

SUMMARY STATUS REPORT OF
TVA'S COMPLIANCE TO 10CFR50.49

ENVIRONMENTAL QUALIFICATION OF ELECTRIC
EQUIPMENT IMPORTANT TO SAFETY FOR
NUCLEAR POWER PLANTS

SEQUOYAH NUCLEAR PLANT - UNITS 1 AND 2

FEBRUARY 1985

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CONTENTS AND DESCRIPTION

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 - a. 10CFR50.49(b)(1) - TVA's methodology for providing assurance that all Design Basis Events (DBEs) which could result in harsh environments were addressed in identifying safety-related equipment within the scope of 10CFR50.49(b)(1).
 - b. 10CFR50.49(b)(2) - TVA's methodology for identifying nonsafety-related equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions by safety-related equipment.
 - c. 10CFR50.49(b)(3) - TVA's methodology for identifying certain post-accident monitoring (PAM) equipment within the scope of 10CFR50.49(b)(3).
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3. TER Summary Table - A summary table providing EQ information such as component type, manufacturer/model number, qualification status, etc., for each TER item number.
4. TER JCOs - JCOs, identified by referenced TER item number, for all TER item numbers in the TER Summary Table which contain equipment for which EQ documentation is not yet complete.
5. Additional Equipment Table - A table providing EQ information, similar to the TER Summary Table, for each piece of safety-related equipment that was added and not reviewed in the TER since its issuance.
6. Additional Equipment JCOs - JCOs, identified by JCO numbers (e.g., EEB-1, 2, MEB-1, 2, etc.), for all equipment, in the Additional Equipment Table for which EQ document is not yet complete.

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7. Replacement Listing - A list of equipment TVA has recently received QA field verification on or equipment that TVA has had verified by plant personnel as being replaced but since the associated work packages are not complete, full QA documentation is not yet available.
8. Specific TER Deficiency Tables - Tables listing TER Item numbers grouped under specific TER Categories (I.A, II.A, II.B, etc.). These specific TER tables contain similar EQ information as the tables in sections 3 and 5.
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10. 10CFR50.49 Master List - A master list of electrical equipment within the scope of 10CFR50.49 required to be qualified.

COMPONENT ABBREVIATIONS

ARDR - Air Dryers
CTPL - Control Panel
CTSW - Control Switch
CVRG - Current/Voltage Regulator
DPSW - Differential Pressure Switch
DPXR - Differential Pressure Transmitter
DSPL - Distribution Panel
EFIC - Electronic Flow Indicator
ELCA - Electric Cable
ELCS - Electric Cable Splice
ELHR - Electric Heater
ELHVAC - Electrohydraulic Valve Actuator
ELMO - Electric Motor
ELPN - Electric Penetration
EREL - Electric Relay
FLCT - Flow Controller
FLSW - Flow Switch
FLXR - Flow Transmitter
H2RE - Hydrogen Recombiner
HMCT - Humidity Control System ox
HMSR - Humidity Sensor
HMTR - Humidity Transmitter
HNSW - Handswitch
HYAN - Hydrogen Analyzer
IPXR - Current-to-Pressure Transducer
JCBX - Junction Box
LMSW - Limit Switch
LVSW - Level Switch
LVTR - Level Transmitter
MSRT - Motor Starter
MVAC - Motorized Valve Actuator
PRTR - Pressure Transmitter
PSCT - Pressure Controller
PSSW - Pressure Switch
PWSP - Power Supply
RADM - Radiation Monitor
REPL - Relay Panel
SGCV - Signal Converter
SNDV - Solenoid Valve
TCPL - Turbine Control Panel
TPEL - Temperature Element
TPPL Duct Heater Control Box and Panel
TPSW - Temperature Switch
TRBK - Terminal Block
XDCR - Transducer
XFMR - Transformer
XFSW - Transfer Switch

1.0 Introduction

On April 26 1983, the Tennessee Valley Authority (TVA) received the Safety Evaluation Report (SER) regarding the Environmental Qualification of Safety-Related Electrical Equipment at Sequoyah Nuclear Plant Units 1 and 2 (SQN). The SER contained a Technical Evaluation Report (TER), written by Franklin Research Center under contract to the NRC, which noted a number of environmental qualification deficiencies for safety-related electrical equipment at SQN. On May 10, 1984, a meeting was held with members of your staff to discuss TVA's proposed method of resolution for each of those deficiencies and the present status of TVA's Environmental Qualification (EQ) program for SQN including additional equipment added to the program since the issuance of the TER.

The proposed resolution, as discussed with your staff, for each of the environmental qualification deficiencies in the TER and the present status for the EQ program are contained in the tables of this report. These tables contain listings for Justifications for Continued Operation (JCOs) for all equipment for which the documentation of environmental qualification is not yet completed. In addition, they provide test report numbers for qualified devices and manufacturer/model numbers and test report numbers for devices which are being replaced, if known.

There were also discussions at the meeting regarding general methodology for compliance with 10CFR50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants." The purpose of this report is to provide documentation of the information requested by the NRC at the May 10 meeting with regard to TVA's compliance to 10CFR50.49.

It is TVA's position that the environmental qualification documentation maintained in the SQN EQ files, and summarized in this report, complies with the requirements of 10CFR50.49 and provides assurance of continued compliance through the EQ program. The JCOs provided in sections 4 and 6 assure that SQN can continue to operate without undue risk to the public health and safety until documentation of environmental qualification is completed.

2.a Assurance That All Design Basis Events (DBE) Which Could Result In A Harsh Environment Were Addressed In Identifying Safety-Related Equipment Within The Scope of 10CFR50.49(b)(1)

All equipment whose functioning is required to mitigate any design basis event (DBE) for Sequoyah Nuclear Plant which causes a harsh environment for the equipment per 10CFR50.49(b)(1) was initially identified. This equipment was determined by identifying all the systems upon which the safety analyses in the Final Safety Analysis Report (FSAR) are dependent. Further, any other systems or equipment necessary to support these systems were also identified.

From the safety systems identified above, a survey of the safety-related equipment within the harsh environment area of the DBEs was conducted. This survey was conducted using electrical instrument tabulations, mechanical piping drawings, mechanical heating and ventilation drawings, instrumentation and control drawings, electrical equipment drawings, and conduit and grounding drawings to identify the safety-related components. Verification of the equipment qualification has been accomplished by a field survey of the installed components to certify proper correlation between the qualification documents and the "in-situ" equipment.

The scope of 10CFR50.49(b)(1) encompasses safety-related systems and equipment required for all DBEs which result in harsh environments, including high energy line breaks (HELBs), loss of coolant accident (LOCAs), fuel handling accidents, radioactive tank rupture, moderate energy line breaks, and flooding inside and outside containment.

TVA calculations show that for a Waste Gas Decay Tank (WGDT) rupture approximately 50 percent of the gas released will stay in the WGDT rooms and approximately 35 percent of the gas released will either be exhausted (approximately 28 percent) or diffused to other areas of the auxiliary building. The remainder will stay in the general areas of el 692 between columns A1 and A6 and columns Q and U. The calculated dose from normal operation plus that due to WGDT rupture in this general area is below 10^4 R. In general, safety-related equipment at Sequoyah is qualified to at least 10^4 R. Section 4.1.2 of the SQN Electrical Equipment Environmental Qualification Report (EEEQR) provides TVA's generic position and justification concerning qualification for radiation environments below 10^4 R. The dose rate in the WGDT rooms after a WGDT rupture will actually be less than the normal operating dose would have been for the same time period. The gas that diffuses to other areas of the auxiliary building will have a lower concentration than that of the general area of el 692; therefore, the WGDT rupture will have even less of an impact in those areas. The gas that is released to the atmosphere results in an offsite dose that is enveloped by previous offsite dose calculations for a WGDT rupture.

The activity released from a fuel handling accident will be contained in the fuel handling area of the auxiliary building. The volume of this area is such that the activity released will be diluted to a concentration below that used in calculating the post-LOCA airborne dose.

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TVA examined the environmental effects of all pipe breaks (single-ended ruptures or critical crack, as applicable) which have an impact on the atmospheric environmental conditions of areas both inside and outside containment. Moderate energy lines (i.e., fluid condition less than 200° F and less than 275 lb/in²g) were not investigated for their environmental effects since their rupture would only cause a liquid water spray condition, which is considered in plant design. The spray water will be drained away by building drains, stairwells, etc., before it can flood equipment. Spray effects are considered where possible in the design of the equipment. Where equipment cannot be designed to resist spray, shields and barriers are provided as required.

All other design basis accidents (DBAs) listed in Chapter 15 of the SQN FSAR have been evaluated and no new harsh environments or systems and equipment have been identified which are not bounded by and included in the NUREG-0588 HELB and LOCA analysis or that was not previously considered for equipment design and qualification. Therefore, the TVA submittal specifically addresses the environmental effects due to LOCAs/HELBs and flooding inside and outside containment.

2.b 10CFR50.49(b)(2) - Methodology to identify nonsafety-related electrical equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions

Paragraph (b)(2) of 10CFR50.49 requires environmental qualification of "nonsafety-related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions . . . by the safety-related equipment."

TVA has evaluated the system process and electrical interfaces through which such unacceptable interactions could occur.

For system process interactions TVA has performed a systematic evaluation of the environmental effects resulting from high energy pipe breaks, inside and outside containment, upon nonsafety-related systems. This evaluation is documented in the Sequoyah FSAR under "Section 7.3.2.4.3" which resulted from TVA's response to IE Information Notice 79-22 on environmental qualification of control systems. The evaluation discussed the method used to identify potential adverse system process interaction and the required operator action to ensure safe shutdown. All potential adverse system interactions were evaluated by studying the transients caused by inappropriate actuation of the final control elements due to environmental induced failures in the associated control circuits. The evaluation concluded that there is a possibility for adverse system interaction between safety and nonsafety-related systems. However, the consequences were acceptable in all cases for the following reasons:

1. Qualified postaccident monitoring (PAM) instrumentation is available to the operator to provide sufficient indication of an adverse system interaction.
2. Qualified Class 1E equipment is available to mitigate or isolate the effect of the nonsafety-related system failing in the adverse direction.
3. Adequate time is available for the operator to take corrective action.

For electrical interactions, both direct interfaces (i.e., direct electrical connection) and indirect interfaces (i.e., physical proximity) were considered.

For the protection system/control systems interface, TVA reviewed the Westinghouse design requirements for safety-related systems to determine if safety and nonsafety-related systems were properly isolated. In all cases the safety-related systems were isolated from nonsafety-related systems through qualified isolation amplifiers. The isolation amplifiers are classified as part of the protection system and are located in the analog protection racks. The control signals obtained from the protection channels via the isolation amplifiers are never returned to the protection racks. This design feature meets the requirements of Criterion 24 of the 1971 GDC. Where failure of a

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protective system component can cause a process excursion which requires protective action, analysis performed by Westinghouse has indicated that the protection system can withstand another independent failure without loss of protective function. This design feature meets the design requirements of Criterion 25 of the 1971 GDC.

For the remainder of the electrical interfaces, both direct and indirect, TVA has implemented physical and electrical independence features in the Sequoyah design to prevent unacceptable interactions between nonsafety-related and safety-related systems and components. TVA's provisions for physical independence were presented in the Sequoyah Final Safety Analysis Report (FSAR) section 8.3.1.4 and were found to be acceptable by the NRC in section 8.5.6 of the Sequoyah Safety Evaluation Report (SER). As a result of our evaluation of the system process and electrical interfaces TVA has identified no additional equipment requiring qualification under 10CFR50.49 paragraph (b)(2).

2.C 10CFR50.49(b)(3) - Methodology to identify post-accident monitoring
(PAM) equipment with the scope of 10CFR50.49(b)(3)

(To be inserted by NUC PR)

2.d Methodology for preparation of the JCOs and their applicability to 10CFR50.49(i)

TVA has provided a justification for continued operation (JCO) for all equipment within the scope of 10CFR50.49 for which documentation to demonstrate full qualification is not presently available. These JCOs are generally based on a technical evaluation of the capability of the components to perform their safety function under harsh environment conditions resulting from design basis accidents for which they must function or not fail. These technical evaluations are based on partial test data, manufacturer design specifications, common usage, operating experience, accomplishment of safety function prior to DBA exposure, etc. If TVA cannot demonstrate, with reasonable assurance, the capability of the equipment to perform its safety function, then such methods as accomplishing the safety function by alternate equipment or limited use of administrative controls are applied.

Although all parts of 10CFR50.49 paragraph (i) are not used on all JCOs, all are considered to the extent required for each evaluation.

If, as a result of an evaluation, it is determined that the equipment in question will fail as a result of the environment caused by the design basis event for which the equipment is required, then no significant degradation of any safety function or misleading information to the operation will occur for that event.

2.e General Status of TVA's 10CFR50.49 Qualification Effort

(To be inserted by NUC PR)

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2.f TVA's surveillance and maintenance program including handling of information notices, bulletins, etc., regarding equipment qualification

(To be inserted by NUC PR)

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3.0 TER Summary Table

RESOLUTIONS REFERENCED IN TER SUMMARY TABLE

1. Replace

This equipment has been determined to lack sufficient documentation to prove qualification according to 10CFR40.49. TVA has determined that the best course of action is either to replace this equipment with qualified equipment or to relocate the equipment to a mild environment.

2. Mild Environment

Equipment no longer considered to be within the scope of 10CFR50.49. The equipment has been reevaluated and been determined to be in a mild environment for the accident it is required to mitigate.

3. NUREG-0588, Category C

Equipment no longer considered to be within the scope of 10CFR50.49. This equipment will experience environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, and whose failure (in any mode) is deemed not detrimental to plant safety or accident mitigation, and need not be qualified for any accident environment, but will be qualified for its non-accident service environment.

4. Equipment Not in the Scope of 10CFR50.49.

This equipment has been determined not to be within the scope of 10CFR50.49 as a result of the equipment no longer performing a safety-related function, equipment being replaced with nonelectrical devices, equipment being removed from safety circuit, etc. (Note: TVA has chosen to use a separate designation for equipment locked in a mild environment or category C per NUREG-0588. See resolution items 2 and 3.)

5. Confirmation of Similarity

This equipment consists of motorized valve actuators manufactured by Limitorque (Model SMB; Size 000). Based on previous qualification efforts by Limitorque and informal data provided by Limitorque, TVA feels the actuators are qualified and has classified them as such. However, at the present time, official confirmation of the applicability of the Limitorque information has not been received by TVA.

RESOLUTIONS REFERENCED IN TER SUMMARY TABLE (Continued)

6. This equipment has been qualified to the requirements of 10CFR50.49. Documentation of qualification is available, in an auditable form, in TVA's files.
7. This equipment is in TER category I.A, "Equipment Qualified." No resolution is required for this equipment.
8. This equipment is in TER category III.A, "Equipment Exempt from Qualification." No resolution is required for this equipment.
9. This equipment is in TER category III.B, "Equipment Not in the Scope of the Review." No resolution is required for this equipment.

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
1	MVAC	Link-Belt	TN200/TN200	II.A	1	JCO
2	MVAC	Link-Belt	TN200/TN200	II.A	1	JCO
3	MVAC	Chicago Fluid Power	TVA-01-0577	IV	6	
4	MVAC	Chicago Fluid Power	TVA-01-0577	IV	6	
5	ELHVAC	MEA	MEA 119 K2	II.A	4	
6	MVAC	Limitorque	SMB	II.A	6	
7	MVAC	Limitorque	SMB	II.A	6	
8	MVAC	Limitorque	SMB	II.A	1	JCO
9	MVAC	Limitorque	SMB	II.A	6	
10	MVAC	Limitorque	SMB	II.A	6	
11	MVAC	Limitorque	SMB	II.A	6	
12	MVAC	Limitorque	SMB	II.A	6	
13	MVAC	Limitorque	SMB	II.A	6	
14	MVAC	Limitorque	SMB	II.A	6	
15	MVAC	Limitorque	SMB	II.A	5	
16	MVAC	Limitorque	SMB	II.A	6	
17	MVAC	Limitorque	SMB	II.A	5	
18	MVAC	Limitorque	SMB	II.A	1,2,6	JCO

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
19	MVAC	Limitorque	SMB	II.A	6	
20	MVAC	Limitorque	SMB	II.A	2	
21	MVAC	Limitorque	SMB	II.A	2	
22	MVAC	Limitorque	SMB	II.A	3	
23	MVAC	Limitorque	SMB	II.A	1,3	JCO
24	MVAC	Limitorque	SMB	II.A	3	
25	MVAC	Limitorque	SMB	II.A	1	JCO
26	ELMO	Reliance	3Y361108	I.B	6	
27	ELMO	Reliance	X-328203	II.A	6	
28	ELMO	Lincoln	T2557	II.A	6	
29	ELMO	Lincoln	T2523	I.B	6	
30	ELMO	Lincoln	T2518	I.B	6	
31	ELMO	Lincoln	T2518	I.B	1	JCO
32	ELMO	Lincoln	T2518	I.B	6	
33	ELMO	Lincoln	T2556	I.B	6	
34	ELMO	Reliance	3Y32208	I.B	6	
35	ELMO	Westinghouse	76055052	I.B	2	
36	ELMO	Lincoln	T2518	I.B	6	

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
37	ELMO	Lincoln	T2523	I.B	6	
38	ELMO	Lincoln	TDUP	I.B	3	
39	ELMO	Westinghouse	5809P24	I.B	6	
40	ELMO	Westinghouse	TBDP	I.B	6	
41	ELMO	Allie-Chalmers	30R56	I.B	6	
42	ELMO	Lincoln	---	I.B	6	
43	ELMO	General Electric	5K256AN205	I.B	2	
44	ELMO	Siemens-Allis	---	I.B	1	JCO
45	ELMO	Westinghouse	HSW1	II.A	6	
46	ELMO	Westinghouse	0524H4-SDBP-MKB	I.B	6	
47	HNSW	Cutler-Hammer	10250T	I.B	6	
48	HNSW	Cutler-Hammer	10250T	I.B	6	
49	XFSW	Electro Switch	Series 24	III.B	9	
50	DPSW	Barton	288	I.B	3	
51	PSSW	Dwyer	3301	I.B	2	
52	PPSW	Barton	288	I.B	4	
53	FLSW	Barton	288	I.B	2	
54	PSSW	Custom Component	604G	I.B	1,2	JCO

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
55	PSSW	Dwyer	1627	II.A	2	
56	FLSW	Dwyer	1627	I.B	2	
57	FLSW	Dwyer	1627	I.B	2	
58	PSSW	Barton	288A	I.B	1	JCO
59	PSSW	Dwyer	1627	I.B	1,3,2	JCO
60	PSSW	Custom Component	604G	I.B	1,3	JCO
61	DPXR	Bailey	555	I.B	1	JCO
62	DPXR	Foxboro	E13DL	I.B	1	JCO
63	DPXR	Bailey	555	I.B	3	
64	DPXR	Bailey	555	I.B	1	JCO
65	DPXR	Barton	764 Lot 2	IV	6	
66	PSCT	Johnson Controls	PL-4000-2	I.B	2	
67	SGCV	Transmation	SW123-1T	I.B	2	
68	ARDR	Pall Trinity	101HA1-64D9810-331	I.B	2	
69	DSPL	Power Electric	CCB	IV	4	
70	TCPL	Terry	GS-2	I.B	2	
71	CTPL	Ingersol-Rand	7X4 EV-1P-NL-2	I.B	2	
72	ELHR	E. L. Wrigan	04265379001	I.B	3	

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>
73	XDCE	ITT Hammel Dahl	T25	I.B	2
74	IPXP	Masoneilan	8005	I.B	6
75	IPXP	Robertshaw	445-C3	I.B	4
76	REPL	International Switchboard	---	III.A	8
77	ELCS	Raychem	WCSF (N)	II.C	6
78	ELCA	America Insulation	---	II.A	6
79	ELCA	Rockbestoes	---	II.A	6
80	ELCA	Anaconda/Continental	---	II.A	6
81	ELCA	Anaconda/Continental	---	II.A	6
82	ELCA	Rockbestos	---	II.A	6
83	ELCA	ITT Surpernant	---	II.A	6
84	ELCA	Brand Rex	---	II.A	6
85	ELCA	ITT Surpernant	Triaxial	III.B	9
86	ELCA	General Electric	Vulkene	I.A	7
87	ELCA	---	---	I.A	7
88	ELCA	---	---	I.A	7
89	ELCA	Okonite	---	II.A	6

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
90	ELCA	---	---	II.A	6	
91	ELCA	---	---	II.A	6	
92	ELCA	---	---	II.A	6	
93	ELPN	Westinghouse	WX-32198 thru WX-32212	II.A	6	
94	ELCA	---	---	II.A	6	
95	ELCA	---	---	III.A	8	
96	JCBX	TVA	---	III.A	8	
97	TREK	---	---	II.A	6	
98	XFMR	Westinghouse	Liquid Filled	I.B	2	
99	SNDV	AVCO	C5439	II.A	1	JCO
100	SNDV	AVCO	C5439	II.A	1	JCO
101	SNDV	ASCO	8320A19	I.B	2	
102	SNDV	ASCO	HT8300	I.B	1	JCO
103	SNDV	ASCO	HT8302B25RF	I.B	2,3,6	
104	SNDV	ASCO	HT8300	I.B	6	
105	SNDV	ASCO	HV202-300-1RV	I.B	1	JCO
106	SNDV	ASCO	HV-200-924-2F	I.B	1	JCO

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
107	SNDV	ASCO	HTX 8320 A22V	I.B	1	JCO
108	SNDV	ASCO	HT8300	I.B	1	JCO
109	SNDV	ASCO	WPX-HV-202-301-1F	I.B	1	JCO
110	SNDV	ASCO	HB8300	I.B	1	JCO
111	SNDV	ASCO	HB8300	I.B	1	JCO
112	SNDV	ASCO	HV-200-921-1RF	I.B	1	JCO
113	SNDV	ASCO	8300 and 8302	I.B	1,2	JCO
114	SNDV	ASCO	832654	I.B	3,5,6	
115	SNDV	ASCO	831654	I.B	2,6	
116	SNDV	ASCO	LB8300B64RU	I.B	3	
117	SNDV	ASCO	HT831654	I.B	4	
118	SNDV	ASCO	LB831654	I.B	6	
119	SNDV	ASCO	LB831654	I.B	6	
120	SNDV	ASCO	HB8300C58RU	I.B	6	
121	SNDV	ASCO	HT8300 Series WPXH2023011	I.B	1	JCO
122	SNDV	ASCO	8320	I.B	6	
123	SNDV	ASCO	8300	I.B	1	JCO

TER SUMMARY TABLE

<u>TER</u> <u>Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER</u> <u>Category</u>	<u>Resolution</u>	
124	SNDV	ASCO	206-381-3RF	I.A	7	
125	SNDV	ASCO	206-381-3RF	I.A	7	
126	SNDV	ASCO	NP831654E	I.A	7	
127	SNDV	ASCO	206-381-3RF	I.A	7	
128	SNDV	ASCO	206-381-3RF	I.A	7	
129	SNDV	ASCO	HV-206-380-1RVU	II.C	6	
130	SNDV	ASCO	206-280 and 206-381	II.C	6	
131	SNDV	ASCO	206-381	II.C	6	
132	SNDV	ASCO	206-281-3RF	II.C	6	
133	SNDV	ASCO	206-381	I.A	7	
134	SNDV	Target Rock	775001	I.A	7	
135 (Unit 1)	LMSW	NAMCO	EA170	II.A	1	JCO
135 (Unit 2)	LMSW	NAMCO	EA 180	II.A	6	
136	LMSW	NAMCO	EA-170-302	I.A	4	
137	LMSW	NAMCO	EA180	II.A	6	
138	LMSW	NAMCO	EA180	II.A	6	
139	LMSW	NAMCO	EA180	II.A	4	
140	LMSW	NAMCO	APDAR 7905	II.A	1	JCO

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TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
141	LMSW	NAMCO	EA700	I.B	1	JCO
142	LMSW	NAMCO	EA700	II.A	3,6	
143	LMSW	NAMCO	EA700	I.B	1,3	JCO
144	LMSW	NAMCO	EA170	II.C	3,6	
145	LMSW	NAMCO	EA170	I.B	1,3,4	JCO
146	LMSW	NAMCO	EA740	II.A	6	
147	LMSW	NAMCO	EA740	II.A	6	
148	RADM	General Atomic	---	I.B	2	
149	PRTR	Bailey	556	I.B	4	
150	LVSW	Mercoid	2036810C1160	I.B	3	
151	TPSW	Penn	A19BAC	I.B	1,3	JCO
152	TPSW	Honeywell	T675A1540	I.B	2	
153	TPSW	Fenwal	27120-50	I.B	1	JCO
154	TPSW	Fenwal	18003-7	I.B	2,3	
155	TPSW	Fenwal	17323-0	I.B	2	
156	TPSW	Honeywell	T675A1540	I.B	3	
157	TPEL	Rosemount	176KS	I.B	6	
158	HYAN	Comsip	K-111M	I.B	6	

DE03;TERRPT

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>
159	PRTR	Foxboro	E11GM	I.B	4,6
160	LVTR	Foxboro	E-13DM (MCA)	IV	6
161	TPEL	Rosemount	176 KF	II.A	6
162	SNDR	Valcor	V70900-301	I.A	7
163	PWSP	Westinghouse	---	III.B	9
164	PRTR	Foxboro	E11GM (MCA)	II.A	6
165	PRTR	Foxboro	E11GM (MCA)	II.A	6
166	PSCT	Johnson Controls	PC-4000-2	I.B	2
167	LVTR	Barton	764 Lot 2	II.A	6
168	LVTR	Barton	763 Lot 2	II.A	6
169 (U1)	LVTR	Barton	764 Lot 2	II.A	6
169 (U2)	LVTR	Barton	764 Lot 2	II.A	6
170 (U1)	LVTR	Barton	764 Lot 1	I.B	6
170 (U2)	CTSW	Culter-Hammer	10250T	I.B	6
171 (U1)	LVTR	Barton	764 Lot 1	I.B	6
171 (U2)	CTSW	Culter-Hammer	10250T	I.B	6
172 (U1)	PRTR	Barton	763 Lot 1	I.B	6
172 (U2)	FLSW	Dwyer	1627	I.B	3,2

