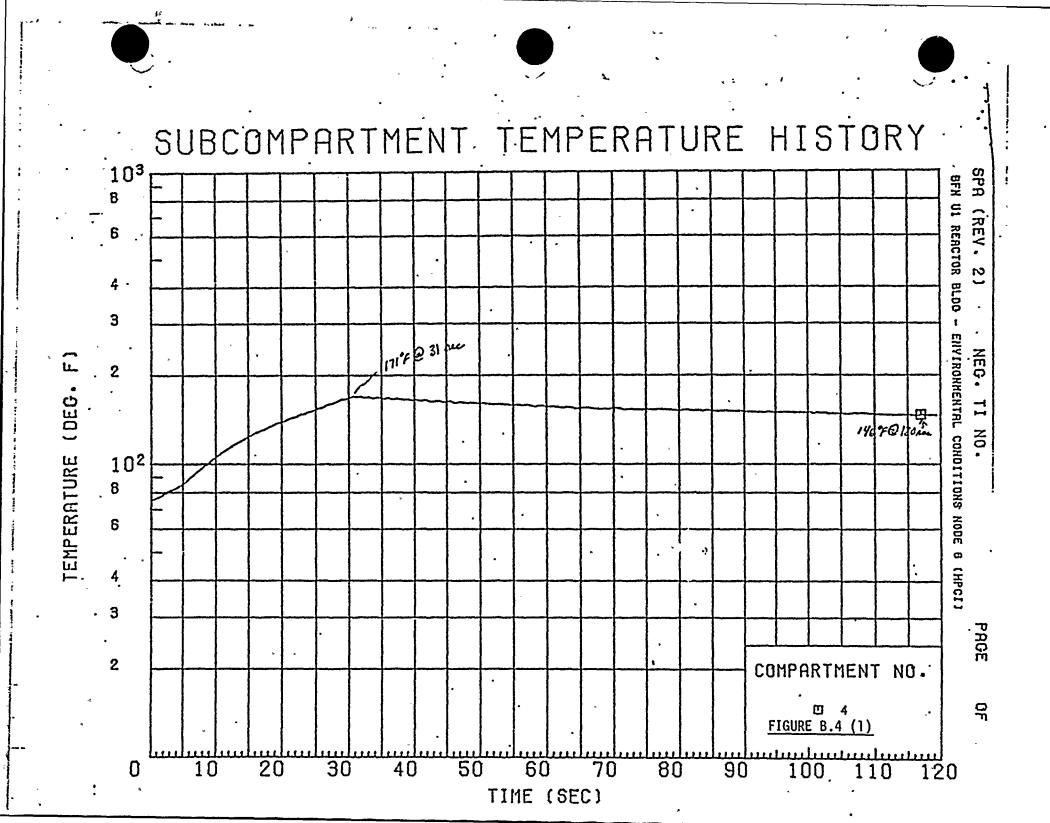
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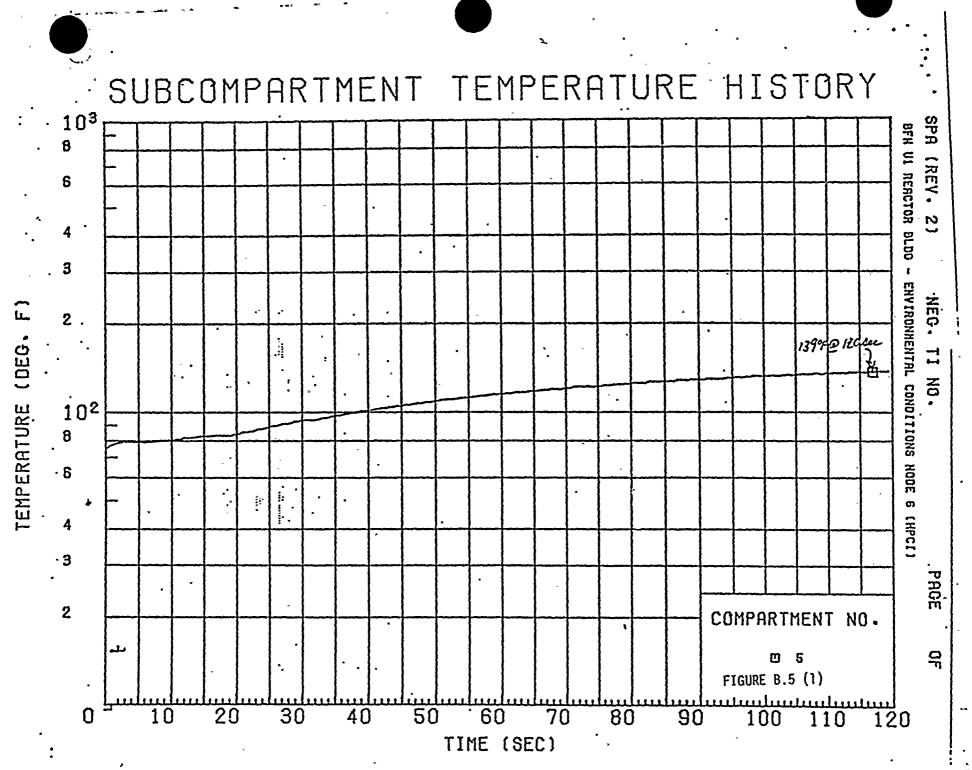
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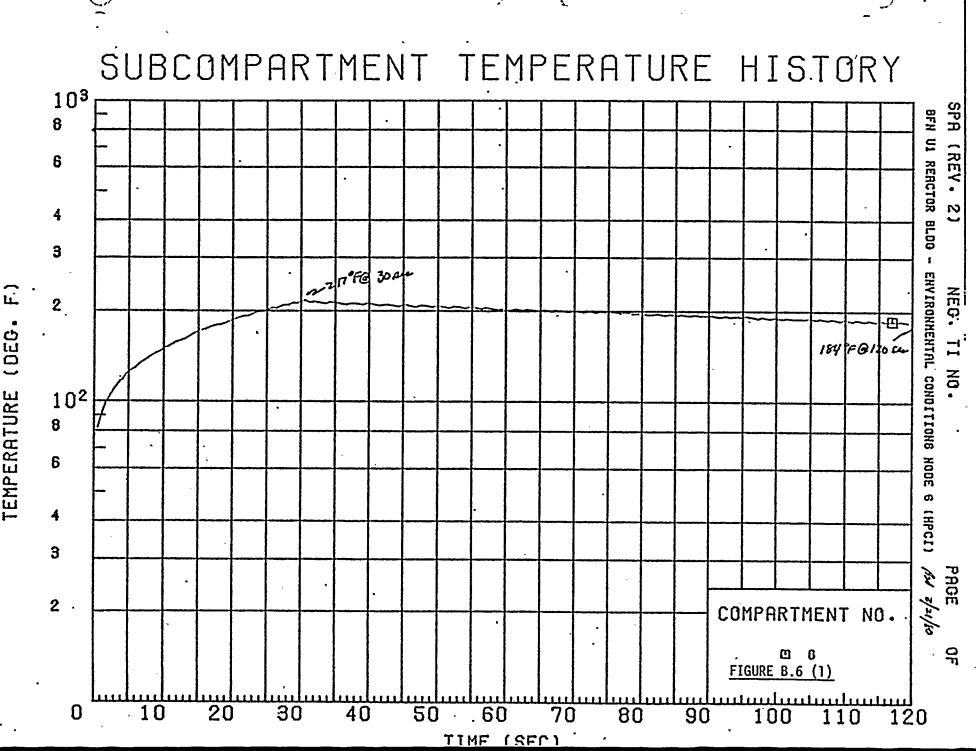


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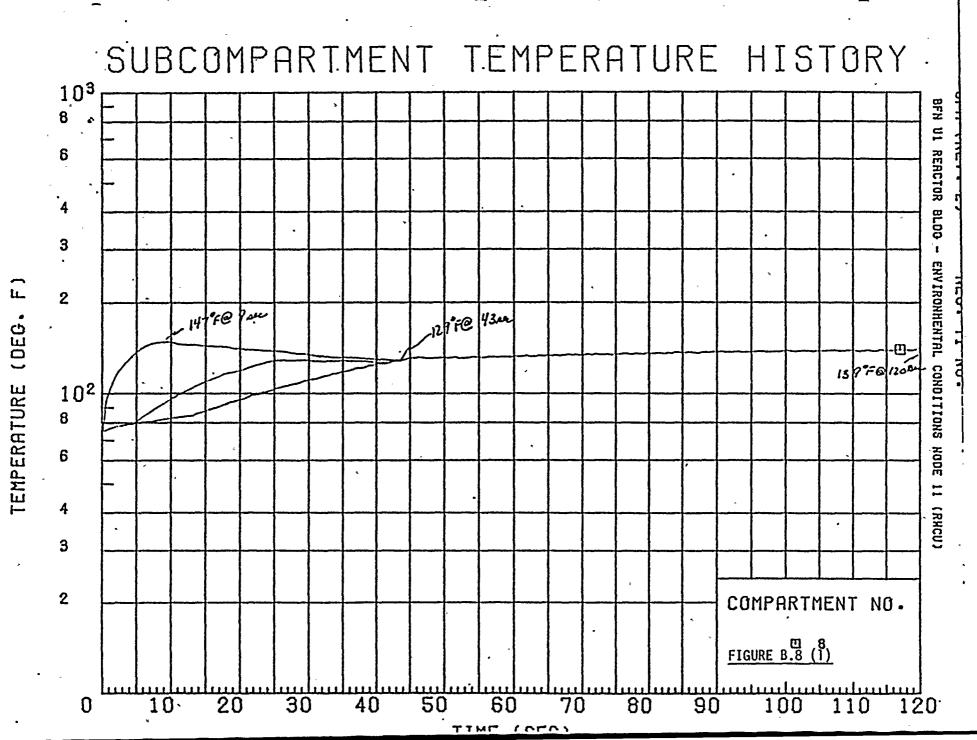


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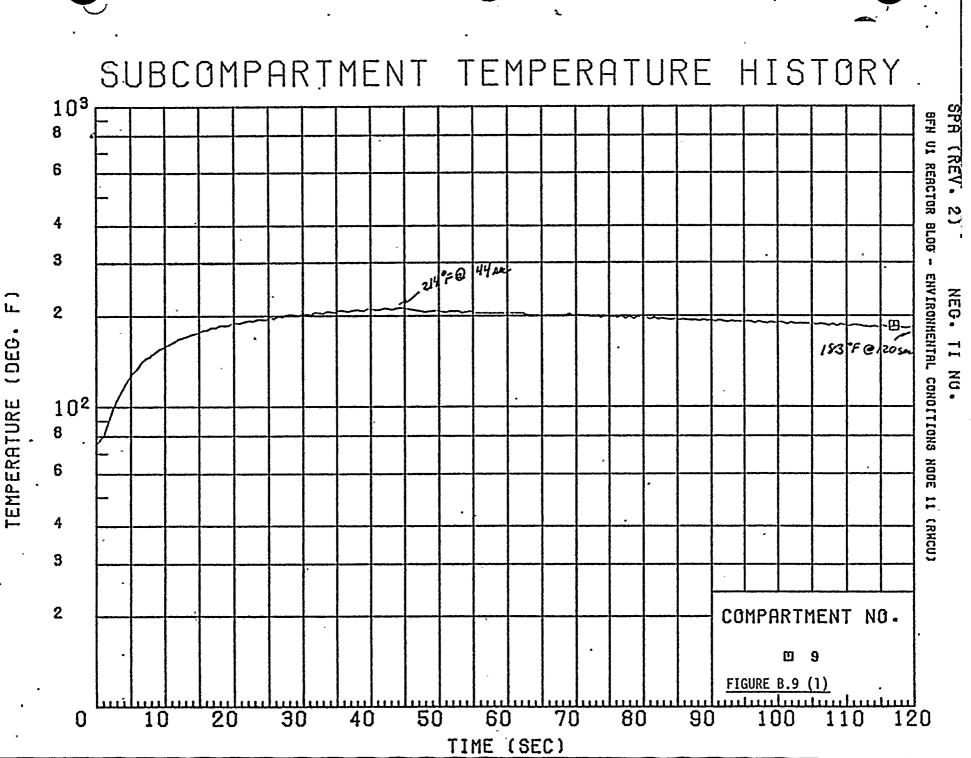
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12: 3/21/80 Ε., PFQ Z Dec •::• Painted 14 8. 5.4 BEN STEAM VALVE VAULT 250 LEUPERATURE V. TIME 10 TENTERAVIG( -----150 ..... روي .... • • ;• 751 50 100 FIGURE B.7 (1) TIME (sell ליגנטייקאיינדיו אנגליינט אין איין איין



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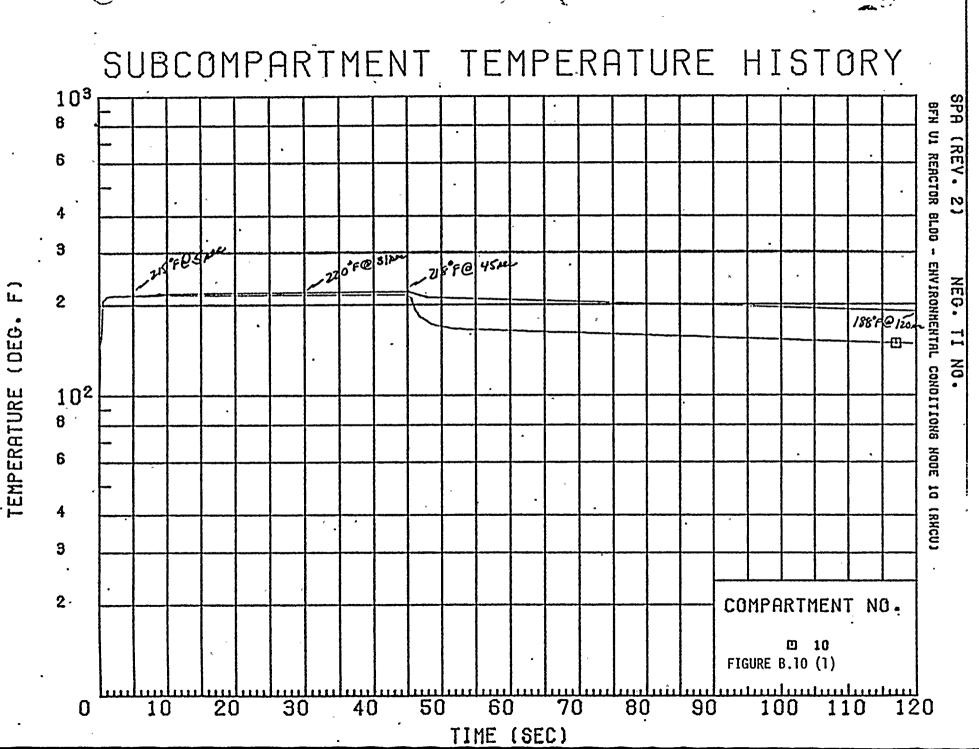
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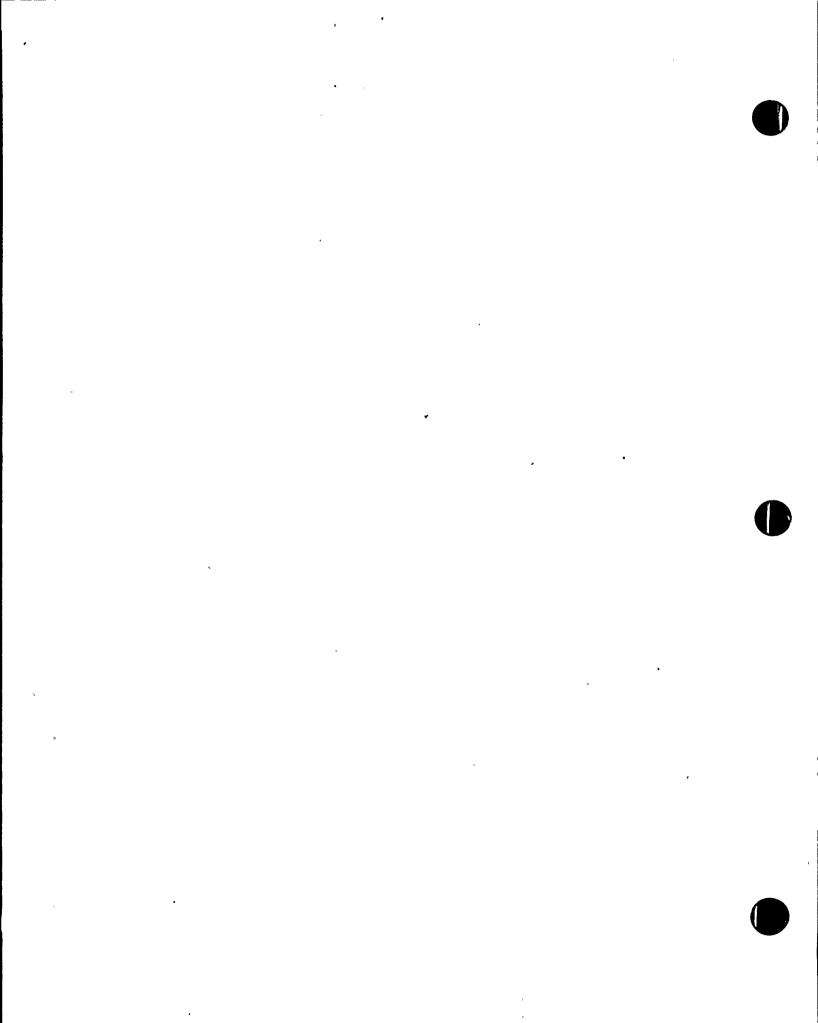
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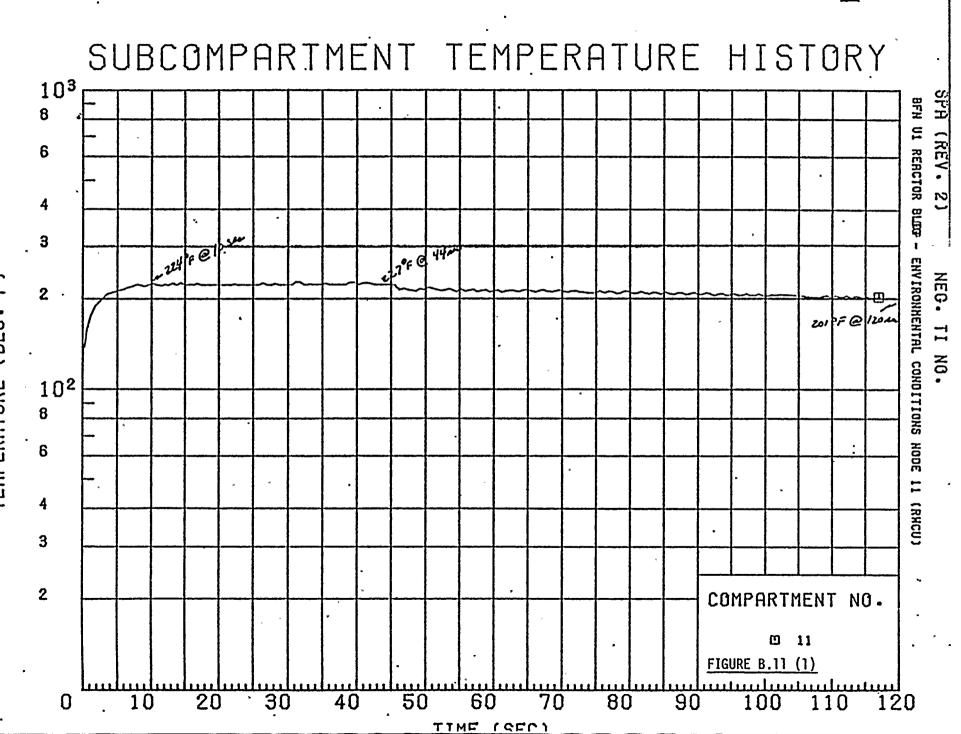
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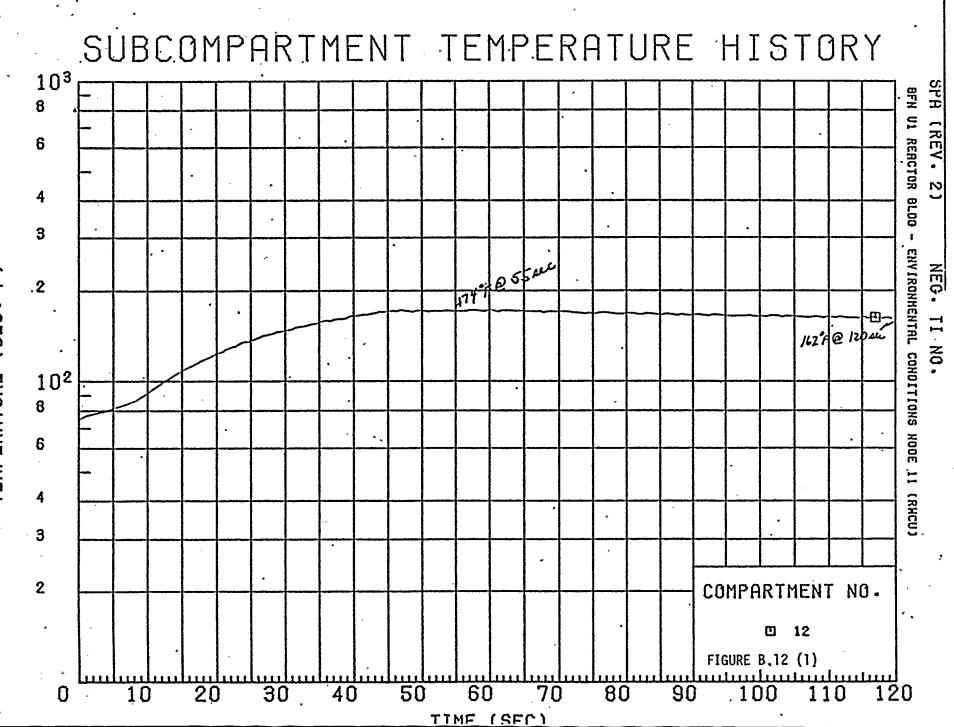


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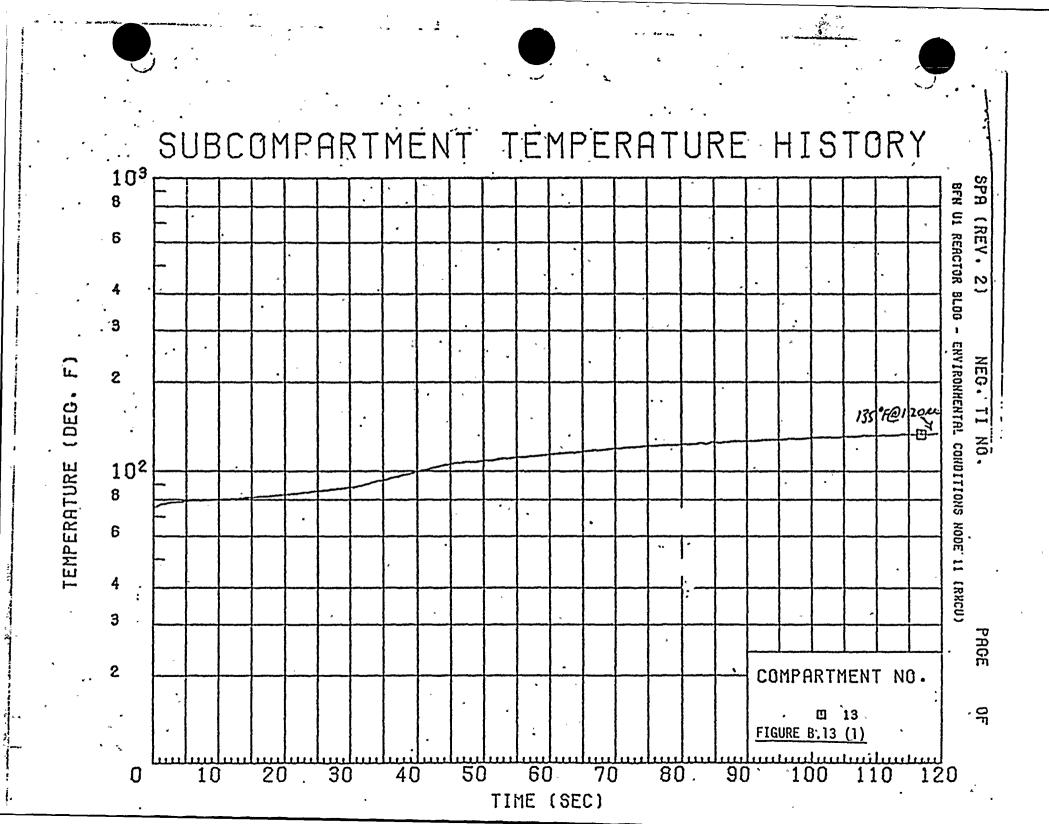
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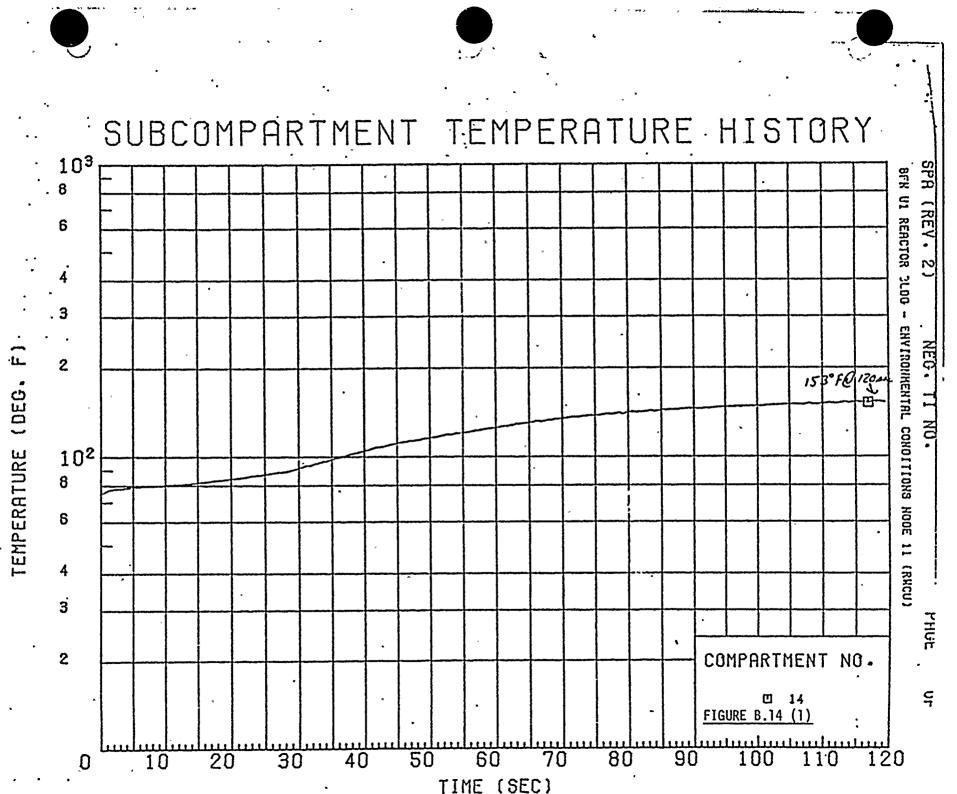
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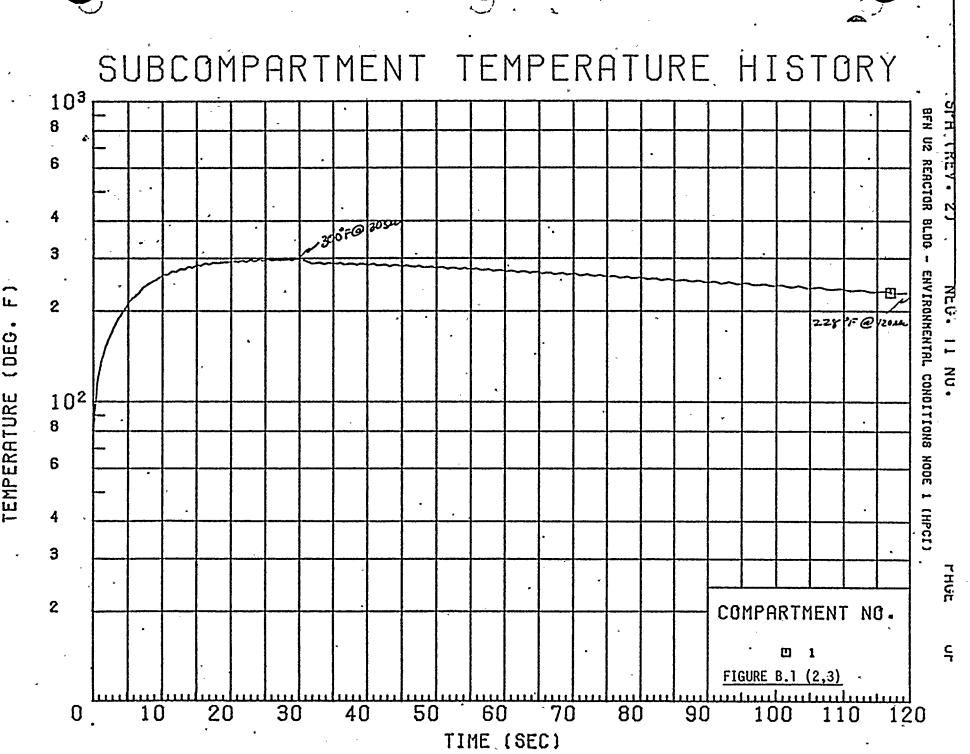
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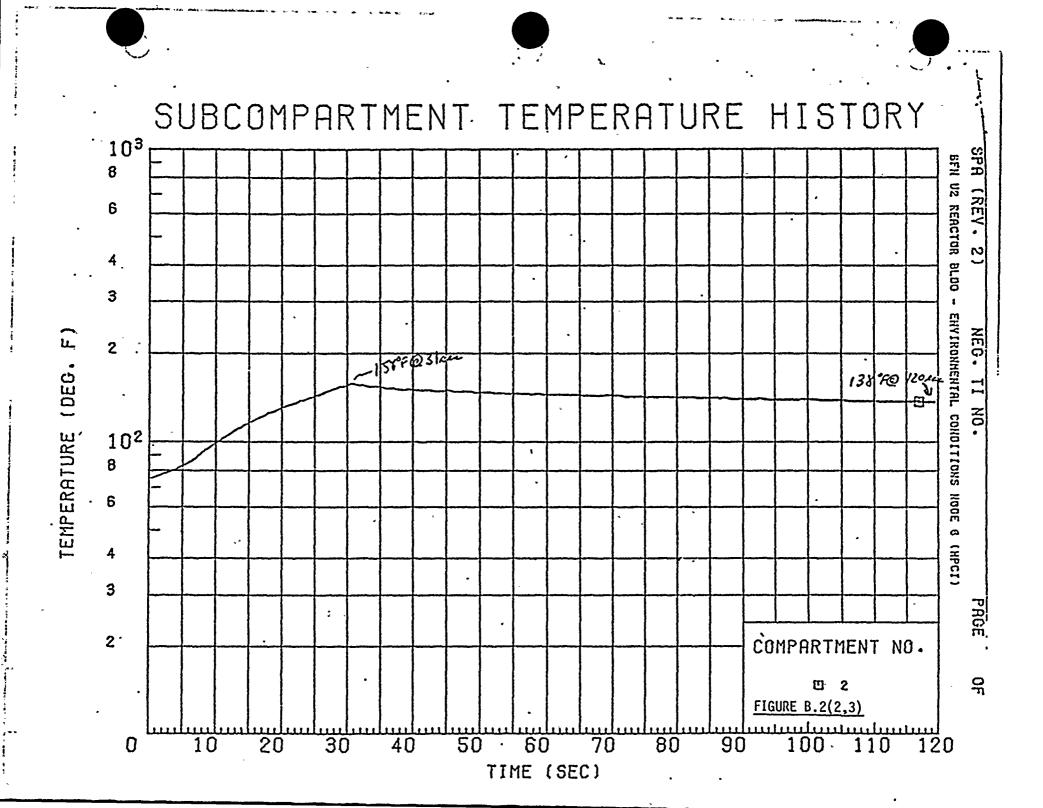
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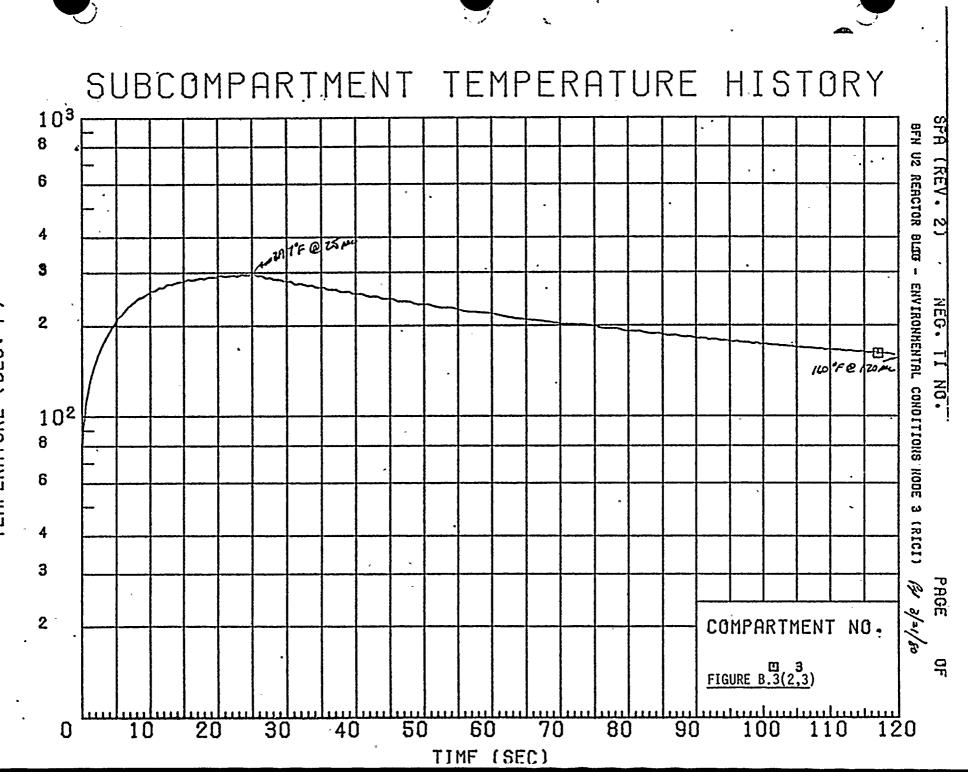
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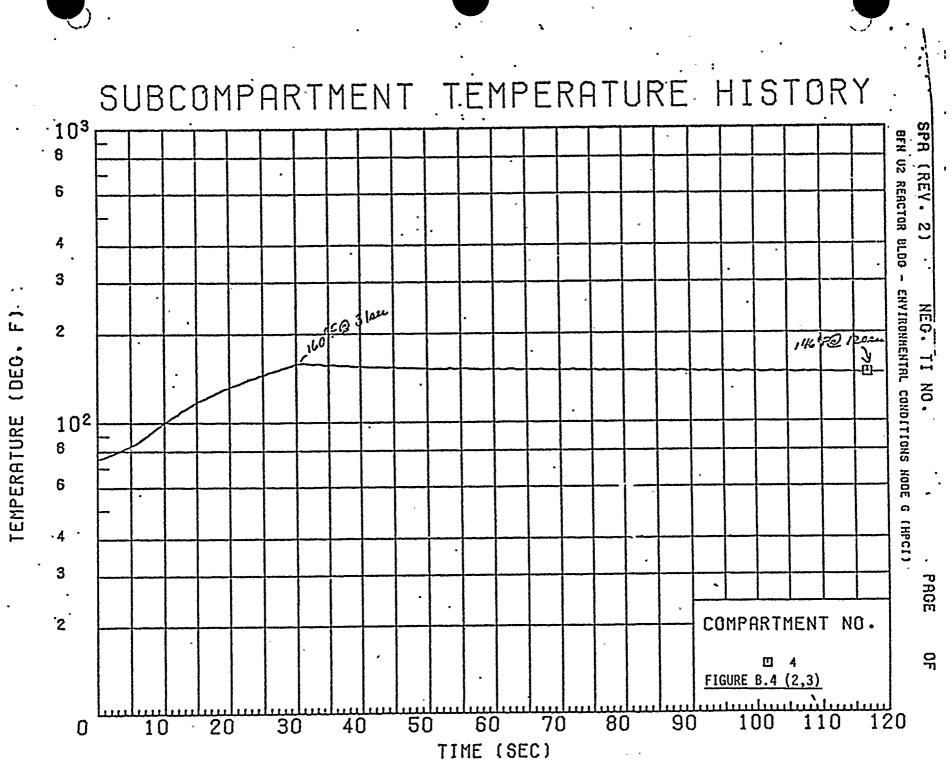
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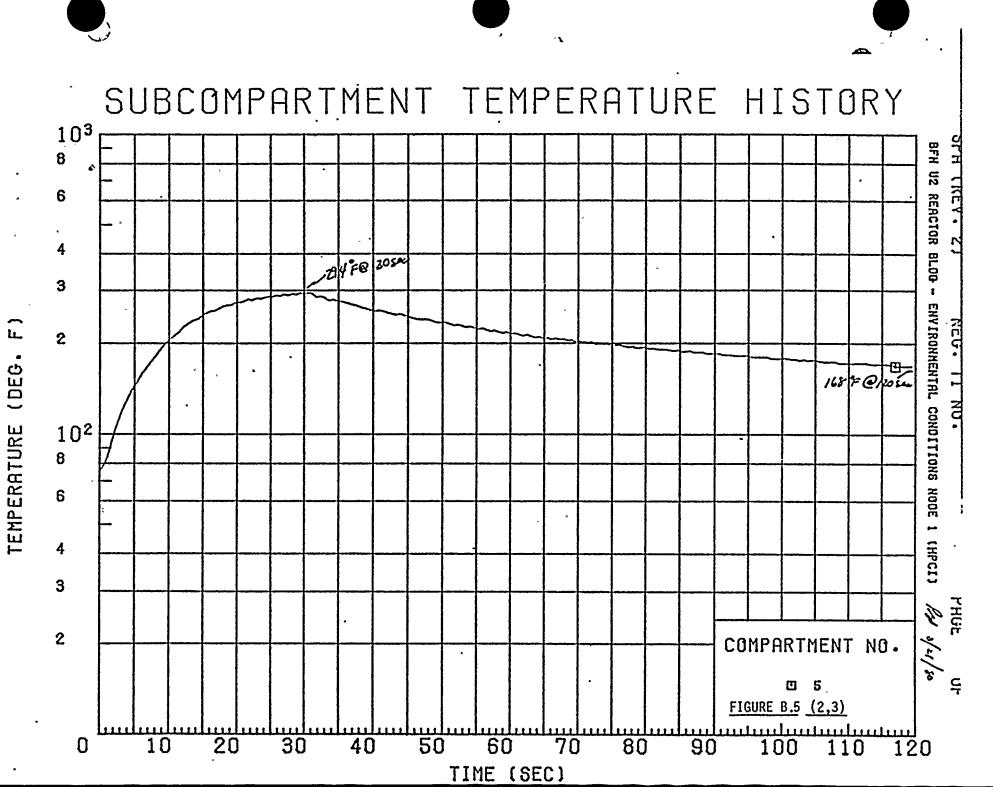
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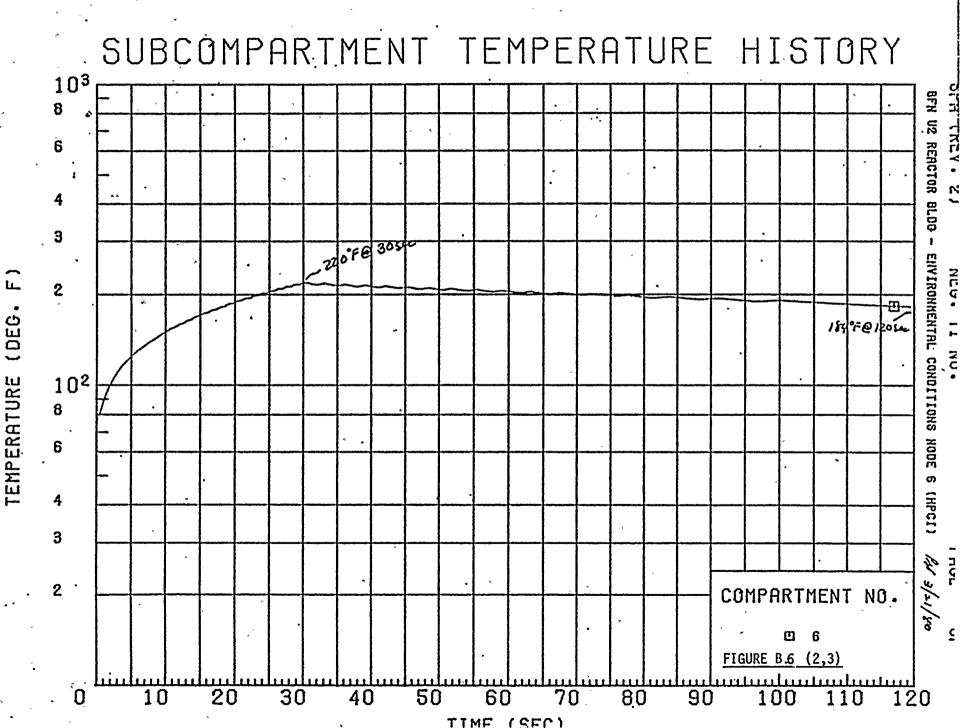