TER SUMMARY TABLE

<u>TER Item No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model</u>	<u>TER Category</u>	<u>Resolution</u>	
173 (U1)	SNDV	ASCO	206-381	I.A	7	
173 (U2)	TPSW	Honeywell	T675A 1540	I.B	2	
174 (U1)	LMSW	NAMCO	EA170	I.B	4,6	
174 (U2)	TPSW	Fenwal	18003-7	I.B	2	
175 (U1)	LMSW	NAMCO	EA-080	I.B	1	JCO
175 (U2)	ELCA	Eaton Corporation	----	II.A	6	
176 (U1)	LVTR	Barton	764 Lot 1	I.B	6	
176 (U2)	ELCA	Samual Moore	---	II.A	6	
177 (U2)	ELCA	Samual Moore	---	II.A	6	
178 (U2)	ELCA	Anaconda	---	II.A	6	
179 (U2)	LMSW	NAMCO	EA-170	II.A	6	
180 (U2)	LMSW	NAMCO	EA-170	I.B	4,6	
181 (U2)	LMSW	NAMCO	EA700	I.B	1	JCO
182 (U2)	LMSW	NAMCO	EA700	I.B	3	
183 (U2)	SNDV	ASCO	206-381	I.A	7	

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY II.C
(EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT
QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
77	Raychem Model WCSF (N)	Aging	Qualified, Wyle Test Report 58442-1
129	ASCO Model HV-206-380	Aging	Qualified; ASCO 2RVU Report AQS-21678/TR-Supp. 3
130	ASCO Models 206-380	Aging	Qualified; ASCO 206-381 Report AQS-21678/TR-Supp. 3
131	ASCO Model 206-381	Aging	Qualified; ASCO Report AQS-21678/TR-Supp. 3
132	ASCO Model 206-381-3RF	Aging	Qualified; ASCO Report AQS-21678/TR-Supp. 3
144	NAMCO Model EA170	Aging	FCV-65-8, 47A, 47B - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588) FCV-65-28A, 28B, 51 (Qualified with NAMCO Model EA-100; Qualified by Report No. QTR-150); LS on FCO-65-10, 30, 52, 53 (Components replaced by FSV-65-10, 30, 52, 53; See TER item 142)

4.0 TER Justifications for Continued Operation (JCO)

IER ITEM NO. - 1

Manufacturer/Model No. - Link-Belt/TN 200/TN 2000

<u>TVA ID No.</u>	<u>Status</u>
1-FCV-67-81	Not in the scope of 10CFR50.49
2-FCV-67-81	Not in the scope of 10CFR50.49
1-FCV-67-82	Not in the scope of 10CFR50.49
2-FCV-67-82	Not in the scope of 10CFR50.49
1-FCV-67-83	Not in the scope of 10CFR50.49
2-FCV-67-83	To be replaced - See note 1
1-FCV-67-88	Replaced with a qualified actuator
2-FCV-67-88	To be replaced - See note 1
1-FCV-67-91	Replaced with a qualified actuator
2-FCV-67-91	To be replaced - See note 1
1-FCV-67-96	Replaced with a qualified actuator
2-FCV-67-96	To be replaced - See note 1
1-FCV-67-99	Replaced with a qualified actuator
2-FCV-67-99	To be replaced - See note 1
1-FCV-67-104	Replaced with qualified actuator
2-FCV-67-104	To be replaced - See note 1
1-FCV-67-107	Replaced with a qualified actuator
2-FCV-67-107	To be replaced - See note 1
1-FCV-67-112	Replaced with a qualified actuator
2-FCV-67-112	To be replaced - See note 1
1-FCV-67-123	Replaced with a qualified actuator
2-FCV-67-123	To be replaced - See note 1
1-FCV-67-124	Replaced with a qualified actuator
2-FCV-67-124	To be replaced - See note 1
1-FCV-67-125	Replaced with a qualified actuator
2-FCV-67-125	To be replaced - See note 1
1-FCV-67-126	Replaced with a qualified actuator
2-FCV-67-126	To be replaced - See note 1
1-FCV-67-127	Replaced with a qualified actuator
2-FCV-67-127	Not in the scope of 10CFR50.49
1-FCV-67-128	Not in the scope of 10CFR50.49
2-FCV-67-128	Not in the scope of 10CFR50.49
2-FCV-67-146	Not in the scope of 10FRR50.49
2-FCV-67-147	To be replaced - See note 1
0-FCV-67-151	Not in the scope of 10CFR50.49
0-FCV-67-152	Not in the scope of 10FRR50.49
	Replaced with a qualified actuator

Note 1 - The equipment has been procured and is onsite awaiting a unit outage to allow installation.

Qualification for Continued Operation - Unit 1

Since this equipment will not experience chemical spray, it is our opinion that this will only increase the life of the actuators.

We feel the manufacturer has adequately addressed the issue of arcing across the motor leads in his test report and that field installation does not fall under the scope of equipment testing for class 1E service. In addition, while environmental temperatures may not have returned to normal in 600 seconds, most environments have gone through any abnormal peaks. Therefore, this should not be a factor. The valve motor operators are qualified by test of a model TN-200 motor operator in Franklin Institute Research Laboratories Report No. F-C2883.

The test sequence was as follows:

1. Radiation 1×10^8 RADS
2. Seismic
3. 6-Day steam and simultaneous 5-hour chemical spray exposure starting at 90 psig/330³F and reduced gradually to 5 psig/225⁰F.

This test does not qualify these actuators for a 100-day accident but the test conditions do envelope the required operating time for these actuators. Based on the above, these actuators are qualified for continued operation until replacement.

Unit 2 - See attached EQS No. MEB-67-005-II

Prepared by: D.F. COX/ 6-20-84

Reviewed by: J.W. HODGES/ 6-20-84

DE02;LEON.25

REVISION	R1	R2	
PREPARED BY	TRW 10-16-84	RAC 8-5-85	
REVIEWED BY	CLM 10-16-84	THH 11-15-85	

Revision					
Preparer/Date	R.J. POOLE	25-2-85			
Reviewer/Date	I.L. BELTZ	1-4-85			

Unit No. 1
 EOS No. MEB-67-005-1
 TVA ID No. See Appendix 1

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Link-Belt TN 200 & TN 2000 (See Appendix 1)
 Verification of Table Information (Table See Appendix 1)

- X Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- X Location - The location has been identified (such as, inside primary containment, annulus, individually cooled rooms, general spaces, or area affected by HELB outside primary containment).
- X Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- X Function - A functional description of the component has been given (such as, steam generator blowdown).
- X Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- X Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables c by references to figures from tables.
- X Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- X Category - A category of a, b, c, or d has been defined for the equipment.
- X Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry):
- X Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- X Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- NA Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EOS considering all the above factors and referenced to the appropriate tables.
- X Qualification of Several Exact Components (If applicable) - When an EQS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- NA Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
- Term of Interim Qualification
- NCR No.
- X Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EOS: NCR number, reason for non-qualification, and justification of continued operation.
 NCR No. SONMEB8201R8

<u>TVA ID No.</u>	<u>Model No.</u>	<u>Table/Sheet No.</u>
1-FCV 67-123	TN 2000	3.11-6/6 & 3.11-8/22
1-FCV 67-125	TN 2000	3.11-6/6 & 3.11-8/22
1-FCV 67-146	TN 200	3.11-6/6 & 3.11-8/22
1-FCV 67-152	TN 200	3.11-6/6 & 3.11-8/22
1-FCV 67-126	TN 2000	3.11-7/3 & 3.11-8/29
1-FCV 67-124	TN 2000	3.11-7/3 & 3.11-8/29
1-FCV 67-93	TN 2000	3.11-5/3
1-FCV 67-88	TN 2000	3.11-5/3
1-FCV 67-91	TN 2000	3.11-5/3
1-FCV 67-96	TN 2000	3.11-5/3
1-FCV 67-99	TN 2000	3.11-5/3
1-FCV 67-104	TN 2000	3.11-5/3
1-FCV 67-107	TN 2000	3.11-5/3
1-FCV 67-112	TN 2000	3.11-5/3

Prepared by: D. J. Cox 2.15.85

Reviewed by: J. A. Hagan 2/15/85

- a. The valve motor operators are qualified by test of model TN-200. The model TN-2000 is qualified by equivalence to the TN-200 operator. The test is described in the Franklin Institute Research Laboratories Report No. F-02883.
- b. The testing sequence was as follows:
1. Radiation 1 by 10^6 rad
 2. Seis.
 3. 1 day steam and simultaneous 5 hour chemical spray exposure starting at 90 psig/330°F and reduced gradually to 5 psig/225°F.
- c. The test subjected the actuator to the temperature pressure profile illustrated in attachment 1.
- d. The test conditions correspond to those for saturated steam or 100 percent relative humidity.
- e. The above test conforms to the requirements set forth in IEEE-323-1971 and NUREG-0588, section 2.2, all applicable paragraphs for the application.
- f. The operating conditions to which these operators will be subjected are within tested parameters.
- g. Operating time - The subject test report does not specifically address this, however, the test parameters (see above) are significantly more severe than our worst case environment (150°F, ATM Press, 100 percent RA and 5 by 10^7 rads), therefore, it's our engineering judgment the test is sufficient to meet the required operating time.

Prepared by: R. J. Paul

Reviewed by: J. L. Bell

RJP8

TOL 11-6
(Sh. 5A)

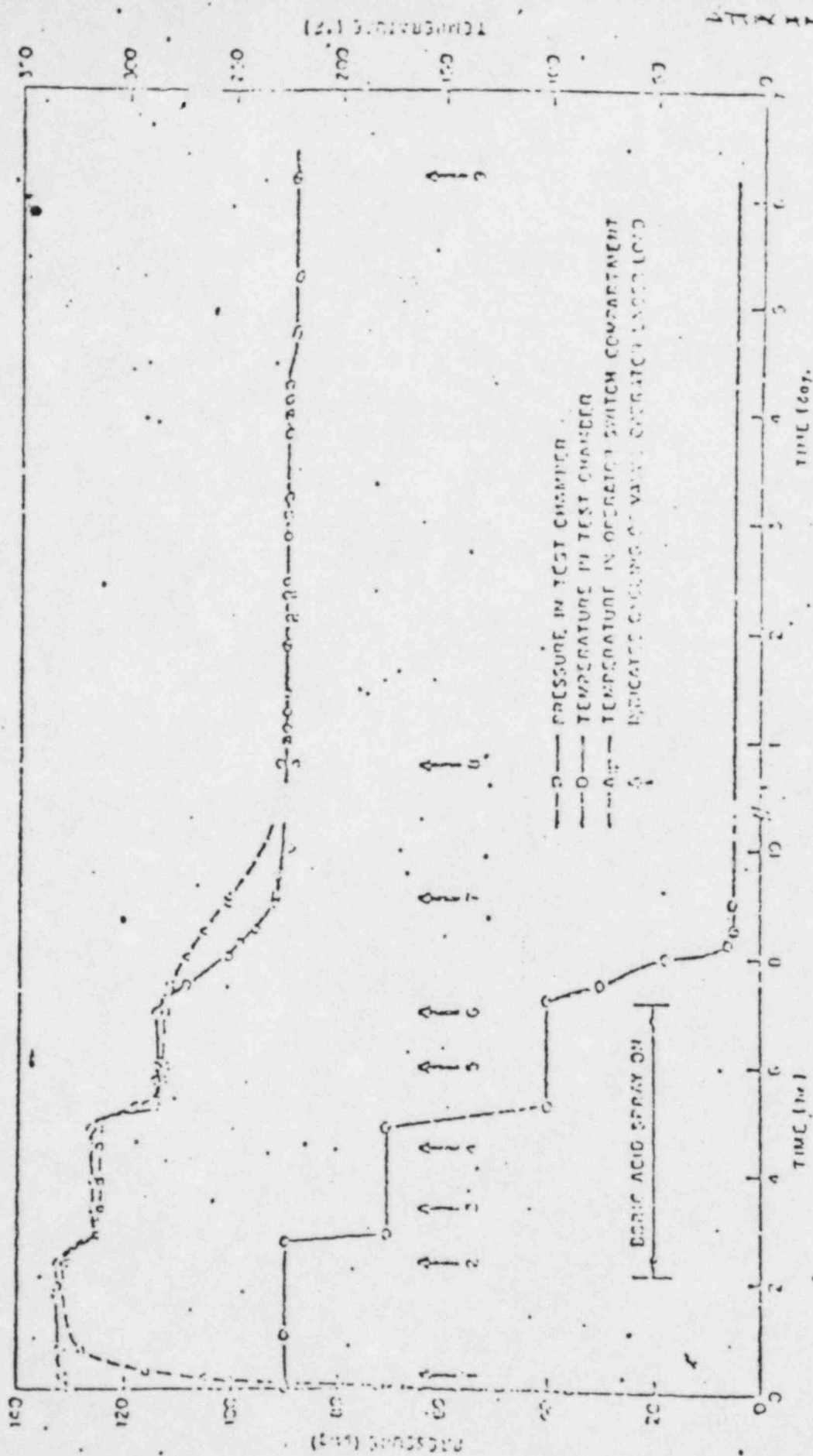


Figure 6. Test Program of Steam/Chemical-Spray Exposure

Revision					
Preparer/Date	R.J. POOLE				
Reviewer/Date	I.L. BELTZ				

Unit No. 2
 EOS No. MEB-67-005-1
 TVA ID No.
 See Appendix 1

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Limitorque: SMB-000
 Verification of Table Information (Table See Appendix 1)

- x Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- x Location - The location has been identified (such as, inside primary containment, annulus, individually cooled rooms, general spaces, or area affected by HELB outside primary containment).
- x Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- x Function - A functional description of the component has been given (such as, steam generator blowdown).
- x Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- x Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables c by references to figures from tables.
- x Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- x Category - A category of a, b, c, or d has been defined for the equipment.
- x Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry): 40 years
- x Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- x Environmental Analysis - An environmental analysis has been done, attached to the EOS, and independently reviewed by the responsible organization.
- x Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EOS considering all the above factors and referenced to the appropriate tables.
- x Qualification of Several Exact Components (If applicable) - When an EOS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- NA Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
 Term of Interim Qualification _____
 NCR No. _____
- NA Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EOS: NCR number, reason for non-qualification, and justification of continued operation.
 NCR No. _____

<u>TVA ID No.</u>	<u>Table</u>	<u>Location</u>
2-FCV 67-81	Not in the scope of 10 CFR50.49	
2-FCV 67-82	Not in the scope of 10 CFR50.49	
2-FCV 67-83	3.11-5/3	Ann
2-FCV 67-88	3.11-5/3	Ann
2-FCV 67-91	3.11-5/3	Ann
2-FCV 67-96	3.11-5/3	Ann
2-FCV 67-99	3.11-5/3	Ann
2-FCV 67-104	3.11-5/3	Ann
2-FCV 67-107	3.11-5/3	Ann
2-FCV 67-112	3.11-5/3	Ann
2-FCV 67-123	3.11-6/6 & 3.11-8/22	714/A1
2-FCV 67-124	3.11-7/3 & 3.11-8/29	690/A19
2-FCV 67-125	3.11-6/6 & 3.11-8/22	714/A1
2-FCV 67-126	3.11-7/3 & 3.11-8/29	690/A19
2-FCV 67-127	Not in the scope of 10CFR50.49	
2-FCV 67-128	Not in the scope of 10CFR50.49	
2-FCV 67-146	3.11-6/6 & 3.11-8/22	714/A1
2-FCV 67-147	Not in the scope of 10CFR50.49	
2-FCV 67-151	Not in the scope of 10CFR50.49	
2-FCV 67-152	3.11-6/6 & 3.11-8/22	714/A1
2-FCV 67-205	Not in the scope of 10CFR50.49	
2-FCV 67-208	Not in the scope of 10CFR50.49	
2-FCV 67-223	Not in the scope of 10CFR50.49	

Prepared by:

D. J. Carr 2-15-85

Reviewed by:

J. A. Hagan 2/15/85

The actuators located in the annulus are required to operate in the following environments as shown on Sequoyah drawing 47E235-47 R0, and summarized below.

Operational Condition	Temp OF	Rel. Hum	Pressure (PSIA)	40-Year Radiation (RADS)	Integrated Acc. Dose (RADS)
1 AVG	105	55	ATM (-)	NA	NA
MAX	110	80	ATM (-)	2 x 10 ⁷	NA
MIN	50	30	ATM (-)	NA	NA
2 MAX	120	90	ATM (-)	NA	NA
MIN	40	10	ATM (-)	NA	NA
3	150	100	ATM (-)	NA	5 x 10 ⁷
5	NA	NA	11.4	NA	NA
6	NA	NA	12.4	NA	NA

Operational Condition Definitions

- 1 Normal
- 2 Abnormal
- 3 LOCA/HELB Inside Primary Containment
- 5 Tornado (Sudden pressure drop)
- 6 Inadvertant Containment Spray Initiation

The actuators are qualified by Limitorque test report 600456, which is an appendix to test report B0058. Each actuator has been inspected to verify that the subcomponents are similar to those in the test report. The test accident environment is summarized as follows:

Temperatures	300°F
Pressure	70 PSIG
Relative Humidity	100%
Radiation	2.04 x 10 ⁸ RADS

Equipment located in the annulus is not affected by a maximum level flood of 723.5 ft, and these actuators are located above the flood level caused by actuation of the containment spray system.

The nonmetallic switch material used is a molded phenolic with a temperature index of 150°C. With a 60°C ambient aging temperature, the physical properties of this material can be estimated to degrade to 50 percent of their original values in 3.07×10^7 hours, which is well over the 100-day requirement.

Limitorque has stated that absolute sealing of these actuators against the ambient conditions is not required for qualification of these components.

Based on the above, these actuators are qualified for 40 years of operation, after which they will be replaced.

Prepared by: D. J. Cook 7-15-85

Reviewed by: J. Q. Hogan 2/10/85

The actuators located at 690/A19 and 714/A1 are required to operate in the following environments as shown on Sequoyah drawings 47E235-49 R0, 50 R1, 59 R0, and 60 R1, and summarized below.

Operational Condition	Temp OF	Rel. Hum	Pressure (PSIA)	40-Year Radiation (RADS)	Integrated Acc. Dose (RADS)
1 AVG	80	55	ATM (-)	NA	NA
MAX	104	80	ATM (-)	1 x 10 ⁶ *	NA
MIN	60	30	ATM (-)	NA	NA
2 MAX	110	90	ATM (-)	NA	NA
MIN	50	10	ATM (-)	NA	NA
3	110	NA	NA	NA	< 1 x 10 ⁴
4	197**	100	14.40	NA	NA
5	NA	NA	13.30	NA	NA

* 5 x 10² RADS for 714/A1
**128°F for 714/A1

Operational Condition Definitions

- 1 Normal
- 2 Abnormal
- 3 LOCA/HELB Inside Primary Containment
- 4 HELB outside Primary Containment
- 5 Tornado (Sudden Pressure Drop of 3 PSI).

Actuators in these locations are qualified by Limitorque test report B0003, which is an appendix to test report B0058. Each actuator has been inspected to verify that its subcomponents are similar to those in the test report. The test accident environment is summarized as follows.

Temperature	250°F
Pressure	25 PSIG
Relative Humidity	100%
Radition	2 x 10 ⁷ RADS

The nonmetallic switch material used is a molded phenolic with a temperature index of 150°C. With a 60°C ambient aging temperature, the physical properties of this material can be estimated to degrade to 50 percent of their original values in 3.07×10^7 hours, which is well over the 100-day requirement.

Limitorque has stated that absolute sealing of these actuators against the ambient conditions is not required for qualification of these components.

Based on the above, these actuators are qualified for 40 years of operation, after which they will be replaced.

Prepared by:

D. J. Cox 2-15-85

Reviewed by:

SA Hagan 2/15/85

TVA ID NO.

0-FCV-70-1	Replaced with a qualified actuator
1-FCV-70-2	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-2	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-3	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-3	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-4	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-4	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-8	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-9	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-10	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-11	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-12	Replaced with a qualified actuator
1-FCV-70-13	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-14	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-15	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-16	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-18	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-22	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-23	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-25	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-26	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-27	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-28	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-29	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-34	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-39	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-40	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-41	Replaced with a qualified actuator
1-FCV-70-64	Replaced with a qualified actuator
1-FCV-70-74	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-75	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-75	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-76	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-78	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-92	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-92	To be replaced - see note 1
0-FCV-70-111	Replaced with a qualified actuator
1-FCV-70-139	Replaced with a qualified actuator
2-FCV-70-139	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
1-FCV-70-140	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-140	To be replaced - see note 1
1-FCV-70-143	Replaced with a qualified actuator
2-FCV-70-143	To be replaced - see note 1
1-FCV-70-153	Replaced with a qualified actuator
2-FCV-70-153	To be replaced - see note 1
1-FCV-70-156	Replaced with a qualified actuator
	To be replaced - see note 1

TVA ID NO.

2-FCV-70-156	Replaced with a qualified actuator
1-FCV-70-168	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-168	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-193	Replaced with a qualified actuator
0-FCV-70-194	Replaced with a qualified actuator
2-FCV-70-195	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
2-FCV-70-196	Not in the scope of 10CFR50.49 per NCR SQNMEB8201
0-FCV-70-197	Replaced with a qualified actuator
0-FCV-70-198	Replaced with a qualified actuator

Note 1 - The equipment has been procured and is onsite awaiting a unit outage to allow installation.

Justification for Continued Operation - Unit 1

Since this equipment will not experience chemical spray, it is our opinion that this will only increase the life of the actuators.

We feel the manufacturer has adequately addressed the issue of arcing across the motor leads in his test report and that field installation does not fall under the scope of equipment testing for class 1E service. In addition, while environmental temperatures may not have returned to normal in 600 seconds, most environments have gone through any abnormal peaks. Therefore, this should not be a factor.

The valve motor operators are qualified by test of a model TN-200 motor operator in Franklin Institute Research Laboratories Report No. F-C2883.

The test sequence was as follows:

1. Radiation 1×10^8 RADS
2. Seismic
3. 6-Day steam and simultaneous 5-hour chemical spray exposure starting at 90 psig/330°F and reduced gradually to 5 psig/225°F.

The test does not qualify these actuators for a 100-day accident but the test conditions do envelope the required operating time for these actuators. Based on the above, these actuators are qualified for continued operation until replacement.

Unit 2 - See attached EQS No. MEB-70-004 R4.

Prepared by: D. J. Cox 2/15/85

Reviewed by: C. L. Mill 2/15/85

Revision		4			
Preparer/Date	R.J. POOLE	2/5/85			
Reviewer/Date	I.L. Beltz	2/15/85			

Unit No. 1
 EQS No. MEB-70-004-1
 TVA ID No. See Appendix 1

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Linkbelt TN 200 & TN 2000 (See Appendix 1)
 Verification of Table Information (Table See Appendix 1)

- X Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- X Location - The location has been identified (such as, inside primary containment, annulus, individually cooled rooms, general spaces, or areas affected by HELB outside primary containment).
- X Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- X Function - A functional description of the component has been given (such as, steam generator blowdown).
- X Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- X Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables c by references to figures from tables.
- X Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- X Category - A category of a, b, c, or d has been defined for the equipment.
- X Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- X Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry):
- X Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- X Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- X Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EQS considering all the above factors and referenced to the appropriate tables.
- X Qualification of Several Exact Components (If applicable) - When an EQS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- NA Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
 Term of Interim Qualification _____
 NCR No. _____
- X Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EQS: NCR number, reason for non-qualification, and justification of continued operation.
 NCR No. SONMEB8201

<u>TVA ID NO.</u>	<u>Table/Sheet Number</u>
1-FCV-70-2	Not in scope of 10CFR50.49
1-FCV-70-3	Not in scope of 10CFR50.49
1-FCV-70-4	Not in scope of 10CFR50.49
1-FCV-70-8	Not in scope of 10CFR50.49
1-FCV-70-9	Not in scope of 10CFR50.49
1-FCV-70-10	Not in scope of 10CFR50.49
1-FCV-70-13	Not in scope of 10CFR50.49
1-FCV-70-23	Not in scope of 10CFR50.49
1-FCV-70-25	Not in scope of 10CFR50.49
1-FCV-70-26	Not in scope of 10CFR50.49
1-FCV-70-27	Not in scope of 10CFR50.49
1-FCV-70-64	Not in scope of 10CFR50.49
1-FCV-70-74	Not in scope of 10CFR50.49
1-FCV-70-75	Not in scope of 10CFR50.49
1-FCV-70-92	Not in scope of 10CFR50.49
1-FCV-70-139	3.11-7/3 and 3.11-8/35
1-FCV-70-140	Not in the scope of 10CFR50.49
1-FCV-70-143	3.11-7/3 and 3.11-8/35
1-FCV-70-153	3.11-7/3 and 3.11-8/35
1-FCV-70-156	3.11-6/6 and 3.11-8/5
1-FCV-70-168	3.11-6/6 and 3.11-8/5
	Not in the scope of 10CFR50.49

Prepared by: D. L. Cox 2/15/85

Reviewed by: C. L. Miller 2/15/85

DE02:RJP10

1. Motor-Operated Valves (MOV) - Link-Belt Electrodyne Model TN-200 and TN-2000

- a. The valve motor operators are qualified by test of model TN-200. The model TN-2000 is qualified by equivalence of the TN-200 operator. The test is described in the Franklin Institute Research Laboratories Report No. F-C2883.
- b. The testing sequence was as follows:
1. Radiation 1 by 10^8 rads
 2. Seismic
 3. 6 day steam and simultaneous 5 hour chemical spray exposure starting at 90 psig/330°F and reduced gradually to 5 psig/225°F.
- c. The test subjected the actuator to the temperature pressure profile illustrated in attachment 1.
- d. The test conditions correspond to those for saturated steam or 100 percent relative humidity.
- e. The above test conforms to the requirements set forth in IEEE-323-1971 and NUREG-0588, section 2.2, all applicable paragraphs for the application.
- f. The operating conditions to which these operators will be subjected are within tested parameters.
- g. Operating time - The subject test report does not specifically address this, however, the test parameters (see above) are significantly more severe than our worst case environment (202°F, ATM-Press, 100 percent RH and 5 by 10^7 rads), therefore, it's our engineering judgment the test is sufficient to meet the required operating time.