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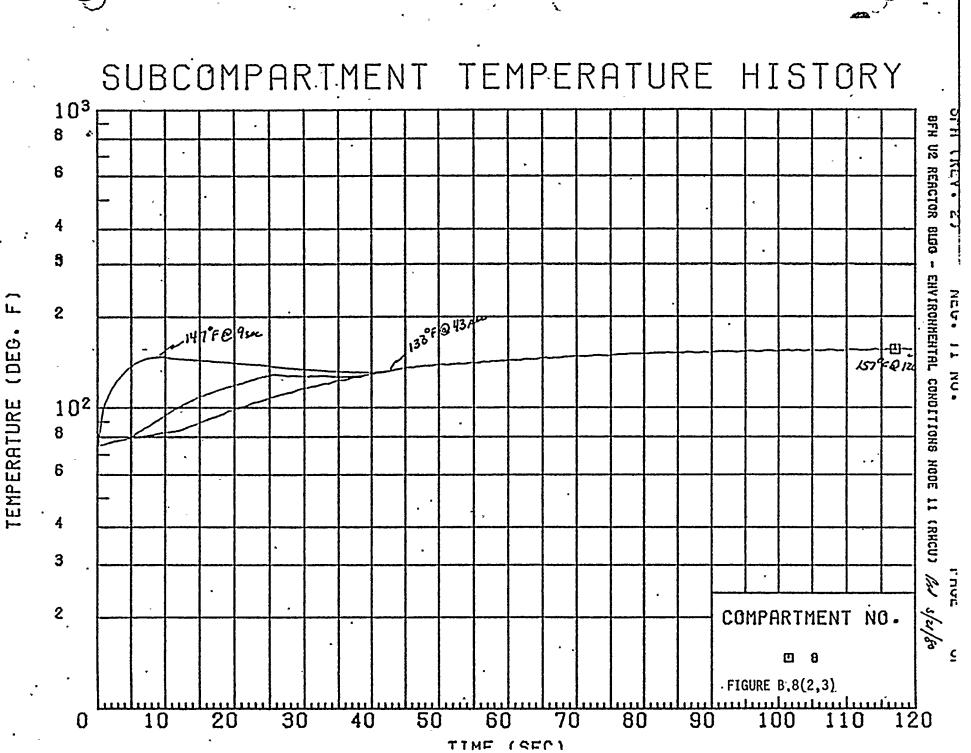
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.... **;**. .: "•: E... 302°F@ 2 sec Τ-BEN STEAM VAEVE VAULT 250 TEOPERATURE VS TIME -----070 40 -TENTELIVEC \_\_\_\_ ----1--------<u> - - -</u> .... 150 -----īls@is 1. 1. 100 ..... 76 L 0 ----50 100 FIGURE B.7 (2, 3). Too Ison

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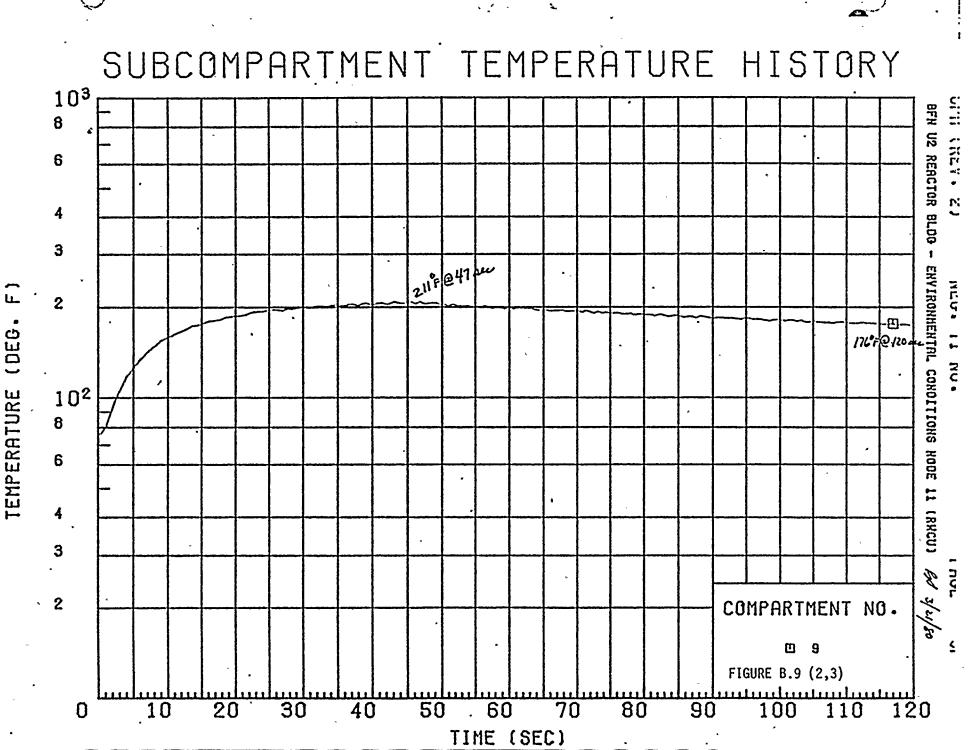


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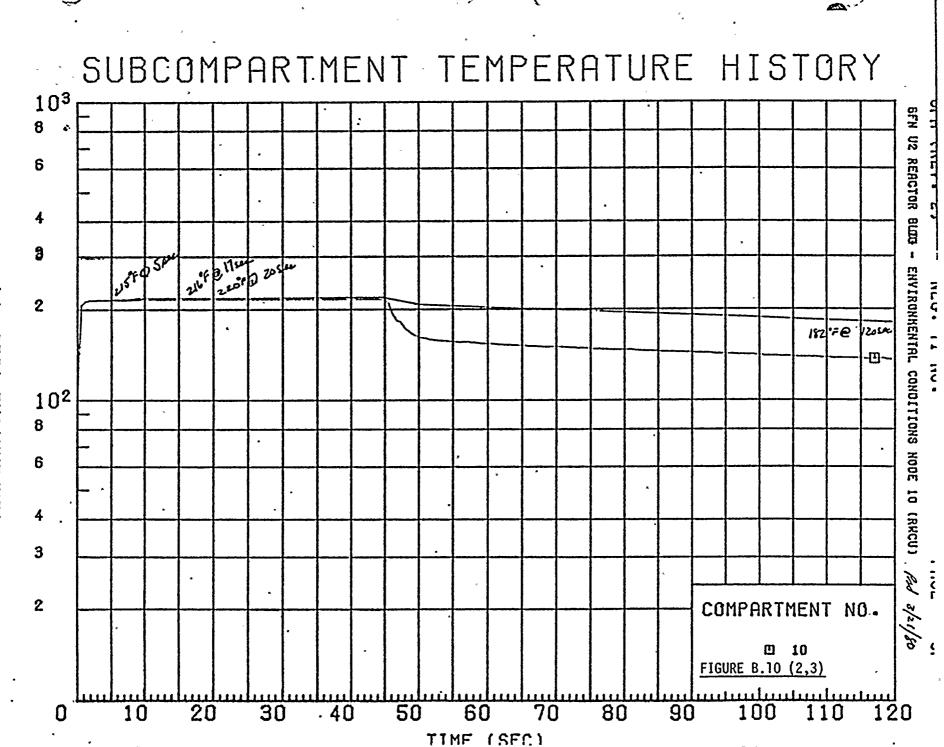
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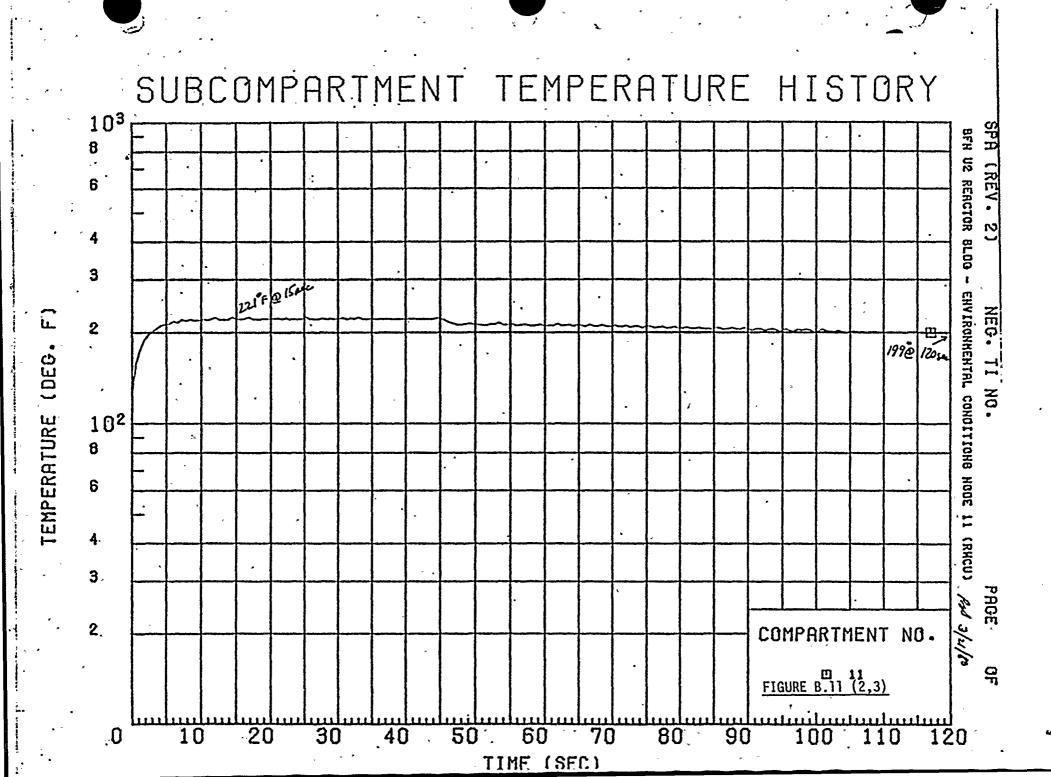
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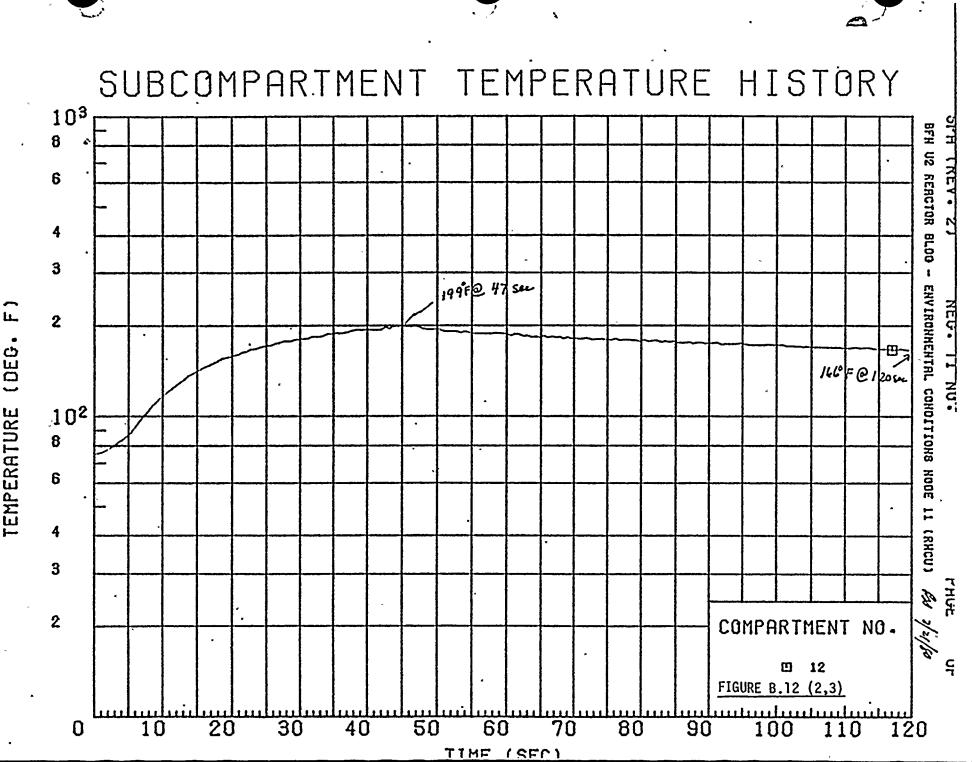
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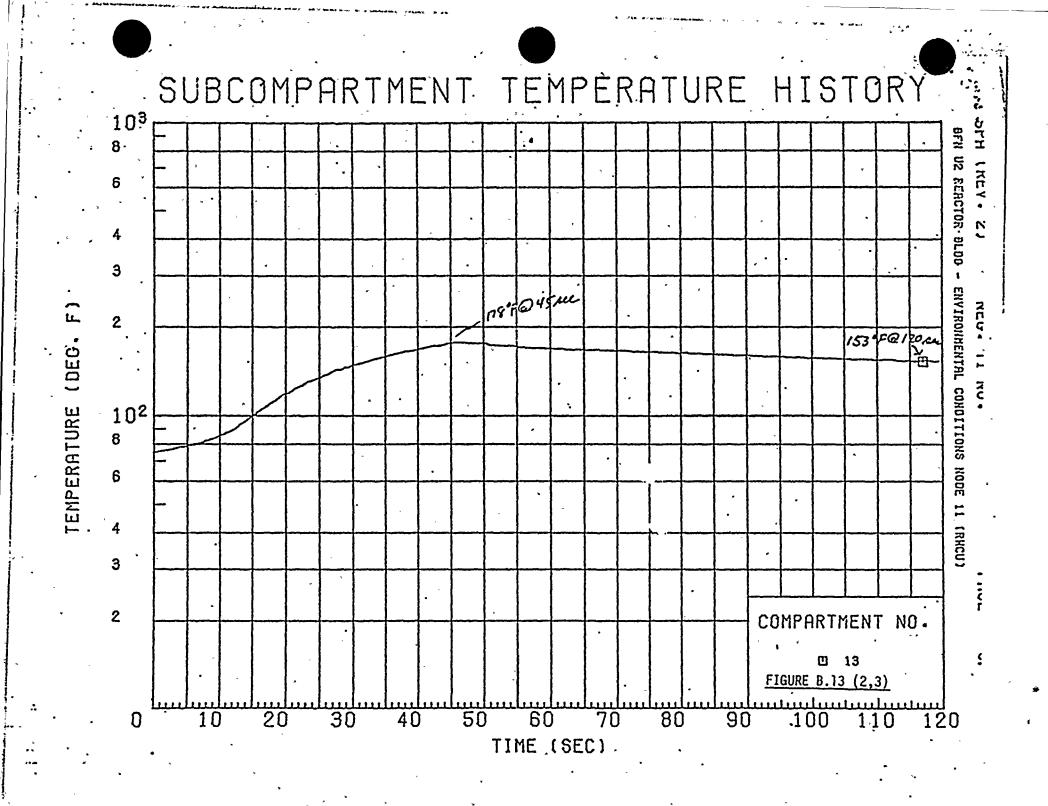
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APPENDIX C EVALUATION WORK SHEETS AND SUPPORTING INFORMATION

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## EWS Clarifications and Errata\*

- 1. All information in the columns of all EWS's concerning aging except the Environmental Specification column are to be ignored unless a qualified life has been determined or a reference to an appendix is given. In all other cases, the generic position 4.1.2 was taken which requires further analysis, type test, or a replacement plan.
- 2. For all EWS written for Rooms "O (Drywell) and "OO" (Wetwell)", the flood level was specified as 552'. This flood level is applicable only for the drywell (Room O) of the primary containment, whereas, for the torus portion [Room OO (Wetwell)] the flood level for a EWS written for Room OO should be ignored and 539' should be used instead.

\*For clarification or errata associated with a particular group of EWS's (NEB, MEB, EEB, or EEB generic items), see the front of the indexes for that section.

## BROWNS FERRY NUCLEAR PLANT

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## EVALUATION WORKSHEET INDEX

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- <u>Sheet No</u> .	Description
EEB-APS-0001	480V Shutdown Board Tfr TS3A - General Electric
-0002	480V Shutdown Board Tfr TS3B - General Electric
· _0003	480V Shutdown Board Emer Tfr TS3E - General Electric
-0004	480V Reactor Mov MCC 3C - General Electric
-0005	480V Reactor Mov MCC 3D - International Switchboard Corp.
·· -0006 ·	480V Reactor Mov MCC 3E - "
-0007	480V Reactor Mov MCC 1D - General Electric
-0008	480V Reactor Mov MCC 2D - "
-0009	480V Reactor Mov MCC 1E - International Switchboard Corp.
0010 .	480V Reactor Mov MCC 2E - "
-0191	Motor Generator Sets (Louis Allis)
-0192	
-0193	10 U 8.11 II II
· -0194	в в страни и
÷0195	11 11 11 11 11 11
-0196	14 15 15 11 20 -
0197	17 II II II II
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-0199	11 11 15 15 20
-0200	
· · · ·	<sup>A</sup> · · · · · · · · · · · · · · · · · · ·
-0202	
-0203	GE 4160V-480V Shutdown Transformer (TSIA)
·-0204	(TSIB)
-0205	(TS2A)
-0206	(TS2B)
-0207	GE 4160V-480V Emergency Shutdown Transformer (TS1E)
-0208	(TS2E)
-0209	GE 480V Motor Control Center (MCC 1C)
-0210	(MCC 2C)
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(3)SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Facility: Browns Ferry Nuclear Plant EEB APS-0001 Sheet No. Unit: 3 Revisión 0 Cocket: 50-296 Date 10-22-80 ENVIRC: EM DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION ITEMS METHOD Specifi-Qualifi-Specifi-Oualifinoitso cation Parameter cation cation System: AUX Power Sys Operating 1 Year None None Appendix 1&2 None Time Plant ID No. TS3A NCR NO. (1)BFNEEB8052 R] Transformer Component • Figure Temperature Manufacturer: General × -None B.12 (2,3) None None (4)(<sup>6</sup>F) Electric ٩. • • Table Pressure Model Number: 11CH2L4 B.1(1,2,3) (PSIA) (4) None None None Function: Power Distribution Relative Humidity (%) Nonė 100 Max (4)None None Accuracy: Req'd: N/A Demon: N/A 4 Chemical Spray N/A N/A Category: \* N/A **'**A' (4) N/A N/A Service: 4160V - 480Volt BFNEEB8052R1 Transformer Resteriou Appendix 1&2 3.1x10<sup>4</sup> None None None (RAD) (4)Location: EL 621, Rm 12 (2)Noné Aging N/A None None 1 Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A N/A N/A N/A N/A (4) No Prepared by: Aug U. Pie Notes: (1)See Section 2.4 in 79-018 report. (2) See Section 4.1. in 79-018 report. Reviewed by: B.A. Welston (3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

QA Acceptance: John J. Free 10/27/50

# EN DES CALCULATIONS

EEB APS-0001 Appendix 1-R0 ·

TITLE				,		UNID	PLANT/UNIT BFN/3
   Engineering Fu	valuation for Co	ntinu	ed Anerat	ion		APS	SAR SECTION(S)
PREPARING ORGANIZ		· · · · · · · · · · · · · · · · · · ·				!	de anna anna anna anna anna anna anna an
EN DES - EEB		REV	(FC	OR MEDS USE	)	MED	S ACCESSION NUMBER
APPLICABLE DESIGN	BRANCH/PROJECT	RO			•		•
DOCUMENTS	IDENTIFIERS	RI					,
N/A	NCR No. BFNEEB8052R1	R2		· ··· · · · · · · · · · · · · · · · ·	<u> </u>		
KEY NOUNS	J						· · ·
Environmental Q	Walification	R3 ·			6		
REV RO	RI	. <u> </u>	R2	R3		TATEMENT OF PR	OPI FM
DATE		<u> </u>		<u></u>	°	,	OBLEM
PREPARED					ł 0	ualification (	documentation for the
1 11 1							-480V shutdown board
ans N. Sielen	-						3A has not been loca-
CHECKED		<u> </u>		<u> </u>			mperature, humidity,
		.			þ	ressure, radi	ation, aging and
O.R. Itelstor					0	perating time	•
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ABSTRACT	•			Å		· · · · · · · · · · · · · · · · · · ·	
leak test o assume that withstand a ANSI C57.12 for short-o transformer radiation s Therefore, qualified f	of 5 psi pressur if the transfo n equal outside -1965 which per ircuit conditio because it is ervice conditio we find that th	e held rmer o press mits a ns. l sealed ns al is Cla eratio	d for a pe can withst sure. Als a maximum Relative I d and fil low up to ass IE 410 on until o	eriod of tand 5 ps so, GE ce tempera numidity led with 1x10 <sup>5</sup> ra 50V-480V confirmat	24 hou rtifie ture f will n Pyrano ds tot shutdo	rs. Thereford rnal pressure of that this the or Class A ins ot affect the l insulating al integrated wyn board trans	d passed a normal e, we can reasonably , then it can also ransformer meets sulation of 250°C operation of this liquid. Usual nuclear 40 years dosage. sformer TS3A is obtained from the
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## EEB APS-0001 Appendix 2, Rev 0

## ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8052R1.
- 2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Kann N. D. R. Helster Reviewed by:

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Facility: Browns Ferry Nuc Unit: 3 Docket:50-296	·······································		•			Sheet No.EEB APS-0002Revision0Date10-22-30		
EQUIPMENT DESCRIPTION		ENVIRONMENT		DOCUMEN	TATION REF	QUALIFICATION	CUTSTANDING	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	NETHOD	ITEMS	
System: AUX Power Sys Plant ID No. TS3B	Operating Time	l Year	None	. (1)	None	None	Appendix 1&2 NCR NO. BFNEEB8052R1	
Component Transformer		Figure	_					
Kanufacturer: General Electric	Temperature (°F)	8.12 (2,3)	None	(4)	None	None		
Model Number: 11CH2L4	Pressure (PSIA)	Table	n.				• .	
Function: Power-	(F31A)	B.1(1,2,3)	None	(4)	None	None	- · ·	
Distribution	Relative Humidity (%)	100-Max	None	(4)	None	. None		
Accuracy: Regid: N/A Demon: N/A	Chemica]					·	<u>k</u>	
Category: A	Spray	N/A	N/A	(4)	N/A	N/A	N/A .	
Service: 4160V-480V Transformer	Radiation (RAD)	3.1x10 <sup>4</sup>	Noné	(4)	None	None	BFNEEB8052R1 Appendix 1&2	
Location: EL 621, Rm 12	Aging	N/A.	None	=(2)	None	None		
Flood Level Elev: 552' Noove Flood Level: Yes X No	Submergence	N/A	N/A	(4) ·	N/A	• N/A	N/A	
Notes: (1) See Section 2		-	Y	. •		Prepared by:	any D. Diesla	
<ul><li>(2) See Section 4</li><li>(3) All notes and</li></ul>	l óther informat	ion not on t	hese	•.	• •	•	Q.R. Kelster	
sheets are or	the attached a 0 and/or Appen	ppendix shee	ts.	: · · ·	•	QA Acceptance:	John F. France	

# EN DES CALCULATIONS

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EEB APS-0002 Appendix 1-R0:

N/A NCR NO. BFNEEB8052 R1 R1 R2 Rivironmental Qualification R3	Engineering Ev	valuation for Co	ntinu	ued Operati	ion		APS	SAR SECTION(S)
N/A       NCR.NO. BFNEEB8052 R1       R1         N/A       NCR.NO. BFNEEB8052 R1       R2         R2       R3         R2       R3         R4       R2         R4       R3         R4       R2         R4       R2         R4       R3         R4       R2         R4       R2         R4       R2         R4       R2         R4       R2         R4       R3         R4       R2         R4       R4         R4		ATION	REV	(FO	R MEDS USE)		MED:	S ACCESSION NUMBER
N/A       NCR.No. BFNEEB8052 R1       R1         R2       R3         R4       R2         R4       R2         R4       R2         R4       R2         R4       R4         R4       R4         R4       R2         R4       R4         R5       R5         <			RO					•
N/A       NCR.No. BFNEEB8052 R1       R2         Invironmental Qualification       R3         REV       R0         REV       R0         NATE       R2         Invironmental Qualification       R3         STATEMENT OF PROBLEM         DATE       Qualification documentation for t         Class : IE 4160V-480V shutdown boar         TREPARED       Class : IE 4160V-480V shutdown boar         Mam.A. Much       Class : IE 4160V-480V shutdown boar         Class : IE 4160V-480V shutdown boar         Transformer TS3B has not been loc         Lass : IE 4160V-480V shutdown boar         Transformer TS3B has not been loc         Lass : IE 4160V-480V         MURAUTED         APPROVED         ATTACHMENTS         WCROFILMED:         LIST ALL PAGES*         DUBLED WTHINS REV:         LIST ALL PAGES*         DIATAGED BYTHIS REV:         LIST ALL PAGES*         DIA	APPLICABLE DESIGN DOCUMENTS					·		۲ 
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radiation service conditions allow up to 1x10° rads total integrated 40 years dosage. Therefore, we find that this Class 1E 4160V-480V shutdown board transformer TS3B is qualified for continued operation until confirmation of the above is obtained from the	transforme	n herause it is	seale	ed and fil	led with Pyr	anol	insulating	liquid. Usual nucl
Therefore, we find that this Class 1E 4160V-480V shutdown board transformer 153B is gualified for continued operation until confirmation of the above is obtained from the		r because no ns comuios conditir	- 200 - 200	llow up to	$1 \times 10^5$ rads	tota	l integrated	1 40 years dosage.
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qualified for continued operation until confirmation of the above is obtained from the vendor including aging and operating time.	Therefore,	we find that th	ns c	lass IE 41	00V-480V Shu	CUOWI	li Duaru crai	stormer 1550 is
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rVA 10697 (ENDES-7-78) *Use revision log (form TVA 10534) if more room is required	TVA 10697 (ENDES-7-7							

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### EEB APS-0002 Appendix 2-R0

## ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8052R1.
- TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Lang Reviewed by: D.R. Helste

EEB APS-0003 Sheet No. Unit: 3 Revision Ω Cocket: 50-296 Date 10-22-80 ENVIRCEMENT DCCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: AUX Power Sys Operating ] Year None None None Appendix 1&2 Plant ID No. TS3E Time NCR NO. (1)BENEEB8017 RT Component Transformer Figure Temperature Manufacturer: General B.13(2,3) None None (°F) None (4) Electric Table ۰. • . Pressure Kodal Number: 11CH2L4 (PSIA) (4) B.1(1,2,3)None None None Function: Power Distribution Relative Humidity (%) 100-Hax (4) None None None Accuracy: Req'd: N/A H Demon: N/A Chemica] Spray Category: , A N/A (4) N/A N/A N/A N/A· Service: 4160V-480V Transformer BFNEEB8017R1 Radiation  $3.1 \times 10^4$ None None None Appendix 1&2 (RAD) (4) Location: EL 639, Rm 13 Aging N/A (2) None None None Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A N/A N/A N/A N/A No  $(4)^{\cdot}$ See Section 2.4 in 79-01B report. -Prepared by: King A Notes: (1)See Section 4.1. in 79-01B report. (2) Reviewed by: D.R. Kelster. (3) All notes and other information not on these sheets are on the attached appendix sheets. See Section 3.0 and/or Appendix B in 79-01B report. QA Acceptance: (4)

Facility: Browns Ferry Nuclear Plant

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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## EN DES CALCULATIONS Appendix 1-R0

TITLE	4					UNID SYSTEM(S)	BFN/3			
	valuation for Con	ntinu	ed Operati	on		APS	SAR SECTION(S)			
PREPARING OKGANIZ	ATION	REV	(FC	R MEDS USE)		MEDS	ACCESSION NUMBER			
EN DES - FEB	BRANCH/PROJECT	RO		n						
DOCUMENTS	IDENTIFIERS					· · · · ·	۳ <u></u> ۲			
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PREPARED				•	-		*			
Lam D. Duile		•			Qualification documentation.for Class 1E 4160V-480V shutdown boa					
CHECKED					emergency transformer TS3E has not been located for the temperature, humidity, pressure, radiation,					
O.R. H. O. T.					ag	ing and oper	ating time.			
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ABSTRACT					*	<u> </u>				
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service con we find that	ditions allow up t this Class lE	to 1 4160V	x10 <sup>5</sup> rads /-480V shut	total integn tdown board e	rated emerg	40 years do ency transfo	osage. Therefore, ormer TS3E is quali- and from the vendor			

including aging and operating time.

TVA 10607 (ENDES-7-78)

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## EEB APS-0003 Appendix 2-R0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8017R1.
- 2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging to provide a basis for establishing equipment operating life.

Prepared by: Sam Dieslu Reviewed by: D.R. Helotin

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Facility: Browns Ferry Nuclear Plant . Unit: 3 Cocket: 50-296

## SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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(3) Sheet No. <u>EEB APS-0004</u> Revision <u>0</u> Date <u>10-22-80</u>

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EQUIPMENT DESCRIPTION		ENVIRG.		DOCUMENT	TATION REF	QUALIFICATION METHOD	OUTSTANDING	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	METHOD .	ITEMS	
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 3C	Operating Time	1 Year	None	(1)	None	None	Appendix 1&2 NCR NO.	
Component 480V Hotor' Control Center (MCC)		Figure			· · ·		BFN'EEB8019R1	
Manufacturer: General Electric	Temperature (°F)	B.8(2,3)	None	(4)	None	None	•	
Model Number: 7700 Series	Pressure (PSIA)	Table B.1(1,2,3)	None	(4)	None	∻. None	• .	
Function: 480V Motor Control	Relative Humidity (%)	100-Max	None	(4)	None			
Accuracy: Req'd: N/A Demon: N/A Category: A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A	
Service: 480V Motive and control power distribution	Radiation (RAD)	5.1x10 <sup>5</sup>	None	(4)	None	None .	BFNEEB8019R1 Appendix 1&2	
Location: EL 565, Rm 8	Aging	N/A	None	(2)	None	None		
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A	(4)	N/A	. N/A	N/A .	
	.4 in 79-01B re				;	Prepared by: 📿	Jang D Bulu	
sheets are on	<ul> <li>.1. in 79-01B</li> <li>other informat</li> <li>the attached a</li> <li>.0 and/or Appen</li> </ul>	ion not on t ppendix shee	ts.		·· · ·	Reviewed by:	<u> 2. R. Kelster</u> olin I. Freuch	
•	•	· · · · · · · · · · · · · · · · · · ·			•		10/27/80	

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# ENDES CALCULATIONS Appendix 1-R0

TITLE						UNID	PLANT/UNIT
						SYSTEM(S)	1 DEN/0
	luation for con	tinue	d operati	on	•	APS	SAR SECTION SAR
PREPARING ORGANIZA	ATION	REV	(F(	DIL MEDS USE)		MEDS	ACCESSION NUMBER
EN DES - EEB	· ····································	RO					
APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT				• •		
Dooonatio	1000000						
		R1					•
N/A	NCR NO.						•
	BFNEEB8019 R1	R2					
KEY NOUNS							
Environmental	Qualification	R3				-	
REV RO	R1	┠╍╍┙┙	R2	l R3	STA	TEMENT OF PRO	OBLEM
DATE		[					
PREPARED		[			- Qua	lification (	documentation for the
206-1					480	V Reactor M	OV MCC 3C has not been
Bry N. Durle				•	100	ated for pre	essure, aging, and `
CHECKED	_				- oper	ration time.	. Other qualification
0.0 86 0.4		•••			awa 1 awa	ity to late	ation by GE of simi- r contracts and TVA
SUBMITTED		ļ					alification report for
APPROVED						rent contra	
ATTACHMENTS MICROFILMED:							
LIST ALL PAGES * ADDED BY THIS REV:					1		,
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ABSTRACT				I			
and Phipps E 1980 (EEB 80 cation Test (contract 77 ture, humid that the 770 tions. Beca a tornado de test is now	Bend Nuclear Pla D1009 050), prov Report to IEEE 7K5-820350). Th ity, and radiati D0 series MCC in ause the accurac epressurization being schedulec ustified for con	ants c vided 323-1 nis re ion se ncludi cy of event d to c	contain ic their "IC 974" for port provervice con ing pneuma the pneum twhich la confirm pr	lentical com 7700 Motor Hartsville ditions. G ditic timing matic timing est at most ressure qual	Ponent and Ph te qua E is r relays appros	ts. GE's le rol Center E alipps Bend M alification now scheduli s meet the p /s may be af kimately 5 s tion, the Cl	wns Ferry, Hartsville etter of September 26, invironmental Qualifi- luclear Plants for the tempera- ing a test to prove pressure service condi- ffected <u>only</u> during seconds and a vendor lass 1E Reactor MOV uding aging and
TVA 10607 (PM/046 - 20)	*The venician to		TVA 105241	f more room is re	, 		•

## EEB APS-0004 Appendix 2-RC

### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8019R1.