Prepared by:

R. J. Pool

Reviewed by:

L. J. Belt

RJP10

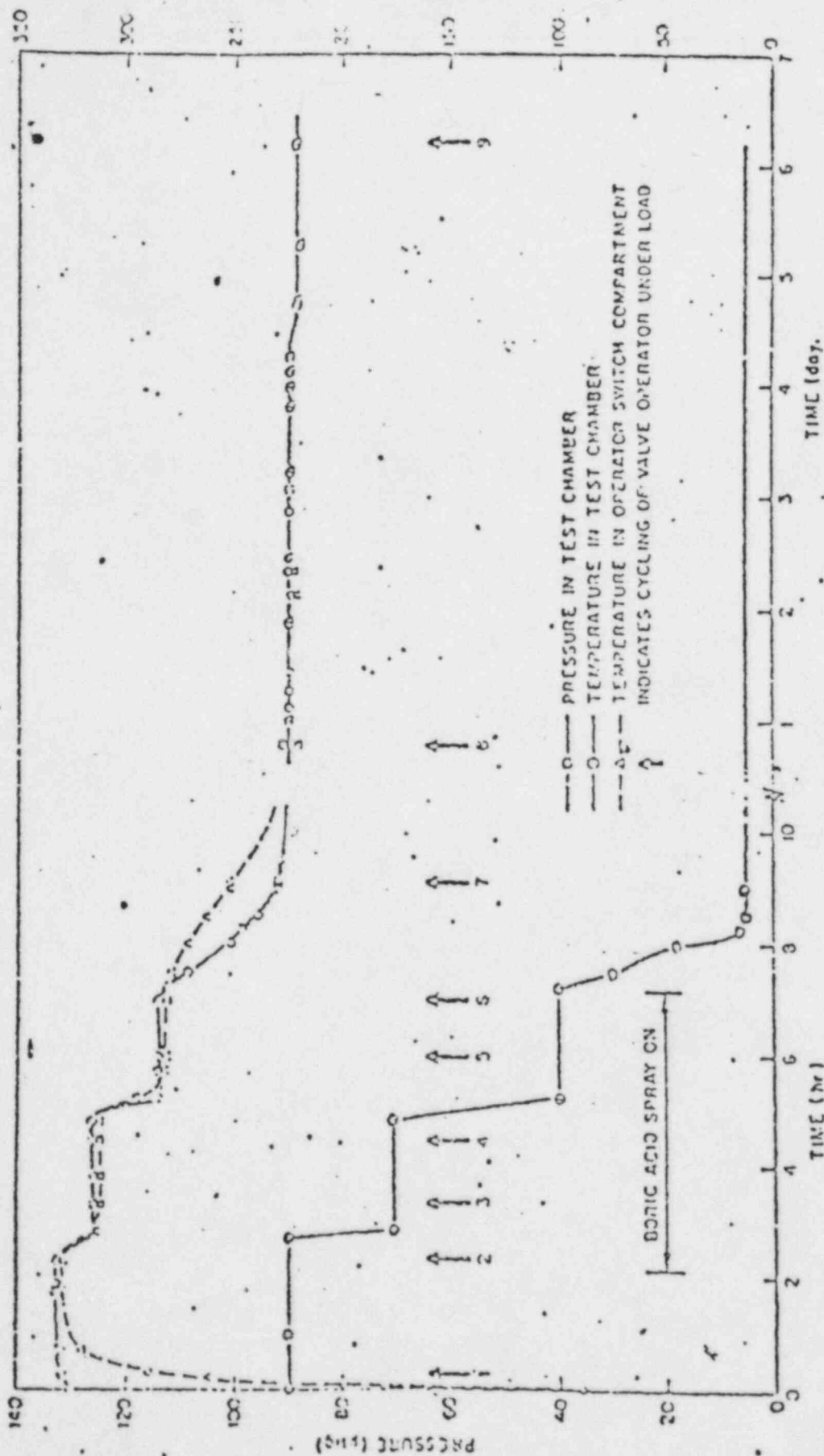


Figure 6. Test Program of Steam/Chemical-Spray Exposure

Revised					
Preparer/Date	R. J. Poole	1-5-85			
Reviewer/Date	I. L. Beltz	1-5-85			

Unit No. 2
 EOS No. MFB-70-004-1
 TVA ID No. See Appendix 1

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Limitorque Model SMB-000
 Verification of Table Information (Table See Appendix 1)

- X Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- X Location - The location has been identified (such as, inside primary containment, annulus, individually cooled rooms, general spaces, or area affected by HELB outside primary containment).
- X Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- X Function - A functional description of the component has been given (such as, steam generator blowdown).
- X Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- X Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables by references to figures from tables.
- X Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- X Category - A category of a, b, c, or d has been defined for the equipment.
- X Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry): 40 years
- X Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- X Environmental Analysis - An environmental analysis has been done, attached to the EOS, and independently reviewed by the responsible organization.
- X Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EOS considering all the above factors and referenced to the appropriate tables.
- NA Qualification of Several Exact Components (If applicable) - When an EOS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- NA Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
 Term of Interim Qualification _____
 NCR No. _____
- NA Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EOS: NCR number, reason for non-qualification, and justification of continued operation.
 NCR No. _____

<u>TVA ID NO.</u>	<u>Table/Sheet Number</u>	<u>Location</u>
0-FCV-70-1	3.11-7/16	714/A1
2-FCV-70-2	Not in scope of 10CFR50.49	
2-FCV-70-3	Not in scope of 10CFR50.49	
2-FCV-70-4	Not in scope of 10CFR50.49	
0-FCV-70-11	3.11-6/6 and 3.11-8/22	714/A1
0-FCV-70-12	Not in scope of 10CFR50.49	
2-FCV-70-14	Not in scope of 10CFR50.49	
2-FCV-70-15	Not in scope of 10CFR50.49	
2-FCV-70-16	Not in scope of 10CFR50.49	
2-FCV-70-18	Not in scope of 10CFR50.49	
0-FCV-70-22	Not in scope of 10CFR50.49	
2-FCV-70-28	Not in scope of 10CFR50.49	
2-FCV-70-29	Not in scope of 10CFR50.49	
0-FCV-70-34	Not in scope of 10CFR50.49	
0-FCV-70-39	Not in scope of 10CFR50.49	
0-FCV-70-40	3.11-6/6 and 3.11-8/22	714/A1
0-FCV-70-41	3.11-6/6 and 3.11-8/22	714/A1
2-FCV-70-75	Not in scope of 10CFR50.49	
2-FCV-70-76	Not in scope of 10CFR50.49	
2-FCV-70-78	Not in scope of 10CFR50.49	
2-FCV-70-92	3.11-7/3 and 3.11-8/35	690/A29
0-FCV-70-111	3.11-6/6 and 3.11-8/11	669/A1
2-FCV-70-139	Not in scope of 10CFR50.49	
2-FCV-70-140	3.11-7/3 and 3.11-8/35	690/A29
2-FCV-70-143	3.11-7/3 and 3.11-8/35	690/A29
2-FCV-70-153	3.11-6/6 and 3.11-8/5	690/A1
2-FCV-70-156	3.11-6/6 and 3.11-8/5	690/A1
2-FCV-70-168	Not in scope of 10CFR50.49	
0-FCV-70-193	3.11-6/6 and 3.11-8/22	714/A1
0-FCV-70-194	3.11-6/6 and 3.11-8/22	714/A1
2-FCV-70-195	Not in scope of 10CFR50.49	
2-FCV-70-196	Not in scope of 10CFR50.49	
0-FCV-70-197	3.11-6/6 and 3.11-8/22	714/A1
0-FCV-70-198	3.11-6/6 and 3.11-8/22	714/A1

Prepared by: DF Cox 2-15-85

Reviewed by: CL Mill 2/15/85

The actuators located at 690/A29, 669/A1, and 714/A1 are required to operate in the following environments as shown on Sequoyah drawings 47E235-64R0, -65R0, -49R0, and -50R1, and summarized below:

Operational Condition	Temp °F	Rel. Hum.	Pressure (PSIA)	40 Year Radiation (rads)	Integrated Acc Dose (rads)
1 Avg.	80	55%	Atm(-)	NA	NA
Max.	104	80%	Atm(-)	1 X 10 ⁶ *	NA
Min.	60	30%	Atm(-)	NA	NA
2 Max.	110	90%	Atm(-)	NA	NA
Min.	50	10%	Atm(-)	NA	NA
3	110	NA	NA	NA	< 1 x 10 ⁴ **
4	154***	100%	14.40	NA	NA
5	NA	NA	13.30	NA	NA

*5 x 10² rads for 714/A1

**1 x 10⁴ rads for 690/A29

***128°F for 714/A1

Operational Condition Definitions

1. Normal
2. Abnormal
3. LOCA/HELB inside primary containment
4. HELB outside primary containment
5. Tornado (sudden pressure drop of 3 PSI)

Actuators in these locations are qualified by Limitorque test report B0003, which is an appendix to test report B0058. Each actuator has been inspected to verify that its subcomponents are similar to those in the test report. The test accident environment is summarized as follows.

Temperature	250°F
Pressure	25 psig
Relative Humidity	100%
Radiation	2 x 10 ⁷ rads

The nonmetallic switch material used is a molded phenolic with a temperature index of 150°C. With a 60°C ambient aging temperature the physical properties of this material can be estimated to degrade to 50% of their original values in 3.07×10^7 hours, which is well over the 100-day requirement.

Limito- He has stated that absolute sealing of these actuators against the ambient conditions is not required for qualification of these components.

Based on the above these actuators are qualified for 40 years of operation, after which they will be replaced.

Prepared By: DA Cox 2-15-85

Reviewed By: CL Miller 2/15/85

STRW1

TER ITEM NO. 8

STATUS: See below

<u>TVA ID Nos.</u>	<u>Status</u>
1-FCV-72-2	To be replaced
2-FCV-72-2	Replaced
1-FCV-72-20	To be replaced
2-FCV-72-20	To be replaced
1-FCV-72-21	To be replaced
2-FCV-72-21	Replaced
1-FCV-72-22	To be replaced
2-FCV-72-22	Replaced
1-FCV-72-23	To be replaced
2-FCV-72-23	To be replaced
1-FCV-72-39	To be replaced
2-FCV-72-39	Replaced
1-FCV-72-40	To be replaced
2-FCV-72-40	To be replaced
1-FCV-72-41	To be replaced
2-FCV-72-41	Replaced

Justification of Continued Operation -

The equipment referenced is similar to equipment tested in Limitorque Test Report F-C3271 as stated in contract S1/FL7-828215 (attached). This was the noted deficiency in the TER.

Prepared by:

D J Cup 4/20/84

Reviewed by:

J W Hodges 6/20/84

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RI
TRW 10-16-84
CLA 10-16-84

ATTACHMENT 2

<u>Item No.</u>	<u>Unit</u>	<u>TVA ID No.</u>	<u>Serial No.</u>
6	1	FCV-70-90	172697
	2	FCV-70-90	172701
	1	FCV-70-133	172694
	2	FCV-70-133	172693
	1	FCV-70-134	220278
	2	FCV-70-134	220277
	1	FCV-70-183	172695
	2	FCV-70-183	172692
	0	FCV-70-206	265540
	0	FCV-70-208	265546
7	1	FCV-72-13	222414
	2	FCV-72-13	222411
	1	FCV-72-34	222413
	2	FCV-72-34	
8	1	FCV-72-2	159384
	2	FCV-72-2	159388
	1	FCV-72-20	159150
	2	FCV-72-20	159153
	1	FCV-72-21	159381
	2	FCV-72-21	159383
	1	FCV-72-22	159382
	2	FCV-72-22	159387
	1	FCV-72-23	159152
	2	FCV-72-23	159151
	1	FCV-72-39	159385
	2	FCV-72-39	159386
	1	FCV-72-40	159156
	2	FCV-72-40	159154
	1	FCV-72-41	159155
	2	FCV-72-41	159155
9	1	FCV-3-116A	176253
	2	FCV-3-116A	176256
	1	FCV-3-116B	177691
	2	FCV-3-116B	176255
	1	FCV-3-126A	177690
	2	FCV-3-126A	177693
	1	FCV-3-126B	176254
	2	FCV-3-126B	177692
	1	FCV-3-136A	173492
	2	FCV-3-136A	232908
	1	FCV-3-136B	173737
	2	FCV-3-136B	232909
	1	FCV-3-179A	173493
	2	FCV-3-179A	232910
	1	FCV-3-179B	173736
	2	FCV-3-179B	232911

Schedule of Prices

No. 81K L7-828215
Page No.

ITEM NO.	ARTICLES OR SERVICES (GIVE DESCRIPTION OR CATALOG NO.)			QUANTITY	UNIT	UNIT PRICE	AMOUNT
	Limitorque Order No.	Limitorque Serial No.	Limitorque Report No.			(Over unit price and compute extension)	
	345804-U	123440	F-C3271				
	345804-U	123441					
	345804-U	123442					
	345804-U	123443					
	345804-U	123444					
	345804-U	123445					
	345804-U	123446					
	345804-U	123447					
	345804-U	123448					
	345804-U	123449					
	345804-U	123450					
	345804-U	123451					
	345804-U	123452					
	345804-U	123453					
	345804-U	123454					
	345804-U	123455					
	345804-U	123456					
	345804-U	123457					
	345804-U	123458					
	345804-U	123459					
	345804-U	123460					
	345804-U	123461					
	366346-A	159381	600198				
	366346-A	159382					
	366346-A	159383					
	366346-A	159384					
	366346-A	159385					
	366346-A	159386					
	366346-A	159387					
	366346-A	159388					
	366346-B	159390					
	366346-B	159391					
	366346-B	159392					
	366346-B	159393					
	366346-C	159394					
	366346-C	159395					
	366346-C	159396					
	366346-C	159397					
	353883-A	137180					
	353883-A	137181					
	353883-A	137182					
	353883-A	137183					

VA 8051 (DP-6-73)

BIDDER

LIMITORQUE CORPORATION

V) ES

Justification for Continued Operation

TER Item No. 18

For the following equipment:

2 FCV-63-175

These operators do not have the proper nameplate data to permit qualification. Qualified operators are being procured and will be installed during the next outage of sufficient duration, once they are received, but no later than November 1985. Inspection of the operators and procurement records shows that these operators are similar to operators supplied by Limitorque and qualified by Limitorque Test Report B0003 and B0058.

Summary

All of these valve operators are for use outside containment. They are similar to valves qualified by a series of tests and by analysis and similarity arguments performed by the manufacturer. Analysis and similarity allow tests to be applied to different sizes of operators, to operators with design modifications unrelated to equipment qualification, and to various combinations of environmental conditions.

Environmental Conditions

All Limitorque valve operators outside containment are qualified as one. The worst combination of environmental conditions, enveloping the conditions of each separate valve, are shown below. (For any one valve, this approach may be conservative, and there may be more margin than is claimed.)

	<u>Normal</u>	<u>Accident</u>
Temperature ($^{\circ}\text{F}$)	115 ⁽¹⁾	216
Pressure ($\text{lb}/\text{in}^2\text{a}$)	Atm	16.0
Relative Humidity (%)	90 ⁽¹⁾	100
Radiation (rad)	1×10^6 (40 yr)	1×10^7

Qualification

a. Documentation and General Qualification

Reference 1, report B0058, compiles applicable test reports in its appendices. It provides an overview of the design and test programs and shows how the several independent tests are mutually

E64191.01

supportive, by supplementing the test reports with separate-effects and partial-type-test data, by adding information about design practices, and by analysis and similarity arguments. Appendix D, which is also known as report B0003, is a key part of this process, being a reasonably complete type test consistent with NUREG-0588. In the discussion which follows, B0003 will be used as the primary source of data.

However, the balance of report B0058 also provides assurance of design adequacy to the extent that it demonstrates additional design, testing, and operating experience.

A detailed review of all the above information has been made. This information is judged to be adequate to fully qualify the operators.

b. Test Temperature, Pressure, and Humidity

The reference 1 (B0003) environmental test was at 250°F for 24 hours and at over 200°F for 15 days more, not including an initial transient cycle. The maximum accident temperature persists for only 15 minutes and declines to normal in 24 hours. These tests were performed at saturated pressures corresponding to those temperatures (25 to 10 lb/in²g) and 100 percent relative humidity. Hence, the test conditions are extremely conservative.

c. Radiation

The test irradiation level of 2×10^7 rads is in excess of the combined normal 40-year dose of 1×10^6 and the accident dose of 1×10^7 rads.

d. Aging

Thermal aging was performed at 165°F (73.9°C) for 200 hours. Reference 1 also points out that the test motor was kept at over 97°C for 144 hours during mechanical cycling (which is taken to mean the temperature at the critical location in the insulation during operation). To the extent that the number of mechanical cycles is in excess of design requirements, some credit could be taken for additional aging. Furthermore, the extra 15 days at 200°F (93.3°C), beyond the time required for the accident itself, could be credited to aging. However, the most optimistic, nonconservative use of these conditions would lead to only 700 days of aging at an equivalent temperature of 155°F, using the 10°C rule. Even disregarding the 115°F ambient, which is after all only present 1 percent of the time, aging would not equal the 40 years plus 100 days (40-year design life plus 100 days postaccident) required at the normal maximum allowed continuous temperature of 104°F.

Reference 1 (B0058) introduces an Arrhenius analysis which shows that at 50°C the life of the limiting material, the class B insulation, is 3074 years. Limitorque concludes that "artificial life aging of Limitorque class B motors for purposes of environmental qualification would be unnecessary." In addendum A to report B0003 (reference 2), the appropriateness of this approach is discussed and additional information is presented. For example, the fact that the insulation is the life-limiting material is established by noting that "thermal aging of the terminal blocks, switches, and seals was deemed unnecessary since they are rated for over 180°F ambient continuous." Wiring, lubricant, and other materials are also discussed.

The data and arguments discussed above are generally accepted. They are consistent with common design practice, which by NEMA standards permits hot-spot temperatures of 120 to 130°C for class B motors operating continuously. The Limitorque operators are normally not operating, hence the capability for operation at 120-130°C indicates long-term capability to just stand by at 40°C or less.

Mechanical aging (over 2000 cycles) and seismic testing were performed in addition to thermal aging discussed above.

e. Test Methods

As previously indicated, reference 1 tests were not complete. Adequate thermal aging in the integrated type test was lacking. (However, the tests do seem consistent with standards and requirements existing at the time.) The analysis and similarity arguments used to supplement the testing, while perhaps not the preferred method of qualification per NUREG-0588, seem to be based in sound engineering principles and supported by industry experience with these operators.

f. Justification for Continuous Operation

Based on the statements above, we conclude that this provides us with justification for continued operation until we replace these operators. Qualified operators have been procured.

References

1. J. B. Drab, "Limitorque Valve Actuator Qualification for Nuclear Power Station Service," Limitorque Corporation, Report B0058, January 11, 1980 (NEB 820421 203).
2. J. B. Drab, "Addendum A Outside Containment Service B0003," October 6, 1978 (Revision C, November 15, 1979) (part of NEB 820421 203).
3. Limitorque letter to I. L. Beltz (TVA) dated December 11, 1981 (MEB 811215 508).

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4. Limitorque letter to C. A. Chandley (TVA) dated January 8, 1982 (MEB 820111 583).
 5. Limitorque letter to I. L. Beltz (TVA) dated June 1, 1982 (MEB 820604 547).

E64191.01

Justification for Continued Operation

TER Item No. 23

For the following equipment:

1&2 FCV-63-172 (MOV)

This valve is for inboard isolation on the RHR hot leg injection lines. This valve would normally be closed at the time of the accident. Its intended use is to provide a path (i.e., the valve be opened) at about 15 hours after a LOCA to allow RHR hot leg injection. However, as stated in Westinghouse letter TVA-6808 (MEB 770923 598), it is sufficient to have simultaneous hot leg recirculation from the safety injection pumps and cold leg recirculation from the RHR pumps. This is acknowledged in FSAR Table 6.3-3 which says the path may be used "if RHR hot leg injection is desired." Thus, postaccident operation of this valve is not essential. Qualified operators have been procured and will be replaced at next outage of sufficient duration. TVA concludes that this provides us with justification for continued operation.

Reference: EN IES Calculation (NEB 811201 251)

E44171.06

Justification for Continued Operation

TER Item No. 25

For the following equipment:

1&2 FCV-68-332, 333

These valves are the pressurizer PORV block valve. If the PORV should stick open, it is desirable to close the associated block valve to isolate the loss of primary fluid. However, a stuck-open PORV is within the scope of the plants small LOCA analysis (WCAP-9600 and 9639). No plant accident analysis calls for the opening of a closed block valve. The desirable but nonessential nature of the postaccident closure capability of the block valves is reflected by the NRC in NUREG-0737 and 0660. The NRC has stated that the operability of the block valves needs to be demonstrated, but that operability is not considered required for safe shutdown.

Our investigation showed that either the postaccident operation of the valve was not required for safe shutdown, or that the limited environmental qualification of the operators was sufficient for safe shutdown. We have, however, procured qualified valve operators and they will be installed at the next outage of sufficient duration.

Reference: EN LES Calculation (NEB 811201 251)

E44171.06

SEQUOYAH NUCLEAR PLANT
JUSTIFICATION FOR CONTINUED OPERATION:
"SIS PUMP COOLER MOTORS"

TER ITEM NO. - 31

TVA ID NO. -
2-MTR-30-179

Manufacturer/Model No. - Unit 2: Lincoln T2518

Status - IV: 2-MTR-30-179

Justification for Continued Operation -

Status IV: 2-MTR-30-179 is scheduled to be replaced with a
Reliance 1E qualified motor (already onsite) by no later than

November 24, 1985.

For JCO, see attached appendix I
EQS No. NEB-ECS-6

Revision	
R	Date
RHL	10/11/84
HEB	10/11/84

Prepared by: R. H. Loveday 6/20/84

Reviewed by: H. E. Burton 6/20/84

Appendix 1
SON UNIT 2

Sheet No. NEB ECS-1 REV
TVA ID No. SIS Pump Cooler
Motor

EQUIPMENT QUALIFICATION SHEET (EQS) (REV 1)

Manufacturer and model number LINCOLN T2518

Verification of Table Information (Table 3.11-7 Sheet 6)

- ☒ Equipment Type - The equipment has been identified as per TVA ID number designations (Ex. MOV, SOV, etc.).
- ☒ Location - The location has been identified (Ex. Inside Primary Containment, Annulus, Individually Cooled Rooms, General Spaces, or area effected by HELB outside primary containment).
- ☒ Component - A unique TVA-ID number has been assigned (Ex. FSV-68-308).
- ☒ Function - A functional description of the component has been given (Ex. Steam Generator Blowdown).
- ☒ Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number has been given.
- ☒ Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables or by references to figures from table.
- ☒ Environment to Which Qualified - The environment to which the equipment has been qualified to is addressed in either the tables or the environmental analysis attached.
- ☒ Category - A category of a, b, or c has been defined for the equipment.
- ☒ Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated has been defined.

Qualification status (check if applicable, NA if not)

- ☒ Qualification Report and Method - A qualification report and the method of qualification has been identified.
- ☒ Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- ☒ Qualification by Similarity - (If Applicable) - A justification for qualification by similarity is attached to the EQS considering all the above factors and referenced to the appropriate table.
- ☒ Qualification of Several Exact Component - (If Applicable) - When an EQS is used for more than one item a list of all exact components is given as an attachment with all references to appropriate tables with justification for qualification considering all the above factors.
- ☒ Interim Qualification - (If Applicable) - (Open Item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written and a qualification or replacement plan is attached. (NCR SON EGB 8010)

EQS: NEB-EQS-6 REV 1
EQUIPMENT QUALIFICATION SHEET (EQS) (Continued)

SHT 2

N/A Unqualified Component (Open Item) - (If Applicable) - Component has been determined to be unqualified; the following is attached to EQS: NCR number, reason for non-qualification, and definition of TVA's qualification or replacement plan.

Attachments:

Appendix 1: Interim Qualification, DNL, 16 pages,
and EEB 80 1107 951.

Appendix 2: Replacement Procurement Request,
3 pages, NEB 801210 263.

Prepared by: B. F. Cronin

Reviewed by: W. E. Pritchett Jr.

QA Acceptance: _____

UNITED STATES GOVERNMENT

EQS:NEB-ECS-6

EEB '80 1107 951

REV 1

Memorandum

APPENDIX 1

TENNESSEE VALLEY AUTHORITY

(SEE PAGE 6)

TO : Those listed

FROM : F. W. Chandler, Chief, Electrical Engineering Branch, W8C126 C-K

DATE : November 5, 1980

SUBJECT: SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2
NU REG 0588 REPORTING ON CLASS 1E MOTORS

- References:
1. NCR SON EEB 8010
Contracts 71C30-92646, 71C30-92695, and 73C38-83532
 2. NCR SON EEB 8015
Contracts 75K36-83716, 73C31-83582, and 72C30-92610
 3. Memorandum from me to Those listed dated October 24, 1980 (EEB 801037936).

The attached calculations and explanation are submitted for inclusion in your Evaluation Qualification Sheets as required by the NRC for reporting environmental qualification of Class 1E electrical equipment for Sequoyah Nuclear Plant per NUREG-0588. This represents a revision of the document transmitted by reference 3. This revision includes calculations for motors provided under contracts 73C31-83582 and 72C30-92610.

F. W. Chandler
F. W. Chandler

C. A. Chandley, W10D224 C-K - A copy of these calculations was hand carried by D. F. Ackerly to your L. A. Johnson on 10/27/80 and your J. Hodges on 10/28/80.

J. A. Raulston, W10C126 C-K - A copy of these calculations was hand carried by D. F. Ackerly to your B. F. Crosslin on 10/28/80.

DFA:SJD
Attachment

cc: R. W. Cantrell, 204 GB-K (2)
MEDS, E4B37 C-K
G. G. Stack, Sequoyah CONST (4)
M. N. Sprouse, W11A9 C-K

NEB 80 11 10 000
CFC
KAC
JRL
BFC BKC

SEQUOYAH NUCLEAR PLANT
NCR SQN EEB 8010
NCR SQN EEB 8015
NCR SQN MEB 8008

October 11, 1980
Revision 1
October 27, 1980
Revision 2
December 10, 1980

Justification for Continued Safe Operation of
Class 1E Motors in the Subject NCR's

INTRODUCTION

The approach used to establish that the motors listed in NCR SQN EEB 8010, NCR SQN EEB 8015, and NCR SQN MEB 8008, which is addressed in these calculations, are safe for continued operation pending full qualification combined partial test data with verbal and sometimes written information on motor materials to support analytical assumptions and conclusions reached. This same approach was used to determine aging effects on the motors for their given operating and accident environments. The environments considered were temperature, humidity, and radiation.

Temperature

Temperature rise test data are available for some motors. For those motors for which we do not have temperature rise test data, we assumed a maximum rise as specified by the contract. Using this value and the most severe temperature condition the motor would experience, the maximum operating temperature of the motor was determined. This temperature was compared to a normal ambient of 40°C at which all motors are rated (NEMA NG-1). The 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) was used to establish the operating life of the motor. (We assumed, conservatively, a five year life for the motors based on 40°C ambient and motor temperature rise.) The 10°C Rule states that for each 10°C rise in temperature above some reference temperature at which the material is able to operate without degradation (in our case 40°C plus the allowable temperature rise) the useful life of the material is halved. Therefore, a 10°C temperature rise above the maximum allowable temperature of the material would reduce the life to 2.5 years. Using this approach we can establish the motor aging due to temperature effect.