- TVA letter of October 2, 1980 (EEB 801002 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and
   radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Lan D. Dien</u> Reviewed by: <u>A.R. Wellester</u>

				مد	L		
Facility: Browns Ferry Nuc Unit: 3 Docket: 50-296	léar Plant	SYSTEM COMP	ONENT EVALUA -	TICN WORK SH	EET (Rev 2)	(3) Sheet No. <u>EEB</u> Revision <u>0</u> Date <u>(0-</u> 2)	
EQUIPMENT DESCRIPTION		EN A Sol The		DOCUMENT	TATION REF	QUALIFICATION	OUTSTAN
EQUIPMENT DESCRIPTION	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	METHOD .	ITEM:
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 3D	Operating Time	1 Year	None	(1)	None	None	Appendix 12 NCR NO. BFNEEB802
Component 480V Motor Control Center (MCC)	۰.	Figure	16 <b>- F</b>			······	1. 1. 6. 6002
Manufacturer: . International Switchboard	Temperature (°F)	B.9(2,3)	None	(4)	None .	None	
Corporation Model Number: N/A	Pressure (PSIA)	Table  B.1(1,2,3)	None	(4)	·. None	•. None	
Function: _480V Motor Con- trol Accuracy: Reg'd: N/A	Relative Humidity (%)	100-Max	None	(4)	None	None	
Demon: N/A Category:A	Chemical Spray	: N/A <sup>,</sup> .	N/A	(4)	N/A	 N/A	N/A <sup>•</sup> .
Service: 480V Motive and control power distribution	Radiation (RAD)	2.1x10 <sup>5</sup>	None	. (4)	None	None .	BFNEEB8020 Appendix 1
Location: EL 593, Rm 9	Aging	N/A	None	(2)	·None	None	
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A	(4)	· N/A	N/A	N/A
Notes: (1) See Section 2	.4 in 79-018 re	port.	٩.	· · ·		Prepared by:	an, D. Dies
(3) All notes and	.l. in 79-01B other informat	ion not on t	hese	•		Reviewed by:	
sheets are on	the attached a .0 and/or Appen	ppendix shee	ts. ·		· · · · ·	QA Acceptance;	ohy F. Fre

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# EN DES CALCULATIONS

EEB APS-0005 Appendix 1-R0

Engineering Ev	valuation for Co	ntinu	ied Operat	ion		SYSTEM(S) APS ·	BFN/3 SAR SECTION(S)11/A
PREPARING ORGANIZ	ATION	REV	(F)	DR MEDS USE)		MED	S ACCESSION NUMBER
EN DES - EEB	· · · · · · · · · · · · · · · · · · ·	RO					•
APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS	<u> </u>			•		
		R1					• .
N/A	NCR No. BFNEEB802CR1	R2					
Environmental	Qualification	R3					
REV RO	R1	[	R2	R3	STA	TEMENT OF PR	OBLEM .
DATE					1		· · · ·
FREFARED Kamp D. Just CHECKED				1 10 K	48	OV Reactor I cated for tl	documentation for the MOV MCC 3D has not bee he temperature, humi- e radiation,aging,and
SUBMITTED	·		····		op	e.	
APPROVED					1		
ATTACHMENTS MICROFILMED:					1		
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ABSTRACT	•						»
References:	"IC7700 Mc	otor ( 23-197	Control Ce 74". (Con	nter Environ	menta	al Qualifica	D9 050), with ation Test Report ville and Phipps
	Gould-Brow Report No.	n Bo\ 33-5	/eri "Clas 52449 QS -	s lE Electri Secondary U	cal E nit S	Equipment Qu Substation:	300205 117), with Malification Summary for IEEE-323-1974. Muclear Plants).
for the 480 Hartsville a ISC is simil Internationa the qualific	volt Reactor MO and Phipps Bend ar to that qual al Switchboard C	V MCC Nucle ified Corpor	2 3D with ear Plants 1 by Refer ration is 2 We find	the material and find th ence 1 and 2 now providin that the C1	list at mc for g TVA ass l	of equipme ost of the e similar ser with a quo F Reactor M	thoard Corporation ent provided for equipment provided by vice conditions. Dation for providing IOV MCC 3D is justified ting time.
				, more room is rea			



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EEB APS-0005 Appendix 2-R0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8020R1.
- 2. TVA letter of October 2, 1980 (EEB 801002 916), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Kan D. Died Reviewed by: B.R. W. elste



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Cocket: 50-296	· · ·	ENVIRONENT		DOCUMEN	TATION REF	Date <u>10-22</u> QUALIFICATION	OUTSTANDIN
EQUIPMENT DESCRIPTION	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	METHOD	ITEMS
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 3E	Operating Time	l Year	None	) . (1)	Noné	None	Appendix 1&2 NCR NO. IBFNEEB 8020R
Component 480V Motor Control Center (MCC) Manufacturer:	Temperaturé	Figure B.12(2,3)	 None	(1)	None	None	
International Switchboard Corporation Model Number: N/A	(°F) Pressure (PSIA)	Table B.1(1,2,3)	None	(4)	None	None	•••
Function: - 480V Motor Control	Relative Humidity (%)	100-Max	None	(4)	None	"None	
Accuracy: Req'd: N/A Demon: N/A Category: A	Chemical Spray	N/A .	N/A	(4)	N/A .	• N/A	N/A'.
Service: 480V Motive and Control Power Distribution	·Radiation (RAD)	3.1x10 <sup>4</sup>	None	(4)	None	None	BFNEEB8020R1 Appendix 1&2
Location: EL 621, RM 12	Aging	N/A	None	(2)	. None	None	<u> </u>
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A	(4)	• N/A	N/A	N/A .
Notes: (1) See Section 2	.4 in 79-018 re	eport.	· ·	······································	······	Prepared by: 🕿	Jam D. Giel
	.l. in 79-01B other informat	•	•		•	Reviewed by:	AR Helste

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# EN DES CALCULATIONS

EEB APS-0006 Appendix 1-R0

Engineering Evaluation for Continued Operation     APS     SAR SECTION       PREPARING ORGANIZATION     REV     (FOR MEDS USE)     MEDS ACCESSION NU       EN DES - EEB     RO     RO     N/A     NCR NO.	<u> </u>
EN DES - EEB     R0       APPI.ICADLE DESIGN     BRANCIL/PROJECT       DOCUMENTS     IDENTIFIERS       R1	MBER
APPLICADLE DESIGN BRANCIL/PROJECT DOCUMENTS IDENTIFIERS R1	
DOCUMENTS IDENTIFIERS . R1	
BFNEEB8020R1	
KEY NOUNS	
( p)	
Environmental Qualification Rev Ro R1 R2 R3 STATEMENT OF PROBLEM	<u> </u>
DATE	
PREFARED Qualification documentat	
480 volt Reactor MOV MCC been located for the tem	
CHECKED been located for the tem	
OR. Webster	
SUBMITTED	<b>6</b> 7
APPROVED	
A TTACHMENTS MICROFILMED:	
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ABSTRACT	
References: 1. GE letter to TVA dated September 26, 1980 (EEB 801009 050 "IC7700 Motor Control Center Environmental Qualification Report to IEEE-323-1974. (Contract 77K5-820350 for Harts and Phipps Bend Nuclear Plants).	Test
<ol> <li>GE (NED) letter to TVA dated February 5, 1980 (NEB 80020) with Gould-Brown Boveri's "Class 1E Electrical Equipment cation Summary Report No 33-52449 QS - Secondary Unit Se for IEEE 323-1974. (Contract 77K3-820181 for Hartsville Bend Nuclear Plants).</li> </ol>	Qualifi- ubstation"
We have compared the Bill of Material provided by International Switchboar tion for the 480 volt Reactor MOV MCC 3E with the material list of equipme for Hartsville and Phipps Bend Nuclear Plants and find that most of the en- provided by ISC is similar to that qualified by Reference 1 and 2 for sim- conditions. International Switchboard Corporation is now providing TVA w tion for providing the qualification documentation. We find that the Clas Reactor MOV MCC 3E is justified for continued operation based on similari- including aging and operating time.	entprovided quipment ilar serviće ith a quota- ss lE
	-
J TVA 10697 (ENDES-7-78) *Use revision log (form TVA 10534) if more room is required	s,

### EEB APS-0006 Appendix 2-R0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8020R1.
- 2. TVA letter of October 2, 1980 (EEB 801002 916), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. Le are actively pursing with the vendor whether the materials used in the equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Sim A. Guila</u> Reviewed by: <u>D. R. W. elister</u>

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•	•				•		•
Facility: Browns Ferry Nucl Jnit: 1	ear Plant	SYSTEM COMP	OHENT EVALUA	TICN WORK SH	EET (Rev 2)	(3) Sheet No. <u>EEB APS-0007</u> Revision <u>0</u>	
Cocket: 50-259 .			·		• •	Date <u>10-22</u>	
EQUIPMENT DESCRIPTION		ENVIRGENE	DOCUMENTATION R			QUALIFICATION METHOD	CUTSTANDIN ITEMS
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		,
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 1D	Operating Time	l Year	None	. (1)	None	None	Appendix 1&2 NCR NO. BFNEEB 8022R
Component 480V Motor Control Center (MCC)	-	Figure				•	1
anufacturer: General	Temperature (°F)	B.9(1)	None	(4)	None .	None	Nach -
Electric	Pressure	Table	•			· •.	•
odel Number: 7700 Series	(PSIA)	B.1(1,2,3)	None	(4)	None	None	
Function: - 480V Motor Control	Relative	100-Max	None	(4).	None	None	
Accuracy: Req'd: N/A Demon: N/A Category: A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A .
Service: 480V Motive and ontrol Power Distribution	Radiation (RAD)	2.1x10 <sup>5</sup>	Nonè	. (4)	None	None	BFNEEB8022 R1 Appendix 1&2
ocation: EL.593, Rm 9	Aging	N/A	None	(2)	None	None	dist.
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A	· (4)	•. N/A •	N/A	, N/A
Notes: (1) See Section 2	.4 in 79-018 re	eport.	۰.	4		Prepared by: e	Lang & Dues
<pre>(2). See Section 4 (3) All notes and</pre>	.l. in 79-01B other informat		· ·			Reviewed by: 🔏	9 R. Welster
sheets are on	the attached a .0 and/or Apper	appendix shee	ets.			QA Acceptance:	folu 7. freu 10/27/50

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## EN DES CALCULATIONS EEB APS-0007 Appendix 1-R0

	TITLE						UNID SYSTEM(S)	PLANT/UNIT BEN/1	
•	· · · · · · · · · · · · · · · · · · ·		ntinued Operation				APS	SAR SECTION(S) /A	
	EN DES - EEB		REV	(FOR MEDS USE)			MEDS ACCESSION NUMBER		
			RO					•	
	APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS				•			
	Dooonarto		R1				ð.	· ,	
	N/A	NCR No. BFNEEB8022RI				· · · · · · · · · · · · · · · · · · ·	<u> </u>		
			R2		•				
l	KEY NOUNS		R3						
	Environmental Qualification		A3						
I	REV RO R1		R2 R3			STA	STATEMENT OF PROBLEM		
1	DATE							documentation for the	
- [	PREPARED						480 volt Reactor MOV MCC 1D has not		
	You A hi-1					be	en located f	for pressure, aging,	
f	CHECKED					and	and operating time. Other qualification awaits confirmation by GE of similarity to later		
ļ	D.K. Welson	•				co	ntracts and	TVA approval of	
ſ	SUBMITTED							report for current	
.[	APPROVED					co	ntract.		
ĺ	ATTACHMENTS MICROFILMED:								
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Ī	ABSTRACT	<u>م</u>							
There is evidence that all GE motor control centers provided for Browns Fe Hartsville and Phipps Bend Nuclear Plants contain identical components. G								or Browns Ferry, noonents. GE's	
	letter of September 26, 1980 (EEB 801009 050), provided their "IC7700 Motor Control Center Environmental Qualification Test Report to IEEE 323-1974" for Hartsville and Phipps Bend Nuclear Plants (contract 77K5-820350). This report provides adequate qualification for the temperature, humidity and radiation service conditions. GE is now scheduling a test to prove that the 7700 series MCC								
the accuracy of the pneumatic timing relays may be affected <u>only</u> during a torna depressurization event which last at most approximately 5 seconds and a vendor test is now being scheduled to confirm pressure qualification, the Class IE Rea MOV MCC 1D is justified for continued operation based on similarity, including								ly during a tornado	
								nds and a vendor	
								the Class IE Reactor	
								arity, including	
	aging	and operating t					-		
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IVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

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EEB APS-0007 Appendix 2-R0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8022RI.
- 2. TVA letter of October 2, 1980 (EEB 801002 913), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Reviewed by: DR. Helon



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Facility: Browns Ferry Nucl Unit: 2 Docket: 50-260	ear Plant	SYSTEM COMP	ONENT EVALUA	NTION WORK SHE	ET (Rev 2)	(3) Sheet Ko. <u>EEB</u> Revision <u>O</u> Date <u>/0</u> -	APS-0008	
EQUIPMENT DESCRIPTION		ENVIRO. T.C.	• <u></u>	DOCUMENT	TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	· · · ·		
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 2D	Operating Time	1 Year	None	· (1)	None	None	Appendix 1&2 NCR. NO. BFNEEB8022R1	
Component 480V Motor ' Control Center (MCC)	د	Figure	••••••••••••••••••••••••••••••••••••••		·.			
Manufacturer: General	Temperature (°F)	B.9(2,3)	None	(4)	None .	None		
Electric	Pressure	Table	•		·.	•	• •	
Model Number: 7700 Series	(PSIA)	B.1(1,2,3)	None	(4).	None	None	- 20-11-1-1-1	
Function: - 480V Motor Con- trol	Relative Humidity (%)	100-Max	None	(4)	None	None		
Accuracy: Req'd: N/A Demon: N/A Category: A	Chemical Spray	N/A:	N/A	(4)	N/A	 N/A	N/A	
Service: 480V Motive and Control Power Distribution	Radiation (RAD)	2.1x10 <sup>5</sup>	None	. (4)	None	None	BFNEEB8022 R1 Appendix 1&2	
Location: EL 593, Rm 9	Aging	N/A	None	(2)	None	`None		
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A	(4)	N/A .	N/A	N/A	
Notes: (1) See Section 2	2.4 in 79-01B re	eport	•	· · ··		Prepared by: <u>e</u>	Lan, D. Suit-	
	.1. in 79-01B I other information		these	•	• • •	Reviewed by:	R. Wilster	
sheets are or	the attached a 3.0 and/or Apper	appendix shee ndix B in 79-	ets.		•	QA Acceptance: Lolus H. Heus		

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# EN DES CALCULATIONS

EEB APS-0008 Appendix 1-R0

	TITLE						UNID SYSTEM(S)	PLANT/UNIT BFN/2
L.	Engineering Ev	aluation for Con	ntinu	ed Operat	ion -		APS	SAR SECTION(6)/A
•	PREPARING ORGANIZ	ATION	REV	(F(	DR MEDS USE)		MEDS	ACCESSION NUMBER
	EN DES - EEB	\ <u></u>	RO				· · · · · · · · · · · · · · · · · · ·	
	APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT	L			•		
			RI		•			
	N/A	NCR No.	<u> </u>					
		BFNEEB8022 RI	R2					
	KEY NOUNS	<u> </u>						•
	Environmental (	Dualification	RJ		•		,	
	REV RO	R1	<u> </u>	R2	RJ	STA	TEMENT OF PRO	OBLEM
	DATE	-						
	PREPARED							locumentation for the or MOV MCC 2D has not
	Law D. Duile							r the pressure, aging,
]	CHECKED					- and	operating t	time. Other quali∸
	108112							confirmation by GE of
	SUBMITTED				<u> </u>			ater contracts and qualification report
	APPROVED						current con	
2	ATTACHMENTS							
	MICROFILMED:							
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	CHANGED BYTHIS REV:				•			
	ABSTRACT	•						
	There i	is evidence that	a11	GE motor	control cen	ters c	provided for	Browns Ferry.
	Hartsvi	ille and Phipps	Bend	Nuclear P	lants conta	in ide	entical comp	onents. GE's
	letter	of September 26	, 198	30 (EEB 80	1009 050),	provid	led their "I	C7700 Notor
	LONTRO	Center Environ	Renta	Nuclear P	Cation lest lants (cont	ract 7	°T TO IEEE 3 7785_820350)	Z3-1974" for This report
	provide	es adequate qual	ifica	ation for	the tempera	ture,	humidity an	d radiation service
	conditi	ions. GE is now	sched	duling a t	est to prov	e that	: the 7700 s	eries MCC including
								Because the accuracy
		which last at mo						nado depressurization
								r MOV MCC 2D is
	justifi	ied for continue						
ł	operat	ing time.						
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5								
1	TVA 10697 (ENDES-7-78)	•Use revision to	r (form	TVA 1053414	f more room is re	ouirod		

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EEB APS-0008 Appendix 2-R0

### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8022RI.

- 2. TVA letter of October 2, 1980 (EEB 801002 913), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Sam & Guita</u> Reviewed by: <u>O.R. Helster</u>

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Unit: ] Docket: 50-259			-		•	Revision 0 Date 10-22	- 80
EQUIDMENT DESCOTOTION	· · · ·	ENVIRO: MENT	·	DOCUMEN	TATION REF	QUALIFICATION	OUTSTANDING
EQUIPMENT DESCRIPTION	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- çation	METHOD	ITEMS
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 1E	Operating Time	l Year	None	(1)	None .	None	Appendix 1&2 NGR NO. BFNEEB8021R1
Component 480V Motor ' Control Center (MCC)		Figure					1
Manufacturer:	Temperature	B.12 (1)	None	(4)	None	None	
International Switchboard Corporation Model Number: N/A	( <sup>o</sup> F) . Pressure	Table			· · .	·.	· .
• •	(PSIA)	B.1(1,2,3)	None	(4)	None	None	···
Function: ~ 480V Motor Control	Relative Humidity (%)	100-Max	None	(4)	None	None	
Accuracy: Req'd: N/A Demon: N/A Category: A	Chemical Spray	N/A	N/A	· . (4)	N/A	• N/A	N/A .
Service: 480V Motive and Control Power Distribution	·Radiation (RAD)	3.1x10 <sup>4</sup>	None	. (4)	None	. None .	BFNEEB8021 R1 Appendix 1&2
Location: EL 621, RM 12	Aging	N/A	None	(2)	None	None	l ≠īV
Flood Level Elev: 552' Above Flood Level: Yes x No	Submergence	. N/A	N/A	(4)	. N/A	N/A	N/A
Notes: (1) See Section 2	2.4 in 79-018 re	eport.	•	· · · ·		Prepared by:	Jan N. Diele
(3) All notes and	.1. in 79-01B I other informat	tion not on i		• • •		Reviewed by:	
· · ·	the attached a 0.0 and/or Apper		,		•••	QA Acceptance:	John F. There 10/27/80

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# ENDES CALCULATIONS Appendix 1-R0

	TITLE						UNID	PLANT/UNIT DEN /1			
<ul> <li>I</li> </ul>	Enginedring Ev	aluation for Con	, 				SYSTEM(S)	BFN/1 SAR SECTION(S)			
	PREPARING ORGANIZ	ATION	REV		ION DR MEDS USE)		APS	<u>N/A</u>			
	EN DES - EEB		<u>, , , , , , , , , , , , , , , , , , , </u>	(rc	JK MEDS (32)	····	MED	S ACCESSION NUMBER			
	APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS	RO		.*			· · ·			
	N/A	NCR No.	R1								
		BFNEEB8021 RI	R2								
	KEY NOUNS	I					*				
	Environmental (	Qualification	RÍ		×.						
	REV RO	R1		R2	R3	I STA	TEMENT OF PRO	OBLEM			
Ì	DATE			·······		1					
[	PREPARED		-			1 Ou	alification	documentation for the			
ļ	Lany D. Diele					48(	OV Reactor №	10V MCC 1E has not for the temperature,			
Ī	CHECKED					hur	midity, pres	sure, radiation,			
	AR. H. elstin		•			ag	ing, and ope	erating time.			
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"[	ATTACHMENTS MICROFILMED:	5.	•								
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	Referen	"IC770 to IEI	DO Mo EE 32	otor Contro	ol Center Env contract 77K5	/iron	mental Oual	801009 050), with ification Test report tsville and Phipps			
		Gould- Summan IEEE 3	-Brow ry Re 323-1	n Boveri's port No. 3	s "Class 1E E 33-52449 OS -	lect Sec	rical Equip ondary Unit	NEB 800205 117) with ment Qualification Substation" for 11e and Phipps Bend			
	for the Hartsvi by ISC tions. for pro MCC 1E	480 volt Reacto lle and Phipps E is similiar to t International S viding the quali	or MO Bend Chat Switc fica	V MCC lE v Nuclear Pl qualified hboard Cor tion docum	with the mate lants and fin by Reference poration is mentation. W	rial d th l a now e fi	list of equ at most of t nd 2 for sin providing T\ nd that the	Switchboard Corporation uipment provided for the equipment provided miliar service condi VA with a quotation Class IE Reactor MOV including aging			
		a		•				x			
					r s			•			

TVA 10697 (ENDES-7-78) \*Use revision log (form TVA 10534) if more room is required

EEB APS-0009 Appendix 2-R0

# ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8021RI.
- 2. TVA letter of October 2, 1980 (EEB 801002 917), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- <sup>4</sup> We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

ann D. Prepared by: Reviewed by:

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Facility: Browns Ferry Nuc Unit: 2 Docket: 50-260	lear Plant	System cokf	PONENT EVALU/	ATION WORK SH	EET (Rev 2)	(3) Sheet Ko. <u>EEB</u> Revision <u>0</u> Date <u>10-2</u> 3	
EQUIPMENT DESCRIPTION		ENVIRONTENT		DOCUMEN	TATION REF	QUALIFICATION	OUTSTANDING
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	METHOD	ITEMS
System: AUX Power Sys Plant ID No. 480V Reactor MOV BD 2E	Operating Time	l Year	None	· . (1)	None	None	Appendix 1&2 NCR NO. BFNEEB POZRI
Component 480V Motor Control Center (MCC)		Figure				μ	
Manufacturer:	Temperature (°F)	B.12 (2,3)	None	(4)	None	None	
International Switchboard Corporation Model Number: N/A	Pressure	Table	•••••••••••••••••••••••••••••••••••••••	·····	· .	· · ·	•
Function: - 480V Motor Cont	(PSIA)	B.1(1,2,3)	None	(4)	None	· None ·	ļ
Accuracy: Reg'd: N/A	Relative Humidity (%)	100-Max	None	(4).	None .	None	- later
Demon: N/A Category: A	Chemical Spray	N/A	N∕A	(4)	: N/A	·. N/A	N/A <sup>+</sup> .
Service: 480V Motive and Control Power Distribution	Radiation (RAD)	3.1x10 <sup>4</sup>	None	(4)	None	None .	BFNEEB8021R1 Appendix 1&2
Location: EL 621, Rm 12	Aging	N/A	None	(2)	None	None	
Flood Level Elev: 552' Above Flood Level: Yes X No	Submergence	N/A	N/A .	(4)	• N/A •	N/A	N/A
Notes: (1) See Section 2	2.4 in 79-018 re	eport.	т. <b>д</b> . М	• • • •	· · · · · · · · · · · · · · · · · · ·	Prepared by:	any D. Diesta
(3) All notes and	.l. in 79-018 I other informat	tion not on t	these	n		Reviewed by: A	9. R. Welster
	the attached a 0 and/or Appen					QA Acceptance:	John F. Freuch 10/27/82.
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# ENDES CALCULATIONS EEB APS-0010 Appendix 1-R0

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<b>、</b>	TITLE						UNID SYSTEM(S)	PLANT/UNIT BFN/2
	Engineering Fv	aluation for Co	ntinu	ed Operat	ion		APS	SAR SECTION(S) II/A
	PREPARING ORGANIZ	ATION	REV		R MEDS USE)		MPDO	ACCESSION NUMBER
	EN DES - EEB				K MEDS (36)		MEDO	ACCESSION NOMBER
	APPLICABLE DESIGN	BRANCH/PROJECT	RO			.		
	DOCUMENTS	IDENTIFIERS						
			RI					
	N/A	NCR No.						1
		BFNEEB8021 RI					·	
			R2					
	KEY NOUNS	J						***************************************
		Our life and the	R3					:
	Environmental REV RO	RI	ļ!	R2	R3	I CTLA	TEMENT OF PRO	ORIEM
	DATE	R1		K2	1.3		TEMENI OF FR	OBLEM
	PREPARED						-1262+-	, Januar Jahan Kaya tha
								documentation for the
	Lave D. Diel							tor MOV MCC 2E has not
1	CHECKED							for the temperature, ssure, radiation,
	. DOI DI							erating time.
1	D.R. Welson					۵ <u>م</u>	ing, and ope	stating times
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	References: 1	Motor Contro	1 (CO)	ntor Envir	commental Au	alifi	cation Test	Report to IEEE
		323_107/1 (2	n cei	act 7785-8	20350 for H	artsv	ille and Ph	ipps Bend Nuclear
1		Plants).	.0111			41 001		ippo beile incoresi
		i rancoj.						
	· · ·	2. GE (NED) let	ter	to TVA dat	ed Februarv	5.1	980 (NEB 80	0205 117), with
	•	Gould-Brown	Bove	ri's "Clas	s lE Electr	ical	Equipment Q	ualification
		Summary Repo	ort N	o. 33-5244	19 OS - Seco	ndary	• Unit Subst	ation" for IEEE 🛛 🦾
		323-1974. (0	contr	act 77K3-8	320181 for H	artsv	ille and Ph	ipps Bend Nuclear
		Plants.)				-		• -
		-					<b>.</b>	
	We hav	ve compared the	Bi11	of Materi	ial provided	_by I	nternationa	1 Switchboard
	Corpoi	ration for the 4	180 v	olt Reacto	or MOV MCC 21	E wit	h the mater:	rial list of
	equipr	ment provided for	or Ha	rtsville	and Phipps B	end N	luclear Plan	its and tind
	that r	most of the equi	ipmen	t provideo	i by ISC is	simil	lar to that	qualitied by
	Refer	ence 1 and 2 for	r sim	iliar serv	nce condition	ons.	Internatio	onal Switchboard
	Corpo	ration is now p	rovid	ing TVA wi	ith a quotat	ion t	or proviain	g the qualification
	docum	entation. We f	ina t	nat the C	ass IL Keac	tor f	INV FILL ZE 1	s justified for
	conti	nued operation l	based	on simila	arity, inclu	iaing	aging and o	operating time.
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	TVA 10697 (ENDES-7-78	<ol> <li>*Use revision lo</li> </ol>	g (form	1 TVA 10534)	if more room is req	luired	,	k.

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EEB APS-0010 Appendix 2-R0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8021RI.
- 2. TVA letter of October 2, 1980 (EEB 801002 917), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Lang D. Guile Reviewed by: D.R. Februar

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acility: Browns Ferry Nucl nit: 1	ear Plant	SYSTEM COM	PONENT EVALUA	TION WORK SH	EE1 (Rev 2)	Revision	APS-0191 0
ccket: 50-259		ENVIRONMENT		DOCUMEN	TATION REF	QUALIFICATION	21-80 OUTSTANDING
EQUIPMENT DESCRIPTION -	Parameter	Specifi <del>.</del> cation	Qualifi- cation	Specifi- cation	Qualifi- cation	METHOD	ITEMS
ystem: Aux. Pwr. lant ID No. IDN	Operating Ting		Continuous motor operation 5 min/hr alt- ernator load- ing.		Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050
emponent Motor Generator Sets (LPSI) anufacturer: Louis Allis Company	Temperature (°F)	(1)	Peak 93° C 58° C Continu		Louis Allis document S40EJ4-099-630 10-10-79	Engineering Analysis + Appendix A	
odel Number: 8-127033	Pressure (PSIA)	Table B.1 (1,2,3)	N/A	(4)	N/A	N/Ą	N/A
unction: Electrical Isolation of Motor- Operated Valves	Relative Humidity (%)	100%	100%	(4)	TVA Specifi- cation 3597	Engineering Analysis + Appendix A	BFNEEB8050
ccuracy: Req'd:N/A Demon: ategory: A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	, . N/A
ervice: 480VAC	Radiation (RAD)	8.1x10 <sup>4</sup> rad normal plus accident cose	10 <sup>5</sup> rads.	(4)	NUREG 0588 material list	Generic material tests + Appendix A	BFNEEB8050
ocation: EL 621.25, Rm. 12	Aging	N/A	11.5years	(2)	See Temperatur	e Row Above	· · ·
lood Level Elev: 552' bove Flood Level: Yes X No	Submergence	N/A	N/A :	(4)	N/A .	N/A .	N/A
ctes: (1) See Section 2	.4 in 79-018 re	eport.	*	•		Prepared by:	US High KI
(3) All notes and	1.2 in 79-01B other informat the attached a	ion not on		•		. Reviewed by: 🔏	R.H.elster

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# ENDES CALCULATIONS ... Appendix A RO ....

<b></b>								· · ·	heet 1 of	
1	TITLE				•			UNID SYSTEM(S)	"BFN7/1,2,	
L	-	aluation for Con	tinue	ed Operati	on				SAR SECTION	(\$)
	REPARING ORGANIZ	ATION	REV	(FC	R MEDS USE)	)		MEDS	ACCESSION NU	MBER
	N DES - EEB	BRANCH/PROJECT	RO	4		`.		•		
	DOCUMENTS	IDENTIFIERS	R1		•				·	<u> </u>
	N/A	NCR No. BFN EEB8050	R2				·····			
ĸ	EY NOUNS		R3						<u></u>	
Ε	nvironment qua	lification	L NS					,		
	EV RO	R1		R2	RS	8	STA'	TEMENT OF PRO	BLEM	·
<u> </u>	REPARED						<b>.</b>	7 4 6 4		• • •
10	1. 34fo, 1/ 1K						low gen	lification of pressure sates of the pressure sates of the pressure sates of the pressure set of the pressu	fety inje contract	ction motor 78K5-823297)
1 -	HECKED G.K. Welster	`				}	hum	not availab idity, and i urring durin	adiation (	temperature environment
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EEB APS-0191 RO Appendix A RO Sheet 2 of 3

### . BROWNS FERRY NUCLEAR PLANT

<u>Temperature</u>. The following two areas were addressed to insure the adequacy with respect to the temperature environment of the MG set:

a. Insulation System.

b. Rectifier Diodes.

Temperature rise test data is available for one motor and one alternator supplied with the MG sets. Since we do not have all the temperature rise test data, we have assumed a maximum temperature rise as stated in Louis Allis' letter dated May 21, 1980 (EEB 800602 020), for contract 78K5-823297 for the alternators and as specified in this same contract for the motors. Using this value and the most severe temperature condition, the MG set would experience, the maximum operating temperature was determined. The most severe temperature profile for the rooms in which these MG sets are situated shows a temperature rise to  $93^{\circ}$  C in 47 seconds, a fall to  $75^{\circ}$  C by 120 seconds, and then a linear decrease to room temperature ( $40^{\circ}$  C) in 24 hours. The mass of this machine will not instantly respond to this temperature transjent; however, the temperature will increase to a value less than the  $75^{\circ}$  C temperature at the 2minute point. For conservatism, we assumed that the ambient temperature rose to  $58^{\circ}$  C for a period of 24 hours. (The value of  $58^{\circ}$  C was arrived at by taking the temperature-time area of the triangle which results from plotting the linear decrease of temperature from  $75^{\circ}$  C at the 2-minute time to  $40^{\circ}$  C at 24 hours. A rectangle of equal area was then plotted for the 24-hour period and the temperature of  $58^{\circ}$  C was found to maintain the same temperature-time area as the original triangular area.) Vendor documentation (Louis Allis document No. 8-127033 change 5) shows a semilog plot of time in hours versus temperature in degrees Celsius. The insulation system, as demonstrated by this plot, has a life expectancy of 350,000 hours with an ambient temperature of  $40^{\circ}$  C. The  $10^{\circ}$  C rule (an approximation of Arrhenius' Law as applied to insulation materials) was used to estimate the operating life of the motor. The  $10^{\circ}$  C rule states that for each  $10^{\circ}$  C rise in temperature above some reference temperature at which the material is able to operate without degradation the useful life of the material is halved. Although future vendor documentation will show the temperature transient as having no significant adverse affect on the useful life of this material, we will assume, for extreme conservatism, the ambient will be at  $58^{\circ}$  C continuously. This will reduce the useful life from 40 years to  $40/2^{1.8} = 11.5$  years.

The rectifier diodes used in the alternator field have (per vendor) a normal ambient temperature rating range of  $-65^{\circ}$  to  $+138^{\circ}$  C with a 70-ampere current flowing through them. In this particular application, a current of 27 amperes is flowing through the diode and the junction temperature is therefore lower. This would allow an even larger ambient temperature range. Since the maximum ambient temperature increases to only 93° C, the diodes are adequate for the worst-case temperature.

EEB APS-0191 RO Appendix A RO Sheet 3 of 3

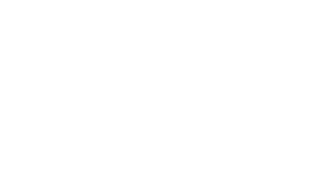
### BROWNS FERRY NUCLEAR PLANT

<u>Humidity</u>. The motor generator set listed on NCR BFNEEB8050 is to be operated in a peak humidity environment of 100 percent. Both the generator and the motor are totally enclosed and fan cooled. Therefore, peak humidity values of 100 percent will not adversely affect this machine. Additionally, the machine is continuously rotating, further reducing insulation susceptability to moisture.

<u>Radiation</u>. The materials for all rotating machinery in environments with greater than  $10^4$  rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. The radiation environment\_including the 40-year normal dose and the integrated accident dose is  $3.1 \times 10^4$  rads. The materials in the machine include polyester varnish ( $10^5$  rads), silicone varpish ( $10^6$  rads), Nomex ( $10^8$  rads), magnetic wire copper with polyimide hide ( $10^6$  rads), and phenolic (diode support) ( $7 \times 10^6$  rads).

The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ ). Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1 \times 10^4 rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100° C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

Prepared by: U3 14 Reviewed by:



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ear Plant	. System com	PONEHT EVALUA -	TION WORK SHI	EET (Rev 2)	Revision	B_APS-0192 0 -20-80	
•	ENVIRONMENT		DOCUMEN	TATION REF	QUALIFICATION	OUTSTANDING ITEMS	
Parameter	Specifi= cation	Qualifi- cation	Specifi- cation	Qualifi- cation		11200	
Operating Tim <u>e</u>	l Year	Continuous Motor operatio 5 min/hr Alternator loading	n; (1) ·	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050	
Temperature (°F)	Figure B.12 (1)		s (4)	Louis Allis document S40EJ4-099-630 10-10-79	Engineering Analysis + Appendix A	· .	
Pressure (PSIA)	Table B.1 (1,2,3)	N/A	(4)	N/A	N/A	N/A	
Relative Humidity (%)	100%	100%	(4)	TVA Specifi- cation 3597	Engiñeering Analysis + Appendix A	BFNEEB8050	
Chemical Spray	N/A	N/A	(4)	N/A	N/A		
Radiation (RAD)	3.1x10 <sup>4</sup> rad normal plus accident do	10 <sup>5</sup> rads e	. (4)	NUREG 0588 material list	Generic material tests + Appendix A	BFNEEB8050	
Aging	N/A	11.5 years	(2)	See Temperat	ure Row Above	· ·	
Submergence	N/A	N/A	(4)	N/A	N/A	N <del>/</del> A	
.4 in 79-018 re	eport.	· <u>····································</u>		4	Prepared by:	WB Heref skin	
other informat the attached a	tion not on opendix she	ets. *			QA Acceptance:	1.7. Februen	
	Parameter Operating Time Temperature (°F) Pressure (PS1A) Relative Humidity (%) Chemical Spray Radiation (RAD) Aging Submergence .4 in 79-018 re 1.2 in 79-018 re 1.2 in 79-018	ENVIRONMENT Parameter Operating Time Specifi= cation Operating Time Pressure (°F) Pressure (°F) Pressure (PSIA) Relative Humidity (%) Chemical Spray N/A Radiation (RAD) Aqing N/A Submergence N/A A in 79-01B report. 1.2 in 79-01B report. Other information not on the attached appendix she	ENVIRONMENTENVIRONMENTParameterSpecifi= cationQualifi- cationOperating TimeI YearContinuous Motor operator 5 min/hr Alternator loadingOperating TimeFigure B.1293° C Peak 58° ContinuouPressure (°F)Table B.1 (1,2,3)N/APressure (PSIA)Table B.1 (1,2,3)N/ARelative Humidity (%)100%100%Chemical SprayN/AN/ARadiation (RAD)3.1x104 rad accident dose105.rads accident doseAqinqN/A11.5 yearsSubmergenceN/AN/A.4 in 79-01B report.100	ENVIRONMENTDOCUMENTParameterSpecifi- cationQualifi- cationSpecifi- cationOperating Time1 YearContinuous Motor operation; 5 min/hr Alternator Ioading(1)Temperature (°F)Figure B.1293° C Peak (1)(1)Pressure (°F)Figure B.1293° C Ontinuous (4)(4)Pressure (PSIA)Table B.1 (1,2,3)N/A(4)Relative Humidity (%)100%100%(4)Chemical SprayN/A105' rads normal plus accident dose(4)AqingN/A11.5 years(2)SubmergenceN/AN/A(4).4 in 79-01B report. other information not on these the attached appendix sheets.*	ENVIRONMENTEOCUMENTATION REFParameterSpecifi- cationQualifi- cationQualifi- cationOperating TimeI YearYearContinuous Motor operaton; Smin/hr Alternator IoadingLouis Allis documentTemperature (°F)Figure B.12 (1)93° C Peak 58° Continuous (4)Louis Allis document S40EJ4-099-630 10-10-79Temperature (°F)Figure B.12 (1)93° C Peak 58° Continuous (4)Louis Allis document S40EJ4-099-630 10-10-79Pressure (PFIA)Table B.1 (1,2,3)N/A (4)N/ARelative Humidity (%)100%100% (4)IVA Specifi- cation 3597Chemical SprayN/A N/AN/AN/ARadiation (RAD)3.1x10 <sup>4</sup> rad accident dose (4)N/ANUREG 0588 material listAdiation (RAD)N/AN/A(4)N/AAgingN/AN/A(4)N/A.4 in 79-01B report. other information not on these the attached appendix sheets.N/AN/A	ear Plant       Sister Component Evaluation work shift' (Nev 2)       Sheet No.	