Humidity

All the motors listed on NCR 8010 operate in environments of 80 percent humidity or less. Years of motor operating experience and assurances from motor manufacturers attest to the fact humidity at these low levels will not cause the motors to be functionally inoperable nor degrade motor performance. The one motor addressed on NCR 8015, the Chilled Water Pumps for Shutdown Board Room Contract 83716, must operate in a 100 percent humidity environment. Since this motor is of open dripproof construction measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating. However, to prevent moisture absorption when the motor stands idle for long periods, an administrative procedure will be established that causes the motor to be operated at regular intervals to drive out excess moisture.

Radiation

The materials for all motors in environments greater than 10^4 rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. In all cases the radiation damage threshold of the materials was equal to or higher than the combined 40 year normal dose and the integrated accident dose. The motors were therefore considered acceptable for the radiation environments in which they were to operate.

Revision 1 (October 27, 1980)

This revision contained format changes in pages 3 through 13 and added pages 14, 15, and 16.

Revision 2 (December 10, 1980)

Revision 2 expands the scope of the document to include NCR SQN MEB 8008. This NCR was written on the Auxiliary Feedwater Pump Motors, which were improperly reported on page 14 of Revision 1 to have been covered by NCR SQN EEB 8015. This revision also includes corrected information on items 11 and 12 on page 7.

SEQUOYAH NUCLEAR PLANT
NCR SQN EEB 8010

October 11, 1980
Revision 1
October 27, 1980

Justification for Continued Safe Operation of 1E
Motors on the Subject NCR

Purpose

The following calculations support TVA's contention that the motors of the noted contracts will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation.

Assumptions - are noted in each section

Contract 72C38-92802 (NEB)

Data

1. Spent Fuel Pit Pump AHU - Lincoln Electric frame T2523, 5HP.
230/460v, 60Hz, 3ph, Class B insulation Max Temp. rise 80°C @
40°C ambient (TEFC)

Operating Environment: Temp. 43.3°C (110°F)
Humidity 30-80%
Radiation 10^6 rads (40 year normal dose)
No accident dose.

Calculations

Radiation - The materials composing the motor* have a radiation damage threshold that exceeds the maximum 40 year normal dose plus the integrated accident 1 year dose. Minimum material threshold = 4.5×10^7 rads. Therefore, the motor is qualified for 5 years life as far as radiation exposure is concerned. (5 years arbitrarily chosen as conservative estimate of insulation life).

Temperature - Motor was specified to NEMA Standard MG-1-1967. For motors operating above a referenced 40°C ambient MG-1-1967 (as modified in February 1971) allows a temperature rise in accordance with the formula:

Temperature rise = $0.9(T_{hs} - T_a)$ where: T_{hs} = hot spot temp. = 130°C

T_a = ambient temp = 43.3°C

Maximum allowable temp. rise = $0.9(130-43.3) = 78^\circ\text{C}$ or rounded to nearest 5°C = 80°C

*Motor materials per Vendor

Radiation Threshold per EEB Cable group: Lead wire - polyethylene (4.5×10^7 rads), propylene (5×10^7 r), magnet wire insulation - class F film code copper Essex Thermetex (3×10^9 r), slot insulation Epoxy saturated Dacron fiber Duroid (5×10^7 r), phase insulation-Aramid fiber Nomex (5×10^7 r), sleeving Acrylic coated fiberglass (1×10^9 r)

The temp rise per the manufacturer's test report was 80°C at a S.F. of 1.15. Therefore we have a 0°C margin. This motor can operate at an overall temperature of $80^{\circ}\text{C} + 43.3^{\circ}\text{C} = 123.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $123.3^{\circ}\text{C} - 80^{\circ}\text{C} = 43.3^{\circ}\text{C}$ continuously without exceeding its maximum overall temperature limitations. (5 year life).

Humidity - This motor is totally enclosed fan cooled (TEFC) and is therefore immune to humidity effects.

Data

2. CCS Pump and AFW Pump AHU - Lincoln Electric frame T2556, 15 HP 230/460 V, 60 Hz, 3 ph, Class B insulation, Maximum temperature rise 80°C @ a 40°C ambient (TEFC)

Operating environment - same as item 1.

Radiation - Justification same as 1.

Calculations

Temperature - Same as 1 except: Temperature rise by report was 72°C. We have an 8°C margin. This motor may operate in an overall temperature of $80^{\circ} + 43.3^{\circ}\text{C} = 123.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $123.3^{\circ} - 72^{\circ}\text{C} = 51.3^{\circ}\text{C}$ without exceeding its maximum overall temperature. (5 year life)

Humidity - Same as 1.

Data

3. Penetration Room Coolers - Lincoln Electric frame T2523, 5 HP, (TEFC) 230/460V, 60 Hz, 3 ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient.

Calculations

Duplicate motor to item 1, same operating environment, justified same as item 1, same test data applies. (5 year life)

Data

4. AFW and Boric Acid Pump AHU - Lincoln Electric frame T2523, 5 HP, 230/460V, 60 Hz, 3 Ph, Class B insulated, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Calculations

Duplicate motor to item 1, same operating environment, justified same as item 1, same test data applies. (5 year life)

Data

5. Containment Spray Pump AHU Lincoln Electric frame T2523, 5 HP, 230/460V, 60 Hz, 3 Ph, Class B Insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment Temperature 43.3°C
 Humidity 30-80 percent
 Radiation 8.8×10^6 rads (40 year dose
 $1 \times 10^6 + 7.8 \times 10^6$ accident)

Computations

Radiation - Justification same as item 1

Temperature - Same as item 1 except, temperature data is not available. Thus, we assume the maximum allowable heat rise per the specifications and standards i.e., 80°C. Using the same calculations as in 1, the maximum ambient temperature in which the motor can operate is 43.3°C. (5 year life)

Humidity - Same as item 1.

Data

6. Pipe Chase AHU - Lincoln Electric frame T2557, 20 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment: Temperature 43.3°C
 Humidity 30-80 percent
 Radiation 1×10^6 rads (40 year dose)
 no accident dose

Calculations

Duplicate motor to item 5, justification is the same as for item 5. (5 year life)

Data

7. Emergency Gas Treatment AHU - Lincoln Electric frame T2518, 3 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment: Temperature 43.3°C
 Humidity 30-80 percent
 Radiation 1×10^6 rads (40 year dose)
 no accident dose

Calculations

Radiation - Justifications same as item 1
 Temperature - No temperature data available. Maximum rise of 80°C assumed, Using the same calculations as in 1 the maximum ambient temperature allowable is 43.3°C.
 Humidity - Same as item 1. (5 year life)

Data

8. RHR Pump Cooler - Lincoln Electric frame T2518, 3 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC)

Operating environment: Temperature 43.3°C
 Humidity 30-80 Percent
 Radiation 8.5×10^6 rads (1×10^6 40 year + 7.5×10^6 accident dose)

Calculations

This motor is a duplicate of item 7 and the justifications is the same as for item 7. (5 year life)

Data

9. SIS Pump Cooler AHU - Lincoln Electric frame T2518, 3 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40° ambient (TEFC).

Operating environment: Temperature 43.3°C
 Humidity 30-80 percent
 Radiations 6.6×10^6 (1×10^6 40 year + 5.6×10^6 accident dose)

Calculations

This motor is a duplicate of item 7 and justification is the same as for item 7. (5 year life).

Data

10. Central Charging Pump Cooler AHU - Lincoln Electric frame T2518, 3 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40° ambient (TEFC).

Operating environment: Temperature 43.3°C
 Humidity 30-80 percent
 Radiation 7.6×10^6 (1×10^6 40 year +
 6.6×10^6 ambient dose)

Calculations

This motor is a duplicate of item 7 and justification is the same as for item 7. (5 year life)

 CONTRACT 73038-83527 (NEE)

Data

11. & Emergency Gas Treatment Fan and Auxiliary Building gas treatment fan-
 12. Reliance Motors - 20 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, frame 265T, (open dripproof) SF=1.15

Operating Environment: Temperature 43.3°C (110°F)
 Humidity 30-80 percent
 Radiation 10^6 rads (40 year dose),
 No accident dose

Calculations

Radiation - The materials composing the motor* have a radiation damage threshold that equal or exceed the maximum 40 year normal dose plus the integrated accident 1 year dose. Minimum material threshold = 1×10^6 to 1×10^7 (fiberglass impregnated with polyester resin). Therefore, the motor is qualified for a 5 year life as far as radiation exposure is concerned.

Temperature - Motors were specified to NEMA Standard MG-1-1967. For motors operating above a referenced 40°C ambient MG-1-1967 (as modified in February 1971) allows a temperature rise in accordance with the formula:

$$\text{Temperature rise} = 0.965 (T_{hs} - T_a) \text{ her } T_{hs} = \text{hot spot temperature} = 140^\circ\text{C}$$

$$T_a = \text{ambient temperature} = 43.3^\circ\text{C}$$

$$\text{Therefore, maximum allowable temperature rise} = 0.965 (140 - 43.3) = 93.3 \text{ or rounded to nearest } 5^\circ\text{C} = 95^\circ\text{C}$$

The temperature rise (per verbal communications with the motor vendor and NEE personnel and not yet verified) was 65°C @ a SF of 1.15. Since we have no verified data we assume the maximum allowable temperature rise per the specifications and standards which is 90°C.

Therefore, we have a 5°C margin. This motor can operate at an overall temperature of $95^{\circ} + 43.3^{\circ}\text{C} = 138.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $138.3^{\circ}\text{C} - 90^{\circ} = 48.3^{\circ}\text{C}$ without exceeding it's maximum overall temperature limitations. (5 year life)

*Motor materials per Vendor (Verbal not verified in writing)

magnet wire - heavy polyester (8×10^6 r) or polyesterimide-amide-imide overcoat (3×10^9 r) lead cable - EXAR 350 (2×10^8 r), slot liner - Nomex polyester (5×10^7 r) coil lead in-Acrylic resin fiberglass (1×10^9 r), top wedge (stick) - fiberglass impregnated polyester resins (1×10^6 to 1×10^7 r)

Midstick - Nomex 410 (2×10^9 r), film stick slot spacer polyester glass (1×10^8 r) adhesive tape - glass tape acrylic adhesive (1×10^9), phase insulation - varnished glass cloth (1×10^8 r), correction insulation-acrylic resins fiberglass (1×10^9 r), tie tape-treated glass (woven glass type - 1×10^8 r) First and last lamination of stator - polyester impregnated fiberglass (1×10^6 to 1×10^7 r) resins on windings 2 epoxies (1×10^8 r)

Humidity - These motors operate in an atmosphere of 80 percent humidity maximum. Humidity at these low levels will not contribute to moisture accumulation in the motor windings and subsequent insulation breakdown.

Contract 76K35-83673-1 (NEB)

Data

13. 480-V Board Room AHU - Westinghouse frame 254T, 15 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation. (open-dripproof) SF=1.15

Operating Environment:	Temperature	46.1°C (115°F)
	Humidity	30-80 percent
	Radiation	Negligible

Calculation

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (5 year life)

Temperature - Motors was specified to NEMA MG-1-1972. For motors operating above a referenced 40°C ambient MG-1-1972 allows a temperature rise in accordance with the formula:

Temperature rise - $0.9 (T_{hs} - T_a)$ where T_{hs} = hot spot temperature = 140°C

T_a = ambient temperature = 46.1

Therefore maximum allowable temperature rise = $0.9 (140 - 46.1) = 85^{\circ}\text{C}$ We do not have heat rise data and therefore assuming the maximum allowable rise by the specification and the standard of 90°C we get a - 5°C margin i.e., at 46.1°C we are 5°C over our maximum allowable rise. If we apply the 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) to determine the aging effects on the motor. If we assume a very conservative life of 5 years for the motor insulations then we could operate up to 95°C ($85^{\circ}\text{C} + 10^{\circ}\text{C}$) and still have one-half of five or 2.5 years of motor insulation life.

Humidity - These motors operate in an atmosphere of a maximum of 80 percent humidity and as noted for motor number 11 and 12 this presents no problem.

Contract 71C30-92695 (MEB)

Data

14. Component Cooling Water Pumps - Allis-Chalmers type FOD, Model 012, frame 587US 460V, 60 Hz, 3 Ph, Class B insulation, S.F. = 1.0, 350 HP

Operating Environment:	Temperature	117°F (47°C) at 20 seconds, 111°F (44°C) at 100 seconds, 116°F (47°C) at 4 minutes, 121°F (49°C) at 10 minutes, linear decline in 24 hours to 104°F (40°C) continuous
	Humidity	100 percent
	Radiation	negligible

Calculations

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (5 years life)

Humidity - Motor has 500 watt space heaters which will operate any time the motor is idle. This will prevent any moisture problems in the windings.

Temperature - The very short term ambient temperature rise to 49°C should not be long enough to allow the motor to stabilize at that higher temperature. However, from a conservative point of view we will assume that the 9°C rise in ambient is a continuous duty. These motors were specified to NEMA Standard MG-1-1967. Our ambient is 49°C . Therefore, temperature rise = $0.9 (130 - 49) = 73^{\circ}$ rounded to nearest $5^{\circ}\text{C} = 75^{\circ}\text{C}$. According to the manufacturers the temperature rise is 45°C at a SF of 1.08. This is well below our maximum allowable temperature rise. Thus, the motor is satisfactory for full life as far as temperature is concerned. (5-year life)

Contract 73C38-83532

Data

15. Component Cooling Water Booster Pumps - Allis Chalmers, Type RG, Model 113, 230/460V, 60 Hz, 3 Ph, 15 HP Class B insulation, SF = 1.15

Operating Environment: Temperature 104°F (40°C)
Humidity 98 percent
Radiation Negligible

Calculations

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (10 year life)

Humidity - Motor has 50 watt space heaters which will operate when the motor is idle. This will prevent any moisture problems in the windings.

Temperature - Maximum allowable temperature rise is 70°C at rated nameplate h.p. or 90°C at 1.15 service factor both referenced to a 40°C ambient. We have no test data available so if we assume the motors have a temperature rise of 90°C at SF of 1.15 they will be satisfactory for full life of the insulation. Even if the motors exceed the maximum allowable rise by as much as 10°C i.e., to 100°C they will still have a useful life of 1/2 of the full life value (see item 13). Assuming a five year life this yields an effective life of 2.5 years.

Contract 71C30-92646 (MEB)

Data

16. Containment Spray Pumps - Westinghouse type LAC, frame 6808-S, model HSW1, 6600V, 60 Hz, 3 Ph, 700 HP, insulation - Class F, SF=1.15
Class B insulation specified

Operating Environment: Temperature 110°F (43.3°C)
Humidity 30-80 percent
Radiation 8.8 x 10⁶ rads (40 year normal dose 1 x 10⁶ plus 7.8 x 10⁶ rads 1 year integrated accident dose)

Calculations

Radiation and Humidity - The insulation material in these motors was tested to 2 x 10⁸ rads and for humidity in accordance with the procedures of IEEE 275. See Westinghouse Qualification Reports WCAP-8754 Rev. 1 and WCAP-7829 pages 15, 16, 40, and 54. These levels exceed our operating and accident environment.

Temperature - In accordance with the above noted qualification reports the insulation material is qualified for a 40-year life at continuous operation at 103°C. Our motors will operate at a temperature of 111°C (68°C rise per test report plus 43°C ambient). However, this is only infrequent operation. Each motor will be tested eight times per year for two hours per test. This test time plus a conservative margin of 50% for other possible tests equals to only 32 hours per year or 55 days over a 40 year period. Moreover, the 2-hour operating time is not sufficient for a motor of this size to reach its continuous operating temperature. Four to six hours would be required for the motor to reach its normal operating temperature.

Therefore the overall aging effect due to temperature is negligible and the motors are qualified for a full 40 years.

Sources of Information

Materials in motors - Manufacturer test reports and verbal contact between NEB/MEB and Vendors

Temperature rise limits - NEMA Standard MG-1 various dates

Environments - SNP FSAR Paragraph 3.11.2.3 and EEB Nuclear Staff

Conclusions

All motors on the above contracts are considered safe for interim operation in their normal and accident environments for periods from 5 to 2.5 years as noted under each contract designation. The Containment Spray Pump Motors Contract 71C30-92646 are fully qualified for a 40-year life in their operating environment.

SEQUOYAH NCR SQN EEB 8015

Justification for continued Safe Operation of 1E
Motors on Contract 75K36-83716 Only

Purpose

The following calculations support TVA's contention that the motors of the noted contract will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation.

Assumptions

Motor life is a conservative 5 years in normal operating environment i.e., radiation - negligible ($\leq 10^4$ rads), temperature - 40°C with temperature rise \leq maximum allowable rise by NEMA MG-1 Standard, humidity ≤ 80 percent.

Data

Contract 75K36-83716 (MEB)
Chilled water pumps for shutdown Board Room AC systems el. 734.0 Lincoln Electric Company, frame 256T, 20 HP, 230V, 60 Hz, 3 ph, SF = 1.15 class B insulation, open dripproof, NEMA MG-1 1972 applies.

Operating Environment:	Temperature	115°F (46.1°C)
	Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

Temperature

Motor was specified to NEMA Standard MG-1-1972. For motors operating above a referenced 40°C ambient MG-1-1972 allow a temperature rise in accordance with the formula:

Temperature rise = $0.9 (T_{hs} - T_a)$ where T_{hs} = hot spot temperature = 140°C , T_a = ambient temperature = 46.1°C

Therefore maximum allowable temperature rise = $0.9 (140 - 46.1) = 85^\circ\text{C}$

The temperature rise of the motor per the manufacturer's test report was 90°C at a SF of 1.15. This means we have exceeded our allowable temperature rise by 5°C. Applying the 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) allows us to determine the aging effects on the motor. Using the assumed 5 year motor life we can operate up to 95°C (85°C + 10°C) and still have one half of five or 2.5 years of motor insulation life.

Sources of Information

Temperature rise - manufacturer test reports
Temperature rise - NEMA MG-1-1972
Environments - SNF FSAR Paragraph 3.11.2.3
and EEB Nuclear Staff

Conclusions

The motors on contract 75K36-83716 are considered adequate to operate in their normal and accident environments for a period up to a minimum of 2.5 years. Temperature is the limiting factor. It should be noted that any normal maintenance as required by the manufacturer will need to be performed to ensure full motor life.

Prepared by: Barry M. H. 10/27/83 *MB*

Reviewed by: D. R. Helster 11/12/80

QA Acceptance: _____

SEQUOYAH NUCLEAR PLANT
NCR SQN EEB 8015

October 27, 1980

Justification for Continued Safe Operation of 1E
Motors on the Subject NCR

Purpose

The following calculations support TVA's contention that the motors cited in NCR SQN EEB 8015 will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation. This supplements information provided by B. M. Gore in his submittal dated October 11, 1980, on the subject NCR.

Assumptions

Motor life is a conservative 5 years in normal operating environment i.e., radiation - negligible ($\leq 10^4$ rads), temperature - 40°C with temperature rise \leq maximum allowable rise by NEMA MG-1 Standard, humidity \leq 80 percent.

Data

Contract 73C31-83582

Auxiliary Air Compressors, General Electric, 20 HP, SF=1.15, 460 volt ac, 60 Hz, 3 phase, Class B insulation, open dripproof enclosure, frame 256T, NEMA MG1-1972 applies.

Operating Environment:	Temperature	115° F (46.1°C)
	Relative Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design, measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

Temperature

Motors were specified to conform to NEMA MG1-1972. The allowable temperature rise was specified not to exceed 90°C above an ambient temperature of 40°C . This requirement is identical to the maximum temperature rise allowed by NEMA MG1-12.42 for a Class B insulation system with a SF of 1.15.

Motors operating above a referenced 40°C ambient are allowed a temperature rise in accordance with the following formula from paragraph 12.42 of NEMA MG1-1972:

$$\text{Temperature rise} = 0.9 (T_{hs} - T_a)$$

where the hot spot temperature, $T_{hs} = 140^\circ\text{C}$
and the ambient temperature, $T_a = 46.1^\circ\text{C}$

Therefore the maximum allowable temperature rise is 85°C . The heat run data was not available for these motors; however, the motors were allowed a 90°C rise by the specification. Assuming the manufacturer supplied a motor that conformed to the specified temperature rise requirements, we would exceed the maximum allowable temperature rise for an ambient of 46.1°C by 5°C . Applying the 10°C Rule (an approximation of Arrhenius's law as applied to insulation materials) allows us to determine the aging effects on the motor. Using the assumed 5-year motor life we can operate up to 95°C ($85^\circ\text{C} + 10^\circ\text{C}$) and still have one half of five or 2.5 years of motor insulation life.

Sources of Information

Temperature rise - Contract 73C31-83582

Temperature rise - NEMA MG1-1972

Environments - SNP FSAR Paragraph 3.11.2.3 and MEB Contract Engineers

Data

Contract 72C30-92610 (MEB)

Auxiliary Feedwater Pumps, Allis-Chalmers, 500 HP, SF=1.15, 6600-volt ac, 60-Hz, 3-phase, Class F insulation, open dripproof enclosure, frame 30RS6; NEMA MG1-1967 applies.

Operating Environment:	Temperature	120°F (48.9°C)
	Relative Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design, measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

The motor temperature rise requirements at the nameplate rated horsepower were specified not to exceed 70°C over a 40°C ambient. A 90°C rise at a SF of 1.15 was specified for short-time service only. This corresponds to the maximum Class B temperature rise allowed under NEMA MG1-12.42 dated February 1971. The use of a Class F insulation while limiting the allowable temperature rise to that of a Class B system, is one method of providing a conservative motor design. Motors operating above a 40°C ambient are allowed a temperature rise in accordance with the following formula:

$$\text{Temperature rise} = 0.9 (T_{hs} - T_a)$$

where the hotspot temperature $T_{hs} = 140^\circ\text{C}$ for a Class B insulation system and the ambient temperature $T_a = 48.9^\circ\text{C}$

Therefore, the maximum allowable temperature rise above the listed operating temperature for a Class B system is 82°C at a SF of 1.15. The temperature rise of the motor according to the manufacturer's test report was 45°C at a SF of 1.15 which is substantially less than the maximum allowable temperature rise.

Sources of Information

Temperature rise - manufacturer's test report dated 9/27/72

Temperature rise - NEMA MG1-1967

Environments - SNP FSAR Paragraph 3.11.2.3 and MEB Contract Engineer.

Conclusions

The motor on contracts 73C31-83582 and 72C30-92610 are considered adequate to operate in their normal and accident environments outside containment for a minimum period of 2.5 and 5 years respectively. It should be noted that any normal maintenance as required by the manufacturer will need to be performed to ensure full motor life.

Prepared by W. P. Achary TS 10/27/80 JRG

Reviewed by D. R. Helsta 10/27/80

EVS: NC15-4-6

SAT 1 OF 2

UNITED STATES GOVERNMENT

Memorandum

KEY 1
APPENDIX 2
3 PAGES

NEB '801210 263

TENNESSEE VALLEY AUTHORITY

TO : F. W. Chandler, Chief, Electrical Engineering Branch, W8C126 C-K

FROM : John A. Faulston, Chief Nuclear Engineer, W10C126 C-K

DATE : DEC 10 1980

SUBJECT: SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 - CLASS IE REPLACEMENT MOTORS FOR HVAC EQUIPMENT - NUREG-0588 COMPLIANCE

As a result of NUREG-0588 compliance review, a number of drive motors for fans from the auxiliary area ECS were identified as having less than 40-year life when subjected to normal and postulated abnormal environments. These motors are identified below by horsepower, Nema frame size, and equipment mark numbers. All motors shall be 460-volt, 3-phase, 60-Hertz, 1750-r/min motors. Please take the necessary action to procure nuclear grade, IE replacement motors. These motors should be installed at the first refueling outage and not later than July 1982 (actual interim-use life of the existing motors can be found in your EEB 801107 951). Required delivery date is thus July 1, 1982. Required motors are as follows:

Qty	HP	NEMA Frame	Equipment Mx No.	Function	SQN Unit
1	3	182T	47A373-27	EGTS AHU	1
1	3	182T	47A373-28	EGTS AHU	2
1	5	184T	47A373-40	Spent Fuel Pit AHU	1
1	5	184T	47A373-41	Spent Fuel Pit AHU	2
2	3	182T	47A373-15	RHR Pump Cooler	1
2	3	182T	47A373-16	RHR Pump Cooler	2
2	3	182T	47A373-19	SIS Pump Cooler	1
2	3	182T	47A373-20	SIS Pump Cooler	2
2	3	182T	47A373-42	Centrifugal Charging Pump Cooler	1
2	3	182T	47A373-43	Centrifugal Charging Pump Cooler	2
1	5	184T	47A373-25	AFW & Boric Acid Pump Cooler	1
1	5	184T	47A373-26	AFW & Boric Acid Pump Cooler	2
1	15	254T	47A373-23	CCW & AFW Pump Coolers	1
1	15	254T	47A373-24	CCW & AFW Pump Coolers	2

F. W. Chandler

DEC 10 1980

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 - CLASS IE REPLACEMENT MOTORS FOR
HVAC EQUIPMENT - NUREG-0588 COMPLIANCE

<u>Qty</u>	<u>HP</u>	<u>NEMA Frame</u>	<u>Equipment Mk No.</u>	<u>Function</u>	<u>SN Unit</u>
2	20	256T	47A373-29	Pipe Chase AHU	1
2	20	256T	47A373-30	Pipe Chase AHU	2
2	5	184T	47A373-17	Containment Spray Pump AHU	1
2	5	184T	47A373-18	Containment Spray Pump AHU	2
1	5	184T	47A373-31	Penetration Room Coolers	1
1	5	184T	47A373-32	Penetration Room Coolers	2
1	5	184T	47A373-33	Penetration Room Coolers	1
1	5	184T	47A373-34	Penetration Room Coolers	2
2	5	184T	47A373-35	Penetration Room Coolers	1
2	5	184T	47A373-36	Penetration Room Coolers	2
2	5	184T	47A373-37	Penetration Room Coolers	1
2	5	184T	47A373-38	Penetration Room Coolers	2
1	20	256T	47A370-92	ABGTS Fan	1
1	20	256T	47A370-93	ABGTS Fan	2
1	20	256T	47A370-94	EGTS Fan	1
1	20	256T	47A370-95	EGTS Fan	2

The motors must be of the same frame size as shown above in order to interface with the existing driven equipment. Service factor shall be 1.15. Motors shall be equal to Reliance Duty Master X-T TEFC ac motors, with type RH insulation, qualified to IEEE334-1974 in

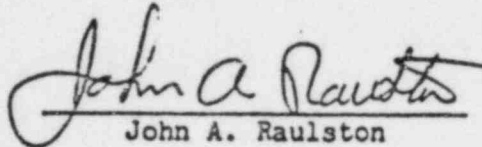
F. W. Chandler

DEC 10 1960

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 - CLASS IE REPLACEMENT MOTORS FOR HVAC EQUIPMENT - NUREG-0588 COMPLIANCE

accordance with Reliance Report NUC-9₈ - 40-year life at (1) total integrated radiation dosage of 2×10^8 rads; (2) relative humidity of 100 percent; (3) maximum operating temperature of 175°C (80°C maximum rise); and (4) pressure of plus or minus 10 inches water gauge.

This request was coordinated with your Barry Gore.


John A. Raulston

*Can
OK'd by
BFC*
BFC:MGR

cc: *R. W. Cantrell, 204 GB-K (2)
T. G. Chapman, W10C165 C-K
R. A. Costner, W11D190 C-K
L. W. Lau, W9C143 C-K
C. A. Myers, W9C135 C-K

*Please provide EEB with a PR for these replacement motors and prepare an ECN as required. NCR SQNEEB8010 is applicable. Coordinated with JCK.

RWC:MGR -

cc: MEDS, E4B37 C-K
G. G. Stack, Sequoyah CONST (4)

E40340.06

SEQUOYAH NUCLEAR PLANT
JUSTIFICATION FOR CONTINUED OPERATION
"CCS PUMP MOTOR"

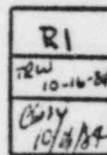
TER ITEM NO. - 44

<u>TVA ID No.</u>	<u>Status</u>
2-MTR-70-33	To be replaced
1-MTR-70-38	Replaced
1-MTR-70-46	Replaced
1-MTR-70-51	Replaced
2-MTR-70-51	To be replaced
2-MTR-70-59	To be replaced

For JCO, see attached
EQS No. MEB-70-024 R2 and EQS No. MEB-72-025 R1

Prepared by: Thomas R. Winton 6/21/84

Reviewed by: L. J. Lane 6-22-84



Sheet No. MEB 70-024
TVA ID No. CCS Pump Motor
Revision No. 2

EQUIPMENT QUALIFICATION SHEET (EQS)(REV 2)

Manufacturer and Model Number Allis Chalmers Model 012 Type FOD

Verification of Table Information (Table 3.11-7 & 8 Sheet 18 and 5)

- ☒ Equipment Type - The equipment has been identified as per TVA ID number designations (e.g., MOV, SOV, etc.).
- ☒ Location - The location has been identified (e.g., Inside Primary Containment, Annulus, Individually Cooled Rooms, General Spaces, or area affected by HELB outside primary containment).
- ☒ Component - A unique TVA ID number has been assigned (E.g., FSV-68-308).
- ☒ Function - A functional description of the component has been given (e.g., Steam Generator Blowdown).
- ☒ Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number has been given.
- ☒ Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables or by references to figures from tables.
- ☒ Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- ☒ Category - A category of a, b, or c has been defined for the equipment.
- ☒ Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated has been defined.

Qualification Status (check if applicable, NA if not)

- ☒ Qualification Report and Method - A qualification report and the method of qualification has been identified.
- ☒ Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- ☒ Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EQS considering all the above factors and referenced to the appropriate tables.
- ☒ Qualification of Several Exact Components (If applicable) - When an EQS is used for more than one item, a list of all exact components are given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- ☒ Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and a qualification or replacement plan is attached.
NCR No. SQN EEB 8010
- ☒ Unqualified Component-(Open item) (If applicable) - Component has been determined to be unqualified; the following is attached to EQS: NCR number, reason for non-qualification, and definition of TVA's qualification or replacement plan.
NCR No. _____

Prepared by: [Signature]
Reviewed by: [Signature]
QA Acceptance: _____

MEB 70-024 R2
Appendix I R2

Refer to NCR SQNEEB8010.

These motors have been determined by analysis to be qualified for a limited interim period (see MEB 72-025 Appendix II ITEM 14)

Motors will be replaced with fully qualified units as soon as possible after receipt of replacements.

Prepared by:

R. P. L.

Reviewed by:

H. D. L.

EQUIPMENT QUALIFICATION SHEET (EQS) (REV 1)

Manufacturer and model number WESTINGHOUSE HSW1

Verification of Table Information (Table 3.11-7 Sheet 7)

- ☒ Equipment Type - The equipment has been identified as per TVA ID number designations (Ex. MOV, SOV, etc.).
- ☒ Location - The location has been identified (Ex. Inside Primary Containment, Annulus, Individually Cooled Rooms, General Spaces, or area effected by HELB outside primary containment).
- ☒ Component - A unique TVA ID number has been assigned (Ex. FSV-68-308).
- ☒ Function - A functional description of the component has been given (Ex. Steam Generator Blowdown).
- ☒ Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number has been given.
- ☒ Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables or by references to figures from table.
- ☒ Environment to Which Qualified - The environment to which the equipment has been qualified to is addressed in either the tables or the environmental analysis attached.
- ☒ Category - A category of a, b, or c has been defined for the equipment.
- ☒ Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated has been defined.

Qualification status (check if applicable, NA if not)

- ☒ Qualification Report and Method - A qualification report and the method of qualification has been identified.
- ☒ Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- ☒ NA Qualification by Similarity - (If Applicable) - A justification for qualification by similarity is attached to the EQS considering all the above factors and referenced to the appropriate table.
- ☒ NA Qualification of Several Exact Component - (If Applicable) - When an EQS is used for more than one item a list of all exact components is given as an attachment with all references to appropriate tables with justification for qualification considering all the above factors.
- ☒ NA Interim Qualification - (If Applicable) - (Open Item) - Component has been determined to be qualified only for a limited interim operation, an ICR has been written and a qualification or replacement plan is attached.

EQUIPMENT QUALIFICATION SHEET (EQS) (Continued)

MEB 72-025 R1
SHT 2 OF 2

NA Unqualified Component (Open Item) - (If Applicable) - Component has been determined to be unqualified; the following is attached to EQS: NCR number, reason for non-qualification, justification for continued safe operation, and definition of IVA's qualification or replacement plan.

Prepared by: R. J. P. [Signature]

Reviewed by: L. F. [Signature]

QA Acceptance: _____

Westinghouse HSWI

These motors have been determined by analysis to be fully qualified
for the service intended (see Appendix II ITEM 16)

Prepared by: R. J. Paul
Reviewed by: L. J. Bell

SEQUOYAH NUCLEAR PLANT
NCR SQN EEB 8010
NCR SQN EEB 8015

October 11, 1980
Revision 1
October 27, 1980

INTRODUCTION

The approach used to establish that the motors listed in NCR SQN EEB 8010 and the one motor (Chilled Water Pumps for Shutdown Board Room Elevation 734), of NCR SQN EEB 8015 which is addressed in these calculations, are safe for continued operation pending full qualification combined partial test data with verbal and sometimes written information on motor materials to support analytical assumptions and conclusions reached. This same approach was used to determine aging effects on the motors for their given operating and accident environments. The environments considered were temperature, humidity, and radiation.

Temperature

Temperature rise test data are available for some motors. For those motors for which we do not have temperature rise test data, we assumed a maximum rise as specified by the contract. Using this value and the most severe temperature condition the motor would experience, the maximum operating temperature of the motor was determined. This temperature was compared to a normal ambient of 40°C at which all motors are rated (NEMA MG-1). The 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) was used to establish the operating life of the motor. (We assumed, conservatively, a five year life for the motors based on 40°C ambient and motor temperature rise.) The 10°C Rule states that for each 10°C rise in temperature above some reference temperature at which the material is able to operate without degradation (in our case 40°C plus the allowable temperature rise) the useful life of the material is halved. Therefore, a 10°C temperature rise above the maximum allowable temperature of the material would reduce the life to 2.5 years. Using this approach we can establish the motor aging due to temperature effect.

Humidity

All the motors listed on NCR 8010 operate in environments of 80 percent humidity or less. Years of motor operating experience and assurances from motor manufacturers attest to the fact humidity at these low levels will not cause the motors to be functionally inoperable nor degrade motor performance. The one motor addressed on NCR 8015, the Chilled Water Pumps for Shutdown Board Room Contract S3716, must operate in a 100 percent humidity environment. Since this motor is of open dripproof construction measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating. However, to prevent moisture absorption when the motor stands idle for long periods, an administrative procedure will be established that causes the motor to be operated at regular intervals to drive out excess moisture.

Radiation

The materials for all motors in environments greater than 10^4 rads (considered negligible) were identified and their radiation damage threshold compared to the operating and accident environments. In all cases the radiation damage threshold of the materials was equal to or higher than the combined 40 year normal dose and the integrated accident dose. The motors were therefore considered acceptable for the radiation environments in which they were to operate.

Justification for Continued Safe Operation of 1E
Motors on the Subject NCR

Purpose

The following calculations support TVA's contention that the motors of the noted contracts will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation.

Assumptions - are noted in each section

Contract 72C38-92802 (NEB)

Data

1. Spent Fuel Pit Pump AHU - Lincoln Electric frame T2523, 5HP.
230/460v, 60Hz, 3ph, Class B insulation Max Temp. rise 80°C @
40°C ambient (TEFC)

Operating Environment: Temp. 43.3°C (110°F)
Humidity 30-80%
Radiation 10⁶ rads (40 year normal dose)
No accident dose.

Calculations

Radiation - The materials composing the motor* have a radiation damage threshold that exceeds the maximum 40 year normal dose plus the integrated accident 1 year dose. Minimum material threshold = 4.5×10^7 rads. Therefore, the motor is qualified for 5 years life as far as radiation exposure is concerned. (5 years arbitrarily chosen as conservative estimate of insulation life).

Temperature - Motor was specified to NEMA Standard MG-1-1967. For motors operating above a referenced 40°C ambient MG-1-1967 (as modified in February 1971) allows a temperature rise in accordance with the formula:

Temperature rise = $0.9(T_{hs} - T_a)$ where: T_{hs} = hot spot temp. = 130°C

T_a = ambient temp = 43.3°C

Maximum allowable temp. rise = $0.9(130-43.3) = 78^\circ\text{C}$ or rounded to nearest 5°C = 80°C

*Motor materials per Vendor

Radiation Threshold per EEB Cable group: Lead wire - polyethylene (4.5×10^7 rads), propylene (5×10^7 r), magnet wire insulation - class F film code copper Essex Thermetex (3×10^9 r), slot insulation Epoxy saturated Dacron fiber Duroid (5×10^7 r), phase insulation-Aramid fiber Nomex (5×10^7 r), sleeving Acrylic coated fiberglass (1×10^9 r)

The temp rise per the manufacturer's test report was 80°C at a S.F. of 1.15. Therefore we have a 0°C margin. This motor can operate at an overall temperature of $80^{\circ}\text{C} + 43.3^{\circ}\text{C} = 123.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $123.3^{\circ}\text{C} - 80^{\circ}\text{C} = 43.3^{\circ}\text{C}$ continuously without exceeding its maximum overall temperature limitations. (5 year life).

humidity - This motor is totally enclosed fan cooled (TEFC) and is therefore immune to humidity effects.

Data

2. CCS Pump and AFW Pump AHU - Lincoln Electric frame T2556, 15 HP 230/460 V, 60 Hz, 3 ph, Class B insulation, Maximum temperature rise 80°C @ a 40°C ambient (TEFC)

Operating environment - same as item 1.

Radiation - Justification same as 1.

Calculations

Temperature - Same as 1 except: Temperature rise by report was 72°C. We have an 8°C margin. This motor may operate in an overall temperature of $80^{\circ} + 43.3^{\circ}\text{C} = 123.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $123.3^{\circ} - 72^{\circ}\text{C} = 51.3^{\circ}\text{C}$ without exceeding its maximum overall temperature. (5 year life)

Humidity - Same as 1.

Data

3. Penetration Room Coolers - Lincoln Electric frame T2523, 5 HP, (TEFC) 230/460V, 60 Hz, 3 ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient.

Calculations

Duplicate motor to item 1, same operating environment, justified same as item 1, same test data applies. (5 year life)

Data

4. AFW and Boric Acid Pump AHU - Lincoln Electric frame T2523, 5 HP, 230/460V, 60 Hz, 3 Ph, Class B insulated, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Calculations

Duplicate motor to item 1, same operating environment, justified same as item 1, same test data applies. (5 year life)

Data

5. Containment Spray Pump AHU Lincoln Electric frame T2557, 20 HP, 230/460V, 60 Hz, 3 Ph, Class B Insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment Temperature 43.3°C
Humidity 30-80 percent
Radiation 8.8×10^6 rads (40 year dose
 $1 \times 10^6 + 7.8 \times 10^6$ accident)

Computations

Radiation - Justification same as item 1

Temperature - Same as item 1 except, temperature data is not available. Thus, we assume the maximum allowable heat rise per the specifications and standards i.e., 80°C. Using the same calculations as in 1, the maximum ambient temperature in which the motor can operate is 43.3°C. (5 year life)

Humidity - Same as item 1.

Data

6. Pipe Chase AHU - Lincoln Electric frame T2557, 20 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment: Temperature 43.3°C
Humidity 30-80 percent
Radiation 1×10^6 rads (40 year dose)
no accident dose

Calculations

Duplicate motor to item 5, justification is the same as for item 5. (5 year life)

Data

7. Emergency Gas Treatment AHU - Lincoln Electric frame T2518, 3 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC).

Operating environment: Temperature 43.3°C
Humidity 30-80 percent
Radiation 1×10^6 rads (40 year dose)
no accident dose

Calculations

Radiation - Justifications same as item 1
Temperature - No temperature data available. Maximum rise of 80°C assumed. Using the same calculations as in 1 the maximum ambient temperature allowable is 43.3°C.

Humidity - Same as item 1. (5 year life)

Data

8. RHR Pump Cooler - Lincoln Electric frame T2518, 3 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40°C ambient (TEFC)

Operating environment: Temperature 43.3°C
Humidity 30-80 Percent
Radiation 8.5×10^6 rads (1×10^6 40 year + 7.5×10^6 accident dose)

Calculations

This motor is a duplicate of item 7 and the justifications is the same as for item 7. (5 year life)

Data

9. SIS Pump Cooler AHU - Lincoln Electric frame T2518, 3 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40° ambient (TEFC).

Operating environment: Temperature 43.3°C
Humidity 30-80 percent
Radiations 6.6×10^6 (1×10^6 40 year + 5.6×10^6 accident dose)

Calculations

This motor is a duplicate of item 7 and justification is the same as for item 7. (5 year life)

Data

10. Central Charging Pump Cooler AMU - Lincoln Electric frame T2518, 3 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, maximum temperature rise 80°C @ 40° ambient (TEFC).

Operating environment: Temperature 43.3°C
Humidity 30-80 percent
Radiation 7.6×10^6 (1×10^6 40 year +
 6.6×10^6 ambient dose)

Calculations

This motor is a duplicate of item 7 and justification is the same as for item 7. (5 year life)

Data

11. & Emergency Gas Treatment Fan and Auxiliary Building gas treatment fan-
12. Reliance Motors - 20 HP, 230/460V, 60 Hz, 3 Ph, Class B insulation, frame 265T, (open dripproof) SF=1.15

Operating Environment: Temperature 43.3°C (110°F)
Humidity 30-80 percent
Radiation 10^6 rads (40 year dose),
No accident dose

Calculations

Radiation - The materials composing the motor* have a radiation damage threshold that equal or exceed the maximum 40 year normal dose plus the integrated accident 1 year dose. Minimum material threshold = 1×10^6 to 1×10^7 (fiberglass impregnated with polyester resin). Therefore, the motor is qualified for a 5 year life as far as radiation exposure is concerned.

Temperature - Motors were specified to NEMA Standard MG-1-1967. For motors operating above a referenced 40°C ambient MG-1-1967 (as modified in February 1971) allows a temperature rise in accordance with the formula:

Temperature rise = $0.965 (T_{hs} - T_a)$ her T_{hs} = hot spot temperature = 140°C

T_a = ambient temperature = 43.3°C

Therefore, maximum allowable temperature rise = $0.965 (140 - 43.3) = 93.3$ or rounded to nearest 5°C = 95°C

The temperature rise (per verbal communications with the motor vendor and NEB personnel and not yet verified) was 65°C @ a SF of 1.15. Since we have no verified data we assume the maximum allowable temperature rise per the specifications and standards which is 90°C.

Therefore, we have a 5°C margin. This motor can operate at an overall temperature of $95^{\circ} + 43.3^{\circ}\text{C} = 138.3^{\circ}\text{C}$ i.e., the motor may operate in an ambient of up to $138.3^{\circ}\text{C} - 90^{\circ} = 48.3^{\circ}\text{C}$ without exceeding it's maximum overall temperature limitations. (5 year life)

*Motor materials per Vendor (Verbal not verified in writing)

Magnet wire - heavy polyester (8×10^6 r) or polyesterimide-amide-imide overcoat (3×10^9 r) lead cable - EXAR 350 (2×10^8 r), slot liner - Nomex polyester (5×10^7 r) coil lead in-Acrylic resin fiberglass (1×10^9 r), top wedge (stick) - fiberglass impregnated polyester resins (1×10^6 to 1×10^7 r)

Midstick - Nomex 410 (2×10^9 r), film stick slot spacer polyester glass (1×10^8 r) adhesive tape - glass tape acrylic adhesive (1×10^9), phase insulation - varnished glass cloth (1×10^8 r), correction insulation-acrylic resins fiberglass, (1×10^9 r), tie tape-treated glass (woven glass type - 1×10^8 r) First and last lamination of stator - polyester impregnated fiberglass (1×10^6 to 1×10^7 r) resins on windings 2 epoxies (1×10^8 r)

Humidity - These motors operate in an atmosphere of 80 percent humidity maximum. Humidity at these low levels will not contribute to moisture accumulation in the motor windings and subsequent insulation breakdown.

Contract 76K35-83673-1 (NEB)

Data

13. 480-V Board Room AHU - Westinghouse frame 254T, 15 HP, 230/460 V, 60 Hz, 3 Ph, Class B insulation. (open-dripproof) SF=1.15

Operating Environment: Temperature 46.1°C (115°F)
Humidity 30-80 percent
Radiation Negligible

Calculation

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (5 year life)

Temperature - Motors was specified to NEMA MG-1-1972. For motors operating above a referenced 40°C ambient MG-1-1972 allows a temperature rise in accordance with the formula:

Temperature rise - $0.9 (T_{hs} - T_a)$ where T_{hs} = hot spot temperature = 140°C

T_a = ambient temperature = 46.1

Therefore maximum allowable temperature rise = $0.9 (140 - 46.1) = 85^{\circ}\text{C}$ We do not have heat rise data and therefore assuming the maximum allowable rise by the specification and the standard of 90°C we get a $- 5^{\circ}\text{C}$ margin i.e., at 46.1°C we are 5°C over our maximum allowable rise. If we apply the 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) to determine the aging effects on the motor. If we assume a very conservative life of 5 years for the motor insulations then we could operate up to 95°C ($85^{\circ}\text{C} + 10^{\circ}\text{C}$) and still have one-half of five or 2.5 years of motor insulation life.

Humidity - These motors operate in an atmosphere of a maximum of 80 percent humidity and as noted for motor number 11 and 12 this presents no problem.

Contract 71C30-92695 (MEB)

Data

14. Component Cooling Water Pumps - Allis-Chalmers type FOD, Model 012, frame 587US 460V, 60 Hz, 3 Ph, Class B insulation, S.F. = 1.0, 350 HP

Operating Environment: Temperature 117°F (47°C) at 20 seconds, 111°F (44°C) at 160 seconds, 116°F (47°C) at 4 minutes, 121°F (49°C) at 10 minutes, linear decline in 24 hours to 104°F (40°C) continuous
Humidity 100 percent
Radiation negligible

Calculations

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (5 years life)

Humidity - Motor has 500 watt space heaters which will operate any time the motor is idle. This will prevent any moisture problems in the windings.

Temperature - The very short term ambient temperature rise to 49°C should not be long enough to allow the motor to stabilize at that higher temperature. However, from a conservative point of view we will assume that the 9°C rise in ambient is a continuous duty. These motors were specified to NEMA Standard MG-1-1967. Our ambient is 49°C . Therefore, temperature rise = $0.9 (130 - 49) = 73^{\circ}$ rounded to nearest $5^{\circ}\text{C} = 75^{\circ}\text{C}$. According to the manufacturers the temperature rise is 45°C at a SF of 1.08. This is well below our maximum allowable temperature rise. Thus, the motor is satisfactory for full life as far as temperature is concerned. (5-year life)

Contract 73C38-83532

Data

15. Component Cooling Water Booster Pumps - Allis Chalmers, Type RG, Model 113, 230/460V, 60 Hz, 3 Ph, 15 HP Class B insulation, SF = 1.15

Operating Environment: Temperature 104°F (40°C)
Humidity 98 percent
Radiation Negligible

Calculations

Radiation - Negligible, materials are qualified for full life as far as radiation is concerned. (10 year life)

Humidity - Motor has 50 watt space heaters which will operate when the motor is idle. This will prevent any moisture problems in the windings.

Temperature - Maximum allowable temperature rise is 70°C at rated nameplate h.p. or 90°C at 1.15 service factor both referenced to a 40°C ambient. We have no test data available so if we assume the motors have a temperature rise of 90°C at SF of 1.15 they will be satisfactory for full life of the insulation. Even if the motors exceed the maximum allowable rise by as much as 10°C i.e., to 100°C they will still have a useful life of 1/2 of the full life value (see item 13). Assuming a five year life this yields an effective life of 2.5 years.

Contract 71C30-92646 (MEB)

Data

16. Containment Spray Pumps - Westinghouse type LAC, frame 6808-S, model ESW1, 6600V, 60 Hz, 3 Ph, 700 HP, insulation - Class F, SF=1.15
Class B insulation specified

Operating Environment: Temperature 110°F (43.3°C)
Humidity 30-80 percent
Radiation 8.8 x 10⁶ rads (40 year normal dose 1 x 10⁶ plus 7.8 x 10⁶ rads 1 year integrated accident dose)

Calculations

Radiation and Humidity - The insulation material in these motors was tested to 2 x 10⁸ rads and for humidity in accordance with the procedures of IEEE 275. See Westinghouse Qualification Reports WCAP-8754 Rev. 1 and WCAP-7829 pages 15, 16, 40, and 54. These levels exceed our operating and accident environment.

Temperature - In accordance with the above noted qualification reports the insulation material is qualified for a 40-year life at continuous operation at 105°C. Our motors will operate at a temperature of 111°C (68°C rise per test report plus 43°C ambient). However, this is only infrequent operation. Each motor will be tested eight times per year for two hours per test. This test time plus a conservative margin of 50% for other possible tests equals to only 32 hours per year or 53 days over a 40 year period. Moreover, the 2-hour operating time is not sufficient for a motor of this size to reach its continuous operating temperature. Four to six hours would be required for the motor to reach its normal operating temperature.

Therefore the overall aging effect due to temperature is negligible and the motors are qualified for a full 40 years.

Sources of Information

Materials in motors - Manufacturer test reports and verbal contact between NEB/MEB and Vendors

Temperature rise limits - NEMA Standard MG-1 various dates

Environments - SNP FSAR Paragraph 3.11.2.3 and EEB Nuclear Staff

Conclusions

All motors on the above contracts are considered safe for interim operation in their normal and accident environments for periods from 5 to 2.5 years as noted under each contract designation. The Containment Spray Pump Motors Contract 71C30-92646 are fully qualified for a 40-year life in their operating environment.

SEQUOYAH NCR SQN EEB 8015

Justification for continued Safe Operation of 1E
Motors on Contract 75K36-83716 Only

Discussion

The following calculations support TVA's contention that the motors of the noted contract will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation.

Assumptions

Motor life is a conservative 5 years in normal operating environment i.e., radiation - negligible ($\leq 10^4$ rads), temperature - 40°C with temperature rise \leq maximum allowable rise by NEMA MG-1 Standard, humidity \leq 80 percent.

Data

Contract 75K36-83716 (MEB)
Chilled water pumps for shutdown Board Room AC systems el. 734.0 Lincoln Electric Company, frame 256T, 20 HP, 230V, 60 Hz, 3 ph, SF = 1.15
class B insulation, open dripproof, NEMA MG-1 1972 applies.

Operating Environment:	Temperature	115°F (46.1°C)
	Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

Temperature

Motor was specified to NEMA Standard MG-1-1972. For motors operating above a referenced 40°C ambient MG-1-1972 allow a temperature rise in accordance with the formula:

Temperature rise = $0.9 (T_{hs} - T_a)$ where T_{hs} = hot spot temperature = 140°C, T_a = ambient temperature = 46.1°C

Therefore maximum allowable temperature rise = $0.9 (140 - 46.1) = 85^\circ\text{C}$

The temperature rise of the motor per the manufacturer's test report was 90°C at a SF of 1.15. This means we have exceeded our allowable temperature rise by 5°C. Applying the 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) allows us to determine the aging effects on the motor. Using the assumed 5 year motor life we can operate up to 95°C (85°C + 10°C) and still have one half of five or 2.5 years of motor insulation life.

Sources of Information

Temperature rise - manufacturer test reports
Temperature rise - NEMA MG-1-1972
Environments - SNP FSAR Paragraph 3.11.2.3
and EEB Nuclear Staff

Conclusions

The motors on contract 75K36-83716 are considered adequate to operate in their normal and accident environments for a period up to a minimum of 2.5 years. Temperature is the limiting factor. It should be noted that any normal maintenance as required by the manufacturer will need to be performed to ensure full motor life.

Prepared by: Sandy M. Lee 10/27/80 ^{SR6}

Reviewed by: D. R. Helton 11/12/80

QA Acceptance: _____

SEQUOYAH NUCLEAR PLANT
NCR SQN EEB 8015

October 27, 1980

Justification for Continued Safe Operation of 1E
Motors on the Subject NCR

Purpose

The following calculations support TVA's contention that the motors cited in NCR SQN EEB 8015 will operate in their respective ambient and accident environments as listed in the SNP FSAR paragraph 3.11.2.3. This constitutes justification for continued safe operation. This supplements information provided by B. M. Gore in his submittal dated October 11, 1980, on the subject NCR.

Assumptions

Motor life is a conservative 5 years in normal operating environment i.e., radiation - negligible ($\leq 10^4$ rads), temperature - 40°C with temperature rise \leq maximum allowable rise by NEMA MG-1 Standard, humidity \leq 80 percent.

Data

Contract 73C31-83582

Auxiliary Air Compressors, General Electric, 20 HP, SF=1.15, 460 volt ac, 60 Hz, 3 phase, Class B insulation, open dripproof enclosure, frame 256T, NEMA MG1-1972 applies.