# ENDES CALCULATIONS EEB APS-0192 RO .....

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TITLE				•		UNID SYSTEM(S)	BFN/1,2,3	
Engineering Eva	aluation for Cor	ntinue	d Operati	on			SAR SECTION(S)	
PREPARING ORGANIZ	ATION	REV	(F)	OR MEDS USE)		MEDS	ACCESSION NUMBER	
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APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS			•	•			
N/A	NCR No.	R1					· ·	
1177	BFN EEB8050	R2						
KEY NOUNS	±	1	······					
Environment qua	alification	R3		۰				
REV RO	R1	1	R2	RS	STA	TEMENT OF PRO	DBLEM	
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The approach which TVA used to establish that the motor generator (MG) set named in NCR BFN EEB 8050 is functionally operable and to determine aging effects for the given operating and accident environments was to combine partial test data with verbal information on the MG set materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation. From this analysis, TVA has determined that the equipment has a qualified life of 11.5 years minimum. The voltage regulator has been relocated to a nonharsh environment.

TVA 10697 (UNDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

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EEB APS-0192 RO Appendix A RO Sheet 2 of 3

## BROWNS FERRY NUCLEAR PLANT

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The rectifier diodes used in the alternator field have (per vendor) a normal ambient temperature rating range of  $-65^{\circ}$  to  $+138^{\circ}$  C with a 70-ampere current flowing through them. In this particular application, a current of 27 amperes is flowing through the diode and the junction temperature is therefore lower. This would allow an even larger ambient temperature range. Since the maximum ambient temperature increases to only 93° C, the diodes are adequate for the worst-case temperature.

EEB APS-0192 RO Appendix A RO Sheet 3 of 3

# BROWNS FERRY NUCLEAR PLANT

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The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ ). Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1 x 10<sup>4</sup> rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100° C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

Prepared by: 113 Here Reviewed by:

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Facility: Browns Ferry Nucl Init: 1	ear Plant	System Comp	PONENT EVALUA	TION WORK SH	EET (Rev 2)	(3) Sheet No. <u>EEB</u> Revision	<u>APS-0193</u>	
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EQUIPMENT DESCRIPTION	-	ENVIRONMENT		DOCUMEN	TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
	Parameter	Specifi= cation	Qualifi- cation	Specifi- cation	Qualifi- cation	· · ·	11L/13 ·	
System: Aux Pwr Plant ID No. 1EN	Operating Tim <u>e</u>	l Year	Continuous motor oper- ation; 5 min/ or alternator loading	(1)	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050	
Component Motor Generator Sets (LPSI) Canufacturer: Louis Allis	Temperature (°F)	Figure B.13 (1)	93° C Peak 58 <sup>0</sup> Continuo	us (4)	document	Engineering Analysis + Appendix A		
Company odel Number: 8-127033		Table B.1 (1,2,3)	N/A	(4)	N/A	N/A ·	N/A	
Function: Electrical Isolation of Motor- Operated Valves Accuracy: Reg'd: N/A	Relative Humidity (%)	100%	100%	(4)	Specification	Engineering Analysis + Appendix A	BFNEEB8050	
Demon: Category: A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A 	
ervice: 480VA	Radiation (RAD)	3.1x10 <sup>4</sup> rads normal plus accident dose	10 <sup>5</sup> rads	. (4)	NUREG 0588 material list		BFNEEB8050	
ocation: EL 639.0, RM 13	Aging	N/A	11.5years	(2)	See Temperatu	re Row Above'		
lood Level Elev: 552' bove Flood Level: Yes X No	Submergence	N/A	N/A	(4)	N/A	Ņ/A	N/A	
(2) See Section 4.	.4 in 79-018 re .1.2 in 79-018	report.	• •		•	Prepared by:	WBHigh .	
sheets are on	other informat the attached a .0 and/or Appen	ppendix she	ets.			QA Acceptance;	1. J. France 10/28/82	

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# EN DES CALCULATIONS ... EEB APS-0193 RO. Appendix A 80

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APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS			·						······
N/A	NCR No.	R1			1	-		•	•	•
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ABSTRACT	•									

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TVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

EEB APS-0193 RO Appendix A RO Sheet 2 of 3

## BROWNS FERRY NUCLEAR PLANT

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`EEB APS-0193 RO Appendix A RO Sheet 3 of 3

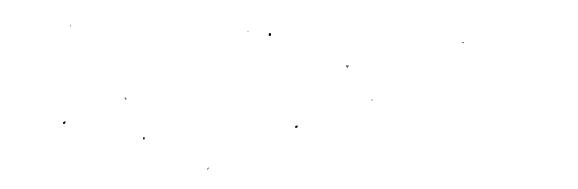
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Prepared by: 13 1/4 Reviewed by:



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Facility: Browns Ferry Nuclear Plant Unit: 1 Docket: 50-259

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(3) Sheet Ko.\_\_\_

Revision

EEB APS-0194

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Socket: 50-259			•				0
	-						0-20-80 OUTSTANDING
EQUIPMENT DESCRIPTION	·	ENVIRONMENT		DOCUMEN	TATION REF	TION REF QUALIFICATION METHOD	
· · · ·	Parameter	Specifi= cation	Qualifi- cation	Specifi- cation	Qualifi- cation		ITEMS _
Eystem: Aux Pwr Plant ID No. IEA	Operating Tim <u>e</u>	l Year	Continuous motor operat- ion; 5 min/hr alternator loading	- · . (1)	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050
Component Motor Generator Sets (LPSI) Canufacturer: Louis Allis Company	Temperature (F)	Figure B.13 (1)	93° Peak 58° C contin	uous (4)	Louis Allis document S40EJ4-099-630 10-10-79	Engiņeering Analysis + Appendix A	
odel Number: 8-127033	Pressure (PSIA)	Table B.1 . (1,2,3)	N/A ·	(4)	N/A -	N/A	N/A
UNCTION: Electrical Isolation of Motor- Operated Valves ACCURACY: Req'd: N/A	Relative Humidity (%)	100%	100%	(4)	TVA Specification 3597	Engineering Analysis + Appendix A	BFNEEB8050
Demon: ategory: A	Chemical Spray	N/A	_ N/A	(4)	N/A	NŽA	N/A
ervice: 480VAC	Radiation (RAD)	3.1x10 <sup>4</sup> rads normal plus accident dose		(4)	NUREG 0588 material list	Generic material tests + Appendix A	BFNEEB8050
ocation:EL 639.0, Rm 13	Aging	N/A '	11.5 years	(2)	. See Temperatu	re Row Above	
lood Level Elev: 552' bove Flood Level: Yes X No	Submergence	N/A .	N/A	(4)	N/A	N/A ·	, N/A
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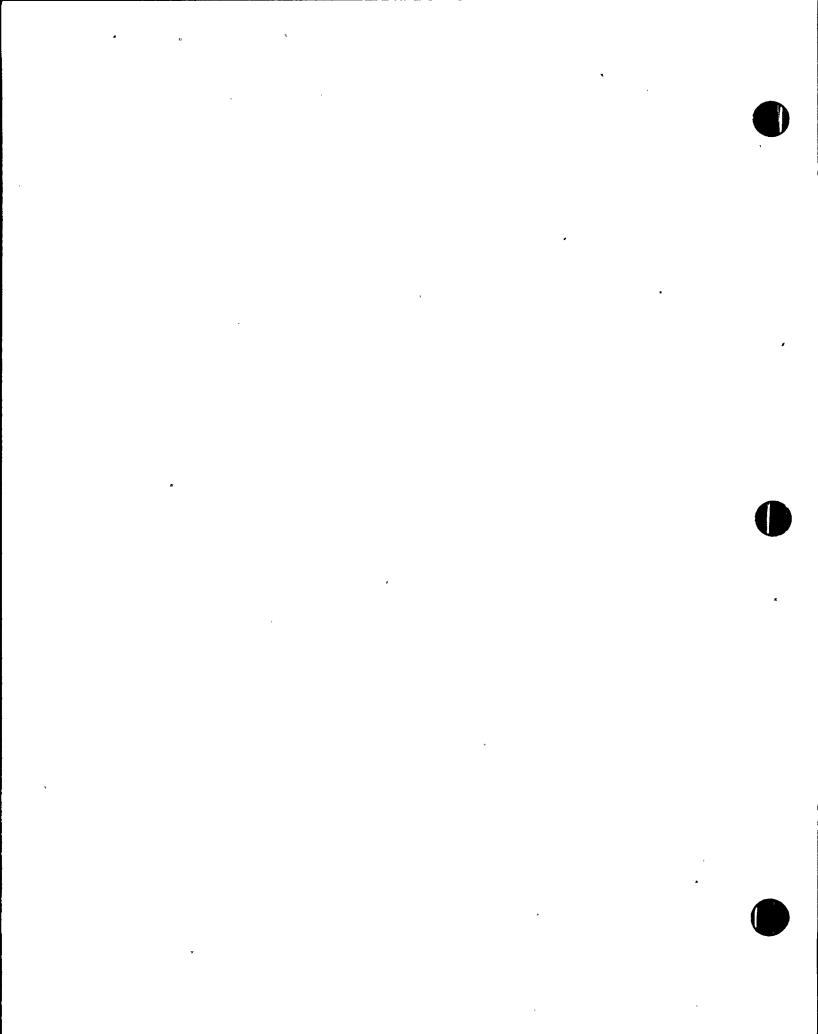
# ENDES CALCULATIONS -- Sheet 1-of 3.--

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PREFARED	•		•		loi gei	Qualification documentation for the low pressure safety injection motor generator set (contract 78K5-8232		
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TVA 10697 (ENDES-7-78)

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EEB APS-0194 RO Appendix A RO Sheet 2 of 3

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EEB APS-0194 RO Appendix A RO Sheet 3 of 3

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The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ ). Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1  $\times$  10<sup>4</sup> rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100° C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

<u>413 /L</u> Prepared by: Reviewed by:

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Sheet No. EEB APS-0195 Revision Unit: 0 50-260 Docket: Date 10-20-80 COCUMENTATION REF OUALIFICATION ENVIRONMENT OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Oualifi-Specifi-Qualification cation cation Parameter cation Continuous System: Aux Pwr Louis Allis motor oper-ation; 5 min/ Óperating Year BÉNEEB8050 document Plant ID No. 2DN-Time S40EJ4-099-630 Test hr alternator 10-10-79 (1)oading. Component Motor Generator Louis Allis Engineering Figure B.12 (2,3) Sets (LPSI) 1930 C Peak document S40EJ4-099-63 10-10-79 Analysis + Temperature 58<sup>0</sup> C Continuous danufacturer: Louis Allis  $(^{\circ}F)$ Appendix A (4) Company Table B.1 ; Pressure del Number: 8-127033 (1,2,3)N/A N/A N/A N/A (PSIA) (4)Function: Electrical TVA BFNEEB8050 Engineering Isolation of Motor-Relative Specification 3597 Analysis + 00% 100% **Operated Valves** Humidity (%) (4) Appendix A Accuracy: Reg'd: N/A N/A 🤸 Chemical Demon: Spray Lategory: A · N/A (4) N/A N/A . N/A N/A 3.1x10<sup>4</sup> rads normal plus 10<sup>5</sup> rads accident dose iervice: 480VA BFNEEB8050 Generic Material Radiation NUREG 0588 material list tests + Appendix A (RAD) (4) .ocation:EL 621.25, Rm 12 See Temperature Row Above 11.5 years (2)Aging N/A lood Level Elev: 552' .bove Flood Level: Yes X Submergence N/A N/A N/A N/A N/A (4) No W3Hip Prepared by: otes: (1)See Section 2.4 in 79-01B report. (2) See Section 4.1.2 in 79-018 report. Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

QA Acceptance:

(3)

# EN DES CALCULATIONS

EEB APS-0195 RO Appendix A-RO

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	TITLE				•		UNID SYSTEM(5)	BFN/1,2,3	} * .	ħ	
	Engineering Eva	aluation for Co	ontinue	ed Operati	on			SAR SECTION	S)		
1	PREPARING ORGANIZ	ATION	REV	(٢0	R MEDS USE)	·	MEDS ACCESSION NUMBER				
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		N/A NCR No. BFN EEB8050			• .	×					
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	DATE		<u></u>								
	PREPARED	· · ·		,		Qualification documentation for the low pressure safety injection moto generator set (contract 78K5-8232				otor 3297)	
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	ABSTRACT										

The approach which TVA used to establish that the motor generator (MG) set named in NCR BFN EEB 8050 is functionally operable and to determine aging effects for the given operating and accident environments was to combine partial test data with verbal information on the MG set materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation. From this analysis, TVA has determined that the equipment has a qualified life of 11.5 years minimum. The voltage regulator has been relocated to a nonharsh environment.

TVA 10007 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required.

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### BROWNS FERRY NUCLEAR PLANT

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b. Rectifier Diodes.

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EEB APS-0195 RO Appendix A RO Sheet 3 of 3

#### BROWNS FERRY NUCLEAR PLANT

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Prepared by: US/le Reviewed by:

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Facility: Browns Ferry Nuclear Plant Unit: 2 Eocket: 50-260

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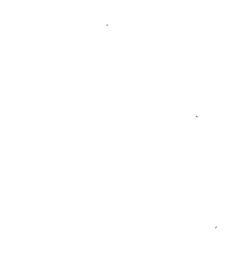
SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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(3) Sheet No. <u>EEB APS-0196</u> Revision <u>0</u> Date <u>10-20-80</u>

EQUIPMENT DESCRIPTION		ENVIRONMENT		DOCUMEN	TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specifi= cation	Qualifi- cation	Specifi- cation	Qualifi- cation	•	
System: Aux Pwr Plant ID No. 2DA	Operating Time		Continuous motor oper- ation; 5 min/ hr alternator loading	. (1)	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050
Component Motor Generator Sets (LPSI) Canufacturer: Louis Allis Company	Temperature (°F)	Figure B.13 (2,3)	93 <sup>0</sup> Peak 58 <sup>0</sup> C Contin	uoūs (4)	Louis Allis document \$40EJ4-099-630 10-10-79	Engineering Analysis + Appendix A	
iodel Number: 8-127033	Pressure (PSIA)	Table B.1 (1,2,3)	N/A	. (4)	N/A	N/A	N/A
Function: Electrical Isolation of Motor- Operated Valves Accuracy: Reg'd: N/A	Relative Humidity (%)	100% .	100%	. (4)	TVA Specification 3597	Engineering Analysis + Appendix A	BFNEEB8050
Demon; N/A Category: A	Chemical Spray		N/A	(4)	N/A	N/A	N/A
ervice: 480V AC	Radiation (RAD)	3.1x10 <sup>4</sup> rad normal plus accident dose	10 <sup>5</sup> rads	. (4)	1	Generic Material tests + Appendix A	BFNEEB8050
ocation: EL 639.0, Rm 13	Aging	N/A	11.5 years	(2)	. See Temperat	ire Row Above	
'lood Level Elev: 552' bove Flood Level: Yes X No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A
otes: (1) See Section 2	.4 in 79-018 re	eport.	×	•		Prepared by:	WB Agyf "
(3) All notes and	.1.2 in 79-018 other informat	ion not on '				. Reviewed by: d	<u> P.R. Welster</u>
•	the attached a .0 and/or Appen			: v	•	QA Acceptance:	10/28-180
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# ENDES CALCULATIONS EEB APS-0196 RO . Appendix & 80

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	Engincering Eva	aluation for Com	ntinue	d Oper	atio	n			SAR SECTION(S)		
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ĺ	Environment qualification		R3		u				-		
Ē	REV RO R1			R2		RS	ST	ATEMENT OF PR	OBLEM		
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	V BILLIN	٠			`	•	loi gei	Qualification documentation for the low pressure safety injection motor generator set (contract 78K5-823297 is not available for the temperature humidity, and radiation environment occurring during a design basis			
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TVA 10697 (ENDES-7-78)

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### BROWNS FERRY NUCLEAR PLANT

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22.2

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Prepared by: Reviewed by:

(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. EEB 4PS-D197 Facility: Browns Ferry Nuclear Plant Unit: 2 Revision Λ Eocket: 50-260 Date 10-20-80 ENVIRONMENT **COCUMENTATION REF** QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Specifi= Qualifi-Specifi-Qualifi-Parameter cation cation cation cation Louis Allis Continuous System: AUX PWR motor oper-ation; 5 min/ hr alternator BFNEEB8050 document Operating. Test Year S40EJ4-099-630 Plant ID No. 2EN Time 10-10-79 (1)lloading . Component Motor Generator 93<sup>0</sup> Peak 58<sup>0</sup> C Continuous Figure B.13 Louis Allis Engineering Sets (LPSI) (Ž,3) document Analysis + \$40EJ4-099-63 Temperature Appendix A 'anufacturer: Louis Allis (4) Company Table 8.1 Pressure fodel Number: 8-127033 (1, 2, 3)(PSIA)(4) N/A N/A N/A N/A Junction: Electrical TVA Engineering Specification 3597 Isolation of Motor-Relative Analysis + 100% 100% **Operated Valves** Humidity (%) Appendix A (4)BFNEEB8050 .ccuracy: Reg'd: N/A Demon; N/A Chemical Spray N/A lategory: A N/A . N/A (4) N/A N/A ervice: • 480V AC. 10<sup>5</sup> rads  $3.1 \times 10^4$  rads **NUREG 0588** Generic Material normal plus Radiation material list tests + Appendix (RAD) BFNEEP8050 (4)dose ocation: EL 639.0, Rm 13 See Temperature Row Above 11.5years (2)N/A Aging lood Level Elev: 552' bove Flood Level: Yes x Submergence N/A N/A N/A N/A N/A (4) No otes: See Section 2.4 in 79-01B report. Prepared by: (1)See Section 4.1.2 in 79-01B report. (2) D.R. Welster . Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets. **OA** Acceptance. See Section 3.0 and/or Appendix B in 79-01B report. (4)

### EN DES CALCULATIONS

EEB APS-0197 RO Appendix A RO

TITLE			·····	-		UNID	BFN/1,2,3		
Engineering Eva	aluation for Co	htinua	d Operati	nn		SYSTEM(5)	SAR SECTION(S)		
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APPLICABLE DESIGN	BRANCH/PROJECT	RO		,	•				
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ABSTRACT	r .								

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TVA 10697 (ENDES-7-78)

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### EEB APS-0197 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

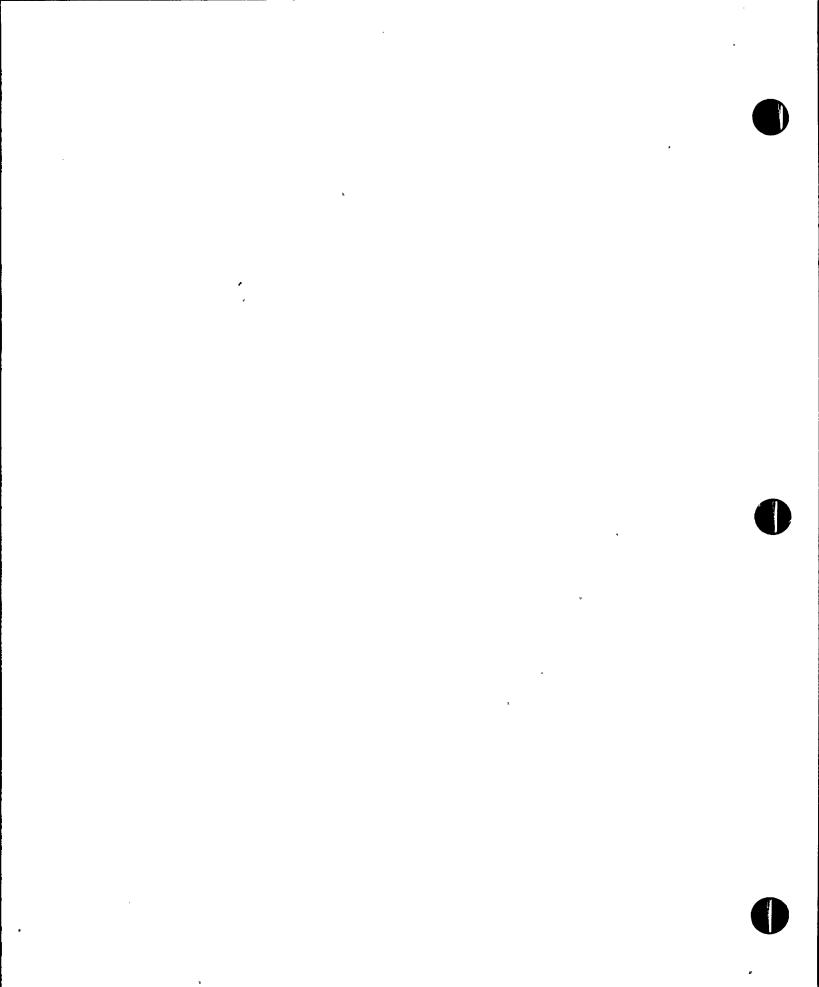
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EEB APS-0197 RO Appendix A RO Sheet 3 of 3

#### BROWNS FERRY NUCLEAR PLANT

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<u>Radiation</u>. The materials for all rotating machinery in environments with greater than  $10^4$  rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. The radiation environment including the 40-year normal dose and the integrated accident dose is 3.1 x  $10^4$  rads. The materials in the machine include, polyester varnish ( $10^5$  rads), silicone varpish ( $10^6$  rads), Nomex ( $10^8$  rads), magnetic wire copper with polyimide hide ( $10^6$  rads), and phenolic (diode support) (7 x  $10^6$  rads).

The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ ). Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1 x 10<sup>4</sup> rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100<sup>6</sup> C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

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Sheet No. EEB APS-0198 Facility: Browns Ferry Nuclear Plant Revision Unit:2 ۵ Socket: Date 50-260 10-20-80 ENVIRONMENT COCUMENTATION REF QUALIFICATION **OUTSTANDING** METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi= Qualifi-Specification cation cation Parameter cation Continuous Louis Allis System: AUX PWR motor oper-ation; 5 min/ hr alternator document BFNEEB8050 Operating Test Year S40EJ4-099-630 Time Plant ID No. 2EA 10-10-79 (1)loading Component Motor Generator 93<sup>0</sup> Peak Figure B.12 Louis Allis Engineering Sets (LPSI) 58° C Continuous document (2,3)Analysis + Temperature (F) \$40EJ4-099-63 Appendix A anufacturer: Louis Allis (4) Company Table B.1 Pressure (1,2,3):odel Number: 8-127033 (PSIA) (4)N/A N/A N/A N/A unction: Electrical TVA Engineering Isolation of Motor-Specification 3597 Relative Analysis + 100% 100% Operated Valves Humidity (%) Appendix A (4)BFNEEB8050 .ccuracy: Req<sup>1</sup>d: N/A Demon; Chemical N/A Spray ategory: A (4)N/A N/A N/A N/A N/A 3.1x10<sup>4</sup> rads normal plus accident dose 10<sup>5</sup> rads ervice: 480V AC **NUREG 0588** Generic Material Radiation material list tests + Appendix BFNEEC8050 (RAD) (4)ccation:EL 621.25, Rm 12 11.5years (2)See Temperature Row Above Aging N/A lood Level Elev: 552' pove Flood Level: Yes x N/A Submergence N/A' N/A : N/A N/A (4)No

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

stes: (1) See Section 2.4 in 79-018 report.

(2) See Section 4.1.2 in 79-01B report.

(3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by:

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## EN DES CALCULATIONS Appendix A RO

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	Environment qua	lification	R3								
-	REV RO	R1	÷	R2	T T	15	STAT	EMENT OF PR	OBLEM		
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	PREPARED W. S. F. K	•				l low gene	Qualification documentation for the low pressure safety injection motor generator set (contract 78K5-823297)				
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1	ABSTRACT										

The approach which TVA used to establish that the motor generator (MG) set named in NCR BFN EEB 8050 is functionally operable and to determine aging effects for the given operating and accident environments was to combine partial test data with verbal information on the MG set materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation. From this analysis, TVA has determined that the equipment has a qualified life of 11.5 years minimum. The voltage regulator has been relocated to a nonharsh environment.

TVA 10697 (ENDES-7-78)

EEB APS-0198 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

<u>Temperature</u>. The following two areas were addressed to insure the adequacy with respect to the temperature environment of the KG set:

a. Insulation System.

b. Rectifier Diodes.

Temperature rise test data is available for one motor and one alternator supplied with the MG sets. Since we do not have all the temperature rise test data, we have assumed a maximum temperature rise as stated in Louis Allis' letter dated May 21, 1980 (EEB 800602 020), for contract 78K5-823297 for the alternators and as specified in this same contract for the motors. Using this value and the most severe temperature condition, the MG set would experience, the maximum operating temperature was determined. The most severe temperature profile for the rooms in which these MG sets are situated shows a temperature rise to  $93^{\circ}$  C in 47 seconds, a fall to  $75^{\circ}$  C by 120 seconds, and then a linear decrease to room temperature ( $40^{\circ}$  C) in 24 hours. The mass of this machine will not instantly respond to this temperature transjent; however, the temper-ature will increase to a value less than the 75° C temperature at the 2minute point. For conservatism, we assumed that the ambient temperature rose to  $58^{\circ}$  C for a period of 24 hours. (The value of  $58^{\circ}$  C was arrived at by taking the temperature-time area of the triangle which results from plotting the linear decrease of temperature from 75° C at the 2minute time to  $40^{\circ}$  C at 24 hours. A rectangle of equal area was then plotted for the 24-hour period and the temperature of 58° C was found to maintain the same temperature-time area as the original triangular area.) Vendor documentation (Louis Allis document No. 8-127033 change 5) shows a semilog plot of time in hours versus temperature in degrees Celsius. The insulation system, as demonstrated by this plot, has a life expectancy of 350,000 hours with an ambient temperature of 40° C The 10° C rule (an approximation of Arrhenius' Law as applied to insulation materials) was used to estimate the operating life off the motor. The  $10^{\circ}$  C rule states that for each  $10^{\circ}$  C rise in temperature above some reference temperature at which the material is able to operate without degradation the useful life of the material is halved. Although future vendor documentation will show the temperature transment as having no significant adverse affect on the useful life of this material, we will assume, for extreme conservatism, the ambient will be at 58° C continuously. This will reduce the useful life from 40 years to  $4D/2^{1.8} = 11.5$  years.

The rectifier diodes used in the alternator field have (per vendor) a normal ambient temperature rating range of  $-65^{\circ}$  to  $\#138^{\circ}$  C with a 70-ampere current flowing through them. In this particular application, a current of 27 amperes is flowing through the diode and the junction temperature is therefore lower. This would allow an even larger ambient temperature range. Since the maximum ambient temperature increases to only 93° C, the diodes are adequate for the worst-case temperature.



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EEB APS-0198 RO Appendix A RO Sheet 3 of 3

### BROWNS FERRY NUCLEAR PLANT

<u>Humidity</u>. The motor generator set listed on NCR BFNEEB8050 is to be operated in a peak humidity environment of 100 percent. Both the generator and the motor are totally enclosed and fan cooled. Therefore, peak humidity values of 100 percent will not adversely affect this machine. Additionally, the machine is continuously rotating, further reducing insulation susceptability to moisture.

<u>Radiation</u>. The materials for all rotating machinery in environments with greater than 10<sup>4</sup> rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. The radiation environment including the 40-year normal dose and the integrated accident dose is  $3.1 \times 10^4$  rads. The materials in the machine include polyester varnish (10<sup>5</sup> rads), silicone varpish (10<sup>6</sup> rads), Nomex (10<sup>8</sup> rads), magnetic wire copper with polyimide hide (10<sup>6</sup> rads), and phenolic (diode support) (7 x 10<sup>6</sup> rads).

The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ . Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1 x 10<sup>4</sup> rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100° C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

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Facility: Browns Ferry Nucl Unit: 3 Cocket: _50-296	ICGI FIQIIC .		-			Sheet No. <u>EEB APS 0100</u> Revision <u>0</u> Date <u>10-20-80</u>		
	· .	ENVIRONMENT		QUALIFICATION METHOD	OUTSTANDING			
EQUIPMENT DESCRIPTION	Parameter	Specifi= cation	Qualifi- cation	Specifi- cation	Qualifi- cation	:	11605	
ystem: AUX PWR lant ID No. 3DN	Operating Time	l Year	Continuous motor oper- ation; 5 min/ hr alternator loading	(1)	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050	
Component Motor Generator Sets (LPSI) Canufacturer: Louis Allis Company	Temperature (°F)	Figure B.12 (2,3)	93 <sup>0</sup> Peak 58 <sup>0</sup> Continuo	_	Louis Allis document \$40EJ4-099-630 10-10-79	Engineering Analysis + Appendix A		
lodel Number: 8-127033	Pressure (PSIA)	Table B.1 (1,2,3)	N/A	. (4)	N/A	N/A.	N/A .	
Unction: Electrical Isolation of Motor- Operated Valves .ccuracy: Req'd: N/A	Relative Humidity (%)	100% ,	100%	(4)	TVA Specification 3597	Engineering Analysis + Appendix A	BFNEEB8050	
Demon; N/A ategory: A	Chemical Spray	N/A	<u>N/A</u>	(4)	N/A	N/A	N/A	
ervice: 480V AC	Radiation (RAD)	3.1x10 <sup>4</sup> rad normal plus accident dose	s 10° rads	(4)		Generic Material tests + Appendix A	BFNEEB8050	
ocation: EL 621.25, Rm 12	Aging	N/A	11.5years	(2)	.See Temperatu	re Row Above		
lood Level Elev: 552' cove Flood Level: Yes X No	Submergence	N/A ·	N/A	· . (4)	N/A	N/A	N/A	
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### EN DES CALCULATIONS

EEB APS-0199R0 Appendix A RO

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TTLE			SYSTEM(S)	BFN/1,2,3					
Engineering Eva	aluation for Co	ntinue	d Operati	on			SAR SECTION(S)		
PREPARING ORGANIZ	ATION	REV (FOR MEDS US2)				MED	S ACCESSION NUMBER		
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APPLICABLE DESIGN DOCUMENTS	BRANCH PROJECT				·				
N/A	NCR No.	R1					· .		
-	BFN EEB8050	R2 .				ų			
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ABSTRACT	•								

The approach which TVA used to establish that the motor generator (MG) set named in NCR BFN EEB 8050 is functionally operable and to determine aging effects for the given operating and accident environments was to combine partial test data with verbal information on the MG set materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation. From this analysis, TVA has determined that the equipment has a qualified life of 11.5 years minimum. The voltage regulator has been relocated to a nonharsh environment.

TVA 10507 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

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EEB APS-0199 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

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b. Rectifier Diodes.

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EEB APS-0199 RO Appendix A RO Sheet 3 of 3

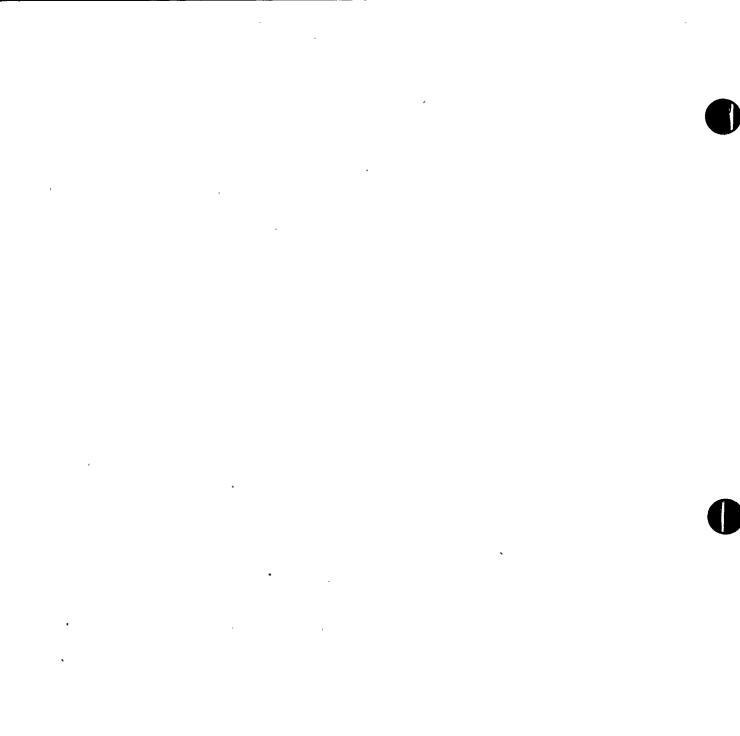
### BROWNS FERRY NUCLEAR PLANT

Humidity. The motor generator set listed on NCR BFNEEB8050 is to be operated in a peak humidity environment of 100 percent. Both the generator and the motor are totally enclosed and fan cooled. Therefore, peak humidity values of 100 percent will not adversely affect this machine. Additionally, the machine is continuously rotating, further reducing insulation susceptability to moisture.

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Facility: Browns Ferry Nucl Unit: 3	ear Plant		• •			Sheet No. <u>FEB</u> Revision o	
Cocket: .50-296			•		0-80		
		ENVIRONMENT	·	DOCUMENT	ATICN REF	QUALIFICATION	CUTSTANDING
EQUIPMENT DESCRIPTION	·					METHOD	ITEMS
	Parameter	Specifi: cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: AUX PWR	<u>rarcileter</u>	· · · · · · · · · · · · · · · · · · ·	Continuous		Louis Allis	·····	
	Operating.	1 Year	motor oper- ation; 5 min/	•	document \$40EJ4-099-630	Test	BFNEEB8050
Plant ID No. 3DA	Time		hr alternator loading	(1)	10-10-79		
Component Motor Generator				(1)			
Sets (LPSI)		Figure B.12 (2,3)	93 Peak O	• •	Idocument	Engineering Analysis +	
Anufacturer: Louis Allis	Temperature (°F)	(2,3)	58 C Continu	us (4)	\$40EJ4-099-630 10-10-79	Appendix A	
Company	(-1)			. (4)	10-10-73		
(ada) Numbana D 107000	Pressure	Table B.1 (1,2,3)	-				•
Kodel Number: 8-127033	(PSIA)	(1,2,5)	N/A	(4)	N/A	N/A	N/A ·
Function: Electrical	•				TVA	Engiaconing	
Isolation of Motor- Operated Valves	Relative	100%	100%		Specification	Analysis +	
Accuracy: Reg'd: N/A	Humidity (%)		•	(4)	3097	Appendix A	BFNEEP8050
Demon; N/A	Chemica]						•
lategory: A	Spray	N/A	N(A)	(4)	N/A	N/A	N/A
ervice: 480V AC		3.1x10 <sup>4</sup> rad	N/A -	(4)			
	Radiation	inormal plus	iu rads	•	NUREG 0588	Generic Material	•
	(RAD)	accident	•	(4)	material list	tests + Appendix	BFNEEB8050
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### ENDES CALCULATIONS

EEB APS-0200 RO

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Engineering Ev	aluation for Co	ntinue	ed Open	ration		SAR SECTION(S)				
PREPARING ORGANIZ	ATION	REV	1	(FOR	MEDS USE)		MED	ACCESSION NUMBER		
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APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT					•				
DOCUMENTS		R1			•					
N/A	NCR No.		ļ				1	• •		
	BFN EEB8050	R2						•		
KEY NOUNS	KEY.NOUNS Environment qualification			· · · · · ·						
Environment qua				R3				· • •		
REV RO	R1	1	R2 · R3 STA			STA	STATEMENT OF PROBLEM			
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ABSTRACT										

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TVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

EEB APS-0200 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

<u>Temperature</u>. The following two areas were addressed to insure the adequacy with respect to the temperature environment of the MG set:

a. Insulation System.

b. Rectifier Diodes.