Operating Environment:	Temperature	115° F (46.1°C)
	Relative Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design, measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

Temperature

Motors were specified to conform to NEMA MG1-1972. The allowable temperature rise was specified not to exceed 90°C above an ambient temperature of 40°C. This requirement is identical to the maximum temperature rise allowed by NEMA MG1-12.42 for a Class B insulation system with a SF of 1.15.

Motors operating above a referenced 40°C ambient are allowed a temperature rise in accordance with the following formula from paragraph 12.42 of NEMA MG1-1972:

$$\text{Temperature rise} = 0.9 (T_{hs} - T_a)$$

where the hot spot temperature, $T_{hs} = 140^\circ\text{C}$
and the ambient temperature, $T_a = 46.1^\circ\text{C}$

Therefore the maximum allowable temperature rise is 85°C . The heat run data was not available for these motors; however, the motors were allowed a 90°C rise by the specification. Assuming the manufacturer supplied a motor that conformed to the specified temperature rise requirements, we would exceed the maximum allowable temperature rise for an ambient of 46.1°C by 5°C . Applying the 10°C Rule (an approximation of Arrhenius's Law as applied to insulation materials) allows us to determine the aging effects on the motor. Using the assumed 5-year motor life we can operate up to 95°C ($85^\circ\text{C} + 10^\circ\text{C}$) and still have one half of five or 2.5 years of motor insulation life.

Sources of Information

Temperature rise - Contract 73C31-83582

Temperature rise - NEMA MG1-1972

Environments - SNP FSAR Paragraph 3.11.2.3 and MEB Contract Engineers

Data

Contract 72C30-92610 (MEB)

Auxiliary Feedwater Pumps, Allis-Chalmers, 500 HP, SF=1.15, 6600-volt ac, 60-Hz, 3-phase, Class F insulation, open dripproof enclosure, frame 3CRS6; NEMA MG1-1967 applies.

Operating Environment:	Temperature	120°F (48.9°C)
	Relative Humidity	100 percent
	Radiation	Negligible

Calculations

Radiation - Negligible, materials are qualified for full life (5 years) as far as radiation is concerned.

Humidity

Since this motor is of open dripproof design, measures must be taken to insure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating since the heat generated in normal service precludes moisture absorptions. However, during periods when the motor is idle, moisture could be absorbed in the winding. Therefore, an administrative procedure will be established such that the motor is operated at regular intervals (not to exceed 1 week) to drive out any excess moisture.

The motor temperature rise requirements at the nameplate rated horsepower were specified not to exceed 70°C over a 40°C ambient. A 90°C rise at a SF of 1.15 was specified for short-time service only. This corresponds to the maximum Class B temperature rise allowed under NEMA MG1-12.42 dated February 1971. The use of a Class F insulation while limiting the allowable temperature rise to that of a Class B system, is one method of providing a conservative motor design. Motors operating above a 40°C ambient are allowed a temperature rise in accordance with the following formula:

$$\text{Temperature rise} = 0.9 (T_{hs} - T_a)$$

where the hotspot temperature $T_{hs} = 140^\circ\text{C}$ for a Class B insulation system and the ambient temperature $T_a = 48.9^\circ\text{C}$

Therefore, the maximum allowable temperature rise above the listed operating temperature for a Class B system is 82°C at a SF of 1.15. The temperature rise of the motor according to the manufacturer's test report was 45°C at a SF of 1.15 which is substantially less than the maximum allowable temperature rise.

Sources of Information

Temperature rise - manufacturer's test report dated 9/27/72

Temperature rise - NEMA MG1-1967

Environments - SNP FSAR Paragraph 3.11.2.3 and MEB Contract Engineer.

Conclusions

The motor on contracts 73C31-83582 and 72C30-92610 are considered adequate to operate in their normal and accident environments outside containment for a minimum period of 2.5 and 5 years respectively. It should be noted that any normal maintenance as required by the manufacturer will need to be performed to ensure full motor life.

Prepared by W. P. Achary 10/27/80 SKG

Reviewed by D. P. Helsta 10/21/80

QA Acceptance _____

TER ITEM NO. 54

TVA ID NO. 1, 2-PS-3-140A, -150A, -139A, -139B, -139D, -144A, -144B, -144D

MANUFACTURER/MODEL NO.

ASCO/Models SB11AKR/TG13A42R and SB31AKR/TD30A32R

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

I. For pressure switches 1 2-PS-3-140A, -150A

1. Pressure switches 1, 2-PS-3-140A, -150A are located in the Auxiliary Building, Elev. 714. Rooms A5, A9. They are required not to fail in a manner detrimental to plant safety for 100 days following a LOCA and for 1 month following an RHR, CVCS, Auxiliary Feedwater, or Auxiliary Boiler line break.¹
2. The pressure switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	195°F
Pressure:	ATM	ATM	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	U1 3.5x10 ⁴ rads (40 yr TID) U2 3.5x10 ² rads (40 yr TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer has tested these switches to the following conditions as documented in ASCO test report AQR-101083/Rev. 1.

Temperature:	210°F
Pressure:	2.2 psig
Relative Humidity:	100%
Radiation:	18.7 x 10 ⁶ rads

4. ASCO has tested these switches and has shown that they are fully qualified for the environmental conditions given in section 2 above. However, there is not sufficient seismic test data to consider these devices fully qualified. TVA is currently awaiting further seismic test data from ASCO.

¹See OE Calculation (NEB 840213 221).

²See SQM Environmental Data Drawings 47E235-51, -52.

5. The seismic DBE failure mode for these switches as documented in ASCO's September 26, 1984 (EEB 840927 019), letter is, "The ASCO Tri-Point pressure switch will produce a change of state of the electrical output in response (to) a process input as this process input signal approaches the set point. The electrical output signal will be maintained after the change of state occurs, if the process signal is maintained at the same level or at a level past the point of change." It has been determined that these switches will have performed their safety requirement so long as a change of state of the electrical output to the tripped condition does not occur above 500 psia. These switches are set at 100 psia and have a 200 psi upper range limit since the process is not approaching the set point at 500 psia a change of state would not occur.

The above information shows that these switches will perform their intended safety function. Complete resolution will be as determined at NCR SQNEEB8408.

II. For pressure switches 1, 2-PS-3-139A, -139B, -139D, -144A, -144B, -144D

1. Pressure switches 1, 2-PS-3-139A, -139B, -139D, -144A, -144B, -144D are located in the Auxiliary Building Elec. 690, Room A1. They are required to operate for 100 days following an RHR, CVCS, Auxiliary Feedwater, or Auxiliary Boiler line break.¹
2. The pressure switches are required to operate in the following environments.³

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	128°F
Pressure:	ATM(-)	ATM(-)	ATM
Relative Humidity:	80%	90%	100%
Radiation:	5x10 ² rads (40 yr TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer has tested these switches to the following conditions as documented in ASCO test report AQR-101083/Rev. 1.

Temperature:	210°F
Pressure:	2.2 psig
Relative Humidity:	100%
Radiation:	18.7x10 ⁶ rads

4. ASCO has tested these switches and has shown that they are fully qualified for the environmental conditions given in section 2 above. However, there is not sufficient seismic test data to consider these devices fully qualified. TVA is currently awaiting further seismic test data from ASCO.

5. The seismic DBE failure mode for these switches as documented in ASCO's letter of September 26, 1984 (EEB 840927 019), is "The ASCO Tri-Point pressure switch will produce a change of state of the electrical output in response (to) a process input as this process input signal approaches the setpoint. The electrical output signal will be maintained after the change of state occurs, if the process signal is maintained at the same level or at a level past the point of change." These switches perform a AFW pump to ERCW switchover. If the process pressure is approaching the setpoint during a seismic event, the setpoint of the switches could be shifted resulting in initiation of ERCW flow to the AFW pumps at a higher than normal setpoint pressure. At that time the switches would remain in the actuated state as long as the system process pressure remains at or below the point at which the switch actuated. This is acceptable from a safety standpoint.
6. The above information shows that these switches will perform their intended safety function. Complete resolution will be as determined by NCR SQNEEB8408.

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TER Item No. 58

TVA ID No.

1,2-PS-30-46A, -47A, -48A

1,2-PS-30-46B, -47B, -48B

Manufacturer/Model No.

Barton/288A

Status IV

Justification for Continued Operation

1. Pressure switches 1,2-PS-30-46A, -46B, -47A, -47B, -48A, -48B are located in the annulus elev 797. They are required to operate for 5 minutes and not to fail in a manner detrimental to plant safety for 100 days following a LOCA.
2. The pressure switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	150°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	2×10^7 rads	5×10^7 rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NKB 830228 221

²See SQN Environmental Data Drawings 47E235-47

3. The manufacturer's specification for the solenoid valves are:

Temperature:	200°F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	2×10^8 rads

4. Material breakdown analysis reveals the presence of switches, wires, and O-rings. These components have been replaced with new parts that have been tested to 2×10^8 rads without any damaging effect to their operation. Reference letter from ITT Barton (ZEB 801204 034), to F. W. Chandler.
5. See generic position 4.1.5 for radiation and 4.1.3 for relative humidity.

6. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the pressure switches. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the pressure switches with qualified devices as determined by the resolution of MCR SQNEE8009.

TER NO. 59

TVA ID NO. 1, 2-FS -30-194, -195, -196, -197

MANUFACTURER/MODEL NO.

Dwyer Instrument/Model 1627-1

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Flow switches 1, 2-FS-30-194, -195 are located in the Auxiliary Building, Elev. 714, Rooms A5, A9. Flow switches 1, 2-FS-30-196, -197 are located in the Auxiliary Building, Elev. 690, Rooms A6, A19. Flow switches are required to operate for 1 month following RHR, CVCS letdown, AFW pump turbine steam supply or AUX Boiler line breaks. Flow switches are not required to operate and a failure is not detrimental to plant safety following a LOCA¹.
2. The flow switches are required to operate in the following environment²:

For flow switches 1, 2-FS-30-194, -195

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	184°F
Pressure:	Atm	Atm
Relative Humidity:	50%	100%
Radiation:	U1 3.5x10 ⁴ rads (40 yr. TID) U1 3.5x10 ² rads (40 yr. TID)	N/A
Spray/Flooding:	N/A	N/A

For flow switches 1, 2-FS-30-196, -197

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	196°F
Pressure:	Atm	Atm
Relative Humidity:	50%	100%
Radiation:	U1 1.75x10 ³ rads (40 yr. TID) U1 3.5x10 ⁴ rads (40 yr. TID)	N/A
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830228 221.

²See SQN Environmental Data Drawings
47E235-51 for 1, 2-FS-30-194, -195
47E235-59 for 1, 2-FS-30-196, -197

3. The Dwyer model No. 2627 differential pressure switch is qualified for the following environment³:

Temperature: 180°F
Pressure: Atm
Relative Humidity: 90%
Radiation: 1×10^7 rads

4. The temperature profiles⁴ for a RHR line break, which is the worst case DBE, denotes that the temperature reaches a maximum of 194 F for 1, 2-FS-30-194, -195 and a maximum of 196°F for 1, 2-FS-30-196, -197 within 600 seconds and then decreasing linearly to a maximum normal of 104°F within 24 hours.
5. The flow switches are not used under normal operation. All penetration room coolers start on an ARI signal. There are no procedures to manually put the coolers in the standby mode. The flow switches are tied into the operation of companion coolers, 194 with 195 and 196 with 197. The flow switches are needed only if the coolers are put into the standby mode. Since the coolers are not normally in the standby mode, failure of one cooler will not cause failure of equipment in the penetration rooms. If after a DBE, the operator does put a cooler in the standby mode and its companion cooler fails, then the operator can manually start the cooler which is in the standby mode.
6. The above information shows justification for continued use of the flow switches. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace switches with qualified devices as determined by the resolution of NCR SQNEEB8036.

³Wyle Laboratories Test Report No. S17460-AR-10 Dated November 20, 1981.

⁴See SQN Environmental Data Drawings

47E235-52 for 1, 2-FS-30-194, -195

47E235-60 for 1, 2-FS-30-196, -197

TER Item No. 60

TVA ID No.

1,2-PS-3-148, -156, -164, -171, -138A, -138B

Manufacturer/Model No.

ASCO/Models SB11AKR/TG13A42R
and SB11AKR/TL10A32R

Status IV

Justification for Continued Operation

I. For Pressure Switches 1,2-PS-3-148, -156, -164, -171

1. Pressure switches 1,2-PS-3-148, -156, -164, -171 are located in the auxiliary building, elev 714, room A1. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS, Auxiliary Feedwater, or Auxiliary Boiler line break.¹
2. The pressure switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	128°F
Pressure:	Atm(-)	Atm(-)	Atm
Relative Humidity:	80%	90%	100%
Radiation:	5x10 ² rads (40 yr TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer has tested these pressure switches to the following conditions as documented in ASCO test report AQS-101083/Rev. 1.

Temperature:	210°F
Pressure:	2.2 psig
Relative Humidity:	100%
Radiation:	18.7 x 10 ⁶ rads

4. ASCO has tested these switches and has shown that they are fully qualified for the environmental conditions given in section 2 above. However, there is not sufficient seismic test data to consider these devices fully qualified. TVA is currently awaiting further seismic test data from ASCO.

5. The seismic DBE failure mode of these switches, as documented in ASCO letter dated September 26, 1984 (EEB 840927 019), is as follows: "The ASCO Tri-Point pressure switch will produce a change of state of the electrical output in response to a process input as this process input signal approaches the set point."

The function of these switches is to perform a "switch-over" from a 4" LCV to a 2" LCV. If, due to a seismic event, switch-over to the 2" LCV occurs at a pressure above 470 psia, the Auxiliary Feedwater pumps will not be able to supply rated flow at rated head. However, 10 minutes is available for the operator to determine lack of rated flow and manually switch back to the 4" LCV. This is based on SQN FSAR section 10.4.7.2.3 which states that if the Auxiliary Feedwater System did not respond for 10 minutes, the system delivers the required flow (880 gpm) to perform the system function.

¹See EN DES Calculations NEB 840213 221.

²See SQN Environmental Data Drawings 47E235-49

II. For Pressure Switches 1,2-PS-3-138A, -138B

1. Pressure switches 1,2-PS-3-138A, -138B are located in the Auxiliary Building elev 669, rooms A6, A26. They are required to operate for 5 minutes following a LOCA and to not fail in a manner detrimental to plant safety for 100 days thereafter¹.
2. The pressure switches are required to operate in the following environments³:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	110°F
Pressure:	Atm(-)	Atm(-)	Atm
Relative Humidity:	80%	90%	100%
Radiation:	5x10 ² rads (40 yr TID)	N/A	< 1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer has tested these pressure switches to the following conditions as documented in ASCO test report AQS-101033/Rev. 1.

Temperature:	210°F
Pressure:	2.2 psig
Relative Humidity:	100%
Radiation:	18.7 x 10 ⁶ rads

4. ASCO has tested these switches and has shown that they are fully qualified for the environmental conditions given in section 2 above. However, there is not sufficient seismic test data to consider these devices fully qualified. TVA is currently awaiting further seismic test data from ASCO.
5. The seismic DBE failure mode of these switches, as documented in ASCO letter dated September 26, 1984 (ZEB 840927 019), is as follows: "The ASCO Tri-Point pressure switch will produce a change of state of the electrical output in response to a process input as this process input signal approaches the set point. The electrical output signal will be maintained after the change of state occurs, if the process signal is maintained at the same level or at a level past the point of change." It has been determined that these switches will have performed their safety requirement so long as a change of state of electrical output to the tripped condition does not occur above 500 psia. These switches are set at 100 psia and have a 200 psi upper range limit. Since the process is not approaching the set point at 500 psia a change of state would not occur.
6. The above information shows that these switches will perform their intended safety function. Complete resolution will be as determined by NCR SQNEEB8408.

³See Environmental Data Drawing 47E235-71, -72.

TER ITEM NO. 61

TVA ID NO. 1, 2-FT-3-142

MANUFACTURER/MODEL NO.

Bailey/Model 555

STATUS IV

JUSTIFICATION FOR CONTINUED USE:

1. Differential pressure transmitters 1, 2-FT-3-142 are located in the Auxiliary Building Elev. 669, Rooms A6, A26. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS letdown or AUX boiler line breaks¹.

2. The transmitters are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104 ^o F	170 ^o F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr. TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the transmitters are:

Temperature:	185 ^o F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the transmitters. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace switches with qualified devices as determined by the resolution of NCR SQNEEB8032.

¹See EN DES Calculations NEB 830713 219.

²See SQN Environmental Data Drawing 47E235-71.

TER ITEM NO. 62

TVA ID NO. 1, 2-PDT-65-80, -82, -90, -97

MANUFACTURER/MODEL NO.

Foxboro/Model E13DL

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Differential pressure transmitters 1, 2-PDT-65-80, -82, -90, -97 are located in the Auxiliary Building, Elev. 714, Rooms A5, A9. They are required to operate for 100 days following a LOCA¹.

2. The transmitters are required to operate in the following environments²:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	110°F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	U1 3.5x10 ⁴ rads (40 yr. TID) U2 3.5x10 ² rads (40 yr. TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer's specifications for the transmitters are:

Temperature:	180°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the pressure transmitters. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace pressure transmitters as determined by the resolution of NCR SQNEEB8025.

¹See EN DES Calculations NEB 830217 221.

²See SQN Environmental Data Drawing 47E235-51.

TER ITEM NO. 64

TVA ID NO. 1, 2-FT-72-13, -34

MANUFACTURER/MODEL NO.

Bailey/Model No. 555

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Flow transmitters 1, 2-FT-72-13, -34 are located in the Auxiliary Building, Elev. 690, Rooms A28, A29. They are required to operate for 100 days following a LOCA¹.
2. The transmitters are required to operate in the following environments².

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	110°F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	3.5x10 ⁴ rads (40 yr. TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer's specifications for the transmitters are:

Temperature:	185°F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the flow transmitters. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace pressure transmitters as determined by the resolution of NCR SQNEEB8034.

¹See EN DES Calculations NEB 830923 221.

²See SQN Environmental Data Drawing 47Z235-64.

TER ITEM NO. - 99

Manufacturer/Model No. - AVCO/C5439/SMB-000

TVA ID NOS. -

FSV-30-8	FSV-30-17
FSV-30-10	FSV-30-40
FSV-30-50	FSV-30-56
FSV-30-52	FSV-30-20
FSV-30-15	FSV-30-58

STATUS: To be replaced

Justification for Continued Operation:

While we are unable to obtain qualification documentation for this valve, we have obtained manufacturer's literature which shows that this valve is manufactured from bronze and viton. For the environments that this valve will be exposed to these materials should not experience debilitating degradation.

Installation of replacements is scheduled as follows:

- Unit 1 - no later than cycle 3 fuel outage period (November 1985)
as previously requested in exemption from 10CFR50.49 rules
- Unit 2 - no later than the end of cycle 2 fuel outage -
November 24, 1984.

REPLACEMENT MATERIAL IS ONSITE

Prepared by: DJ Cuy 6/20/84

Reviewed by: JW Hedges 6/20/84

G24172.03

TER ITEM NO. - 100

Manufacturer/Model No. - AVCO/C5439/SMB-000

TVA ID NOS.

FSV-30-2	FSV-65-28A
FSV-30-5	FSV-65-28B
FSV-30-60	FSV-65-47A
FSV-30-61	FSV-65-47B
FSV-65-7	FSV-65-50
FSV-65-8	FSV-65-51

STATUS - To be replaced

Justification for Continued Operation -

While we are unable to obtain qualification documentation for this valve we have obtained manufacturer's literature which shows that this valve is manufactured from bronze and viton. For the environments that this valve will be exposed to these materials should not experience debilerating degradation.

Installation of replacements is scheduled as follows:

Unit 1 - no later than cycle 3 fuel outage period (November 1985)
as previously requested in exemption from 10CFR50.49 rules
Unit 2 - no later than the end of cycle 2 fuel outage -
(COMMON) November 24, 1984.

REPLACEMENT MATERIAL IS ON SITE

Prepared by:

DJ C 6/2/84

Reviewed by:

JW Hodges 6/2/84

TER ITEM NO. 102

TVA ID NO. 1, 2-FSV-61-192, -194, -122, -97

MANUFACTURER/MODEL NO.

ASCO/Model No. HT8300

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Solenoid valves 1, 2-FSV-61-192, -194, -122 are located inside containment, upper compartment. Solenoid valves 1, 2-FSV-61-97 are located inside containment, lower compartment. Valves are required to operate for 5 minutes following a LOCA and not to fail detrimental to plant safety for 100 days thereafter¹. Valves are required to operate for 5 minutes following a main steam or feedwater line break and not to fail detrimental to plant safety for 100 days thereafter¹. Valves are required to operate for 5 minutes following a RHR or CVCS line break and not to fail detrimental to plant safety for 1 month thereafter¹.

2. The solenoid valves are required to operate in the following environments².

Solenoid valves 1, 2-FSV-61-192, -194, -122

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	160°F
Pressure:	14.7 psia	26.4 psia
Relative Humidity:	80%	100%
Radiation:	2x10 ⁷ rads (40 yr. TID)	1x10 ⁸ rads
Spray/Flooding:	Spray only	Spray only

Solenoid valves 1, 2-FSV-61-97

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	327°F
Pressure:	14.7 psia	26.4 psia
Relative Humidity:	80%	100%
Radiation:	2x10 ⁷ rads (40 yr. TID)	1x10 ⁸ rads
Spray/Flooding:	Spray only	Spray only

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	4.5x10 ⁵ rads

¹See EN DES Calculations NEB 830208 222.

²See SQN Environmental Data Drawings 47E235-44 for 1, 2-FSV-61-192, -194, -122; 47E235-45 for 1, 2-FSV-61-97.

4. The solenoid valves must change position (deenergize) to allow the associated containment isolation valves to close. The solenoid valves must not fail such that air can be admitted to the valve operator causing the valve to open. Failure of the solenoid valve during the first 5 minutes following a DBE will result in the valve deenergizing to its "fail-safe" position. Failure of the solenoid valve during the 100 hrs following a DBE, due to degradation of elastomeric components, will not result in control air being admitted to the isolation valve operator.
5. The above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace solenoid valves as determined by the resolution of NCR SQNEEB8120..

TER Item No. 105

TVA ID No.

1,2-PSV-81-12

Manufacturer/Model No.

ASCO/Model No. HU200-300-1RV

Status IV

Justification for Continued Operation

1. Solenoid valves 1,2-PSV-81-12 are located in the auxiliary building, elev 690, room A28 and A29 . They are required to operate for 5 minutes following a LOCA and not to fail detrimental to plant safety for 100 days thereafter¹.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	128°F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	3.5x10 ⁵ rads (40 yr TID)		1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

¹See EN DES Calculations NEB 840120 226

²See SQN Environmental Data Drawings 47E235-64

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	4x10 ⁵ rads

4. See generic position 6.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8015.

TER ITEM NO. 106

TVA ID NO. O-FSV-12-79

MANUFACTURER/MODEL NO.

ASCO/Model No. HV200-924-2F

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Solenoid valve O-FSV-12-79 is located in the Auxiliary Building, Elev. 690, Room A1 (Volume 9). It is required to operate for 5 minutes following a LOCA or AFW pump turbine steam supply line break and not to fail detrimental to plant safety for 100 days following a LOCA or for 1 month following AFW pump turbine steam supply line break¹.
2. The solenoid valves are required to operate in the following environments².

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	110°F
Pressure:	Atm	Atm	Atm
Relative Humidity:	80%	90%	100%
Radiation:	5x10 ² rads (40 yr. TID)	N/A	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	Water tight enclosure
Radiation:	7x10 ⁶ rads

4. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace solenoid valves as determined by the resolution of NCR SQNEEB8050.

¹See EN DES Calculations NEB 830923 220.

²See SQN Environmental Data Drawings 47E235-55, -57.

TER ITEM NO. 107

TVA ID NO. 1, 2-FSV-90-107, -111, -113, -117

MANUFACTURER/MODEL NO.

ASCO/Model No. HTX8320A22V

STATIC TV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Solenoid valves 1, 2-FSV-90-107, -111, -117 are located inside Annulus, Elev. 718. They are required to operate for 5 minutes following a LOCA, main steam line break or feedwater line break and not to fail detrimental to plant safety for 100 days thereafter¹. They are required to operate for 5 minutes following a RHR or CVCS line break and not to fail detrimental to plant safety for 1 month thereafter¹.

2. The solenoid valves are required to operate in the following environments².

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	150°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	2x10 ⁷ rads (40 yr. TID)	5x10 ⁷ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	200°F
Pressure:	Atm
Relative Humidity:	Water tight enclosure
Radiation:	7x10 ⁶ rads

4. See generic position 4.1.8 for relative humidity.
5. The solenoid valves must deenergize to close their associated containment air monitor isolation valves on a containment vent isolation signal. The solenoids cannot fail such the control air will be admitted to the FCVs causing them to remain open. Failure of the solenoid valve during the first 5 minutes following a DBE will result in the valve deenergizing to it's "fail-safe" position. Failure of the solenoid valve during the 100 days following a DBE, due to degradation of elastomeric components, will not result in control air being admitted to the isolation valve operator.
6. The above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace solenoid valves as determined by the resolution of NCR SQNEEB8044.

¹See EN DES Calculations NEB 830923 220.

²See SQN Environmental Data Drawings 47E235-55, -57.

TER Item No. 108

TVA ID No.

1,2-LSV-3-148, -156, -164, -171, -172, -173

Manufacturer/Model No.

ASCO/Model No. HT8300B58RU

Status IV

Justification for Continued Operation

I. For Solenoid Valves 1,2-LSV-3-148, -156, -164, -171

1. Solenoid valves 1,2-LSV-3-148, -156, -164, -171 are located in the auxiliary building, elev 714, room A1. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS letdown or aux boiler line breaks.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	128°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr TLD)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB830713 219

²See SQN Environmental Data Drawings 47E235-49

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	Water Tight Enclosure
Radiation:	4.5x10 ⁵ rads

4. See generic position 4.1.8 for relative humidity.

5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB048.

II. For solenoid valve: 1,2-LSV-3-172, -173

1. Solenoid valves 1,2-LSV-3-172, -173 are located in the auxiliary building elev 714, rooms A6, A10. They are required to operate for 5 minutes following a LOCA and not to fail detrimental to plant safety for 100 days thereafter¹. They are required to operate for 5 minutes following RHR, CVCS letdown or aux boiler line breaks and not to fail detrimental to plant safety for 1 month thereafter¹.
2. The solenoid valves are required to operate in the following environment³:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	194°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	1x10 ⁶ rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	Water Tight Enclosure
Radiation:	4.5x10 ⁵ rads

4. See generic position 4.1.8 for relative humidity.
5. Following a DBE, the solenoid valves must go to the deenergized state so that the associated LCV's go to the modulate mode. The solenoid valves must remain in the deenergized state so that the LCV's do not close and isolate the flow of AFW to any steam generator. Failure of the solenoid valve during the first five minutes following a DBE will result in the valve deenergizing to its "Fail-Safe/Modulating" position. Failure of the solenoid valve during the 100 days following a DBE, due to degradation of elastomeric components, will not result in loss of control air to the modulator.
6. The above information shows justification for continued use of the solenoid valves. However, due to the lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8048.

³See SQN environmental data drawing 47E235-83.

TER Item No. 109

TVA ID No.

1,2-LSV-3-148A, -156A, -164A, -171A, and 1,2-FSV-77-128

Manufacturer/Model No.

ASCO/Model No. WPX-EV-202-301-1F

Status IV

Justification for Continued Operation

I. For Solenoid Valves 1,2-LSV-3-148A, -156A, -164A, and -171A

1. Solenoid valves 1,2-LSV-3-148A, -156A, -164A, and -171A are located in the auxiliary building, elev 714, room A1, volume 12. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS, auxiliary feedwater, or auxiliary boiler line breaks.¹
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	129°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830713 219

²See SQN Environmental Data Drawings 47E235-49R0 and -50R0.

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	7x10 ⁶ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8049.

for solenoid valve: 1,2-PSV-77-128

1. Solenoid valves 1,2-PSV-77-128 are located in the auxiliary building elev 690, rooms A28 and A29, respectively, volume 17. They are required to operate for 5 minutes and not to fail in a manner detrimental to plant safety for 100 days following a LOCA³.
2. The solenoid valves are required to operate in the following environments⁴

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	129°F
Pressure:	Atm(-)	Atm
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	7x10 ⁶ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8049.

³See EN DES Calculations NEB 830208 225

⁴See SQN Environmental Data Drawing 47E235-64R0

TER Item No. 110

TVA ID No.

1,2-FSV-67-342, -344, -346, -348, -350, -352
1,2-FSV-70-35

Manufacturer/Model No.

For solenoid valve 1,2-FSV-67-342	ASCO/HB830081RU
For solenoid valve 1,2-FSV-70-85	ASCO/HT8300B58RU
For solenoid valve 1,2-FSV-67-344, -346, -348, -350, -352	ASCO/HB8300C58RU

Status IV

Justification for Continued Operation

I. For Solenoid Valves 1,2-FSV-67-342, -344, -346, -348

1. Solenoid valves 1,2-FSV-67-342, -344, -346, -348 are located in the auxiliary building, elev 669, rooms A7 and A25. They are required to operate for 100 days following a LOCA and for 1 month following an auxiliary boiler line break, auxiliary feedwater line break, RHR and CVCS accidents.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	110°F
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	100%
Radiation:	1.75x10 ² rads (unit 1) 3.5x10 ⁴ rads (unit 2) (40 yr TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830829 220 for essential raw cooling water system and NEB 830829 221 for component cooling system.

²See SQN Environmental Data Drawing reference: I - 47E235-69,70,EO
II - 47E235-64, EO
III - 47E235-59,60,EO

II. For solenoid valves 1,2-FSV-70-85

1. Solenoid valves 1,2-FSV-70-85 are located in the auxiliary building, elev 690, room A28 and A29. They are required to operate for 5 minutes following a LOCA. Additionally, they must not fail in a manner detrimental to plant safety for 100 days thereafter.

2. These solenoid valves are required to operate in the following environments².

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	110°F (LOCA)
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	N/A
Radiation:	3.5x10 ⁵ rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

III. For solenoid valves 1,2-FSV-67-350, -352,

1. Solenoid valves 1,2-FSV-67-350, -352 are located in the auxiliary building at elev 690, room A6. They are required to operate for 100 days following a LOCA and one month following an auxiliary feedwater line break, auxiliary boiler line break, CVCS and BHR accidents.
2. The solenoid valves are required to operate in the following environments².

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	196°F (HELI)
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	N/A
Radiation:	1.7x10 ³ rads (unit 1) 3.5x10 ⁴ rads (unit 2) (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specification for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4x10 ⁵ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.

5. The above information shows that the valves are not qualified. These solenoids operate the ERCW control valves which supply cooling water to the penetration room coolers located on elevations 690 and 714. The solenoids are normally in the energized position, which keeps the control valves closed. Upon receipt of a penetration room cooler fan start signal, the solenoid valves will deenergize to supply cooling water to the room coolers. The maximum design temperature for these solenoid valves is 140°F. This temperature will be exceeded in approximately 1-1/2 minutes after an RHR line break (this is an RHR line break in the auxiliary building, which can be isolated). However, the cooling fans are set to start at 95°F, so the solenoid valves will complete their safety function (deenergizing to allow control valve to open) before failure occurs. No failure mode is foreseen that will cause solenoid reenergization (causing the control valve to close). If the temperature subsides to where the fan turns off, the failure of the solenoid to reenergize will not compromise plant safety. TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

TER Item No. 111

TVA ID No.

1,2-FSV-67-168, 170, 176, 182, 184, 186, 188, 190, 213, 215, 354, 356

Manufacturer/Model No.

For solenoid valves 1,2-FSV-67-168, 170, 176, 182, 188, 190, 213, 215, 354, 356, and 1-FSV-67-184 ASCO/HB8300C58RU

For solenoid valves 2-FSV-67-184 ASCO/HV-200-921-1RF

Status IV

Justification for Continued Operation

I. For Solenoid Valves 1,2-FSV-67-168, 170

1. Solenoid valves 1,2-FSV-67-168, 170 are located in the auxiliary building, elev 669, room A1. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS letdown, AFW pump turbine steam supply or aux boiler line breaks.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	143°F
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr TLD)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 330829 220

²See SQN Environmental Data Drawings 47E235-65, 68

3. The manufacturer's specification for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4x10 ⁵ rads

4. See generic position 4.1.5 for radiation 4.1.8 for relative humidity.

5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

II. For solenoid valve: 1,2-FSV-67-176, 182

1. Solenoid valves 1,2-FSV-67-176, -182 are located in the auxiliary building elev 669, room A1. They are required to operate for 5 minutes following a LOCA³.
2. The solenoid valves are required to operate in the following environment³:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	N/A
Pressure:	Atm(-)	N/A
Relative Humidity:	80%	N/A
Radiation:	5x10 ² rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specification for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4x10 ⁵ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

III. For solenoid valves 1,2-FSV-67-184, -186, -188, -190

1. Solenoid valves 1,2-FSV-67-184, -186, -188, -190 are located in the auxiliary building, elev 653, room A1. 1,2-FSV-67-184, -186 are required to operate for 30 days following a LOCA. 1,2-FSV-67-188, -190 are required to operate for 100 days following a LOCA⁵.

2. The solenoid valves are required to operate in the following environments⁶.

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	N/A
Pressure:	Atm(-)	N/A
Relative Humidity:	80%	N/A
Radiation:	5x10 ² rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4x10 ⁵ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace these valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

IV. For solenoid valves 1-FSV-67-213, -215

1. Solenoid valves 1-FSV-67-213, -215 are located in the auxiliary building, elev 714, room A1. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS letdown, AFW pump turbine steam supply or aux boiler line breaks⁷.
2. The solenoid valves are required to operate in the following environments⁸:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	128°F
Pressure:	Atm(-)	14.4 psia
Relative Humidity:	80%	100%
Radiation:	5x10 ² rads (40 yr TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

⁷See EN DES Calculation NEB 830829 220

⁸See SQN Environmental Data Drawings 47E235-49, -50

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4×10^5 rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace these valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

V. For solenoid valves 1,2-FSV-67-354, -356

1. Solenoid valves 1,2-FSV-67-354, -356 are located in the auxiliary building, elev 714, rooms A5 and A9. They are required to operate for 100 days following a LOCA and for 1 month following RHR, CVCS letdown, AFW pump turbine steam supply or aux boiler line breaks⁹.
2. The solenoid valves are required to operate in the following environments¹⁰:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	194°F
Pressure:	Atm(-)	14.4 psia
Relative Humidity:	80%	100%
Radiation:	3.5×10^4 rads (40 yr TID unit 1)	1×10^4 rads (LOCA)
	3.5×10^2 rads (40 yr TID unit 2)	
Spray/Flooding:	N/A	N/A

⁹See EN DES Calculation NEB 830829 220

¹⁰See SQN Environmental Data Drawings 47E235-51, -52

3. The manufacturer's specifications for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4×10^5 rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.

5. The above information shows that the valves are not qualified. These solenoids operate the ERCW control valves which supply cooling water to the penetration room coolers located on elevations 690 and 714. The solenoids are normally in the energized position, which keeps the control valves closed. Upon receipt of a penetration room cooler fan start signal, the solenoid valves will deenergize to supply cooling water to the room coolers. The maximum design temperature for these solenoid valves is 140°F. This temperature will be exceeded in approximately 1-1/2 minutes after an RHR line break (this is an RHR line break in the auxiliary building, which can be isolated). However, the cooling fans are set to start at 95°F, so the solenoid valves will complete their safety function (deenergizing to allow control valve to open) before failure occurs. No failure mode is foreseen that will cause solenoid reenergization (causing the control valve to close). If the temperature subsides to where the fan turns off, the failure of the solenoid to reenergize will not compromise plant safety. TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8046.

TER Item No. 112

TVA ID No.

2-FSV-67-184

Manufacturer/Model No.

ASCO/Model No. HV-200-921-1RF

Status IV

Justification for Continued Operation

1. Solenoid valve 2-FSV-67-184 is located in the auxiliary building, elev 653, room A1. It is required to operate for 30 days following a LOCA.
2. The solenoid valve is required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	N/A
Pressure:	Atm(-)	N/A
Relative Humidity:	80%	N/A
Radiation:	5x10 ² rads	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830829 220 for Essential Raw Cooling Water

²See SQN Environmental Data Drawings 47E235-73R0

3. The manufacturer's specification for the solenoid valve is:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1 Enclosure
Radiation:	4.0x10 ⁵ rads

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the solenoid valve. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valve with qualified devices as determined by the resolution of NCR SQNEEB8046.

TER Item No. 113

TVA ID No.

2-FSV-61-96, and -110

Manufacturer/Model No.

ASCO/Model No. HT8300D58RF

Status IV

Justification for Continued Operation

1. Solenoid valves 2-FSV-61-96, and -110 are located in the auxiliary building, elev 734, room A16. They are required to operate for 5 minutes and not fail in a manner detrimental to plant safety for 100 days following a LOCA¹.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	110°F
Pressure:	Atm	Atm
Relative Humidity:	80%	N/A
Radiation:	3.5x10 ² rads (40 yr TID)	3x10 ⁷ rads (LOCA)
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830208 222

²See SQN Environmental Data Drawings 47Z235-81R0

3. The manufacturer's specification for the solenoid valves are:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic position 4.1.8 for relative humidity. The solenoid valves must change position (DE-ENERGIZE) to allow the associated containment isolation valves to close. The solenoid valves must not fail such that air can be admitted to the valve operator causing the valve to open. The solenoid valves will not see the full 3x10⁷ rads within the first 5 minutes of the LOCA. Failure of the solenoid valves due to degradation of elastomeric components during the 100 days following a LOCA will not result in control air being admitted to the isolation valve operator.
5. The above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace solenoid valves as determined by the resolution of NCR SQNEEB8007.

014165.01

TER Item No. 121

IYA ID No.

1,2-FSV-1-181, -182, -183, -184; 1,2-FSV-77-127; 1,2-FSV-90-108, -109, -110, -114, -115, -116

Manufacturer/Model No.

For 1,2-FSV-1-181, -183, -184; 2-FSV-1-182
ASCO/Model No. HT8300B58RU

For 1-FSV-1-182
ASCO/Model No. LB8300B64RU

For 1,2-FSV-77-127
ASCO/Model No. WPXHV202-301-1

For 1,2-FSV-90-108, -109, -110, -114, -115, -116
ASCO/Model No. HT8320A22V

Status IV

Justification for Continued Operation

1. Solenoid valves 1,2-FSV-1-181, -182, -183, -184; 1,2-FSV-77-127; 1,2-FSV-90-108, -109, -110, -114, -115, -116 are located in the containment, lower compartment. Solenoid valves are required to operate for 5 minutes following a LOCA, main steam line break or feedwater line break and not to fail detrimental to plant safety for 100 days thereafter¹.
2. The solenoid valves are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	1200°F	3270°F
Pressure:	14.7 psia	26.4 psia
Relative Humidity:	80%	100%
Radiation:	2×10^7 rads (40 yr TID)	1×10^8 rads
Spray/Flooding:	Spray Only	Spray Only

¹For 1,2-FSV-1-181, -182, -183, -184 see EN DES Calculations WBS 840213 219

For 1,2-FSV-77-122 see EN DES Calculations WBS 840213 219

For 1,2-FSV-90-108, -109, -110, -114, -115, -116 see EN DES Calculation WBS 830223 227

²See SQW Environmental Data Drawings 47E235-45

3. The manufacturer's specification for the solenoid valves are:

Model No(s). HT8300B58RU, WPXHV202-301-1

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	HT8300B58RU NEMA 1
	WPXHV202-301-1 Watertight Enclosure
Radiation:	4.5×10^5 rads

Model No. LB8300B64RU

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	NEMA 1
Radiation:	4×10^5 rads

Model No. HTX8320A22V

Temperature:	200°F
Pressure:	Atm
Relative Humidity:	Watertight Enclosure
Radiation:	7×10^6 rads

4. See generic position 4.1.3 for relative humidity.
5. Following a DBE, solenoid valves 1,2-PSV-1-181, -182, -183, -184 must go to the deenergized state and remain in that position to prevent an open path to outside containment.

Following a DBE, solenoid valves 1,2-PSV-77-127 must deenergize to close their associated FCV's on a phase A containment isolation signal or high radiation. The solenoids cannot fail such that control air will be admitted to FCV(s) causing them to remain open.

Following a DBE, solenoid valves 1,2-PSV-90-108, -109, -110, -114, -115, -116 must deenergize to close their associated FCVs on a containment vent isolation signal. The solenoids cannot fail such that control air will be admitted to FCV(s) causing them to remain open.

Failure of the solenoid valves during the first five minutes following a DBE will result in the solenoid valve deenergizing to its "Fail-Safe" position. Failure of the solenoid during the 100 days following a DBE, due to degradation of elastomeric components, should not result in control air being admitted to the valve operator and reopening the valve.

6. The above information shows justification for continued use of the solenoid valves. However, due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8039.

ISR Item No. 123

IYA ID No.

1,2-FSV-1-7, -14, -25, -32, -147, -148, -149, -150

Manufacturer/Model No.

ASCO/Model No. MT8300B5SRU

Status IV

Justification for Continued Operation

1. Solenoid valves 1,2-FSV-1-147, -150, -7, -14, -25, -32 are located in the auxiliary building, elev 706, rooms A1, A11. Solenoid valves 1,2-FSV-1-148,, -149 are located in the auxiliary building, elev 706, rooms A2, A10. Solenoid valves are required to operate for 5 minutes following main steam or feedwater line breaks and not to fail detrimental to plant safety for 100 days thereafter¹.
2. The solenoid valves are required to operate in the following environments²:

For solenoid valves 1,2-FSV-1-147, -150, -7, -14, -25, -32

	<u>Normal</u>	<u>Accident</u>
Temperature:	1300°F	3070°F
Pressure:	Atm	22.9 psia
Relative Humidity:	50%	100%
Radiation:	3.5x10 ⁴ rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

For solenoid valves 1,2-FSV-1-148, -149

	<u>Normal</u>	<u>Accident</u>
Temperature:	1300°F	2990°F
Pressure:	Atm	24.4 psia
Relative Humidity:	50%	100%
Radiation:	1.75x10 ³ rads (40 yr TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations WEB 830217 219

²See SQN Environmental Data Drawings 47E235-79

3. The manufacturer's specification for the solenoid valves are:

Temperature:	176°F
Pressure:	Atm
Relative Humidity:	Water Tight Enclosure
Radiation:	4.5×10^5 rads

4. See generic position 4.1.8 for relative humidity.
5. Following a DBE, solenoid valves 1,2-FSV-1-7, -14, -25, -32 must go to their deenergized position to close their associated isolations valves and remain deenergized so that the valves remain closed to prevent an uncontrolled loss of water from the steam generators. If the steam generator warming valves are open when a DBE occurs, solenoid valves 1,2-FSV-1-147, -148, -149, -150 must go to the deenergized position to close their associated valve to isolate the loss of main steam, and the solenoids must remain deenergized to keep the valves closed. If the warming valves are not in use when the event occurs (warming valves are closed), the solenoids must remain in the deenergized state to keep the valves closed. Failure of the solenoids valves during the first five minutes following a DBE will result in the valve deenergizing to its "Fail-Safe" position. Failure of the solenoid valve during the 100 days following a DBE, due to degradation of elastomeric components, should not result in control air being admitted to the valve operator and reopening the valve.
6. The above information shows justification for continued use of the solenoid valves. However, due to the lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8048.

TER ITEM NO. 135

MANUFACTURER/MODEL NO. - Namco EA-170

TVA ID - 1-FCV-90-107(LS), -111(LS), -113(LS), -117(LS)

STATUS - IV

JUSTIFICATION FOR CONTINUED OPERATION (JCO)

The limit switches are in the seal-in (control) circuit for the containment upper and lower compartment air monitors outboard containment isolation valves. These valves close upon receipt of a containment vent isolation signal. After an accident inside containment, the limit switches may fail in the closed position allowing the associated valves to reopen (if open at time of accident) when the containment vent isolation signal is reset. Taking a single failure of the inboard isolation valve (failing open), a path to outside primary containment (into the annulus) would exist. After a Loss of Coolant Accident (LOCA), the increased containment pressure may cause airborne radioactivity to be released into the annulus, and may also pressurize the annulus. We believe that justification for continued operation is provided for the following reasons:

1. It is highly unlikely that the spring-loaded fail-closed inboard valve (which receives the same signal as the outboard valves) would fail in the open position.
2. Resetting the containment vent isolation signal is included in emergency procedure ES-0.2, "SI Termination." After a large break LOCA, SI (Safety Injection) will not be terminated until very late in the event. By this time, containment pressure will be reduced to near normal and any radiation leakage into the annulus will be filtered through the Emergency Gas Treatment System (EGTS).
3. ES-0.2 cautions the operator to determine whether, after a LOCA, the containment ventilation systems should be returned to normal alignment. It is highly unlikely that the operator will reset containment vent isolation if there is any significant release of radiation into the containment.

Note: SQN drawing 47W611-88-1 shows that the valves associated with the subject limit switches receive a "phase B" containment isolation signal. This reflects a change required by ECN L-5966. This ECN changed the valve closure signal from "containment vent" to "phase B." Up to this time, the ECN has never been implemented. Therefore, the valves still receive a containment vent isolation signal instead of a phase B signal, which is the closure signal upon which this JCO is based. If the ECN change is implemented before these limit switches are replaced with qualified components, this JCO is null and void.

Prepared by D. R. Waller 2/12/85

Reviewed by B. H. Waller 2/12/85

TER ITEM NO. - 140

Manufacturer Model No. - MicroSwitch OPDAR 7905

STATUS: See below

<u>TVA ID NO.</u>	<u>STATUS</u>
1-FCV-313-222	Replaced
2-FCV-313-222	Replaced
1-FCV-313-223	Replaced
2-FCV-313-223	Replaced
1-FCV-313-224	Replaced
2-FCV-313-224	Replaced
1-FCV-313-225	Replaced
2-FCV-313-225	Replaced
1-FCV-313-229	Replaced
2-FCV-313-229	To Be Replaced
1-FCV-313-230	Replaced
2-FCV-313-230	To Be Replaced
1-FCV-313-231	Replaced
2-FCV-313-231	To Be Replaced
1-FCV-313-232	Replaced
2-FCV-313-232	To Be Replaced

Justification for Continued Operation -

MicroSwitch has a line of standard basic switches which have a wide range of operating characteristics, temperature tolerances, and sealing materials. Their basic switch is comprised of phenolic, beryllium copper, and silver with capabilities of 400° F. Based on standard manufacturer's specifications and past experience we believe these switches are qualified for operation until their replacements can be installed.

Installation of replacements is scheduled as follows:

no later than the end of cycle 2 fuel outage -
November 24, 1984.

REPLACEMENT MATERIAL IS ONITE

Prepared by:

DJ C 6/20/84

Reviewed by:

JW Hodges 6/20/84

G24172.05

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T&W 10/16/84
CLW 10/16/84

TER Item No. 141

TVA ID No.

1-FCV-32-80, -102, -0110

Manufacturer/Model No.

KANCO Controls/ Model No. ZA-700

Status IV

Justification for Continued Operation

1. Limit switches 1-FCV-32-80, -102, -110 are located in the annulus at elev 707. They are required to operate for 5 minutes following a LOCA, main steam line break, feedwater line break, RHR, and CVCS accidents. Additionally, they must not fail in a manner detrimental to plant safety for 100 days after a LOCA,, main steam line break, feedwater line break, and 1 month after a RHR or CVCS accident.
2. The limit switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	150°F
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	100%
Radiation:	2x10 ⁷ rads (40 yr TID)	5x10 ⁷ rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations WEB 830208 220 for control air system

²See SQN Environmental Data Drawings 47E235-47R0

3. The manufacturer's specification for the solenoid valves are:

Temperature:	194°F
Pressure:	Atm
Relative Humidity:	NEMA 4
Radiation:	Not specified

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the limit switches. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the limit switches with qualified devices as determined by the resolution of NCR SQNEEB8104.

TER Item No. 143

TVA ID No.

1,2-FCV-1-147 (LS), -148(LS), -149(LS), -150(LS)

Manufacturer/Model No.

NAMCO Controls/Model No. EA-700

Status IV

Justification for Continued Operation

1. Limit switches 1,2-FCV-147, -148, -149, -150 are located in the auxiliary building, elev 706, rooms A1, A2, A10, and A11. They are required to operate for 5 minutes following a main steam line break and feedwater line break. Additionally, they must not fail in a manner detrimental to plant safety for 100 days following a main steam line break and auxiliary feedwater line break.
2. The limit switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	130°F	299°F East (HELB) 307°F West
Pressure:	Atm(-)	24.4 psia (East) 22.9 psia (West)
Relative Humidity:	50%	100%
Radiation:	1.75x10 ³ rads East 3.5x10 ⁴ rads West	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830217 219 for main steam system

²See SQN Environmental Data Drawing 47E235-79R0

3. The manufacturer's specification for the limit switches are:

Temperature:	194°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not Specified

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.

Justification for Continued Operation

TER Item No. 145

for the following equipment:

LS's on

2-FCV-62-69
2-FCV-62-70
2-FCV-62-77
2-FCV-63-3
2-FCV-63-4
2-FCV-63-175

The limit switches on 2-FCV-62-69 and 70 are used to seal in the automatic closure signal on low pressurizer level in the event of a CVCS letdown line break. If the CVCS letdown line break were to occur inside containment, the limit switches could cause these associated valves to reopen each time the pressurizer level was restored to the normal level by the emergency core cooling pumps. Under these conditions, the RCS would continue to experience a LOCA. Although it is good engineering design to isolate a LOCA, if possible, it is not essential to plant safety. The plant is designed to mitigate the effects of a wide spectrum of LOCAs, including the effects of single failure, without jeopardizing the public health and safety. If the CVCS letdown line break were to occur outside containment, the limit switch on 2-FCV-62-77 could cause its associated valve to take inappropriate action. However, since the event occurs outside containment, FCV-62-69 and 70 will not be affected by the harsh environment and will isolate the letdown line on low pressurizer level.

The limit switches on 2-FCV-63-3, 4, and 175 are used to provide on open permissive signals to FCV-63-8 and 11. These limit switches are required to be qualified for the radiation effects due to a LOCA. The radiation effects are only significant when the Safety Injection System is placed in the recirculation mode of operation. In order to establish the recirculation mode of operation, FCV-63-8 and 11 must initially be open. Therefore, the limit switches on FCV-63-3, 4, and 175 will perform their intended safety functions prior to significant changes in the environment for which the switches are qualified.

Therefore, it is concluded that whether or not the above limit switches function, plant safety will not be jeopardized in the interim.

These limit switches are onsite and scheduled to be replaced during the next refueling outage in September 1984.

SEQUOYAH NUCLEAR PLANT
JUSTIFICATION FOR CONTINUED OPERATION:
"TEMPERATURE SWITCHES - COOLERS"

TER ITEM NO. - 151

TVA ID NO. - 1-TS-30-186, -187, -190, -191, -196, -197, -201, & -202
 2-TS-30-186, -187, -196, -197, -201, & -202
 0-TS-30-192, & -193

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation -

Subject temperature switches are to be replaced with 1E qualified switches (already onsite). Installation of replacements is scheduled as follows:

- Unit 1 - no later than cycle 3 fuel outage period (November 1985)
 as previously requested in exemption from 10CFR50.49 rules
- Unit 2 - no later than the end of cycle 2 fuel outage -
 November 24, 1984.

For JCO, see attached appendix I
EQS No. MEB-30-64.

Prepared by:

R. H. Loueday 6/20/84

Reviewed by:

H. E. Burton 6/20/84

Appendix 1

Revision	R1			
Preparer/Date	RH Lowndes / 15/4/80			
Reviewer/Date	W. V. Chen / 5/11/80			

Unit No. 122
 EQS No. MEB-30-64
 TVA ID No. see Appendix I & J
 Temperature switches

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Pynn A19BBC-2
 Verification of Table Information (Exp List - outside cont - 659-105)

- ✓ Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- ✓ Location - The location has been identified (such as, inside primary containment, annulus, individually cooled rooms, general spaces, or area affected by HELB outside primary containment).
- ✓ Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- ✓ Function - A functional description of the component has been given (such as, steam generator blowdown).
- ✓ Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- ✓ Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables or by references to figures from tables.
- ✓ Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- ✓ Category - A category of a, b, c, or d has been defined for the equipment.
- ✓ Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- ✓ Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry):
- NA Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- ✓ Environmental Analysis - An environmental analysis has been done, attached to the EQS, and independently reviewed by the responsible organization.
- NA Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EQS considering all the above factors and referenced to the appropriate tables.
- ✓ Qualification of Several Exact Components (If applicable) - When an EQS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- ✓ Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
- Term of Interim Qualification Dec. 86
- ✓ NCR No. SON MEB B301
- ✓ Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EQS: NCR number, reason for non-qualification, and justification of continued operation.
- NCR No. SON MEB B301

Appendix I

ADDITIONAL EQUIPMENT

Temperature Switches

TVA ID No. - ~~2-30-186 and -187~~

1-TS-30-186 and -187

2-TS-30-186 and -187

1-TS-30-190 and -191

0-TS-30-192 and -193

~~1-TS-30-194 and -195~~

~~2-TS-30-194 and -195~~

1-TS-30-196 and -197

2-TS-30-196 and -197

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation and/or
Resolution of Deficiencies -

The temperature switches are subjected to the following accident conditions (worst case - penetration room el 714.0 - HELB):

Temperature - $\begin{cases} 110^{\circ}\text{F max (30 days max - LOCA)} \\ 143^{\circ}\text{F maximum (decreasing to } 140^{\circ}\text{F over 4 hr. pd.)} \end{cases}$
Pressure - 14.4 psia maximum
Relative Humidity - 100% maximum (24 hr. max)
Radiation - $< 1 \times 10^4$ rads (LOCA)

The temperature switches functions are to start the pipe chase coolers to provide cooling to the motor operated valves in pipe chase. The switches can operate at a maximum temperature of 140°F (see attachment 1). Per Johnson Controls: since 100% relative humidity occurs only over a 24 hour time period, there would be no adverse affects on subject switches. The maximum temperature of 143°F ; however, could have adverse affects on the switches. This maximum temperature occurs during a residual heat removal pipe rupture and is an extremely conservative figure. Probability of occurrence is extremely low.