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EEB APS-0200 RO Appendix A RO Sheet 3 of 3

### BROWNS FERRY NUCLEAR PLANT

<u>Humidity</u>. The motor generator set listed on NCR BFNEEB8050 is to be operated in a peak humidity environment of 100 percent. Both the generator and the motor are totally enclosed and fan cooled. Therefore, peak humidity values of 100 percent will not adversely affect this machine. Additionally, the machine is continuously rotating, further reducing insulation susceptability to moisture.

<u>Radiation</u>. The materials for all rotating machinery in environments with greater than  $10^4$  rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. The radiation environment including the 40-year normal dose and the integrated accident dose is 3.1 x  $10^4$  rads. The materials in the machine include polyester varnish ( $10^5$  rads), silicone varpish ( $10^6$  rads), Nomex ( $10^8$  rads), magnetic wire copper with polyimide hide ( $10^6$  rads), and phenolic (diode support) (7 x  $10^6$  rads).

The rectifier diodes are of the diffused type with a silicon substrate and heavily doped with phosphorous and boron.  $(10^{20} \text{ electrons/cm}^3 \text{ and } 10^{14} \text{ holes/} \text{ cm}^3 \text{ respectively, and silicon has } 5 \times 10^{22} \text{ ATMS/cm}^3$ . Reference Grove, A.S. Physics and Technology of Semiconductor Devices, New York: John Wiley & Son, Incorporated, 1967. Diodes used in a radiation environment must be heavily doped to eliminate carrier removal. As a conservative estimate the radiation dosage of 3.1 × 10<sup>4</sup> rads would increase the leakage current of the diode by a factor of 10. (A radiation dosage of 18 megarads has increased the leakage current of a smaller geometry diode by a factor of 10). Large diodes have leakage currents in the order of 20 milliamperes at a temperature of 100<sup>6</sup> C. With the combined radiation dosage and temperature under accident conditions, a 200-milliampere current may result which would not affect the field current of 27 amperes.

Prepared by: (13) Reviewed by:

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Facility: Browns Ferry Nucle Unit: 3 Cockat: _50-296	ear Plant .	SYSTEM COMP	PONENT EVALUA	TION WORK SH	EET (Rev 2)	Revision	APS-0201 ) 20-80	
EQUIPMENT DESCRIPTION		ENVIRONMENT			TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
	Parameter	Specifi <del>.</del> cation	Qualifi- cation	Specifi- cation	Qualifi- cation	· :		
System: AUX PWR Plant ID No. 3EN	Operating Time	l Year	Continuous motor oper- ation; 5 min/ hr alternator loading	." (1)	Louis Allis document S40EJ4-099-630 10-10-79	Test	BFNEEB8050	
Component Motor Generator Sets (LPSI) Anufacturer: Louis Allis Company	Temperature (°F)	Figure B.12 (2,3)	93 <sup>0</sup> Peak 58 <sup>0</sup> C CONTINUO	)US (4)	document	Engineering Analysis + Appendix A		
fodel Number: 8-127033	Pressure (PSIA)	Table B.1 (1,2,3)	N/A	(4)	N/A	N/A	 N/A	
Sunction: Electrical Isolation of Motor- Operated Valves	Relative Humidity (%)	100%	100%	(4)	TVA Specification 3597	Engineering Analysis + Appendix A	BFNEEP8050	
Iccuracy:       Req'd: N/A         Demon;       N/A         lategory:       A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A	
ervice: 480V AC	Radiation (RAD)	3.1x10 <sup>4</sup> rads normal plus accident dose	10 <sup>5</sup> rads except. diodes .	. (4)		Generic Material tests + Appendix A	BFNEED8050	
ocation:EL 621.25, Rm 12	Aging	N/A	11.5 years	(2)	. See Temper	ature Row Above	· · · · · · · · · · · · · · · · · · ·	
lood Level Elev: 552' bove Flood Level: YesX No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A	
otes: (1) See Section 2.	.4 in 79-018 re	eport.	•	•	· ·	Prepared by:	Withigh	
(2) See Section 4.	1.2 in 79-01B	report.	<i>.</i> •	••••		. Reviewed by: 6	APHAL	

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## EN DES CALCULATIONS

EEB APS-0201 RO Appendix RO

TITLE		UNID SYSTEM(S)	BFN/1,2,3							
Engineering Eva	aluation for Cor		SAR SECTION(S)							
PREPARING ORGANIZ	ATION	REV	. (	FOR MEDS USE)		MEDS ACCESSION NUMBER				
EN DES - EEB	•	RO								
APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS						······································			
N/A	NCR No.	R1					·			
	BFN EEB8050	R2					· ,			
KEY NOUNS Environment qua	alification	R3			, ,		· · ·			
REV RO	RI	1	R2 /	R3	STA	TEMENT OF PR	OBLEM			
DATE	ļ	ļ	•			7:5:	de europhetice fair the			
PREPARED	-	~			. low ger	Qualification documentation for the low pressure safety injection motor generator set (contract 78K5-823297)				
CHECKED D. K. Itelstin			•		hun occ	nidity, and curring duri	not available for the temperature idity, and radiation environment urring during a design basis			
SUBMITTED		1			eve	ent.	•			
APPROVED										
ATTACHMENTS MICROFILMED: /						``				
LIST ALL PAGES * ADDED BY THIS REV:					,		, ,			
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ABSTRACT .										
The approach which TVA used to establish that the motor generator (MG) set named in NCR BFN EEB 8050 is functionally operable and to determine aging effects for the given operating										
and accident environments was to combine partial test data with verbal information on the MG set materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation. From this analysis, TVA has determined										
that the equipment has a qualified life of 11.5 years minimum. The voltage regulator has been relocated to a nonharsh environment.										

TVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

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EEB APS-0201 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

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a. Insulation System.

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EEB APS-0201 RO Appendix A RO Sheet 3 Of 3

### BROWNS FERRY NUCLEAR PLANT

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113 110 Prepared by: Reviewed by:





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(3) EEB APS-0202 SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Facility: Browns Ferry Nuclear Plant Sheet Ko. Unit: 3 Revision ົ Socket: 50-296 Date 10-20-80 ENVIRONMENT COCUMENTATION REF QUALIFICATION OUTSTANDING METHOD EQUIPMENT DESCRIPTION ITEMS Spacifi= Specifi-Cualifi-Qualifi-Parameter cation cation cation cation Louis Allis Continuous Aux Pwr BFNEEB8050 System: motor oper-ation; 5 min/ hr alternator document ' Operating. Test 1 Year S40EJ4-099-630 Plant ID No. 3EA Time 10-10-79 (1)loading Component Motor Generator 93<sup>0</sup> Peak 58<sup>0</sup>C Continuous Figure B.12 Louis Allis Engineering Sets (LPSI) document (2.3)Analysis + Temperature \$40EJ4-099-630 10-10-79 Appendix A 'anufacturer: Louis Allis (4) $(^{O}F)$  Company Table B.1 Pressure (1,2,3)(odel Number: 8-127033 (PSIA) N/A (4)N/A N/A N/A Function: Electrical TVA Engineering Specification 3597 Isolation of Motor-Relative Analysis + 100% 100% **Operated Valves** BFNEEB8050 Humidity (%) Appendix A (4)iccuracy: Req'd: N/A: Demon: N/A Chemical . . Spray lategory: A N/A (4) N/A N/A N/A N/A 3.1x10<sup>4</sup> rads normal plus accident dose 10<sup>5</sup> rads ervice: · 480V AC NUREG 0588 Generic Material Radiation except. diodes material list tests + Appendix BFNEEB8050 (RAD) (4)ocation: EL 621.25, Rm 12 See Temperature Row Above Aging 11.5 years (2)N/A lood Level Elev: 5521 bove Flood Level: Yes X Submergence N/A N/A · N/A N/A N/A (4) No otes: See Section 2.4 in 79-01B report. Prepared by: Whi I (1)See Section 4.1.2 in 79-01B report. (2) . Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets. QA Acceptance: (4) See Section 3.0 and/or Appendix B in 79-01B report.

# ENDES CALCULATIONS - Sheet 1 OT 3 RO ... Appendix A RO

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7.1.1.1.2	نیه همچن پر مورون از بردهندن در <u>از مان که خدم محمو</u>					UNID SYSTEM(S)	BFN/1,2,3			
Engineering Ev	aluation for Con	ntinu	ed Operati	on			SAR SECTION(S)			
PREPARING ORGANIZATION		REV		OR MEDS USE)		MEDS ACCESSION NUMBER				
EN DES - EEB		1	· · · · · · · · · · · · · · · · · · ·							
APPLICABLE DESIGN	BRANCHPROJECT	RO	1		.					
DOCUMENTS	IDENTIFIERS			· ·						
		R1					•			
N/A	NCR No.									
	BEN EEB8050	R2								
KEY NOUNS	l						· •			
Environment qua	alification	R3								
REV RO	R1	1	R2	R3	STA	TEMENT OF PRO	OBLEM			
DATE										
PREPARED	*	1					documentation for the			
10 24-12		ł					afety injection motor			
		<u> </u>					(contract 78K5-823297) le for the temperature			
CHECKED							radiation environment			
D.K. Helestes	4	·					ng a design basis			
SUBMITTED			· · · · · · · · · · · · · · · · · · ·		event.					
APPROVED	!				-		·			
ATTACHMENTS					-					
MICROFILMED:					_					
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ABSTRACT	•						_			
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TVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

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EEB APS-0202 RO Appendix A RO Sheet 2 of 3

### BROWNS FERRY NUCLEAR PLANT

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EEB APS-0202 RO Appendix A RO Sheet 3 of 3

### BROWNS FERRY NUCLEAR PLANT

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113 Her Prepared by: Reviewed by:



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Facility: Browns Ferry Nuc Unit: 1	lear Plant .	SYSTEM COMP	ONENT EVALUA	TION WORK SHE		B-APS-0203		
Docket: 50-259			-	•			-30-80	
EQUIPMENT DESCRIPTION	n.	ENVIRONMENT		DOCUMENT	ATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
	Parameter	Specifi- Qualifi- Specifi- Qualifi- cation cation cation cation			I I CI'IO			
System: Aux Pwr Plant ID No. TS-1A	Operating Time	1 Year	None	(1)	None	·. None	BFNEEB8051 R1 Appendix 1&2	
Component Transformer Hanufacturer: General Electric	Temperature (°F)	Figure B.12 (1)	None	(4)	None	None	· .	
Model Number: N/A	Pressure (PSIA)	Table B.1 (1,2,3)	None	(4)	None	None		
Function: Power Distribution Accuracy: Req'd: N/A	Relative Humidity (%)	100 max	None	(4)	- None	None		
Category: A Service: 4160V-480V	Chemical Spray	N/A	. N/A	· (4)	N/A	N/A	N/A	
JELAICE: 41004-4004	1	! !		l	1	f -	-	

None

None

N/A

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Notes: (1) See Section 2.4 in 79-01B report.

No

Transformers

Location: El 621, Rm 12

Flood Level Elev: 552' Above Flood Level: Yes X

- See Section 4.1.2 in 79-01B report. (2)
- (3) All notes and other information not on these sheets are on the attached appendix sheets.

Radiation

(RAD)

Submergence

Aging

3.1x10<sup>4</sup>

N/A

N/A

(4) See Section 3.0 and/or Appendix B in 79-01B report. Prepared by: C

N/A

None

None

None

None

N/A

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(4)

(2)

(4)<sup>'</sup>

Reviewed by:

BFNEEB8051 R1

Appendix 182

N/A

QA Acceptance

## **EN DES CALCULATIONS**

EEB-APS- 0203 Appendix 1, Rev 0

TITLE		UNID SYSTEM(S)	BFN/ 1					
·•	aluation for Co	ontin	ued Opera	tion	APS	SAR SECTION(S)		
PREPARING ORGANIZA	TION	REV	(F)	OR MEDS USE)	a da se a construction de la constru	MEDS ACCESSION NUMBER		
EN DES - EEB		RO			Ŧ			
APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS							
		Rì				-		
	NCR No. BFNEEB8051; R1	R2		•		- · ·		
Environmental	Qualification	RJ						
REV RO	R1		R2	R3	STATEMENT OF PR	TEMENT OF PROBLEM		
DATE 10/30/80			<u> </u>			·		
Any D. Suist		۲		Class 1E 4160V transformer TS	ualification documentation for the lass lE 4160V-480V shutdown board ransformer TS lA has not been			
ON. Kelster					located for th humidity, pres aging, and ope	sure, radiation,		
APPROVED				-	-			
ATTACHMENTS MICROFILMED:	4		×		-			
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ABSTRACT	······································							
that if the tra an equal outsid which permits a conditions. Re it is sealed an conditions allo	ansformer can w de pressure. A a maximum tempe elative humidit nd filled with ow up to 1 x 10	or a iths lso, ratun y wi Pyrar 5 rac	period o tand 5-ps GE certi re for Cla ll not af nol insula ds total	f 24 hours. i internal p fied that th ass A insula fect the ope ating liquid integrated 4	Therefore, we c ressure, then it is transformer m tion of 250°C fo ration of this t	ransformer because radiation service Therefore, we find		

that this Class 1E 4160V-480V shutdown board transformer TS1A is qualified for continued operation until confirmation of the above is obtained from the vendor including aging and operating time.

TVA 10697 (ENDES-7-78) \*

\*Use revision log (form TVA 10534) if more room is required

EEB-APS-0203

Appendix 2, Rev 0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8051, R1.
- 2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: Sam D. Bieden Reviewed by: D.R. Helsta

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant EEB-APS-0204 Sheet No. Unic: Revision **n** Docket: 50-259 Date 10-30-80 ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD **ITEKS** Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Aux Pwr Operating Plant ID No. TS1B BFNEEB8051 R1 Time 7 Year None None None Appendix 182 (1)Component Transformer Figure Temperature Manufacturer: General **B.**12 (1) None (4)  $\left( {}^{0}F\right)$ None None Electric • . • Pressure Table Model Number: N/A (PSIA) B.1 (1,2,3) None None (4) None Function: Power Distribution Relative Humidity (%) 100 max None ۰. None (4) None Accuracy: Reg'd: N/A Demon: N/A Chemical Spray Category: A N/A N/A (4) N/A N/A N/A . Service: 4160V-480V Transformers Radiation BFNEEB8051 R1  $3.1 \times 10^4$ None (RAD) None None Appendix 1&2 (4) Location: El 621, Rm 12 Aging N/A None (2) None None Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A N/A N/A N/A N7A No (4)<sup>\*</sup> Notes: (1) See Section 2.4 in 79-01B report. Prepared by: Am Le L (2) See Section 4.1.2 in 79-01B report. ·. \* Reviewed by: N.M. Holan (3) All notes and other information not on these

sheets are on the attached appendix sheets.

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(4) See Section 3.0 and/or Appendix B in 79-01B report.

QA Acceptance

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## **EN DES CALCULATIONS**

EEB-APS- 0204 Appendix 1, Rev 0

	TITLE		UNID SYSTEM(S)	BFN/1						
-`\		valuation for Co		APS.	SAR SECTION(S)					
	PREPARING ORGANIZ	ATION	REV (FOR MEDS USE)					ACCESSION NUMBER		
	EN DES - EEB		RO	,	•	÷	a			
	APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS						, 		
ļ			R1							
	N/A	NCR No. BFNEEB8051, RI	R2		•		· · · · · · · · · · · · · · · · · · ·	2		
	Environmental	Qualification	RJ							
ł	REV RO	R1		82	R3	I STA	TEMENT OF PRO	ORIEM		
ł	DATE 10/10/80			· · ·			I LINDITI OF I RO	JULM		
Ī	PREPARED						lification	documentation for the		
ł	Lamp D. Bieles					C1a	Qualification documentation for Class 1E 4160V-480V shutdown boa transformer TS1B has not been located for the temperature,			
ſ	CHECKED									
	A.L. It ilsta		hu hu			hum	humidity, pressure, radiation, aging, and operating time.			
ľ	SURMITTED							a child child.		
	APPROVED									
1	ATTACHMENTS MICROFILMED:				-	1				
	LIST ALL PAGES * ADDED BY THIS REV:									
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	LIST ALL PAGES * CHANGED BYTHIS REV:					7				
	ABSTRACT							· · · · · ·		
	GE submitted t	est reports for	thic	trancfo	, mon indicati	ina 11		bassed a normal leak		
	test of 5-psi	pressure held f	or a	neriod o	f 24 hours	Thow	at it had p	an reasonably assume		
	that if the tr	ansformer can w	ithst	and 5-hs	i internal n	mert	conte, we co	can also withstand		
	an equal outsi	de pressure. A	lso	GE certi	fied that the	is tr	e, unen 10 ansformar me	ets ANSI C57.12-1965		
	which permits	a maximum tempe	ratur	e for CI	ass A insulat	tion r	of 250°C for	c short_circuit		
	conditions. R	elative humidit	y wil	1 not af	fect the open	ratior	of this tr	ransformer because		

it is sealed and filled with Pyranol insulating liquid. Usual nuclear radiation service conditions allow up to  $1 \times 10^5$  rads total integrated 40 years dosage. Therefore, we find that this Class 1E 4160V-480V shutdown board transformer TS 1B is qualified for continued operation until confirmation of the above is obtained from the vendor including aging and operating time.

TVA 10697 (ENDES-7-78)

EEB-APS-0204

Appendix 2, Rev 0

### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8051, R1.

- TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. .Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Lang D. Dies</u> Reviewed by: <u>D.R. Welsten</u>

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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) EEB-APS-0205 Facility: Browns Ferry Nuclear Plant Sheet No. Unit: Revision n Docket: 50-260 Date 10-30-82 DOCUMENTATION REF QUALIFICATION OUTSTANDING ENVIRONMENT EQUIPMENT DESCRIPTION METHOD ITEKS Specifi-Qualifi-Qualifi-Specifi-Parameter cation cation cation cation System: Aux Pwr Operating BFNEEB8051 RT Plant ID No. TS-2A Time 1 Year Appendix 182 None None None (1)Component Transformer Figure Temperature Manufacturer: General B.12 (2,3) (4) None  $(^{0}F)$ None None Electric Pressure Table ٠. Model Number: N/A (PSIA) B.1 (1,2,3) None · None None (4) Function: Power Distribution Relative Humidity (%) 100 max None None None .(4) Accuracy: Regid: N/A Demon: N/A Chemical Spray Category: A N/A (4) N/A N/A N/A K/A Service: 4160V-480V Transformers BENEEB8051 R1 Radiation 3.1x10<sup>4</sup> Appendix 1&2 None None None (RAD) (4) Location: El 621, Rm 12 Aging  $(2)^{2}$ N/A None None None Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A N/A N/A N/A N/A -(4)^ No Prepared by: Jun L. Suis Notes: (1) See Section 2.4 in 79-018 report. •. • (2) See Section 4.1.2 in 79-01B report. Reviewed by: A.M. Wilson (3) All notes and other information not on these . . sheets are on the attached appendix sheets. QA Acceptance; See Section 3.0 and/cr Appendix B in 79-01B report. (4) 

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# EN DES CALCULATIONS

EEB-APS- 0205 Appendix 1, Rev 0

1	valuation for Co	ontin	ued Opera	tion		APS	SAR SECTION(S)
PREPARING ORGANIZ	ATION	REV (FOR MEDS USE)					S ACCESSION NUMBER
EN DES - EEB	BRANCH/PROJECT	RO	2				
DOCUMENTS	IDENTIFIERS	R1					ί
	• •						
N/A	NCR No. BFNEEB8051, R1	R2				<b>I</b>	
Environmental	Qualification	R3					
REV RO	R1 ,		R2	R3	STA	TEMENT OF PR	OBLEM
DATE 10/30/90 PREPARED					-	lification	de aumanitesti au Eau Alu-
Lamp. Duile					Cla	ss 1E 4160V	documentation for the -480V shutdown board 2A has not been
CHECKED			4		100	ated for th	e temperature,
O.L. Hebster							sure, radiation, rating time.
SUBMITTED					_ agi	ing, and ope	raing inne.
APTROVED				-			
ATTACHMENTS MICROFILMED:							
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ABSTRACT							
test of 5-psi that if the th an equal outs which permits conditions. If it is sealed a conditions all that this Clas	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ls total i tdown boar	24 hours. internal pr ied that thi ss A insulat ect the oper ting liquid. ntegrated 40 d transforme	Ther ressu is tr tion ratio Us yea yea	efore, we c re, then it ansformer m of 250°C fo n of this t ual nuclear rs dosage. 2A is quali	passed a normal leak an reasonably assume can also withstand eets ANSI C57.12-1965 r short-circuit ransformer because radiation service Therefore, we find fied for continued including aging and
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TVA 10697 (ENDES-7-78) \* \*Use revision lo

\*Use revision log (form TVA 10534) if more room is required

EEB-APS- 0205

Appendix 2, Rev 0

#### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8051, R1.

2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.

3. Environment Specification represents "worst-case" service conditions.

4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

<u>an D.</u> G Prepared by: D. R. W. lat Reviewed by:

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Docket: 50-260		ENVIRONMENT	•	DACHWEN	ATION DEE		-30-80	
EQUIPMENT DESCRIPTION		·····			TATION REF	QUALIFICATION METHOD	CUTSTANDING ITEMS	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation			
Sýstem: Aux Pwr Plant ID No. TS2B	Operating Time	1 Year	None	(1)	None	· None	BFNEEB8051 R Appendix 1&2	
Component Transformer				•	÷		· ·	
Manufacturer: General Electric	Temperature (°F)	Figure <u>B.12 (2,3)</u>	None	. (4)	None	None		
Nodel Number: N/A	Pressure (PSIA)	Table B.1 (1,2,3)	None	• (4)	None	·. None		
Function: Power Distribution Accuracy: Req'd: N/A	Relative Humidity (%)	- 100 max	None	(4)	None	· None		
Demon: N/A Category: A	Chemical Spray	N/A ·	N/A	(4)	N/A	N/A	N/A	
Service: 4160V-480V Transformers	Radiation (RAD)	3.1x10 <sup>4</sup>	None	. (4)	None	None	BFNEEB8051 R Appendix 1&2	
Location:E1 621, Rm 12	Aging	N/A	None	(2)*	None	None		
Flood Level Elev: 552' Above Flood Level: YesX No	Submergence	N/A	N/A	. (4)	N/A	N/A	N/A	
	2.4 in 79-01B re	eport. 👈		•	Jr. + 1	· Prepared by:	Fain D. Die	
(3) All notes and	.1.2 in 79-01B d other informat n the attached a	ion not on t	hese <u>.</u>	• <b>.</b> •	· · ·	- Reviewed by: 🏑	R.W. Istr	

# **EN DES CALCULATIONS**

EEB-APS-0206 Appendix 1, Rev 0

	TITLE UNID PLANT/UNIT SYSTEM(S) BFN/2									
	Engineering E	valuation for Co	ontin	ued Operat	tion	••	APS	SAR SECTION(S)		
	PREPARING ORGANIZA	ATION	REV	(FO	R MEDS USE)			ACCESSION NUMBER		
	EN DES - EEB		RO							
	APPLICABLE DESIGN DOCUMENTS	BRANCH PROJECT IDENTIFIERS	~~					¥		
			R1							
	N/A	NCR No. BFNEEB8051, R1	R2							
	KEY NOUNS Environmental	Qualification	R3							
	REV RO	R1		R2	R3	STA	TEMENT OF PRO	DBLEM		
	DATE. 10/30/80									
¢	Arts D. Suils			4		Cla   tra	ss 1E 4160V- nsformer TS2	documentation for the -480V shutdown board 2B has not been e temperature,		
	D.A. Helster		•			hum	ndity, press	sure, radiation,		
	SUBMITTED					ן "פי	ing, and open	acting chile.		
	APPROVED	•				1	y			
4	ATTACHMENTS MICROFILMED:		<u> </u>			1				
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	ABSTRACT						i			
	test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Clas	pressure held f ansformer can w de pressure. A a maximum tempe Relative humidit and filled with ow up to 1 x 10 s 1E 4160V-480V	or a ithst lso, ratur y wil Pyrar <sup>5</sup> rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ls total i tdown boar	24 hours. internal pr ied that thi ss A insulat ect the oper ting liquid. ntegrated 40 d transforme	Ther ressu s tr ion ratio Us yea yea	efore, we ca re, then it ansformer me of 250 <sup>0</sup> C for n of this tr ual nuclear rs dosage. 2B is qualif	bassed a normal leak in reasonably assume can also withstand ets ANSI C57.12-1965 short-circuit ansformer because radiation service Therefore, we find ied for continued		

operation until confirmation of the above is obtained from the vendor including aging and

operating time.

TVA 10697 (ENDES-7-78) \* \*Use revision log (form TVA 10534) if more room is required

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EEB-APS- 0206

Appendix 2, Rev 0

### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8051, R1.

- 2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by Reviewed by:

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Facility: Browns Ferry Nucl Unit: 1 Docket: 50-259	ear Plant .	SYSTEM COMP	ONENT ÈVALUA	TION WORK SHE	ET (Rev 2)	Revision 0 Date 10	3-APS-0207 -30-80
EQUIPMENT DESCRIPTION		ENVIRONMENT		DOCUMENT	TATION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Aux Pwr Plant ID No. TSAE	Operating Time	l Yeaŗ	None	(1)	None	None	BFNEEB8018 R1 Appendix 122
Component Transformer Manufacturer: General	Temperature (°F)	Figure` B.13 (1)	None	- (4)	None	None	
Electric Model Number: N/A	Pressure (PSIA)	Table B.1 (1,2,3)	None	(4)	• None	·. None	•
Function: Power Distribution Accuracy: Reg'd: N/A	Relative Humidity (%)	100 <sup>°</sup> max	None	(4)	_ None '	None	
Demon: N/A Category: A	Chemical Spray	N/A	N/A	(4)	N/A	N/A	<u>.</u>
Service: 4160V-480V Transformers Location: El 639, Rm 13	Radiation (RAD)	3.1x10 <sup>4</sup>	None	. (4)	None	None	BFNEEB8018 R1 Appendix 1&2
	Aging	N/A	None	(2)	None	None	
Flood Level Elev: 552' Above Flood Level: YesX No	Submergence	'N/A	N/A	(4)	N/A	N/A	N/A
Notes: (1) See Section 2	2.4 in 79-018 re	eport.	4	•		Prepared by: O	Parry D. Diele.
(2) See Section 4	.1.2 in 79-01B	report.		`•'	*	•	n n gh n +
	l other information				• •	Reviewed by: $\bigwedge$	T. IC. IT Cliller
	the attached a 0.0 and/or Apper	• •	-	. <b>\</b>		QÀ Acceptance:	
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EEB-APS- 0207

Appendix 2, Rev 0

#### ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8018, R1.

2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.

3. Environment Specification represents "worst-case" service conditions.

4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by Reviewed by:

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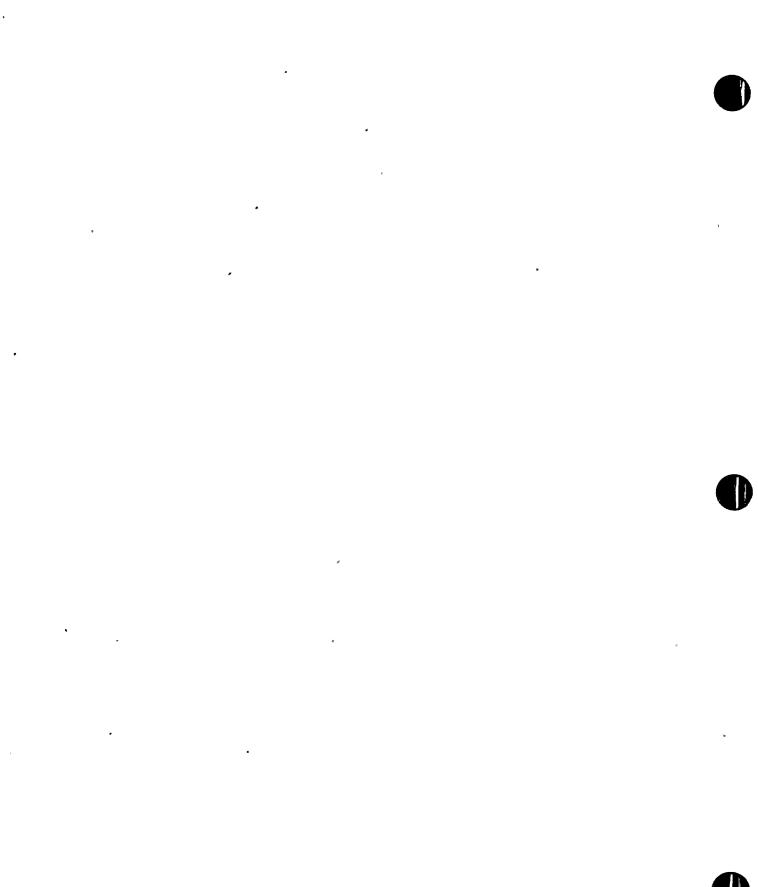
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EEB-APS-0208 Facility: Browns Ferry Nuclear Plant Sheet .llo. Vait: Revision 0 50-260 Docket: Date 10-30-80 CUTSTANDING ENVIRONMENT DOCUMENTATION REF QUALIFICATION EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Oualifi-Specifi-Oualifi-Parameter cation cation cation cation System: Aux Pwr • . Operating BFNEEB8018 R1 Plant ID No. TS-2E Time ] Year Appendix 1&2 None None None (1)Component **Transformer** Figure Temperature (°F) -Manufacturer: General B.13 (2,3) None (4) - None None Electric Pressure Table Model Number: N/A (PSIA) B.1 (1,2,3) None None None (4) Function: Power Distribution Relative Humidity (%) 100 max None None ' None (4) Accuracy: Reg!d: N/A Demon: N/A Chemical Spray Category: A N/A (4) N/A N/A N/A N/A Service: 4160V-480V Transformers BENEEB8018 R1 . Radiation 3.1x10<sup>4</sup> None<sup>•</sup> (RAD) (4) None None Appendix 1&2 Location: El 639, Run 13 J. Aging  $(2)^{-}$ N/A None None None Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A - N/A N/A N/A N/A (4)<sup>·</sup> No Notes: Prepared by: (1) See Section 2.4 in 79-01B report. (2) See Section 4.1.2 in 79-01B report. •. • Reviewed by: D.H. Hiller (3) All notes and other information not on these sheets are on the attached appendix sheets. QA Acceptance (4) See Section 3.0 and/or Appendix B in 79-01B report.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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# EN DES CALCULATIONS

EEB-APS-0208 Appendix 1, Rev 0

	ATION	REV		DR MEDS USE)		APS	<u>1 N/A * _      </u>
EN DES - EEB			(*(	JIL MEIJS USE)		MED:	S ACCESSION NUMBER
APPLICABLE DESIGN DOCUMENTS	BRANCHAROJECT IDENTIFIERS	RO			-		
		Rì		•			
N/A	NCR No. BFNEEB8018, R1	R2				i	
KEY.NOUNS	TOTALLOOUTO, KI			· · · · · · · · · · · · · · · · · · ·			•
Environmental	Qualification	R3				-	
REV RO	R1		R2	R3	STA	TEMENT OF PR	OBLEM
UATE 10-30-80				<u> </u>	-	1 * * * + *	
1 . 1 . 1					Qua Cla	SS IF 4160V	documentation for t -480V shutdown boar
ary & Linda					tra	nsformer TS	2E has not been
CHECKED					100	ated for th	e temperature,
A.R. H. alette					hum	idity, pres	sure, radiation,
SUBMITTED					-  agi	ng, and ope	rating time.
AFPROVED			·····		-		
ATTACHMENTS MICROFILMED:					1		
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AST ALL PAGES * MANGED BYTHIS REV.			<u> </u>		1		
ABSTRACT							
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	passed a normal lea an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued including aging and
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued
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GE submitted t test of 5-psi that if the tr an equal outsi which permits conditions. F it is sealed a conditions all that this Class operation unti	pressure held f ransformer can w ide pressure. A a maximum tempe Relative humidit and filled with low up to 1 x 10 ss 1E 4160V-480V il confirmation	or a ithsi lso, ratur y wil Pyrar 5 rac shut	period of tand 5-psi GE certif re for Cla ll not aff nol insula ds total i tdown boar	24 hours. internal pried that the ss A insulated ect the open ting liquid ntegrated 40 d transformed	Ther ressu is tra- tion ration . Us J year Sr TS	efore, we c re, then it ansformer m of 250 <sup>0</sup> C fo n of this t ual nuclear rs dosage. 2F is quali	an reasonably assum can also withstand eets ANSI C57.12-19 r short-circuit ransformer because radiation service Therefore, we find fied for continued

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## EEB-APS-0208

Appendix 2, Rev 0

## ADDITIONAL INFORMATION

1. Lack of qualification documentation noted on NCR No. BFNEEB8018, R1.

- 2. TVA letter of October 10, 1980 (EEB 801010 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Sang M. Dies</u> Reviewed by: <u>D.R. Thelate</u>



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## **EN DES CALCULATIONS**

EEB-APS-0209 Appendix 1, Rev 0

TITLE						UNID SYSTEM(S)	PLANT/UNIT BFN/1		
Engineering Ev	valuation for Co	ntinu	ed Operat	ion		APS	SAR SECTION(S)		
PREPARING ORGANIZ		REV	· · · · · · · · · · · · · · · · · · ·	R MEDS USE)		MEDS ACCESSION NUMBER			
EN DES - EEB		RO							
APPLICABLE DESIGN DOCUMENTS	BRANCH/PROJECT IDENTIFIERS								
N/A . NCR No.		R1			•				
	BFNEEB8023, R1	R2		,	•				
KEY NOUNS	•	RJ					· ·		
REV RO	R1		R2	R3	STA	TEMENT OF PR	OBLEM		
DATE 10-30-80		•				ualification	n documentation for		
PREPARED			ж. #		tł no	ne 480V Reac ot been loca	tor MOV MCC 1C has ated for pressure.		
CHECKED D. R. H. elster					qı by	aging, and operation time. Other qualification awaits confirmation by GE of similarity to later			
SUBMITTED						ntracts and	TVA approval òf		
APPROVED				, ,		ntract.	report for current		
ATTACHMENTS MICROFILMED:						, in the second se			
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ABSTRACT									

There is evidence that all GE motor control centers provided for Browns Ferry, Hartsville, and Phipps Bend Nuclear Plants contain identical components. GE's letter of September 26, 1980 (EEB 801009 050), provided their "IC 7700 Motor Control Center Environmental Qualification Test Report to IEEE 323-1974" for Hartsville and Phipps Bend Nuclear Plants (contract 77K5-820350). This report provides adequate qualification for the temperature, humidity, and radiation service conditions. GE is now scheduling a test to prove that the 7700 series MCC including pneumatic timing relays meet the pressure service conditions. Because the accuracy of the pneumatic timing relays may be affected <u>only</u> during a tornado depressurization event which lasts at most approximately 5 seconds and a vendor test is now being scheduled to confirm pressure qualification, the Class IE Reactor MOV MCC 1C is justified for continued operation, based on similarity including aging and operating time.

TVA 10697 (ENDES-7-78)

\*Use revision log (form TVA 10534) if more room is required

EEB-APS- 0209

Appendix 2, Rev 0

## ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8023, R1.
- 2. TVA letter of October 2, 1980 (EEB gol002 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: . 0 any L. A. R. Helster Reviewed by:



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ewed by: <u>A.R.M</u>	•
a	/A N ared by:

## **EN DES CALCULATIONS**

EEB-APS-0210 Appendix 1, Rev 0

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	L TITLE		•				UNID SYSTEM(S)	BFN/ 2
,	Engineering Ev	valuation for Con	ntinu	ed Operat	ion		APS	SAR SECTION(S)
	PREPARING ORGANIZ	ATION .	REV	(FO	R MEDS USE)		MED	ACCESSION NUMBER
	EN DES - EEB		RO					
	APPLICABLE DESIGN DOCUMENTS	BRANCH PROJECT IDENTIFIERS						
۲	N/A	NCR No.	R1					
	NY A	BFNEEB80 23, R1	R2					
	KEY NOUNS		RJ		· · · ·			`
	REV RO	R1		R2	R3	STA	TEMENT OF PR	OBLEM
	DATE 10-30-80					1	•	
	Lang D. Dieste			•			ne 480V Reac ot been loca	documentation for tor MOV MCC 2C has ted for pressure,
	CHECKED O.K.H.Listu					qı by	Jalification GE of simi	peration time. Other awaits confirmation larity to later
	SUBMITTED APPROVED	-				co   qi	ntracts and alification	TVA approval of . report for current
	ATTACIIMENTS MICROFILMED:					- cc	ontract.	
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	ABSTRACT						****	

There is evidence that all GE motor control centers provided for Browns Ferry, Hartsville, and Phipps Bend Nuclear Plants contain identical components. GE's letter of September 26, 1980 (EEB 801009 050), provided their "IC 7700 Motor Control Center Environmental Qualification Test Report to IEEE 323-1974" for Hartsville and Phipps Bend Nuclear Plants (contract 77K5-820350). This report provides adequate qualification for the temperature, humidity, and radiation service conditions. GE is now scheduling a test to prove that the 7700 series MCC including pneumatic timing relays meet the pressure service conditions. Because the accuracy of the pneumatic timing relays may be affected <u>only</u> during a tornado depressurization event which lasts at most approximately 5 seconds and a vendor test is now being scheduled to confirm pressure qualification, the Class IE Reactor MOV MCC 2C is justified for continued operation, based on similarity including aging and operating time.

TVA 10697 (ENDES-7-78)

EEB-APS- 0210

Appendix 2, Rev 0

### ADDITIONAL INFORMATION

- 1. Lack of qualification documentation noted on NCR No. BFNEEB8023, R1.
- 2. TVA letter of October 2, 1980 (EEB 801002 915), has been sent to the vendor asking if qualification information for temperature, humidity, pressure, and radiation is available on identical equipment, and if so, when it will be submitted to TVA. Our letter asked the vendor to submit this information by November 15, 1980.
- 3. Environment Specification represents "worst-case" service conditions.
- 4. We are actively pursuing with the vendor whether the materials used in this equipment are susceptible to radiation and thermal aging and to provide a basis for establishing equipment operating life.

Prepared by: <u>Sam Dusta</u> Reviewed by: <u>D.R. Hebrita</u>

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## BROWNS FERRY NUCLEAR PLANT EVALUATION WORKSHEET.INDEX

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EWS	Description
EEB 1-1001	Solenoid Valve - Target Rock - 1/2 SMS-A-01-1
-1002 -1003 -1004 -1005 -1006 -1007 -1008 -1009 -1010	Limit Switch - Namco -EA740-50100
EEB 23-1001	Solenoid Valve - Atkomatic Valve Co 15830WP-VPI
EEB 24-1001 -1002	Pressure Switch - Meletron Corp 2121-32A . ↓
EEB 32-1001 -1002	Solenoid Valve - AAA - SO2 ↓
EEB 43-1001 -1002	Flow Indicating Switch - Fischer & Porter - 10A2235A-55 ↓
EEB 64-1001 -1002 -1003 -1004 -1005 -1006 -1007 -1008 -1009 -1010 -1011 -1012 -1013 -1014 -1015 -1016 -1017 -1018 -1019	Pressure Differential Switch - Dwyer - 3302 Solenoid Valve - ASCO - HB830281RU Pressure Differential Modifier - Honeywell - A7165A-1078 Pressure Differential Control Indicator - Fischer & Porter - 53EL3311BB1B Pressure Differential Transmitter - Fischer & Porter - 10B2494TBAB

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## BROWNS FERRY NUCLEAR PLANT EVALUATION WORKSHEET INDEX

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EWS	Description .
EEB 64-1020	Pressure Differential Transmitter - Fischer & Porter - 1082494TBAB
-1021	Pressure Differential Switch - Fischer & Porter - 10B2494TBAB
-1022	Solenoid Valve - ASCO - HV200-924-2
-1023	Solenoid Valve - ASCO - HB830281RU
-1024	
-1025	Ļ
-1026	Pressure Differential Switch - Dwyer - 3302
-1027	Temperature Element - Weed - SP601-1A-A-3-C-275-5N4-2
-1028	Solenoid Valve - ASCO - HB830281RU/
-1029	
-1030	
-1031	
-1032 -1033	$\Psi$
-1033	Solenoid Valve - ASCO - HV200-924-1F Solenoid Valve - ASCO - HV200-924-2
-1034	SUTENUTU VATVE - ASCU - AV200-924-2
-1035	Solenoid Valve - ASCO - HV200-924-1F
-1037	
-1038	Pressure Differential Modifier - Honeywell - A7165A-1078
-1039	Temperature Detector - Weed - SP601-1A-A-3-C-275-SN4-2
-1040	Temperatúre Detector - Weed - SP601-1A-A-3-C-275-SN4-2
-1041	Pressure Differential Switch - Dwyer - 3302
-1042	$\checkmark$
EEB 65-1001	Flow Transmitter - GE/MAC - 50-554212BK223
EEB 67-1001 -1002	Solenoid Valve - ASCO - HT8262A2O3E
-1003	$\checkmark$
-1004	Limit Switch - Namco - Series EA-750
-1005 >	Flow Transmitter - GE/MAC - 555
-1006	Pressure Transmitter - Bailey (GE/MAC) - 551
-1007 -1008	
-1008	<i>,</i>
-1010	
-1011	↓ ·

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## BROWNS FERRY NUCLEAR PLANT EVALUATION WORKSHEET INDEX

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b	v v
EWS	Description
EEB 69-1001 -1002, -1003 -1004 -1005 -1006 -1007 -1008	Temperature Switch - Fenwal - 18002-27
EEB 71-1001 -1002	Solenoid Valve - ASCO - HTX8300B614 ↓
EEB 73-1001 -1002 -1003 -1004	Level Switch - Robertshaw - SL-200 Pressure Transmitter - Rosemount - 1151GP8EZZLMPB0I Level Switch - Robertshaw - SL-200 Power Supply - Rosemount - SPS-2102-P
EEB 74-1001 -1002 -1003 -1004	Solenoid Valve - ASCO - 8300C61U
EEB 75-1001 -1002 -1003 -1004 -1005	Solenoid Valve - ASCO - HTX8300C61U Solenoid Valve - ASCO - HB830081F Solenoid Valve - ASCO - HTX8300C61U ↓ Solenoid Valve - ASCO - HB830081F
EEB 76-1001 -1002 -1003 -1004 -1005 -1006 -1007 -1008 -1009 -1010 -1011 -1012 -1013	Solenoid Valve - Valcor - 526D



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4 • BROWNS FERRY NUCLEAR PLANT

. EWS Description EEB 76-1014 Solenoid Valve - ASCO - HT8262A203E -1015 -1016 -1017 -1018 -1019 Solenoid Valve -1020 Solenoid Valve -1021 EEB 77-1011 Level Switch - Robertshaw - 351 -1002 -1003 -1004 Solenoid Valve - ASCO - HB830081RF -1005 Solenoid Valve - ASCO - 8300C6RU -1006 Solenoid Valve - ASCO - 8300C61U -1007 Level Switch - Robertshaw - 351 -1008 EEB 84-1001 Solenoid Valve - Target Rock - 73FF-05 -1002 .. . . . -1003 -1004 Solenoid Valve - ASCO - T8210C87 Solenoid Valve - ASCO - HT8211C94 -1005 -1006 D/P Transmitter - Bailey (GE/MAC) - 555 -1007 *`-*1008 -1009 I/P Converter - Fisher Controls - 546 -1010 Pressure Switch - Custom Components - 630GH -1011 -1012 -1013 Solenoid Valve - Target Rock - 73FF-005 EEB 85-1001 Solenoid Valve - ASCO - WPHT8316E36 -1002 EEB-90-0001 Radiation Element - Nuclear Measurements Corp. -0002 -0003

-0004 -0005 .-0006. -0007 -0008 -0009

Facility: Browns Ferry Nucl Unit: 1,2,3 Docket:	•		ONENT EVALUA	TION NORK SH		(3) Sheet <u>N</u> o Revision Date	EEB 1-1001 0 10/27/80
EQUIPMENT DESCRIPTION		ENVIRONMENT		DOCUHEN	TATION REF	QUALIFICATION METHOD	I OUTSTANDING
-	Parameter ·	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	-	
System: Main Steam Plant ID No. PSV-1-179	Operating Time	1 Year	None	(1)	None	None	NCR No. BFNEEB8057
Component Solenoid Valve Hanufacturer:	Temperature (°F)	Figure B.0 (1,2,3)		(4)			
Target Rock Model Number: 1/2 SMS-A-01-1	Pressure (PSIA)	Figure B.0 (1,2,3)		(4)		· .	
Function: Relief Valve Accuracy: Req'd:N/A	Relative Humidity (%)	100%		(4)			
Demon: Category: B	Chemical • Spray	N/A	ніа	. (4)			
Service: Main Steam Line A Location: O	Radiation (RAD)	2x10 <sup>8</sup>	None	. (4)			
	Aging	N/A	None	(2)	<u> </u>	- <u>↓</u>	Y
	Submergence	N/A	N/A	(4)	N/A ·	N/A	N/A
Flood Level Elev: 552' Above Flood Level: Yes× No		N/A			N/Å	N/A Prepared by:	

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## Appendix 1, Sheet 1 of 1 EEB1-1001, Rev. 0

### Justification for Continued Operation

These valves have been qualified by Target Rock to the following levels:

Temperature	:	340 <sup>0</sup> F
Pressure	:	65 PSIG
Relative Humidity	:	100%
Radiation	:	$3.4 \times 10^{7}$

This is all documented in Target Rock report No. 2199 dated 1-9-79, which is proprietary information for G.E. and not available to TVA.

The valves are required to operate in the following environment:

Temperature	:	325 <sup>0</sup> F
Pressure	:	69.7 PSIA
Relative Humididy	:	100%
Radiation	:	2 x 10 <sup>8</sup>

The operating conditions to which these valves will be subjected are well within the levels to which they have been tested in all areas except radiation.

The failure modes of these values have been reviewed and are all in the desired direction. Degradation of seats will also result in alignment to the desired position.

The above information shows justification for continued use of the valves. However, due to lack of sufficient documentation, TVA will either type-test this valve or replace it with a type-tested valve. •

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Revisión Unit: 1,2,3 0 ٦. Docket: Date 10/27/80 QUALIFICATION DOCUMENTATION REF OUTSTANDING ENVIRONMENT EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Qualifi-Specifi-Oualification cation cation Parameter cation System: Main Steam Operating 1 Year None -None None NCR No. Time Plant ID No. PSV-1-180 BFNRRN8057 (1)Component Figure B.O Solenoid Valve (1;2,3)Temperature (°F) **Hanufacturer:** (4) Target Rock Figure B.O Pressure Model Number: (1,2,3) (PSIA) (4) 1/2 SMS-A-01-1 Function: Relief Valve' Relative Humidity (%) (4) 100% Accuracy: Reg'd: N/A Demon: Chemical ۰. · Spray N/A N/A Category: B (4) Service: . Main Steam Line D Radiation <u>2x10</u><sup>8</sup> (RAD) (4) None Location: 0 (2)Aging N/A None Flood Level Elev: 552' Above Flood Level: Yes x Submergence N/A H/A ٩. N/A N/A N/A (4) No Prepared by: Notes: (1)See Section 2.4 in 79-01B report. (2) See Section 4.1.2 in 79-01B report. Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets. :\* QA Acceptance: (4) See Section 3.0 and/or Appendix B in 79-01B report.

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SYSTEM COMPONENT EVALUATION WORK, SHEET (Rev 2)

(3)

EEB 1-1002

Sheet No.

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Facility: Browns Ferry Nuclear Plant



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Appendix 1, Sheet 1 of 1 EEB1-1002, Rev. 0

## Justification for Continued Operation

These valves have been qualified by Target Rock to the following levels:

Temperature	:	340 <sup>0</sup> F	
Pressure	:	65 PSIG	
Relative Humidity	:	100%	
Radiation	:	$3.4 \times 10^{7}$	7

This is all documented in Target Rock report No. 2199 dated 1-9-79, which is proprietary information for G.E. and not available to TVA.

The valves are required to operate in the following environment:

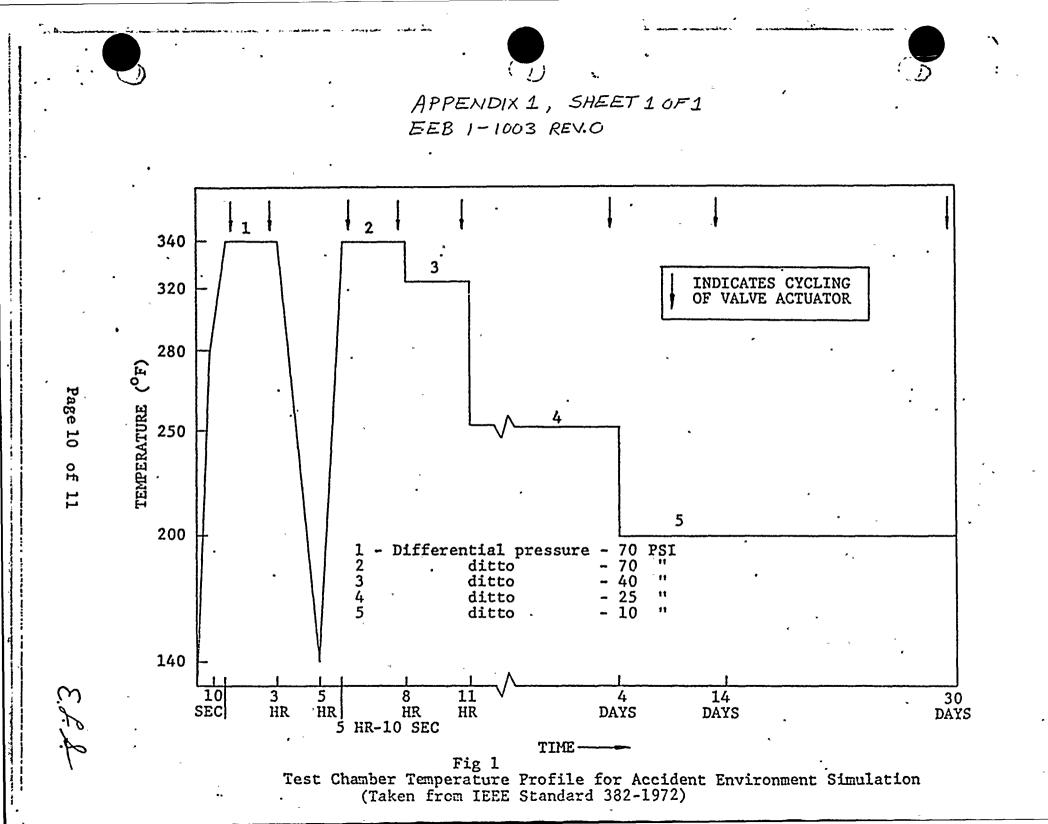
Temperature	:	325 <sup>0</sup> F
Pressure	:	69.7 PSIA
Relative Humididy	:	100% ,
Radiation	:	2 x 10 <sup>8</sup>

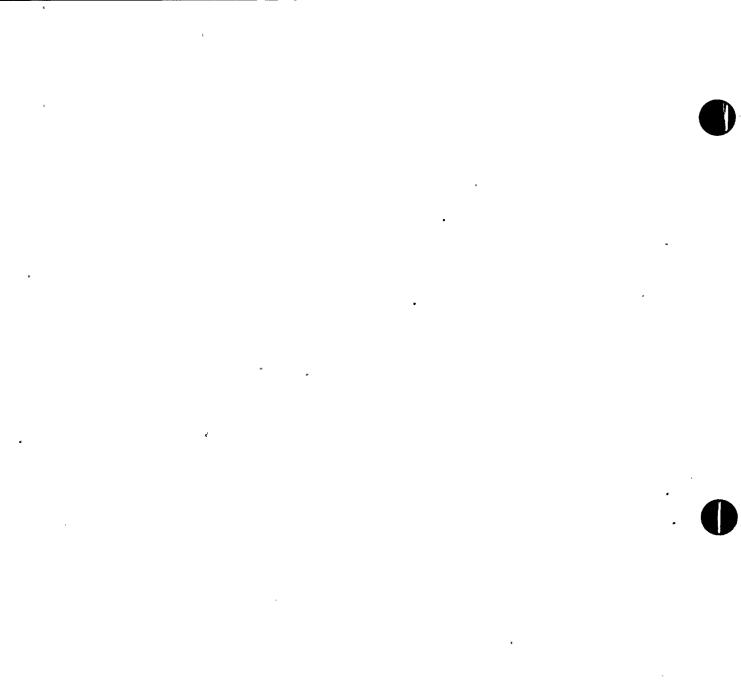
The operating conditions to which these valves will be subjected are well within the levels to which they have been tested in all areas except radiation.

The failure modes of these valves have been reviewed and are all in the desired direction. Degradation of seats will also result in alignment to the desired position.

The above information shows justification for continued use of the valves. However, due to lack of sufficient documentation, TVA will either type-test this valve or replace it with a type-tested valve.

(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. Facility: Browns Ferry Nuclear Plant EEB 1-1003 Revision 0 Unit: 1,2,3 .-Date Docket: 10-22-80 QUALIFICATION OUTSTANDING DOCUMENTATION REF ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Specification cation cation cation Parameter ACME Cleveland System: Main Steam System Operating Development Co. Sequential NONE 1 Day 30 Days Plant ID No. zs-1-15 Time Test Report Test (1) ٠Ç Component Figure B.7 Appx. 1 Limit Switch (1)340 . Temperature Figure B.7 **Hanufacturer:** (4)  $(^{\circ}F)$ NAMCO Appx. 1 Pressure Table B.1 (1,2,3) Model Number: 70 (PSIA) (4) EA740-50100 Function: Relative Scram Trip 100 Humidity (%) (4) 100 Accuracy: Reg'd: N/A Chemical Demon: ۰. Spray N/A N/A Category: A (4) Service: Radiation Main Steam Line A -- $2 \times 10^8$  $2.03 \times 10^{6}$ (4) (RAD) Outphoard Isol. Vlv. Location: 7 1 Appx. 2 Analysis N/A 7 Years (2)Aging Flood Level Elev: 552' N/A N/A N/A Above Flood Level: Yes X Submergence N/A H/A (4) Ho Prepared by: Notes: See Section 2.4 in 79-01B report. (1)See Section 4.1.2 in 79-01B report. (2) Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets. QA Acceptance: W.E. Mm. Dlo. 27.00 (4) See Section 3.0 and/or Appendix B in 79-01B report.





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EBSC-100'S 101337 <u>APPENDIX Z</u> \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_ AGING ANALYSIS FOR NAMCO EA740 REVO сомритер 711192 DATE 10-23-80 (-+--Establishing Ounlified Life at Ense service Conditions. A. Aging due to heat Aging Infinite ACME. CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) T= Temp of Aging Test = 200°F = = = (200-32)°C=(93.3+273.15)=366.48 to= Time of Ming Tost = 200 hr tai= Equivalite Age At service conditions Tal= NORMAL Service Temp = 140°F= 34 (140-32) E= 60°C = 333.14 -Assume Ea= 0.958eV  $\frac{ta_1}{t} = \frac{E_a}{K} \left( \frac{1}{Ta_1} - \frac{1}{Tt} \right)$ 0.958 EV X1.602-X10-19 333.15 366,98 In == 3,036  $t_{a} = 200 (^{3.03L})$ 4164 hr -B. Aging due to Loca Test = 0 - 10 NR - negligable effect Time 10.00 - 3hc Ti= 340°F = 171°C = 444.26°K  $t_{t} = \sim 3 hr$  $l_{n} \frac{4}{3} = 1.1121\chi/0^{4} \left(\frac{-1}{333.5} - \frac{1}{444.26}\right)$ In to = 8,349 ta= 308.349 = 12675.56 hrs.

REN O Z or L. APPX. 2, EEB 1-1.00:5 NAMCO LIMIT SWITCHES COMPUTED\_\_\_ Conservation Temp= 2.40°F Time 2-Sha for 2 hrs = 388.7  $T_{t} = 240$ te= 2hr  $\frac{t_0}{2} = 1.1121 \times 10^4 \left( \frac{1}{333.15} - \right)$ 388.7 キー 4,77 Om . . P. 1.77 = 236 hr ta= Time 5-8 hr T+= 3,40 ty = 3 . SAME AS 1023 hrs ta= 12675.56 ۰. Time = 8-11 hrs T+= 320°F= 160°C= 433.15°C 6+ = 3 hrs te = 1,1121×104 (-333,15 - 437,15 #= 7.7 t. = 3 07.7 = 6669.2 hrs Time 11hr - 4 days T= 250F=121°C= 394,26°K tt= B5hrs  $2n\frac{1}{32} = 1.1121X10^{4} (222.15 - 294.26) = 5.174$ t= 65 es.174 = 15013 hc

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REV O SHEET 3 or Go. HPPX. 2, E CD. 1- LOU > DATE COMPUTED HECKED DATE 4drys - 30 days ta= 624hrs T== 200F= 366,48°K . 3,036 +==== 1,1121X/04 2. 333.15 366.48 3,036 = ta= 624 P 12991 hrs Total Service Chiditicas + :1 A.0.0 Z ta tampe Ξ. 4164 + 12675 + 236 + 12675 + 6669 +15012 + 12971 taroinL= tamme = 64.423 hrs- 2684 days= 7.35y cs • ۵ اور . . · . 4 ٠

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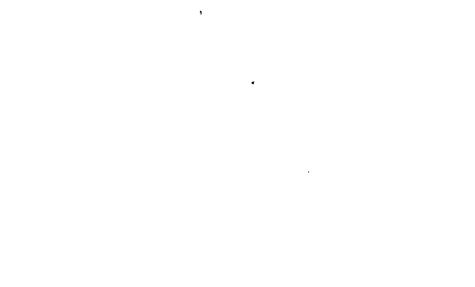
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HPPX.2, EED 1-100 5 SHEET 4 or 6. REVO DATI <u>بر ا</u> CHECKED LOCA in plant <u> Haire</u> due 6 minutés 325°F= 163°C= 435,9 °K  $T_{\pm} =$ TIME += 10 min  $\frac{1}{3767hc} = 1.1121X10^4 \left(\frac{1}{373.15}\right)$ = 7,87 - 435.9 ta = 0.167. C7.87 Ξ 437 hours 34min ... coruntiunteles est in a died TE= 325°/== 475.9% TIME 6 6+= 28min= 0,467 <u>+a</u> 467 = 1, 1121×104 - 7.27 467 e7,87 = 1722.4 hr £a = Ting 3 gov = 110 she servature la estimated at TE=300°F= 148°C= 4221 ty= 4 lomin= 0.68 7.028 In the = 1.1121×10+1 333,15 - 422 07.028 : 10= .68. 7766.9. hrs IME = 1.25 - 6 hrs ート  $t_{+} = 4.75 \, hr$ La=4,760 4.356 ta= 370 hrs T+=215 = 1010= Time 6-12his 374,85 t: = Chis  $ta = 60^{2.71}$ 245:3 hrs +a =

APPX. 2, FEB1-1003 HEET 5 or 4. COMPUTED CHECKED  $T_{t} = 190 = 88^{\circ}C = 361 K$ JIME 12-18hes  $\frac{t_{\tau} = 6 h_{rs}}{t_{a} = 6 0^{2.549}}$ ta = 78. TIME 18-24 TH= 170°F = 77°C= 350K ta: 6 C - 517 = 29.0 hrs Total Aging due to Locat tar = -2148.4 hrs . Maximum Lifetime before Loca <u>Ta - tan</u> <u>Ta - tan</u> <u>Ta - 64423-3148.4= 61274 hrs</u> tias = 6.99 yrs . đ , ٠



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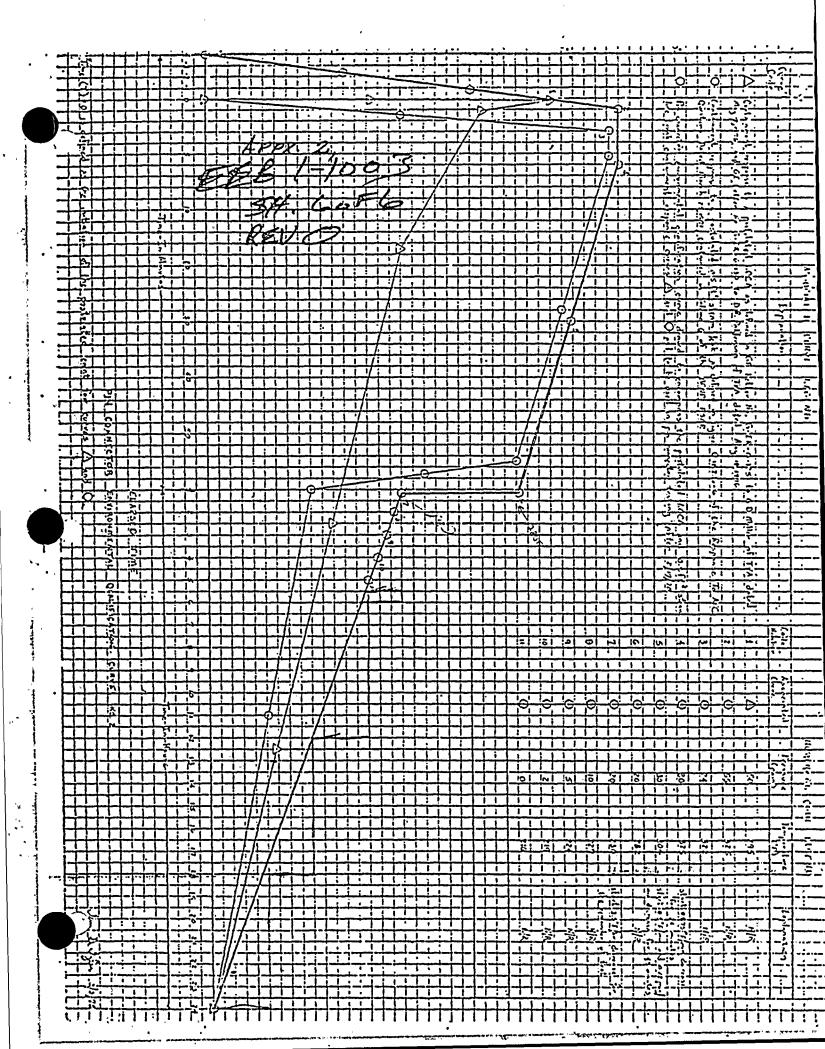
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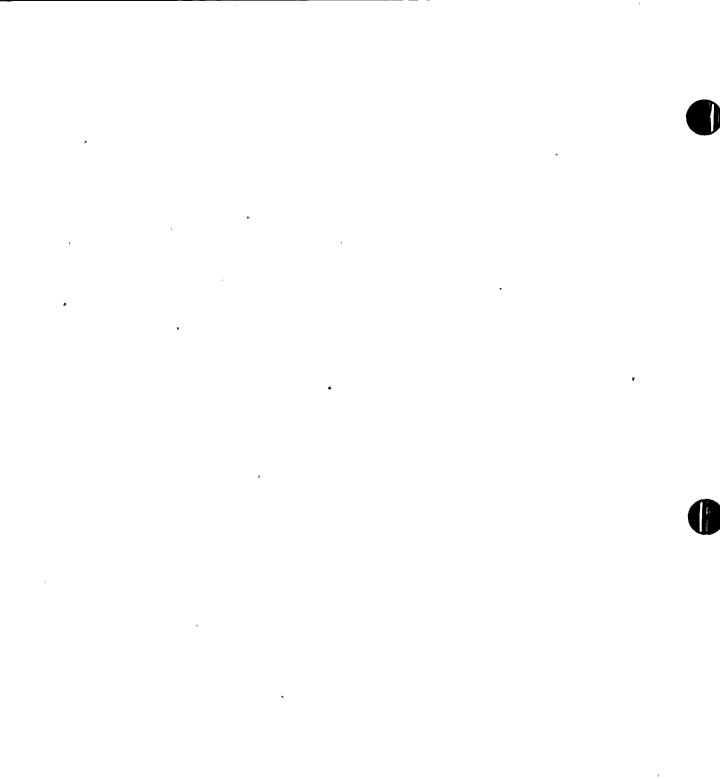
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Facility: Browns Ferry Nuclear Plant Unit: 1. 2. 3

Revisión Π Docket: Date 10-22-80 ENVIRONMENT DOCUMENTATION REF OUALIFICATION OUTSTANC EOUIPMENT DESCRIPTION METHOD ITEMS Specifi-Oualifi-Specifi-Qualifi-Parameter · cation cation cation cation System: Main Steam System ACME-Cleveland Operating Development Co. 1 Dav 30 Days Sequential NoNE Plant ID No. ZS-1-14 Time Test Report Test (1)DTD 2/20/78 Component Figure B.O Appx. 1 Limit Switch (1,2,3) 340 Temperature Manufacturer: NAMCO  $(^{0}F)$ (4) Figure B.O Appx. 1 (1,2,3)Pressure Model Number: EA740-50100 70 (PSIA) (4) Function: Scram Trip Relative 100 100 Humidity (%) (4) Accuracy: Rea'd: N/A Demon: Chemical *.*• Spray N/A N/A Category: A (4) Service: Main Steam . Line A Inboard Isol\_Vlv Radiation  $2 \times 10^8$  $2 \times 10^8$ (RAD) (4) Location: 0 7 Years Aging ' N/A (2)ADDX. 2 Analysis Flood Level Elev: 552' Above Flood Level: Yes X Submergence N/A N/A N/A · N/A N/A (4) No Notes: See Section 2.4 in 79-01B report. (1)Prepared by: 、 ·

- (2)See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.

See Section 3.0 and/or Appendix B in 79-01B report. (4)

QA Acceptance: W.E. Um Thin 27

Reviewed by:

(3)

Sheet No. EEB 1-1004



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

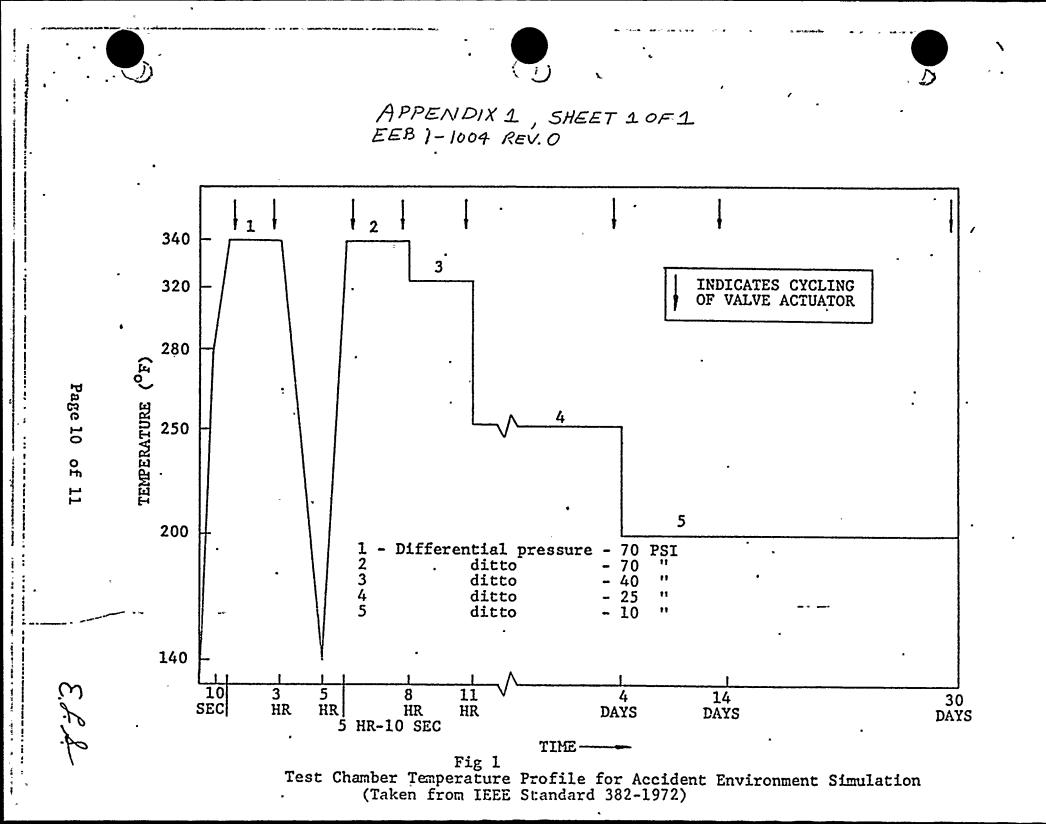
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BED1-100 INA CONCESSION REVO COMPUTED 2771982 DATE 10-23-50 Establishing Ourlified Life at Base service Conditions A. Aging due to heat Aging (reference ACME- CLEVEZAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) tai= Equivalient Age At social conditions Tel = NORMAL Service Temp = 140°F= \$ (190-32) &= 60°C = 333,15 Assume Eas 0. 95Bev ln = 是(=-== 1 333*.15* 0.758 ev X+ 602 × 10 366,48 ln = 3,036 C<sup>3.03,6-</sup>= 4164 hrs B. Aging due to Loca Test - negligable effect = 0 > 10 pic Time love - 3hc  $T_{t} = 340^{\circ}F = 171^{\circ}C$ 444.26°K 1 t+=~3hr In = 1,1121×104 (333,5 - 444,26 1 = 8.349 ta= 2 0 8,349 12675.56 bra. =

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APPX. 2, EEDI-1004 2 or 6 SHEET REV 0 NAMCO LIMIT SWITCHES COMPUTED ... DATE 2-5hr Conservatione Temp= 240°F for Thre = 385.7 Time  $T_{t} = 240$ te= 2hr = 1,1121×104 (-323,15 - 358.7 キー= 4,77 ta= 2 C 4.77 = 236 hr Time 5-8 hr T+= 340  $t_{+} = 3$ SAME AS 10= 3 hrs t~= 12675.56 ۰. T= 320°F= 160°C= 433,15°C Time = 8-11 hrs 6+ = 3 hrs  $\frac{t}{3} = 1,1721 \times 10^{4} \left( \frac{1}{333,15} - \frac{1}{432,15} \right)$ 1= 7.7 +. = 3 C7.7 = 6669.2 hrs T= 250F=121°C= 394,26°K Time 11hr - 4 days tt= B5krs Ξ 5,174 t= 65 es.174 = 15013 - hr

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APPX. Z, EEDI-1004 SHEET 3 OF 6. REV 0 DATE <u>4.days - 30 days to = 624 hrs</u> T= 200 F = 366, 48°K .  $\frac{2n}{629} = \frac{1}{1121 \times 10^4} \left( \frac{1}{337.15} - \frac{1}{366.46} \right) = 3.036$ ta= 624 e 3.036 = 12991 hrs Total Age at Service Conditions . tarra = Eta tatotal= 4164 + 12675 +236 + 12675 + 6669 +15012 + 12911 · taron = 69.423 hrs - 2684days = 7.35yrs . ٠

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APPX. 2, EBB 1-1004 1. HEBRENULDS I RENO COMPUTED\_ CHECKED DATE in plant Hainer due LaCA 40 6 minutes 325°F= 163°C= 435,9 °K TIME 10 min ·lm = 7,87 ta = 0.167 e7.87 Ξ 437 hours 34 min in servativately estimation TE= 3250==435,90 TIME 6. 6+= 28 min= 0,467 ta = 1,1121×104 = 7.87 467 E7.87 = 1772,4 hr ta= Time 3 Ameniliosh conservatuely estimated at TE= 300° F = 148°C= 42ZK tr= 4 lomin= 0.68-4 = 7,0.28 In the = 1.1121×107 333,15 - 422 ta= .68.07.028 = 7.66.9. nr. IME = 1.25 - 6 hrs -/<  $t_{+} = 4.75 \, hr$ ta=4,760 4.356 - `; ta= .370 hr Time 6 - 12 his Tt=215=1010= 374,8K t: = Chrs ta= 603.71. • ta = 245.3 hrs

APPX. 2, EEU1-1007 . KEN ~&-COMPUTED. DATE DATE JIME 12-18 hrs  $T_{t} = 190 = 88^{\circ}C = 361K$ <u>ta= 602.569</u> ta = 78. <u>TIME 18-24</u> T= 170°F = 77°C= 350K ta: 6 C = 29.0 hrs . TotAL Aging due to LacA tar = 3148.4 hrs Lifetime before Loca MAXIMUM - tac T. 64423 - 3148.4= 6/274 hrs tru = tias = 6.99 yrs

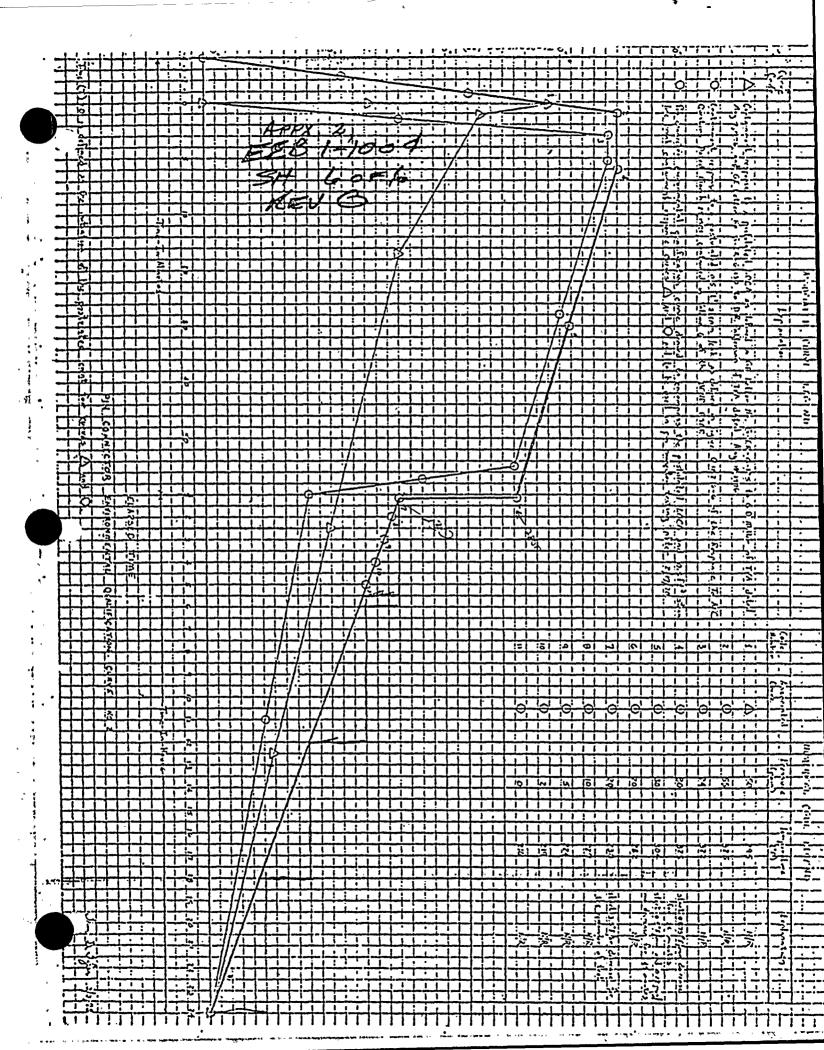
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Facility: Browns Ferry Nuclear Plant Unit:1,2,3 Docket: SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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(3) Sheet No. <u>EEB 1-1005</u> Revision <u>0</u> Date 10-21-80

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDIN( ITEMS
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Main Steam Plant ID No.	Operating Time	1 Day	30 Days	(1)	ACME_Cleveland Devel. Co. Test Report DTD 2-20-78	Sequential Test	None
Component (Qty 6) . Limit Switch Manufacturer:	Temperature (°F)	Figure B.0 (1,2,3)	Appx. 1 340	(4)			
Namco Model Number: EA740-50100 Function:	Pressure (PSIA)	Figure B.0 (1,2,3)	70 Аррх. 1	(4)			·  .
Scram Trip Accuracy: Req'd: N/A Demon: Category: A	Relative Humidity (%)	100	100	(4)			
	Chemical Spray	N/A	N/A	(4)			
Service: Main Stm Line B Inboard Isln Vlv	Radiation (RAD)	See 4.1.4 2 x 10 <sup>8</sup>	2 x 10 <sup>8</sup>	. (4)		· ·	
Location: 0	Aging	N/A	7 Years	(2)	Appx. 2	Analysis	, i vi
Flood Level Elev: 552' Above Flood Level: Yes x No	Submergence	N/A	N/A	(4)	N/A	- N/A .	N/A
Notes: (1) See Section 2	2.4 in 79-01B report.			· ·		Prepared by: 🖊	: Dean Klolle
<ul> <li>(2) See Section 4.1.2 in 79-01B report.</li> <li>(3) All notes and other information not on these sheets are on the attached appendix sheets.</li> </ul>					• ,	Reviewed by: Z	Chard I Bier
	i the attached a	thheunity sug	563.			<b>01 1 1 1</b>	here al

(4) See Section 3.0 and/or Appendix B in 79-01B report.

QA Acceptance: Lite. Trouts 10.24



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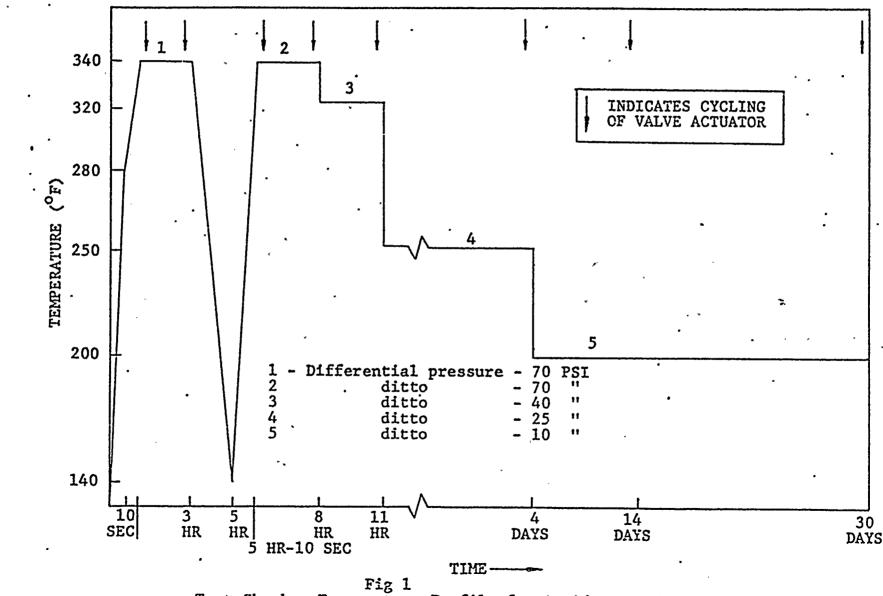
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APPENDIX 1, SHEET 1 OF 1 EEB1 - 1005, REV. O



Test Chamber Temperature Profile for Accident Environment Simulation (Taken from IEEE Standard 382-1972)

Page 10 of

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· EEBI-1005 KEY.0 TAANS SNDES 3 771 COMPUTED 77.19 DATE 10-23-80 Establishing Ourlified Life at Base service Conditions A. Aging due to heat Aging Infume ACME-CLEVELAND DEVELOPMENT CO TEST REPORT DID 2-20-78) T= Temp of Aging Test = 200°F = - \$ (200-32)°C=(93.3+273.15)=366.48 te= Time of Aquing Test = 200 hr tai= equivalient age At service conditions Tai = NORMAL SOLVICE TEMP = 140°F= % (140-32) &= 60°C = 333.15 t'Assume Ea= 0.95Bev In the = the (+ - + 1 366,42 ta1 = 0.958 EV X1.602 X10-19  $ln \frac{1}{000} = 3,036$ ta = 200 C = 4164 hrs. B. Aging due to Loca Test Time = 0 > 10 sic - negligable effect Time 10 sec - 3hc T= 340°F = 171°C = 444.26°K  $t_{\pm} = \sim 3 hc.$ Ł ln = 1,1/2/X/04 (333,5 - 444,26 In to = 8,349 ta= 3 @ ". = 12675.56 hrs.

TVA 455 (EN UES 3 //I APPENDIX 2 EEB 1-1005 SHITET 2 OT 6 BEN.D. NAMCO LIMIT SWITCHES DATE Conservative Time Temp= 240°F = 388.7  $T_{+}=240$  $t \in = 2hr$  $\frac{4n}{2} = 1.1121 \times 10^4 (-323.15 - 388.1)$ In == 4,77 = 118. hr .ta= . ine 5-8 hr T+= 340 SAME AS 10=3 hrs  $t_{t} = 3$ t\_=12675,56 • • Time = 8-11 hrs Tt= 320°F= 160°C= 4.33.15°C 6+ = 3 hrs  $l_{m} = \frac{t_{1}}{3} = 1.112 \times 10^{4} \left(\frac{1}{333.15} - \frac{1}{433.15}\right)$ th = 7.7 e" = 6669.2 hrs 3  $t_{\star} =$ Time 11hr - 4 days T= 250F=121°C= 394,26°K tt - B5hrs lin to = 1.1121×10 (333.15 ) = 5,174 t= 85 es.174 = 15013 - T. hr

APPENDIX 2 EEB 1-1005 SHEET 3 OF 6 REV.O COMPUTED DATE DATE 4 days - 30 days += 624hrs T== 200 == 366,48°K  $ln \frac{4}{624} = 1,1121\times10^{4} \left(\frac{1}{337.15} - \frac{1}{366.48}\right)$ 250,5,2 ta= 624 e 3.036 = 12991 has Total age at Service Conditions .. tatorne = Eta tarotal= 4164 + 12675 +236 + 12675 + 6669 +15013 + 12991 tarom = 64423 brs = 2689 days = 7.35y cs \_ , 1 , ; ŗ

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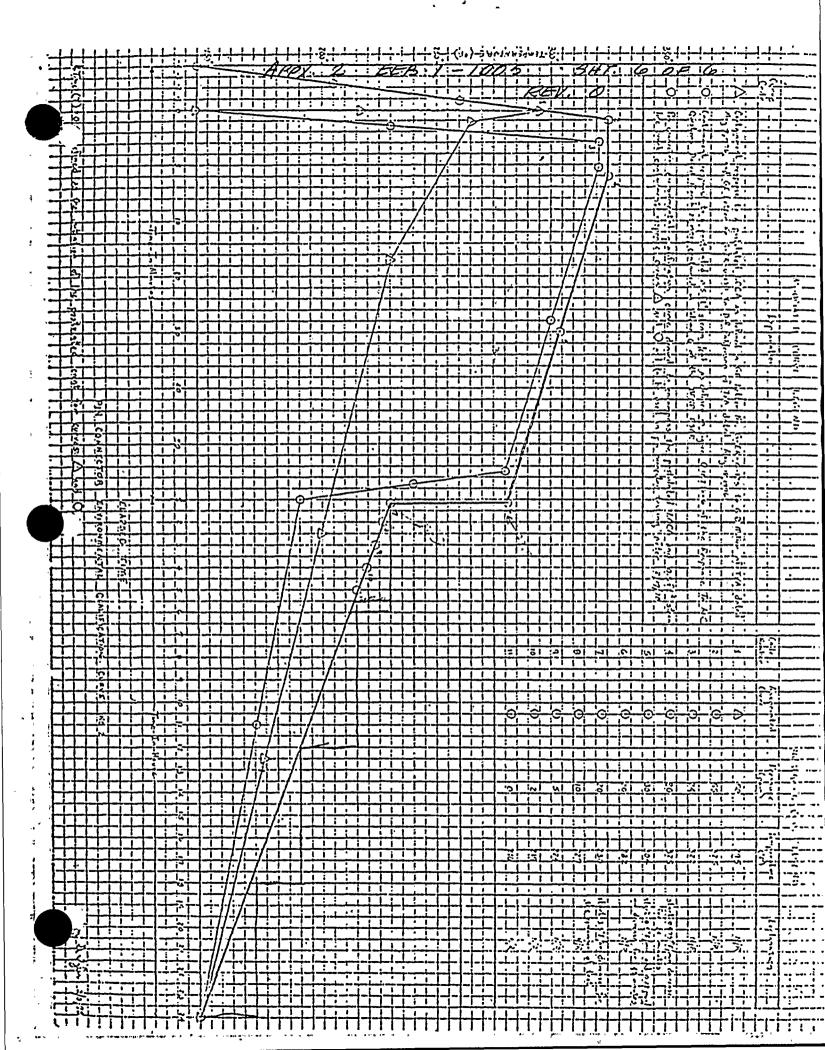
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APPENDIX 2 EFB 1-1005 SHEET 4 of Lo REV. O Aging due to LOCA in plant. Ti= 325°F= 163°C= 435,9 °K 4-6 minutes TINE. t= 10 mm <u>377,15 - 435,9</u> = 1, 1/21 X104 = 7,87 ta = 0.167 C. = 437 hours 34 min conservativately estimated TE= 325° E= 435,9% TIME C-64= 28 min= 0,467 4r ln . 407= 1,1121 × 104 ( 1333.15 4-35.9 = 7.87 ta= 467 e7,87 = 1772.4 Time 3 gowi- 125he conservatively estimated at TE= 300°F = 148°C= 422K ty= 4 lonin= 0.68.40  $ln \frac{t_{12}}{568} = 1.1121 \times 10^{4} \left(\frac{1}{333.15} - \frac{1}{422}\right) = 7.028$ ta= 068. C7.028 = 7.66.9. hrs t+ = 4.75 hr 1: ta= 370 hrs T+=215=1010= 374,8K Time 6-12his tt = 6 hrs ta= 603.71 ta= 245,3 hrs

APPX. 2 EEB 1-1005 SHEKT 5 OF 6 REV. O COMPUTED DATE  $T_{z} = 19.0 = 88^{\circ}C = 361 K$ JIME 12-18 hrs  $\frac{t_{r}}{\mathcal{O}^{2.569}} = \frac{6}{hrs}$ t.== ta = 78. TIME T= 170°F = 77°C-350× to= 6 C - 577 = 29.0 hrs · ~ ` Total Aging due to Locas tan = 3148.4 hrs Lifetime before Mrx LOCA tai 7. 61274 hrs = 3148.4= 6442 = 6-99 yrs ter . ١.





Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Docket:

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(3) Sheet No. <u>EEB 1-1006</u> Revision <u>0</u> Date <u>10-21-80</u> QUALIFICATION OUTSTAND

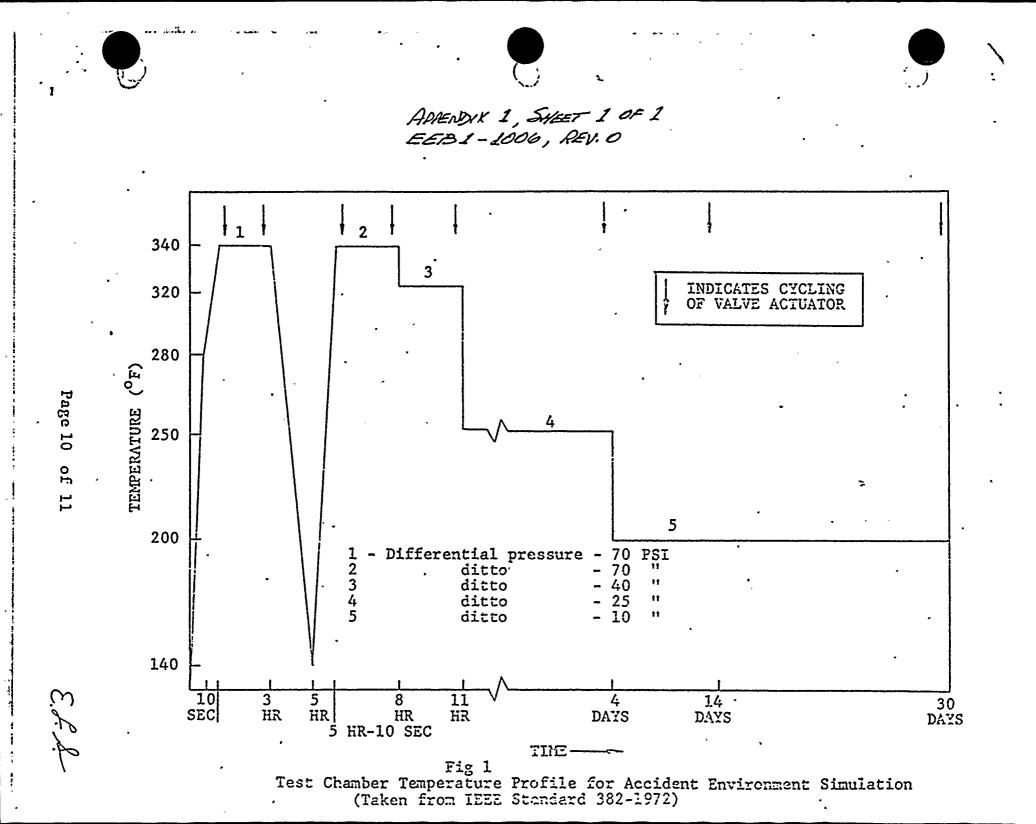
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMEN	ITATION REF	QUALIFICATION METHOD	OUTSTANDI ITEMS	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	ni mob	11643	
System: Main Steam Plant ID No. _ZS-1-27 (Qty 6)	Operating Time	l Day	30 Days	(1)	ACME-Cleveland Devel. Co. Test Report DTD 2-20-78	Sequential Test None.		
Component Limit Switch Manufacturer:	Temperature (°F)	Figure B.7 (1) Figure B.7 (2,3)	Appx. 1 340	- (4)				
Namco Model Number: EA740-50100	Pressure (PSIA)	Table B.1 (1,2,3)	Appx. 1 70	(4)			· · ·	
Function: Scram Trip Accuracy: Req'd: N/A Demon: Category: A	Relative Humidity (%)	100	100	(4)				
	Chemical Spray	N/A	· N/A	(4)	· · ·			
Service: Main Stm Line B Outboard Isln Vlv	Radiation (RAD)	2.03 x 10 <sup>6</sup>	2 × 10 <sup>8</sup>	. (4)		ę .		
Location: 7 .	Aging	N/A	7 Years	(2)	Appx. 2	Analysis		
Flocd Level Elev: 552' Above Flocd Level: Yes x No	Submergence	N/A	N/A .	(4)	Ņ/A .	N/A	N/A	
Notes: (1) See Section 2	.4 in 79-018 re			Prepared by: C. Sean Leli				
. (3) All notes and	.1.2 in 79-015 other informat	tion not on			•	Reviewed by: Z	Ruhar 19 Pu	

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sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-018 report.

· QA Acceptance: W.E. The Mon24.



annolad (\* APPENDIX Z AGING ANALYSIS FOR NAMCO EA740 KEVD COMPUTED 211182 DATE 10-23-50 Establishing Qualified Life at Ease corvice Conditions A. Aging due to heat Aging (reference ACME- CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) .\_\_\_\_ T= T= T= p.of Aging Test = 200°F = - = (200-32)°C=(93.3+273.15)=366.18 tal = Equivalite + Age At social conditions Tal = NORMAL Service Temp = 140°F = \$4 (140-32) &= 60°C = 333.15 -Assume Ea= 0, 95 Bey  $l_{n} = \frac{t_{a_{1}}}{t_{a_{1}}} = \frac{t_{a}}{R} \left( \frac{1}{t_{a_{1}}} - \frac{1}{t_{a}} \right)$ = 10.958 EY XI.602 X10-19---- ln 200. а в а ln 200 = 3,036 ta= 200 C3:056 = 4164 hrs. B. Aying due to Loca Test Time = 0 > 10 pic - negligable effect  $\frac{Time / 0 - 3he}{Te^{2} - 340^{\circ}F = 1.71^{\circ}C = 444.26^{\circ}K}$  $t_{\pm} = -3hc$  $l_{n} \frac{1}{3} = 1,1121\chi/0^{4} \left(\frac{1}{332J5} - \frac{1}{444,26}\right)$ In 19 = 8,349 8:299 = 12675.56 hrs. ta=3



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APPX. 2, EEBI-1006 SHEET Zor 6 NAMCO LIMIT SWITCHES COMPUTED ... Conservative Terrys = 240°F for 2 hrs = 388.7 Time 3-Sha  $T_{+}=240$  $t \in = 2hr$ to = 1,1121 × 104 (-323,15 - 358.7 芝= 4,77 On ta= 2 C = 236 hr SAME AS 19=3 hrs ±+= 3 t== 12675.56 T= 320°F= 160°C= 433,15°C Time = 8-11 hrs t+ = 3 hrs  $\frac{t_e}{3} = 1,1721 \times 10^4 \left(\frac{1}{333,15} - \frac{1}{437,15}\right)$ = 7.7 t. = 3 C7.7 = 6669.2 hrs Time 11hr - 4 days T= 250F= 121°C= 394,26°K ter B5hrs  $lin = 1.1121X10^{4} (323.15 - 394.26) = 5.174$ t= 85 @ 5,174 = 15013 - hr

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APPX. 2, EEB 1-100 6 SHEET 3 or 16 REV 0 COMPUTED DATE CHECKED DATE Adays - 30 days ti= 624hrs T== 200 == 366.48°K 2n tag = 1, 1121×104 (337.15 - 366,48 3.036 3.036 = ta= 624 P 12991 hrs Service Creditions Total As: 19+ tarom : Eta tarene= 4164 + 12675 +236 + 12675 + 6669 +15013 + 12911 tament = 64.423 hrs = 2684 days = 7.35yrs . , .

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HPPX. 2 EEB 1-1006 SHEET \_ 4 or -16 REV O COMPUTED. DATE CHECKED to LOCA in plant. Hainen due -4- 6 minutes T= 325°F= 163°C= 435,9 °K TIME 10 min -167hr = 1.1121×104 (333.15 - 425.9 = 7,87 lm ta = 0,167 e7.87 = 437 hours TIME 6- 34 min in second watching Estimated TE= 3250/== 425,90 64= 28 min= 0,467 tan = 1,1121×104 (322,15-435.9 = 7.87 .467 e<sup>7,87</sup> = 1222,4 hr. tar 34000 = 125hor mercustual estimated at TEB00°F = 148°C= 422k tr= 4 6min= 0,68:4, ln tig = 1,1121×10+ (333,15 - 422 =7,028 ta= 068. C1.028 = 766.9. hrs -IME = 1.25-6hrs t+ = 4.75 hr Ec= = 4,75 0 4.356 . . . ta= 370 hrs Time 6 - 12 hrs TE=215=1010= 374,8K te: Chrs  $t_a = 60^{3.71}$ 245.3 hr անցել ացանել ինչպեստի հաներությալ, բիշ դուսոր՝ պարցելին էր դեռնաստի մինչ։ է թեռնաստին։ Թու էլ

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APPX. 2, EEB 1-1006 HEET 5 or, 6 \_ COMPUTED\_ DATE CHECKED DATE . IIME: 12-18hes TE= 190 = 88°C = 361K t= 6 02.569 ta= 6 02.569 ta = 78. TIME 18-24 TH= 170°F = 77°C= 250K ta: 6 C = 29.0 hrs TotAL Aging due to Loca tas = 3148.4 hrs Lifetime before Loca MAXIMUM - tac . T ter = 64423 - 3148,4= 61274 hrs ties = 6.99 yrs ۰,

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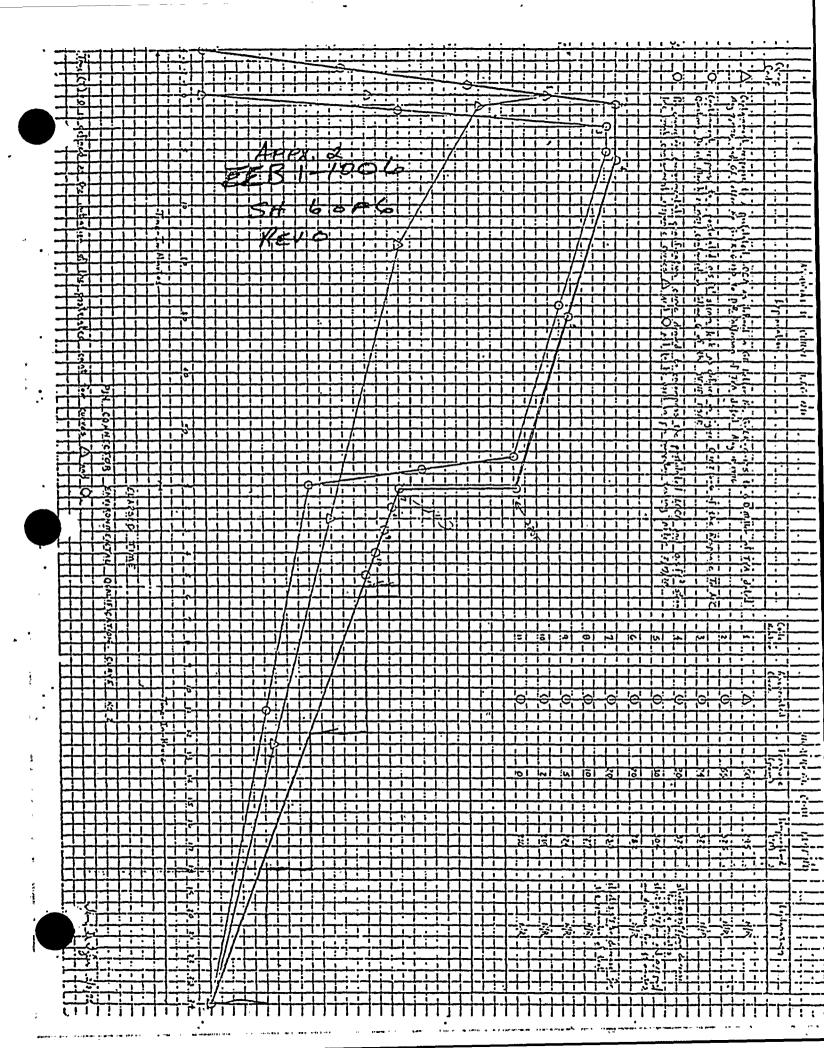
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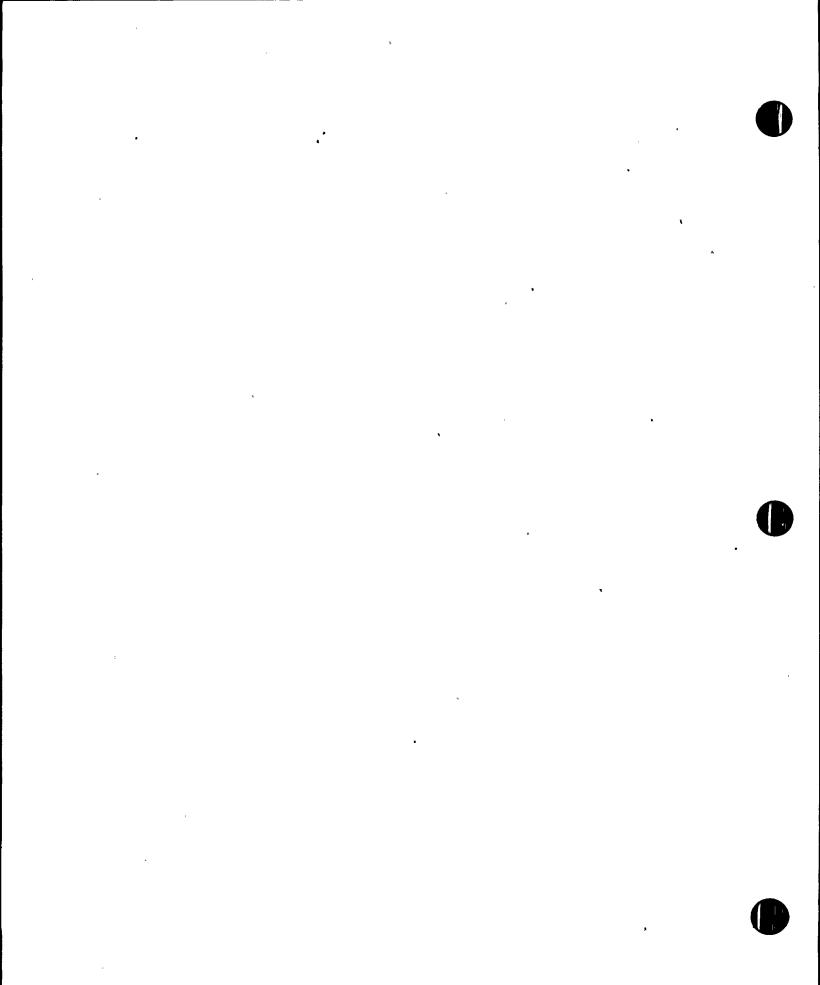
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Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Docket: SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(4)

(3) Sheet No. <u>EEB 1-1007</u>. Revision <u>0</u> Date <u>10-21-80</u>

> OUTSTANDI ITEMS

None

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EQUIPMENT DESCRIPTION	·	ENVIRONMENT	•	DOCUMEN	ITATION REF	QUALIFICATION METHOD	
	Parameter	Specifi- cation	Qualifi∸ cation	Specifi- cation	Qualifi- cation		
System: Main Steam Plant ID No. ZS-1-37 (Qty 6) Component Limit Switch Manufacturer: Namco Model Number: EA740-50100 Function: Scram Trip Accuracy: Req'd:N/A Demon: Category: A Service: Main Stm Line C Inboard Islq Vlv Location: 0	Operating Time	l Day .	30 Days	(1) -	ACME-Cleveland Devel. Co. Test Report DTD 2-20-78	Sequential Test	
	Temperature (°F)	Figure B.0 (1,2,3)	Appx. 1 340	(4)			
	Pressure (PSIA)	Figure B.0 (1,2,3)	Appx. 1 70	(4)		·	
	Relative Humidity (%)	100	100	(4)			
	Chemical Spray	N/A	· N/A	(4)			
	Radiation (RAD)	See 4.1.4 2 x 10 <sup>8</sup>	2 x 10 <sup>8</sup>	(4)	-		
	Aging	<u>N/A</u>	7 Years	(2)	Appx, ?	Analysis	
Flood Level Elev: 552' Above Flood Level: Yes X	Submergence	N/A	N/A		N/A ·	N/A	

Notes: (1) See Section 2.4 in 79-01B report.

No

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

QA Acceptance: W.E. Tuentholzyl

Prepared by:

Reviewed by:

N/A



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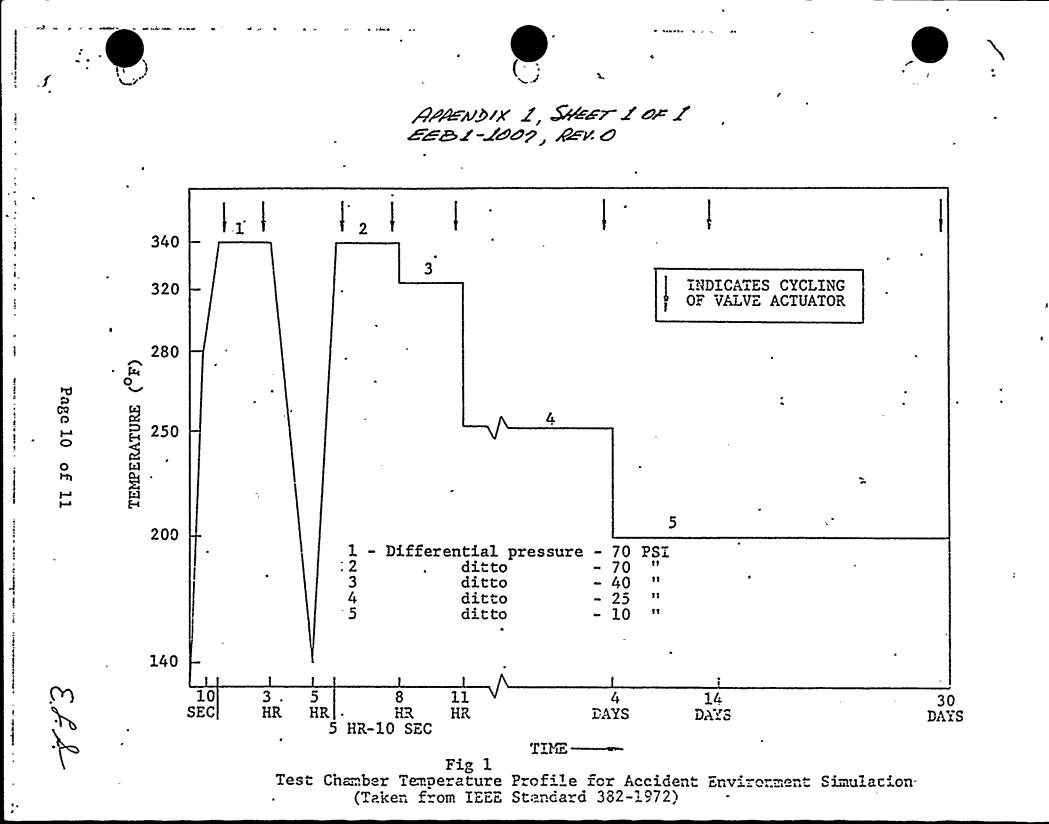
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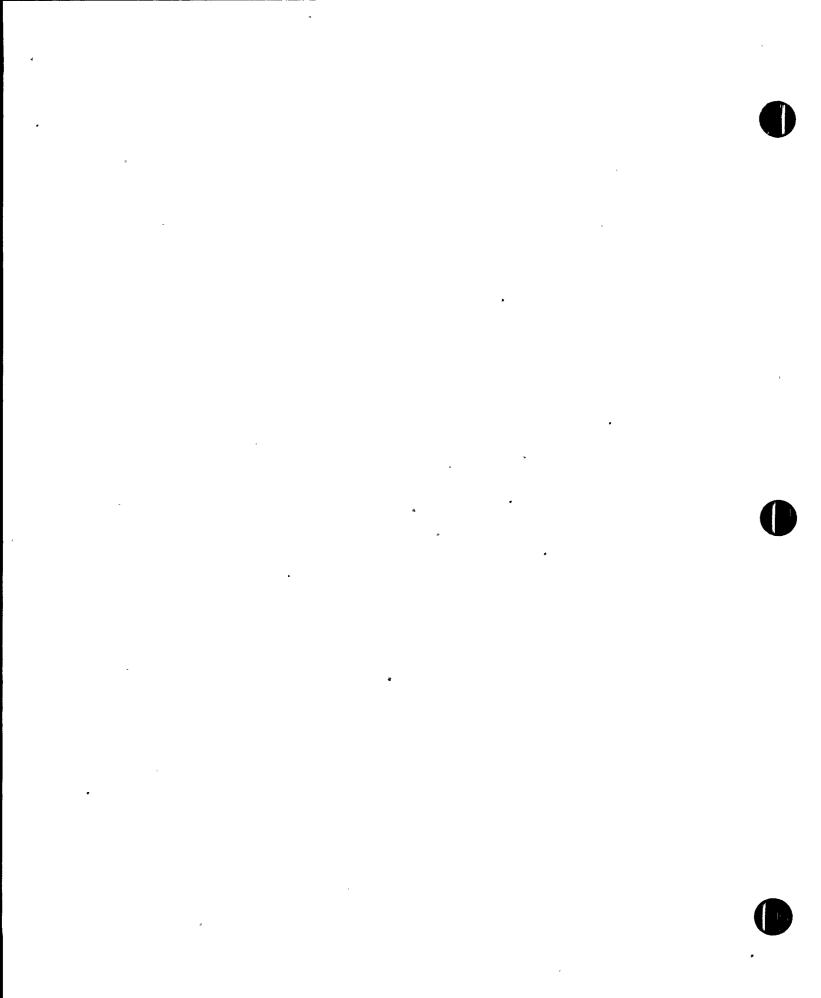
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EEB1-1007 REV. 0. TAA ANA IEN DES 3 771 APPENDIX Z EEGI-100/ 2007.0 AGING ANALYSIS FOR NAMCO EA740 COMPUTED 211182 DATE 10-23-50 (------Establishing Qualified Life at Base service Conditions A. Aging due to heat Aging (refinince ACME- CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78)  $T_{z} = T_{emp:of} Aging T_{est} = 200°F = \frac{5}{9}(200-32)°C = (93.3+273.15) = 366.46$   $t_{z} = T_{ime} of regring T_{est} = 200 hc$   $t_{ai} = equivalized Age at service conditions$   $T_{ai} = Normal Service Temp = 140°F = \frac{1}{4}(140-32)E = 60°C = 333.15$   $tAssume E_{a} = 0.9.5 BeV$  $l_n \frac{t_{a_1}}{t_t} = \frac{E_a}{K} \left( \frac{1}{T_{a_1}} - \frac{1}{T_{t_{a_1}}} \right)$ ta: = 0.938 EV X1.602 X10-19 1 333*.15* 366,98  $ln \frac{1}{200} = 3,036$ ta= 200 03.032 4164 hrs. B. Aging due to Loca Test Time = 0 > 10 sic - negligable effect Time losic - 3hc Ti= 340°F = 171°C = 444.26°K  $t_{\pm} = -3 hr$  $\ln \frac{4}{3} = 1,1121\chi/0^4 \left(\frac{1}{333J5} - \frac{1}{444,26}\right)$ In to = 8,349 ta= 3 e = 12675.56 hrs.



APPX: 2, EEB 1-1007 REV. 0 SHEET 2 or 6 NAMCO LIMIT SWITCHES COMPUTED DATE Time 2-5hr Conservations Temp= 240°F for 2hrs = 385.7  $T_{+}=240$ te= 2hr In = 1.1121×104 (-333.15 - 388.7 In = 4,77 ta= 2 C +177 = 236 hr Time 5-8 hr T+= 340  $t_{+} = 3$ SAME AS 19=3 hrs t~=12675.56 Time = 8-11 hrs T+= 320°F= 160°C= 433.15°C t+ = 3 hrs  $l_{m} = 1, I_{R}^{2} | \chi | 0^{4} \left( \frac{1}{333, 15} - \frac{1}{432, 15} \right)$ In = 7.7 t= 3 07.7 = 6669.2 hrs Time 11hr - 4 days Tt= 250F= 121°C= 394,26°K te= B5hrs 2i = 1.1121×10 (333,15 - 394,26) = 5,174 t= 65 @ 5.174 = 15013 - hr



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APPX. 2, EEB 1-1007 REV. 0 SHEET 3 OF 6 COMPUTED DATE DATE 4days - 30 days to= 624hrs T== 200F= 366,48°K .  $2n \frac{4}{629} = 1, 1121 \times 10^{4} \left( \frac{1}{337.15} - \frac{1}{366.46} \right)$ = 3,036 ta= 624 03.036 = 12991 hrs Total An et Service Cr, ditiras tamme = Eta Taronic= 4164 + 12675 +236 + 12675 + 6669 +15013 + 12971 tamme = 64.423 hrs = 2684days = 7.35yrs ۰. •

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APPX. 2, EEB 1-1007 REVO SHEET 4 OF 6 LOCA in plant. AGINES - 6 minutes T= 325°F= 162°C= 435,9 °K TIME -167hr = 1, 1/21×104 (333,15 - 435,9 = 7,87 ta = 0,167 @ - 437 hours TIME 6-34 min :- servativately estimated TE= \$25° F= 435.9% 64= 28min= 0,467 ln ta = 1,1121×104 (1 15 425.9 - 7.27 ta= ,467 e7187 1222.4 hr. estimated at TE= 300° F = 128°C= 422K 34mm=11254 conservatively tr= 4 lenin= 0.68. )=7.028 the = 1.1121×10+ (333.15 -422 ta= .68. C1.028 = 766.9. hrs . - 1- 2-30F=110C = 38,3,15K -IME = 1.25 - 6 hrs  $t_{+} = 4.75 \, hr$ Ea=4,760 4.356 •••• 370 hrs ta= Time 6 - 12 hrs T+=215=1010= 374,8K t: : Ches  $t_a = 60^{3.71}$ 245,

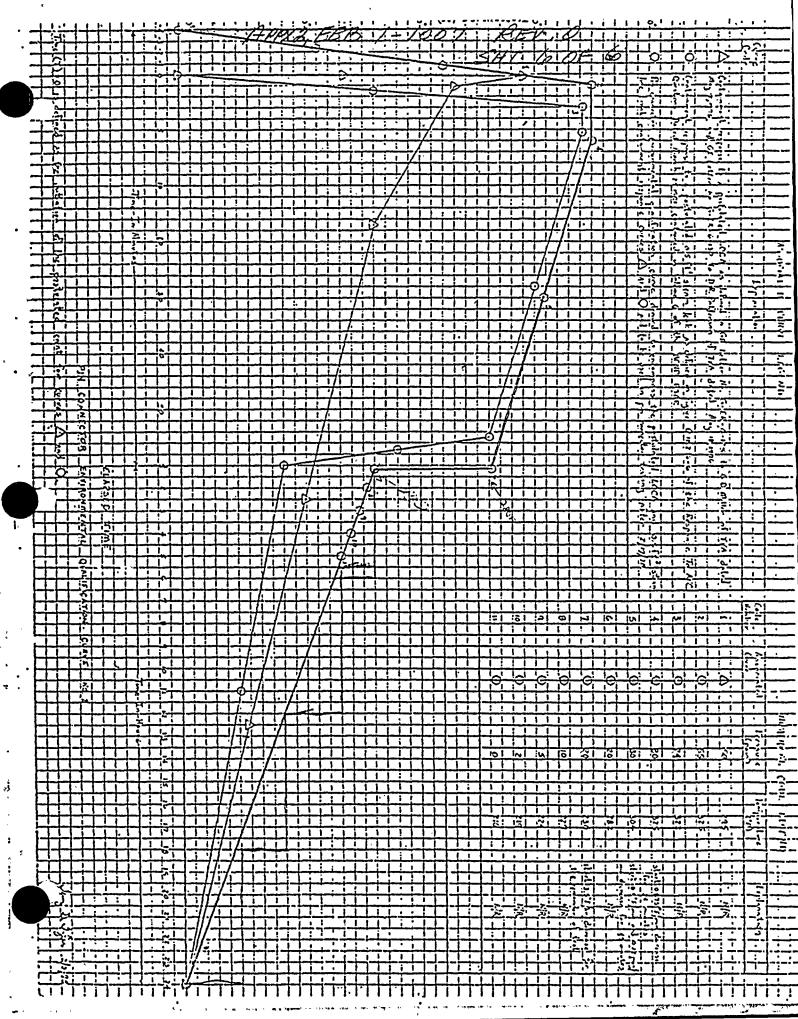
APPX 2, EEB 1-1007 REV. 0 SHEET 5 or 6 . COMPUTED. DATE JIN.E 12-18 hes T== 190 = 88°C = 361K <u>ta= 602:569</u> ta = 78. TIME 18-24 T= 170°F = 77°C= 250K ta: 6 C - 317 = 29.0 hrs Total Aging due to Larra 3148.4. hrs tar = ifetime hotore Leca MAXIMUM tar Ter = 3148.4= 61274 hrs 64423 tips = 6.99 yrs

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

EEB 1-1008

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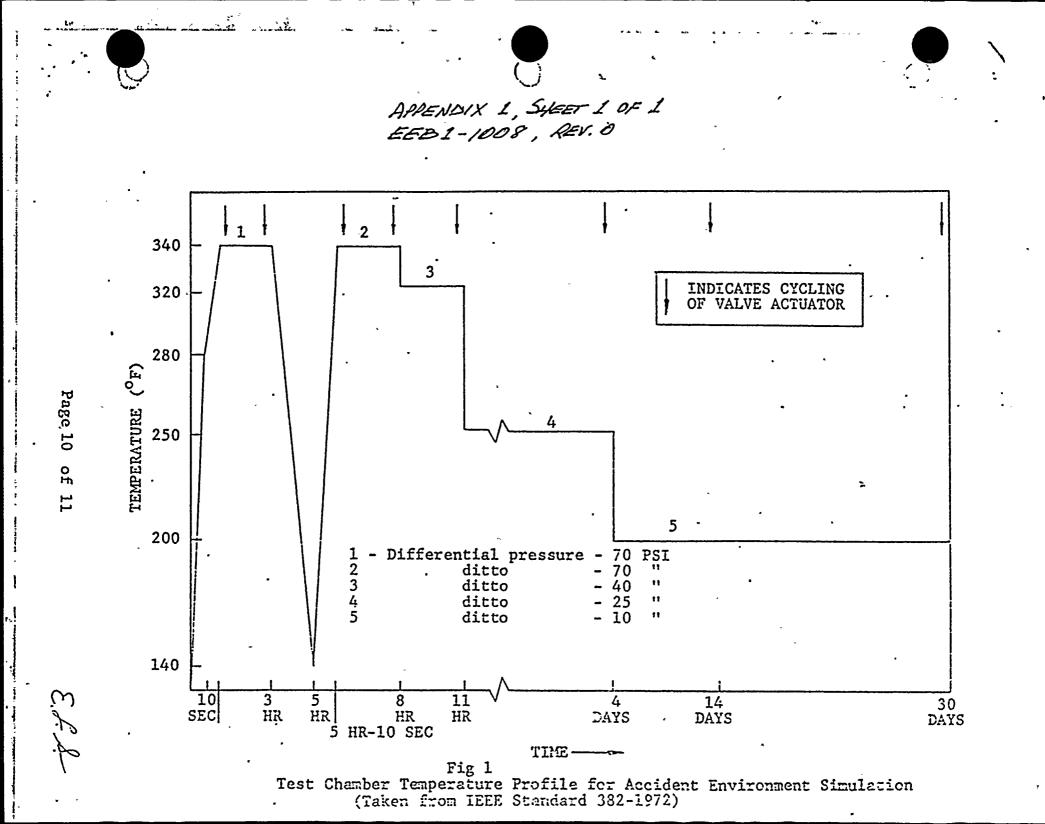
Sheet No.

Facility: Browns Ferry Nuclear Plant Unit: 1.2.3

Revision n Cccket: Date 10-21-80 DOCUMENTATION REF **OUALIFICATION** ENVIRONMENT OUTSTANDI EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation ACME-Cleveland Devel. Co. System: Main Steam Operating Day 30. Days Test Report Sequential Test Plant ID No. Time None. DTD 2-20-78 (1) . ZS-1-38 (Qty 6) Component Figure B.7 Limit Switch Appx. 1 iqure B.7 Temperature Manufacturer: 340 (2,3)(4)  $(^{0}F)$ Namco Table B.1 70 Pressure Model Number: (1,2,3)Appx. 1 (PSIA) (4)EA740-50100 Function: Relative Scram Trip 100 Humidity (%) 100 (4) Accuracy: Reg'd: N/A . Demon: Chemical Spray Category: A N/A (4) N/A Service: Main Stm Line C Outboard Isln Vlv Radiation 2.03 x  $10^{6}$  $|2 \times 10^{8}$ (RAD) (4) Location: 7 Aginc 7 Years (2)Appx. 2 N/A Analysis Flood Level Elev: 552' Above Flood Level: Yes x Submergence N/A N/A N/A N/A N/A (4)No Notes: See Section 2.4 in 79-01B report. Prepared by: (1)"Jean (2) See Section 4.1.2 in 79-01B report. Reviewed by: (3) All notes and other information not on these sheets are on the attached appendix sheets.

(4) See Section 3.0 and/or Appendix B in 79-01B report.

QA Acceptance: W.E.T.Mullic.z



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EEB 1-1008 12EV. U APPENDIX Z SHRET \_\_\_\_\_ OF \_\_\_\_ AGING ANALYSIS FOR NAMCO EA740 COMPUTED DI118 10-23-80 Establishing Ounlified Life At Base service Conditions A. Aging due to hert Aging (reference ACME-CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) tal = liquivalizet Age At sorvice conditions Tal = NORMAL Service Temp = 140°F= \$4 (140-32) &= 60°C = 333,15 tAssume Ea= 0.958ev  $\frac{ta_1}{t_1} = \frac{E_a}{K} \left( \frac{1}{Ta_1} - \frac{1}{T_1} \right)$  $\frac{t_{a_1}}{200} = \frac{0.936 \text{ ev} \times 1.602 \times 10^{-19}}{1.38 \times 10^{-23}} \left( \frac{1}{333.15} \right)$ 366.18 ln === 3,036 ta= 200 C3.036 = 4164 hrs. B. Aging\_due to Loca Test Time = 0 > 10 pic - negligable effect Time 10.00 - 3hc THE 340°F = 171°C = 444.26°K  $t_{t} = -3hr$  $l_{n} = 1.1121\chi/0^{4} (\frac{1}{333.15} - \frac{1}{444.26})$ In the = 8,349 ta= 3 @ 8.349 = 12675.56 hrs.



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APPX. 2, EEB 1-1008 REV 0\_\_\_\_\_\_ SHEET 2 OF 6 NAMCO LIMIT SWITCHES \_\_\_\_\_ COMPUTED\_\_\_\_\_ DATE CHECKED DATE Conservative Temp= 240°F for 2hrs = 388.7 Time 3-Sha  $T_{\pm} = 240$ te= 2hr += 1,1121×104 (-333,15- - 358.7 キュ= 4,77 Cm ta= 2 C +177 = 236 h.r Time 5-8 hr T+ = 340  $t_{\tau} = 3$ SAME AS 10=3 hrs ta= 12675.56 Time = 8-11 hrs T= 320°F= 160°C= 433,15°C t+ = 3 hrs ln = 1,112/1×104 (333,15 - 437,15 In = 7.7 t. = 3 07.7 = 6669.2 hrs Tt= 250F=121°C= 394,26°K Time 11hr - 4 days ter B5hrs lin to = 1.1121×10 (223,15 - 399,26) = 5,174 t= 65 es. 174 = 15013 - hr 1999 - 18 E a series and

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400 . EN UED 3. / APPL. 2, EEB 1-1008 REV. 0 SHEET \_3 OF \_6\_\_\_ 7 COMPUTED. DATE ÷. CHECKED DATE 4drug - 30'drugs ti= 624hrs THE 200 F = 366,48°K  $2n\frac{1}{620} = 1,1121\times10^{4}$ 337.15 - 366.48 3,036 ta= 624 P3.036 = 12991 hrs . Total Ace nt Service Criditions tarrer : Eta taroph = 4164 + 12675 + 236 + 12675 + 6669 +15012 + 12971 tamme = 64.423 hrs = 2684 days = 7.35yrs . . . 4 . . 



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INA 420 IEN UES 3 771 APPX. 2. EEB 1-1008 REV. 0\_ SHEET\_ 4 . 6. CHECKED LOCA in plant. Painer due to · 6 minutes T= 325°F= 163°C= 435,9 °K -4 TIME t= 10 min In 167hr = 1, 1/21×104 (337,15 - 435,9 = 7,87 ta = 0.167 e7.87 = 437 hours 6- 34 min in servativately estimated TE= 3250/== 435,90% TIME 64= 28min= 0,4671 ln 447= 1,1121×104 = 7.87 467 E7.87 = 17.2.2.4 hr ta= 34 mini 1:25 horas seconduely estimated at TE-300° F = 148°C= 4221 TIME ty= 4 lonin= 0,68-4 = 7.028 In the = 1.1121×107 ( 333.15 - 422 ta= .68. 07.028 = 7.66.9. hrs -IME = 1.25 - 6 hrs  $t_{+} = 4.75 hr$ ta=4,760 4.356 370 hrs ta= Time 6 - 12 hrs  $T_{\pm} = 215 = 101C$ 374.85 te: Chrs ta= 603.71 ta= 245,3 hrs

APPX. 2, EEB 1-1008 REV. 0 SHEET 5 OF 6. COMPUTED DATE CHECKED DATE 12-18hes T= 190 = 88°C = 361K JIME • t= 6 02.569 ta = 78. -IME 18-24 THE 170°F = 77°C= 350K ta: 6 C = 29.0 hrs Total Aging due to Laca tal = 3148.4 hrs Maximum Lifetime before Loca tar T 61274 hrs 3148,4= **T**. = 64423 tibe = 6-99 yrs . • . .



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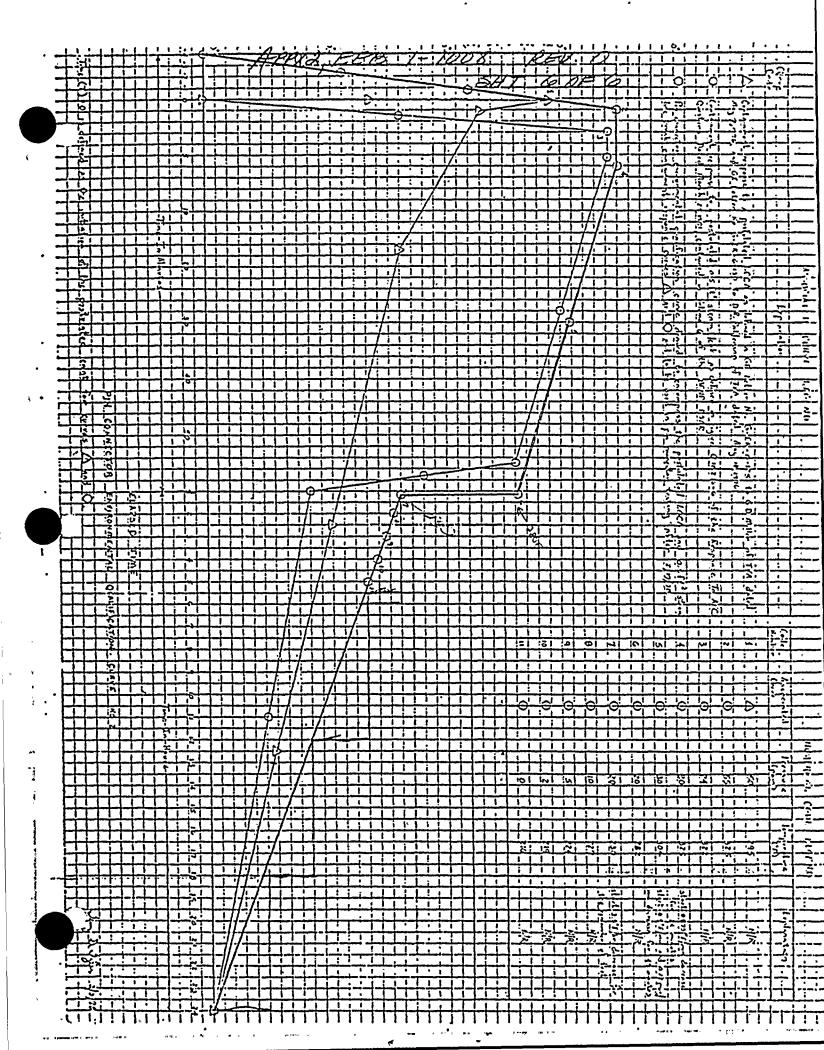
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Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Docket:

EQUIPMENT DESCRIPTION

Namco

Function:

Service:

## SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Specifi-

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DOCUMENTATION REF

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(3) Sheet No. EEB 1-1009. Revision £ Date 10-21-80

OUTSTANDI

None

ITEMS

QUALIFICATION

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METHOD

Parameter cation cation cation cation ACME-Cleveland System: Main Steam Operating Devel. Co. Sequential Test Plant ID No. Time 1 Day 30 Days Test Report ZS-1-51 (Qty 6) Component (1) . DTD 2-20-78 Figure B.O Appx. 1 Limit Switch (1,2,3)340 Temperature Kanufacturer: (<sup>0</sup>F) (4)Figure B.O 70 Pressure' Model Number: (1,2,3)Appx. 1 (PSIA) (4)EA740-50100 Scram Trip Relative 100 100 Humidity (%) (4)Accuracy: Req'd: N/A Demon: Chemical Spray Category: A N/A (4) N/A See 4.1.4 Radiation Main Stm Line D Inboard 2 x 10<sup>8</sup>  $2 \times 10^8$ Isln Vlv (RAD) (4)Location: 0 Acina N/A (2)7. Years ADDX. 2 Analysis Flood Level Elev: 552' N/A Above Flood Level: Yes x Submergence H/A N/A N/A No (4)

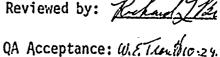
ENVIRONMENT

Specifi-

Notes: (1) See Section 2.4 in 79-01B report.

- (2) See Section 4.1.2 in 79-018 report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.

See Section 3.0 and/or Appendix B in 79-01B report. (4)

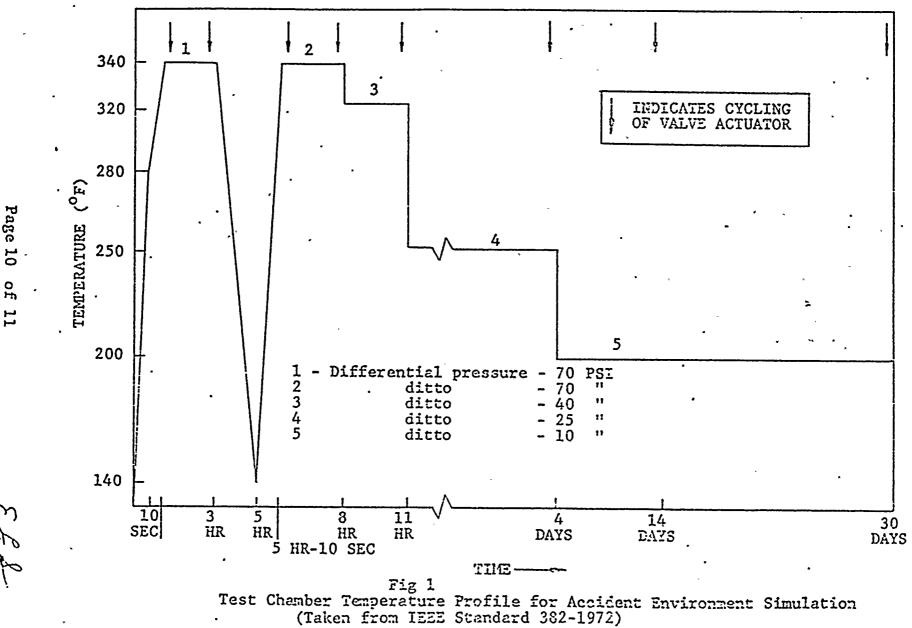


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Prepared by:

APPENDIX 1, SHEET 1 OF 1 EEB1-1009, REV. 0



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EEB 1 - 1009 1/4455 (ENDES 3-77) APPENDIX Z SHEET \_\_\_\_\_ OF \_\_\_\_\_ AGING ANALYSIS FOR NAMCO EA740 KE COMPUTED 5717182 DATE 10-23-80 Establishing Qualified Life at Base service Conditions Aging due to heat Aging Crefinance ACME- CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) Aging\_ T= Temp of Aging Test = 200°F = = = (200-32)°C=(93.3+273.15)=366.48 tou = equivalient Age At secure conditions Tai = NORMAL Service Temp = 140°F= \$4 (140-32) 6= 60°C = 333.15 tAssume Ea= 0.95Bev  $\frac{t_{a_1}}{t_{a_1}} = \frac{t_{a_1}}{K} \left( \frac{1}{T_{a_1}} - \frac{1}{T_{a_1}} \right)$ ta, \_ 0.958 EV XH.602-X10-19 366.48 333.15 ln == 3,036 2.3.022 4164 hrs B. Aging due to Loca Test - negligable effect = 0 - 10 pic Time love - 3hc  $T_{t} = 340^{\circ}F = 171^{\circ}C =$ 444.26°K  $t_{\pm} = \sim 3 hr$  $\frac{4}{3} = 1,1121\chi/0^4 \left(\frac{1}{333.5} - \frac{1}{444.26}\right)$ In the = 8,349 ta= 308,349 12675.56 hrs. =

APPX. 2, EEBI-1009 SHEET 2 or 6 EV D NAMCO LIMIT SWITCHES COMPUTED DATE Conservations Temp= 2.40°F Time 3-Sha for Zhrs = 388.7  $T_{\pm} = 24.0$ te= 2hr キュ= 4,77 On. ta= 2 C. 4.77 = 236 hr Time 5-8 hr T+= 340  $t_{\tau} = 3$ SAME AS 19=3 hrs ta= 12675.56 T+= 320°F= 160°C= 433,15°C Time = 8-11 hrs t+ = 3 hrs  $l_{n} = 1.1 R 1 \times 10^{4} (\frac{1}{333.15} - \frac{1}{432.15})$ ln = 7.7 ta = 3 (27.7 = 6669.2 hrs. Time 11hr - 4 days Tt= 250F= 121°C= 394,26°K te = B5hrs ) = 5,174 2n = 1.1121×104 (323.15 - 394.26 t= 85 @ 5.174 = 15013 - hr

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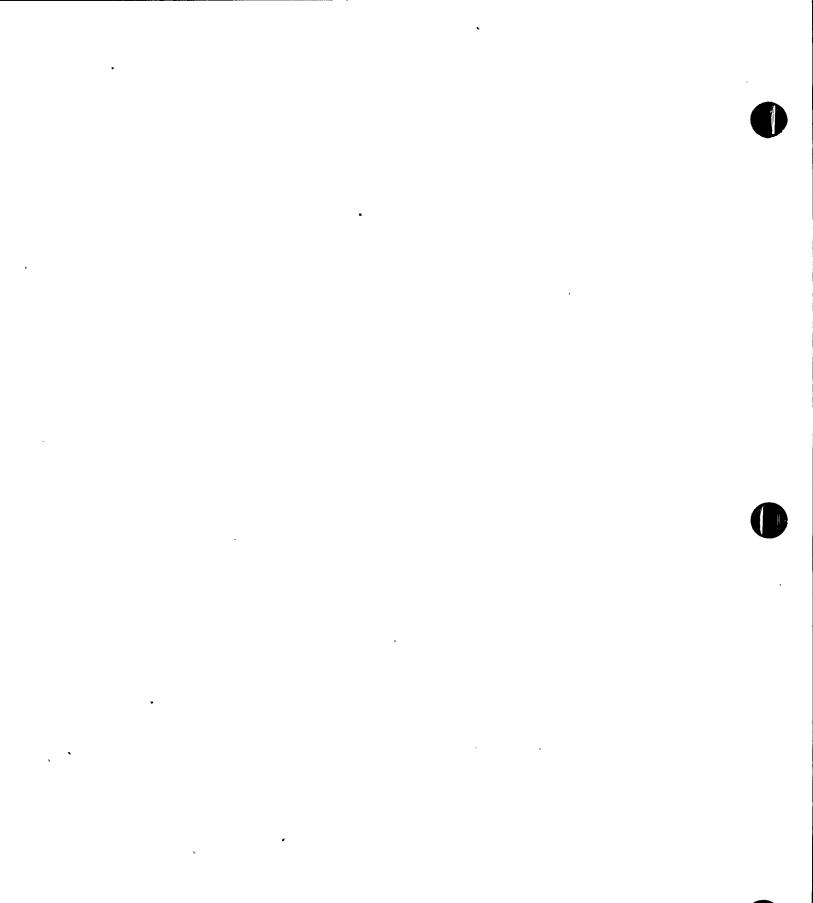
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A PAR CHARDS DATE COMPUTED DATE CHECKED 4drug - 30 days ta= 624hrs T== 200 == 366.48°K 337.15  $\frac{1}{629} = 1,1121X/0^{4}$ 3,036 2. 366,48 ta= 624 e3.036 = 12991 hrs Age 1st Service Criditions. Total taron = Eta tarene= 4164 + 12675 +236 + 12675 + 6669 +15012 + 12971 tamen = 64.423 hrs= 2684 days= 7.35y cs ٠. . 4 . z • .... ć



-------APPX. 2, EES 1-1001 -----Pol COMPUTED DATE CHECKED in plant <u> Hininen</u> LOCA 6 minutes 325°F= 163°C= 435,9 °K TIME  $T_{\pm} =$ t= 10 min  $\frac{1}{267hc} = 1.1121 \times 10^4 (\frac{1}{337.15} - \frac{1}{435.9})$ ln = 7,87 ta = 0.167 C7.87 Ξ 437 hours 6- 34 min IME in servationately restinged TE= 3250/== 425,9% 6+= 28min= 0,4674 ta = 1,1121×104 .9 - 7.87 4.67 27.87 1772 4 £ c. = , 34mm - 11254 Time estimated at T= 300°F = 148°C= 422E ty= 46min= 0.68-4 the = 1.1121×107 333,15 - 422 7.028 ta= .68.07.028 = 7.66.9. hrs TIME = 1.25 - 6 hrs  $t_{+} = 4.75 \, hr$ ta=4,750 4.356 ۰. · . . . . ta<u>=</u> 370 hrs Time 6 - 12hrs  $T_{\pm} = 215 = 1010 =$ 374,85 t: : Chis  $t_a = 6e^{3.71}$ 245



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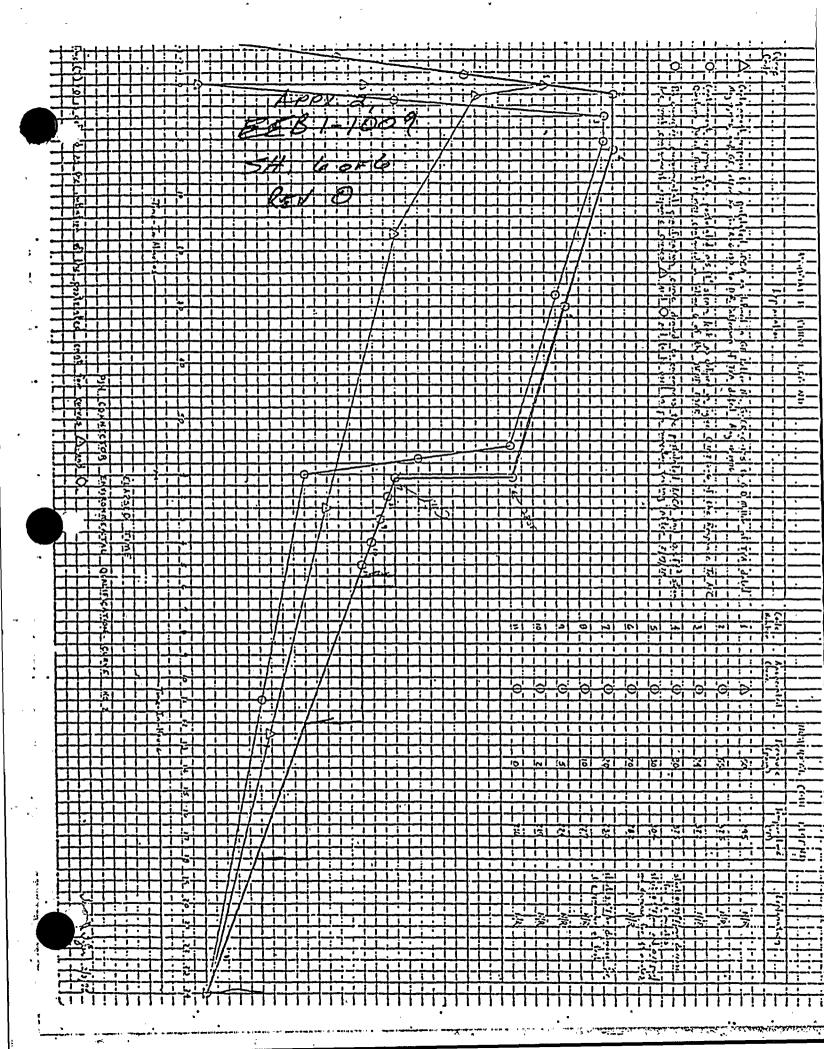
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APPX, 2, EEBI-1004 SHEET 5 or 6. COMPUTED\_\_ DATE CHECKED DATE T= 190 = 88°C = 361K JIME 12-18/25 tr = 6 hrs ta= 60 ta = 78. u <u>T'IME</u> 18-24 T= 170°F = 77°C= 250K ta: 6 C - 317 = 29.0 hrs Total Aging due to loca tar = 314.8.4. hrs . Maximum Lifetime before Loca - tac T. ter = 64423 - 3148.4= 61274 hrs tiph = 6.99 yrs . . .. ٠ ÷





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Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Docket:

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(3) Sheet No. <u>EEB 1-1010</u> Revision <u>0</u> Date <u>10-21-80</u>

EQUIPMENT DESCRIPTION	ENVIRONMENT .			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDI ITEMS	
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation			
System: Main Steam Plant ID No. ZS-1-52 (Qty 6)	Operating Time	l Day	30 Days	(1)	ACME-Cleveland Devel. Co. Test Report DTD 2-20-78	Sequential Test	None	
Component Limit Switch Manufacturer:	Temperature ( <sup>O</sup> F)	Figure B.7 (1) Figure B.7 (2,3)	Appx. 1 340	- (4) <sup>-</sup>				
Namco Model Number: EA740-50100	Pressure (PSIA)	Table B.1 (1,2,3)	Appx. 1 70	(4)		· .		
Function: Scram Trip Accuracy: Req'd: N/A	Relative Humidity (%)	100 ·	100	(4)				
Demon: Category: A	Chemical Spray	N/A	N/A	(4)				
Service: Main Steam Line D Outboard Isln Vlv	Radiation (RAD)	2.03 x 10 <sup>6</sup>	$2 \times 10^{8}$	. (4)	F			
Location: 7 .	Aging	N/A	7 Years	(2)	Appx. 2	Analysis		
Flood Level Elev: 552' Above Flood Level: Yes <sub>x</sub> No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A	
Notes: (1) See Section 2	(1) See Section 2.4 in 79-01B report.				,	Prepared by: (. Dean Lel		
<ul> <li>(2) See Section 4.1.2 in 79-01B report.</li> <li>(3) All notes and other information not on these sheets are on the attached appendix sheets.</li> </ul>						Reviewed by: <u>Reviewed Bu</u>		
(4) See Section 3.0 and/or Appendix B in 79-01B report.						QA Acceptance: W.E.Turito 10:21		



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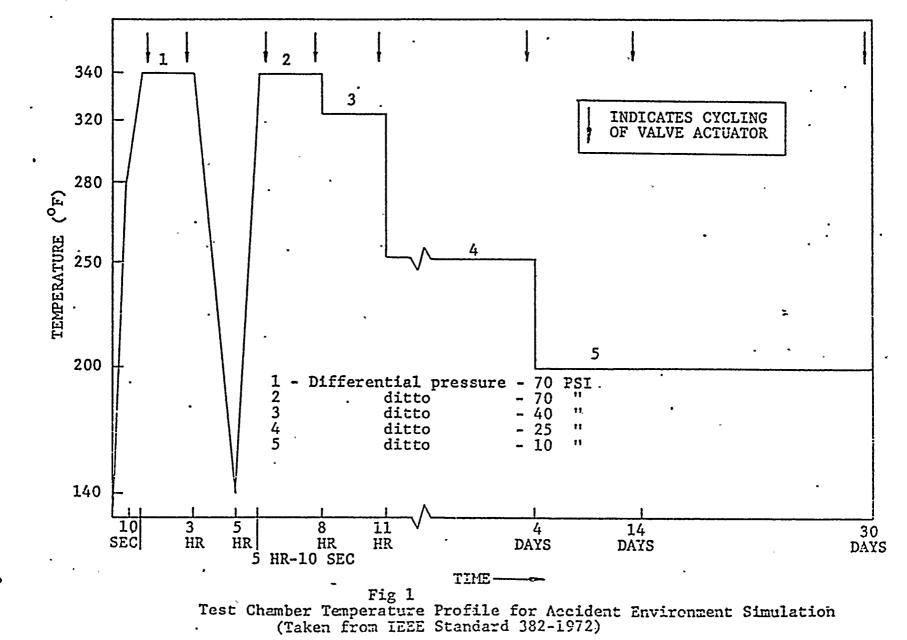
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APPENDIX 1, SHEET 1 OF 1 EEB1-1010, REV. O



Page 10 of 11

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EEGI-1010 REV.0 RANDES 3.774 APPENDIX Z or 6 GING ANALYSIS FOR NAMCO EATAO \_\_\_\_ сонрите 577718 Mr 10-23-50 Establishing Ounlified Life At Ense service Conditions Aging due to heat Aging (reference ACME- CLEVELAND DEVELOPMENT CO TEST REPORT DTD 2-20-78) to= Time of ming Test = 200 hr tai= equivalient age of service conditions Tai= NORMAL Service Temp= 140°F= \$4 (140-32) &= 60°C = 333.15 tAssume Ea= 0.958er  $\frac{ta_1}{t_t} = \frac{Ea}{K} \left( \frac{1}{Ta_1} - \frac{1}{Tt} \right)$ 0.758 EV X1.602 X 10-19 366,48 333.15 ln 200 = 3,036 3.02.0. ta = 200 P 4164 hrs. B. Dging due to LOCA Test = 0 > 10 arc - negligable effect Time lose - 3hc Tt= 340°F = 171°C = 444.26°K  $t_{+} = \sim 3 hr$  $\ln \frac{4}{3} = 1.1121 \times 10^4 \left( \frac{1}{333.5} - \frac{1}{444.26} \right)$ In the = 8,349 ta= 308.349 12675.56 hrs. =

APPX. 2 EEB 1-1010 REV. 0 SHEET 2 or 6 VAMCO LIMIT SWITCHES DATE Conservation Temp= 2400F for 2 hrs = 388.7 Time 2-Shri  $T_{\pm} = 240$ te = 2hr $l_{n} \frac{t_{n}}{2} = \frac{1.1121 \times 10^{4} (-333.15 - 388.7)}{388.7}$ 芝= 4,77 On ta= 2 P. 4.77 = 236 hr Trime 5-8 hr T+ = 3.40  $t_{+} = 3$ SAME AS 19=3 hrs ta=12675.56 Time = 8-11 hrs T+= 320°F= 160°C= 433,15°C t+ = 3 hrs  $l_{m} = \frac{t_{e}}{3} = 1, 1 R 1 \times 10^{4} \left( \frac{1}{333, 15} - \frac{1}{437, 15} \right)$ In = 7.7 +. = 3 (?.7 = 6669.2 hrs T= 250F=121°C= 394,26°K Time 11hr - 4 days tt= B5hrs  $2n \frac{1}{53} = 1.1121 \times 10^{4} \left(\frac{1}{323.15} - \frac{1}{394.26}\right) = 5.174$ t= 85 @ 5.174 = 15013 - hr . rkase un el andarae a un en an

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- APPX. 2 EEB 1-1010 REV. OSHEET 3 or 6 COMPUTED. DATE DATE CHECKED 4days'-30 days the GZAhrs T== 200 == 366,48°K In the = 1, 1121×104 (337.15 3,036 - - 366,48 -. • 3,036 = ta= 624 P 12991 hrie . Total ADD At Service Conditions tamme = Eta taraphe 4164 + 12675 +236 + 12675 +6669 +15013 +12971 tampor = 69.423 hrs = 2684 days = 7.35yrs . . • •

APPX. 2 EEB 1-1010 REV. 0 SHEET 4 or le DATE COMPUTED CHECKED in plant. <u> Hginer</u> LOCA T= 325°F= 163°C= 435,9 °K - 4 - 6 minutes TIME += 10 min = 7,87 ta = 0.167 e7.87 = 437 hours 6- 34 min in scruptiontele, est mater TE= 325°F= 435,9% TIME 64= 28 min= 0,4674 taun= 1,1121×104 (1) 1.25 9 - 7.27 467 e7.87 = 1222.4 hta = . Time 3 Amin - 1'2 share seconducts estimated at TEBOO'F = 148°C= 4221 0.68-4 ty= 4 bmm= In the = 1.1121×104 333,15 - 422 = 7.028 ta= .68. 07.022 = 7766.9. hrs -IME = 1.25 - 6 hrs t+ = 4,75 hr ta=4.750 4.356 · . . 370 hrs ta= Time 6 - 12hrs T+=215=1010= 374,8K te: Chrs  $t_{a} = 60^{3.71}$ 245,3 hrs ta =



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APPX. 2 EEB 1-1010 REN. 0 SHEET 5 or 6 COMPUTED. DATE JIME 12-18 hrs T= 190 = 88°C = 361K <u>ta= 602.569</u> . ta = 78. T= 170°F = 77°C= 350K -IME 18-24 ta= 6 e<sup>1.577</sup> = 29.0 hrs Total Aging due to Laca. tan = 3148.4 hrs Maximum Lifetime before Loca 1 tar --tai 3148,4= 61274 hrs Tra = 64423-= 6.99 yrs tish • .

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