It is our engineering judgement that due to the mass of the valves and the short duration of the line break, the valves will not significantly be affected by failure of the temperature switches to continue to provide cooling. The subject switches can operate for all other line breaks; therefore, we feel the temperature switches can continue to operate until they are replaced with qualified temperature switches. A replacement schedule is immediately being implemented to rectify this situation.

Ref.: TVA Environmental Data drawings 47E235- 49 thru 52,
55 thru 60, 69 & 70

Appendix II

ADDITIONAL EQUIPMENT

Temperature Switches

TVA ID No. - 1-TS-30-201 and -202
2-TS-30-201 and -202

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation and/or
Resolution of Deficiencies -

The temperature switches are subjected to the following accident conditions (HELB):

Temperature - 209°F maximum (24 hr max); 110°F (30 days max. LOCA)
Pressure - 14.4 psia maximum
Relative humidity - 100% (24 hr max)
Radiation - Accident: $< 1 \times 10^4$ rads (LOCA)

The temperature switches functions are to start the pipe chase coolers to provide cooling to the motor operated valves in pipe chase. The switches can operate at a maximum temperature of 140°F (see attachment 1). Per Johnson Controls: since 100% relative humidity occurs only over a 24 hour time period, there would be no adverse affects on subject switches. The maximum temperature of 209°F; however, could have adverse affects on the switches. This maximum temperature occurs during a residual heat removal pipe rupture and is an extremely conservative figure. Probability of occurrence is extremely low.

It is our engineering judgement that due to the mass of the valves and the short duration of the line break, the valves will not significantly be affected by failure of the temperature switches to continue to provide cooling. The subject switches can operate for all other line breaks; therefore, we feel the temperature switches can continue to operate until they are replaced with qualified temperature switches. A replacement schedule is immediately being implemented to rectify this situation.

Ref.: TVA Environmental Data drawings 47E235-62 & -63
LEON.4 for SQN.

A19 SERIES TEMPERATURE CONTROLS

ATTACHMENT NO. 1

COILED BULB THERMOSTATS



A19BAC-1

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Bulb and Capillary	Range Adjuster	Electrical Rating 120V. A.C. (See page 14)	Shipping Wt. Lbs.
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VENTILATING, HEATING

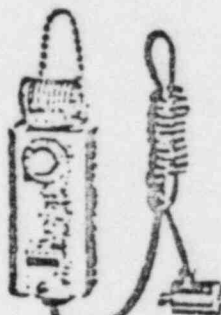
A19BAC-3	SPST, Open High "No Heat" position	35 to 95	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16.0 A. Table 3	1.2
A19BAC-1	SPDT	30 to 110	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16.0 A. Table 3	0.9
A19BAF-1	SPDT	30 to 110	2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	6.0 A. Table 4	1.0

COOLING

A19BAC-2	SPDT	-20 to +100	3 to 12	1 1/2" x 2 1/4" Coiled	Screwdriver Slot	16.0 A. Table 3	1.0
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Maximum bulb temperature is 140° F.

THERMOSTAT FOR PORTABLE HEATERS



A19BAG-1

Catalog No. A19BAG-1 is a sturdy, compact thermostat with visible scale and adjusting knob. Designed to take heavy duty use encountered in portable heater applications. Liquid charged, copper coiled air bulb for rapid response and dependability. 6' long extension cord with rubber covered polarized 3 prong plug and "series" socket for 120 V. service. 15 Amp. rating. 7" beaded chain hanger supplied to permit supporting the thermostat in any convenient location.

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.
A.C. Full Load Amps	15.0
A.C. Locked Rotor Amps	90.0
Non-Inductive	1800 Watts
Pilot Duty — 125 VA.	24 to 120 V. A.C.

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Shipping Wt. Lbs.
A19BAG-1	SPST Open High "No-Heat" Position	35 to 95	3 1/2 Non-Adj.	1.6

Maximum bulb temperature is 140° F.

AUTOMATIC CHANGEOVER



A19CAC-1

(Remote Bulb Model)

Changeover control for use with combination heating and cooling thermostats. Control feels water temperature and automatically selects correct thermostat function. Recommended for convectors, fan coils and blast coil units, etc.

Catalog Number	Switch Action	Range (° F.)	Diff. (° F.)	Mounting
A19CAC-1	SPDT	60 to 90	10 Fixed	4 1/2" Cap
A19CAC-2	SPDT	60 to 90	10 Fixed	Direct

A19CAC-2 may be mounted directly on either vertical or horizontal pipe by mounting strap supplied with control. A19CAC-1 has remote bulb for greater wiring and mounting convenience.

Max. Case Ambient Temperature: 140° F.

Max. Sensing Element Temperature: 250° F.

Shipping Weight: 1.2 lbs. each

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.	240 V.
A.C. Full Load Amps	10.0	6.0
A.C. Locked Rotor Amps	60.0	36.0
Pilot Duty — 125 VA.	120 to 240 V. A.C.	

TER Item No. 153

TVA ID No.

O-TS-12-91A, -91B, -92A, -92B, -93A, -93B, -94A, -94B, -95A, -95B, -96A, -96B, -97A, -97B, -98A, -98B, -99A, and -99B

Manufacturer/Model No.

Fenwal/Model No. 27120-50

Status IV

Justification for Continued Operation

1. Temperature switches listed above are located in various areas and elevations of the auxiliary building. They are required to operate for 5 minutes after an auxiliary boiler line break¹.
2. A composite set of environmental conditions enveloping all the maximum values the temperature switches are required to operate in is detailed below:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	143°F
Pressure:	Atm(-)	14.55 psia
Relative Humidity:	80%	100%
Radiation:	1.75x10 ³ rads (40 yr TID)	N/A
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830923 220

3. The manufacturer's specification for the temperature switches are as follows:

Temperature:	500°F
Pressure:	Atm
Relative Humidity:	Switch is hermetically sealed
Radiation:	Not specified

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the temperature switches. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the temperature switches with qualified devices as determined by the resolution of NCR BQNEEB8201.

TER Item No. 175

TVA ID No.

1-ZS-30-46-, -47, -48

Manufacturer/Model No.

NAMCO Controls/Model No. EA-080

Status IV

Justification for Continued Operation

1. Limit switches 1-ZS-30-46, -47, -48 are located in the annulus at elevation 823. They are required to operate for 5 minutes following a LOCA, main steam line break, feedwater line break, CVCS and RHR accidents. Additionally, they must not fail in a manner detrimental to plant safety for 100 days following a LOCA, main steam line break, feedwater line break, RHR, and CVCS accidents.
2. The limit switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	150°F
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	100%
Radiation:	2×10^7 rads (40 yr TID)	5×10^7 rads
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830228 221 for the containment ventilation system

²See SQN Environmental Data Drawings 47E235-47R0

3. The manufacturer's specification for the solenoid valves are:

Temperature:	194°F
Pressure:	Atm
Relative Humidity:	NEMA 4, 12 Enclosure
Radiation:	1×10^6 rads

4. See generic position 4.1.5 for radiation and 4.18 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the limit switches. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the solenoid valves with qualified devices as determined by the resolution of NCR SQNEEB8117.

TER Item No. 181

TVA ID No.

2-PCV-32-81(LS), -103(LS), -111(LS)

Manufacturer/Model No.

NAMCO Controls/Model No. ZA-700

Status IV

Justification for Continued Operation

1. Limit switches 2-PCV-32-81, -103, -111 are located in the annulus at elevation 707. They are required to operate for 5 minutes following a LOCA, main line break, feedwater line break, RHR and CVCS accidents. Additionally, they must not fail in a manner detrimental to plant safety for a LOCA, main steam line break, and feedwater line break and 1 month following a RHR or CVCS accident:
2. The limit switches are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	110°F	150°F(LOCA)
Pressure:	Atm(-)	Atm(-)
Relative Humidity:	80%	100%
Radiation:	2x10 ⁷ rads (40 yr TID)	5x10 ⁷ rads (LOCA)
Spray/Flooding:	N/A	N/A

¹See EN DES Calculations NEB 830208 220 for the control air system

²See SQN Environmental Data Drawings 47E235-47E0

3. The manufacturer's specification for the limit switches are:

Temperature:	194°F
Pressure:	Atm
Relative Humidity:	NEMA 4
Radiation:	Not specified

4. See generic position 4.1.5 for radiation and 4.1.8 for relative humidity.
5. Since the operating environment is within the manufacturer's specifications, the above information shows justification for continued use of the limit switches. However due to lack of sufficient documentation to demonstrate environmental qualification, TVA will replace the limit switches with qualified devices as determined by the resolution of NCR SQNEE38102.

5.0 Additional Equipment

014313.03

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-PSV-1-13A	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
2-PSV-1-13A	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
1-PSV-1-13B	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
2-PSV-1-13B	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
1-PT-1-23	PRTR	Foxboro	E11GM	Qualified; WCAP-8541
2-PT-1-23	PRTR	Foxboro	E11GM	Qualified; WCAP-8541
1-PSV-24A	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
2-PSV-24A	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
1-PSV-24B	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
2-PSV-24B	SNDV	ASCO	206-381-2RVU	Qualified; Report No. AQS21678/TR, Rev. A
1-ZS-1-181	LMSW	NAMCO	EA-740	Qualified; Qualification of NAMCO controls limit switch model EA-740 to IEE standards 344 (1975), 323 (1974), and 382 (1972), revision 1, February 22, 1979.

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-ZS-1-181	LMSW	NAMCO	EA-700	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-111: JCO No. EEB-1
1-ZS-1-182	LMSW	NAMCO	EA-740	Qualified; Qualification of NAMCO controls limit switch model EA-740 to IEE standards 344 (1975), 323 (1974), and 382 (1972), revision 1, February 22, 1979.
2-ZS-1-182	LMSW	NAMCO	EA-700	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-111: JCO No. EEB-1
1-ZS-1-183	LMSW	NAMCO	EA-740	Qualified; Qualification of NAMCO controls limit switch model EA-740 to IEE standards 344 (1975), 323 (1974), and 382 (1972), revision 1, February 22, 1979.
2-ZS-1-183	LMSW	NAMCO	EA-700	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-111: JCO No. EEB-1.
1-ZS-1-184	LMSW	NAMCO	EA-740	Qualified; Qualification of NAMCO controls limit switch model EA-740 to IEE standards 344 (1975), 323 (1974), and 382 (1972), revision 1, February 22, 1979.
2-ZS-1-184	LMSW	NAMCO	EA-700	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-111: JCO No. EEB-1.
1-FT-3-35A	FLXR	Foxboro	E13DM	Qualified; WCAP-8541

DE03;TERRPT

ADDITIONAL EQUIPMENT

<u>TVA ID NO.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FT-3-35A	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-35B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-35B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-48A	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-48A	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-48B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-48B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-90A	FLXR	Foxboro	E13CM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-90A	FLXR	Foxboro	E13CM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FT-3-90B	FLXR	Foxboro	E13CM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-90B	FLXR	Foxboro	E13CM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-LT-3-93	LVTR	Barton	764 Lot 7	Qualified; WCAP-8687, Supp 2-E03
2-LT-3-94	LVTR	Barton	764 Lot 7	Qualified; WCAP-8687, Supp 2-E03
1-LT-3-98	LVTR	Barton	764 Lot 2	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-LT-3-98	LVTR	Barton	764 Lot 2	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-103A	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-103A	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
1-FT-3-103B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
2-FT-3-103B	FLXR	Foxboro	E13DM	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)

ADDITIONAL EQUIPMENT

<u>TVA IL J.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-LT-3-110	LVTR	Barton	764 Lot 7	Qualified; WCAP-8687, Supp 2-E03
1-PS-3-121A	PSSW	Custom Components	6046	Replace with ASCO model SB21AR/TD20A2R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
2-PS-3-121A	PSSW	Custom Components	6046	Replace with ASCO model SB21AR/TD20A2R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
1-PS-3-121B	PSSW	Custom Components	6046	Replace with ASCO model SB21AR/TD20A2R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
2-PS-3-121B	PSSW	Custom Components	6046	Replace with ASCO model SB21AR/TD20A2R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
1-PS-3-121D	PSSW	Custom Components	6046	Replace with ASCO model SB21AR/TD20A2R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
2-PS-3-121D	PSSW	Custom Components	6046	Replace with ASCO model SB21AKR/TD20A32R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-2
1-PT-3-122A	PSSW	Bailey	556	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588).
2-PT-3-122A	PSSW	Bailey	556	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588).

ADDITIONAL EQUIPMENT

<u>TVA ID NO.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-PX-3-142	PWSP	Lamda	LCS-2-04	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-PX-3-142	PWSP	Lamda	LCS-2-04	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-FM-3-142A	SGCV	Beckman	8950	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-FM-3-142A	SGCV	Beckman	8950	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-FT-3-147	FLXR	Bailey	555	Replace with Rosemount Model 1153D85; Qualified by Report No. 108025: JCO No. EEB-3
2-FT-3-147	FLXR	Bailey	555	Replace with Gould Model PD3200-400-18-22-36-59; Qualified by Report Nos. 528-0994 and 528-1006: JCO No. EEB-3
1-LCV-3-148	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
2-LCV-3-148	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-FT-3-155	FLXR	Bailey	555	Replace with Rosemount Model 1153D85; Qualified by Report No. 108025: JCO No. EEB-3

ADDITIONAL EQUIPMENT

<u>TVA ID NO.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FT-3-155	FLXR	Bailey	555	Replace with Gould Model PD3200-400-18-22-36-54; Qualified by Report Nos. 528-0994 and 528-1006: JCO No. EEB-3
1-LCV-3-156	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
2-LCV-3-156	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-PS-3-160A	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101085, Rev. 0: JCO No. EEB-5
2-PS-3-160A	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101085, Rev. 0: JCO No. EEB-5
1-PS-3-160B	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101085, Rev. 0: JCO No. EEB-5
2-PS-3-160B	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101085, Rev. 0: JCO No. EEB-5
1-FT-3-163	FLXR	Bailey	555	Replace with Rosemount Model 1153D85; Qualified by Report No. 108025: JCO No. EEB-3
2-FT-3-163	FLXR	Bailey	555	Replace with Gould Model PD3200-400-18-22-36-59; Qualified by Report Nos. 528-0994 and 528-1006: JCO No. EEB-3
1-LCV-3-164	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4

DE03;TERRPT

ADDITIONAL EQUIPMENT

<u>TVA ID</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-LCV-3-164	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-PS-3-165A	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-5
2-PS-3-165A	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-5
1-PS-3-165B	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-5
2-PS-3-165B	PSSW	Custom Components	6046	Replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101083, Rev. 0: JCO No. EEB-5
1-FT-3-170	FLXR	Bailey	555	Replace with Rosemount Model 1153DB5; Qualified by Report No. 108025: JCO No. EEB-3
2-FT-3-170	FLXR	Bailey	555	Replace with Gould Model PD3200-40-18-22-36-59; Qualified by Report Nos. 528-0994 and 528-1006: JCO No. EEB-3
1-LCV-3-171	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
2-LCV-3-171	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-LCV-3-172	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4

DE03;TERRPT

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-LCV-3-172	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-LM-3-172	SGCV	Beckman	8952	Equipment no longer considered to be within the scope of 10CFR50.49. (Located in a mild environment).
2-LM-3-172	SGCV	Beckman	8952	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-LCV-3-173	IPXR	Masoneilan	8012	Testing in progress confirm qualification: JCO No. EEB-4
2-LCV-3-173	IPXR	Masoneilan	8012	Testing in progress confirm qualification: JCO No. EEB-4
1-LM-3-174	SGCV	Beckman	8012	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-LM-3-174	SGCV	Beckman	8012	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-LCV-3-174	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
2-LCV-3-174	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
1-LCV-3-175	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4
2-LCV-3-175	IPXR	Masoneilan	8012	Testing in progress to confirm qualification: JCO No. EEB-4

DE03;TERRPT

ADDIT. EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FCV-30-2 (LS)	LMSW	NAMCO	EA-180	Qualified by Report No. QTR-105
2-FCV-30-2 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FCV-30-5 (LS)	LMSW	NAMCO	EA-180	Qualified by Report N. QTR-105
2-FCV-30-5 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO EA-180; Qualified by Report No. QTR-105: JCO No. MEB- 101
1-FSV-30-7	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR; Rev. A: JCO No. MEB-102
2-FSV-30-7	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-7	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-7	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-ZS-30-8	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111: JCO No. MEB-105
2-ZS-30-8	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FSV-30-9	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-9	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74D; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-9	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-9	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
1-ZS-30-10	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111: JCO No. MEB-105
2-ZS-30-10	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111
1-FSV-30-12	SNDV	ASCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-12	SNDV	ASCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-FSV-30-14	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-14	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-14	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-ZS-30-14	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-ZS-30-15	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111 JCO No. MEB-105
2-ZS-30-15	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-1
1-FCV-30-16 (LS)	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-FCV-30-16 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FSV-30-16	SNDV	ASCO	8316	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/1A, Rev. A: JCO No. MEB-103
2-FSV-30-16	SNDV	ASCO	8316	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-103
1-FSV-30-19	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/1A, Rev. A: JCO No. MEB-102
2-FSV-30-19	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-19	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-ZS-30-19	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-ZS-30-20	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111; JCO No. MEB-105
2-ZS-30-20	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111
2-FCO-30-22 (LS)	LMSV	NAMCO	EA 740020100	Qualified; NAMCO report QTR-105
2-FSV-30-22	SNDV	ASCO	206-381-2 RUV	Qualified; ASCO AQS21678/TR, Rev. A
1-FCV-30-37 (LS)	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-111
2-FCV-30-37 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FSV-30-37	SNDV	ASCO	NP 8316	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-103
2-FSV-30-37	SNDV	ASCO	NP 8316	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-103
1-PDT-30-42	DPXR	Foxboro	El1GM	Qualified; WCAP-8541
2-PDT-30-42	DPXR	Foxboro	El1GM	Qualified; WCAP-8541
1-PDT-30-43	DPXR	Foxboro	El1GM	Qualified; WCAP-8541

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-PDT-30-43	DPXR	Foxboro	E11GM	Qualified; WCAP-8541
1-PDT-30-44	DPXR	Foxboro	E11GM	Qualified; WCAP-8541
2-PDT-30-44	DPXR	Foxboro	E11GM	Qualified; WCAP-8541
1-PDT-30-45	DPXR	Foxboro	E11GM	Qualified; WCAP-8541
2-PDT-30-45	DPXR	Foxboro	E11GM	Qualified; WCAP-8541
1-ZS-30-50	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111; JCO No. MEB-105
2-ZS-30-50	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111
1-FSV-30-51	SNDV	ASCO	NP 8316A74E	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FSV-30-51	SNDV	AVCO	C-5439	Replace with ASCO Model No. NP8316A74E; Qualified by JCO No. MEB-102
1-ZS-30-51	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-51	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105; No. MEB-101
1-ZS-30-52	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111; JCO No. MEB-105
2-ZS-30-52	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FSV-30-53	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-53	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-53	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-53	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FCV-30-54 (LS)	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-FCV-30-54 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FSV-30-54	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A47E; Qualified by Report No. AQS21678/TR Rev. A: JCO No. MEB-102
2-FSV-30-54	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-56	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111: JCO No. MEB-105
2-ZS-30-56	LMSW	NAMCO	EA 18011302	Qualified; NAMCO report No. QTR-111

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FSV-30-57	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A743; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-57	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A743; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-57	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-57	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-ZS-30-58	LMSW	NAMCO	EA 18011302	Replace with NAMCO Model EA 740; Qualified by NAMCO Report QTR-111: JCO No. MEB-105
2-ZS-30-58	LMSW	NAMCO	EA 74020100	Qualified; NAMCO report No. QTR-111
1-FSV-30-59	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-59	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-ZS-30-59	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-ZS-30-59	LMSW	NAMCO	EA-170	Replace with NAMCO Model ATR-105; Qualified by Report No. QTR-105: JCO No. MEB-101

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FCV-30-61 (LS)	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-FCV-30-61 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FSV-30-61	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-61	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-FCV-30-62 (LS)	LMSW	NAMCO	EA-180	Qualified; NAMCO Report No. QTR-105
2-FCV-30-62 (LS)	LMSW	NAMCO	EA-170	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. MEB-101
1-FSV-30-62	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
2-FSV-30-62	SNDV	AVCO	C-5439	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. MEB-102
1-FSV-30-87	SNDV	ASCO	206-381-2RVU	Qualified; ASCO Report No. AQS21678/TR Rev. A
1-FCO-30-87 (LS)	LMSW	NAMCO	EA74020100	Qualified; NAMCO Report No. QTR-111

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FSV-30-109	SNDV	ASCO	206-381-2RVU	Qualified; ASCO Report No. AQS21678/TR, Rev. A
1-FCO-30-107 (LS)	LMSW	NAMCO	EA 74020100	Qualified; NAMCO Report No. QTR-111
2-FCO-30-109 (LS)	LMSW	NAMCO	EA 74020100	Qualified; NAMCO Report No. QTR-111
0-FS-30-147	FLSW	CEMCO	RH15-05-D1	Qualified; Nutherm Report N-166-R
0-TC-30-147	TPPL	Edwin L. Weigand & Nutherm International	126-027959-001	Qualified; Nutherm Report N-166-R
0-TS-30-147	TPSW	Thermo-Disc	60T-11	Qualified; Nutherm Report N-166-R
0-FS-30-156	FLSW	CEMCO	RH15-05-D1	Qualified; Nutherm Report N-166-R
0-TC-30-156	TPPL	Edwin L. Weigand & Nutherm International	126-027959-001	Qualified; Nutherm Report N-166-R
0-TS-30-156	TPSW	Thermo-Disc	60T-11	Qualified; Nutherm Report N-166-R
2-FSV-30-157A	SNDV	ASCO	206-380-2RUV	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-MTR-30-184	ELMO	Reliance	2YF882998	Qualified; Reliance Test Report NUC-9
2-TS-30-184	TPSW	Penn	A19BEC-2	Replace with Static-O-Ring Model 201TA-13125-JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-C, and 18441-83N: JCO No. MEB-17
2-MTR-30-185	ELMO	Reliance	2YF882998	Qualified; Reliance Test Report NUC-9

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-TS-30-185	TPSW	Penn	A19BBC-2	Replace with Static-O-Ring Model 201TA-13125 - JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-D, and 18441-83N: JCO No. MEB-17
1-TS-30-194	TPSW	Penn	A19BBC-2	Replace with Static-O-Ring Model 201TA-13125 - JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-D, and 18441-83N: JCO No. MEB-17
2-TS-30-194	TPSW	Penn	A19BBC-2	Replace with Static-O-Ring Model 201TA-1325 - JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-D, and 18441-83N: JCO No. MEB-17
1-TS-30-195	TPSW	Penn	A19BBC-2	Replace with Static-O-Ring Model 201TA-1325 - JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-D, and 18441-83N: JCO No. MEB-17
2-TS-30-195	TPSW	Penn	A19BBC-2	Replace with Static-O-Ring Model 201TA-1325 - JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-D, and 18441-83N: JCO No. MEB-17
1-MTR-30-201	ELMO	Reliance	5YF882998	Qualified; Reliance Test Report NUC-9
2-MTR-30-201	ELMO	Reliance	5YF882998	Qualified; Reliance Test Report NUC-9
1-MTR-30-202	ELMO	Reliance	5YF882998	Qualified; Reliance Test Report NUC-9

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<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-MTR-30-202	ELMO	Reliance	5YF882998	Qualified; Reliance Test Report NUC-9
1-MTR-30-214	ELMO	Reliance	726977	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-MTR-30-214	ELMO	Reliance	726977	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-STR-30-214	MSTR	ITT	P202C12	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-STR-30-214	MSTR	ITT	P202C12	Equipment no longer considered to be within the scope of 10CCFR50.49 (Located in a mild environment)
0-MC-30-319	HMCT	Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-ME-30-319	HMSR	Hy-Cal	HS-3552-B-8-120H5	Qualified; Nutherm Report N-166-R
0-MM-30-319	HMTR	Hy-Cal	CT-822H-H-0-100X	Qualified; Nutherm Report N-166-R
0-MS-30-319	CVRG	Rochester	ET-1219	Qualified; Nutherm Report N-166-R
0-MC-30-320	HMCT	Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-ME-30-320	HMSR	Hy-Cal	HS-3552-B-8-120H5	Qualified; Nutherm Report N-166-R
0-MM-30-320	HMTR	Hy-Cal	CT-822H-H-0-100X	Qualified; Nutherm Report N-166-R
0-MS-30-320	CVRG	Rochester	ET-1219	Qualified; Nutherm Report N-166-R

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-FCV-43-2 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
2-FCV-43-2 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
1-FCV-43-11 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
2-FCV-43-11 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
1-FCV-43-22 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
2-FCV-43-22 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
1-FCV-43-34 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FCV-43-34 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
1-FCV-43-75 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
2-FCV-43-75 (LS)	LMSW	MICR-SWITCH	LSC4L	Equipment no longer considered to be within the scope of 10CFR50.49 (Equipment removed from safety circuit).
1-FSV-43-75	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FSV-43-75	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
1-FSV-43-207	SNDV	ASCO	206-381-3M4F	Qualified; ASCO Report No. AQS21678/TR, Rev. A
1-FSV-43-208	SNDV	ASCO	206-381-3M4F	Qualified; ASCO Report No. AQS21678/TR, Rev. A
1-RLY-46-1	EREL	NUTHERM	MDR 138-8	Qualified; NUTHERM International report No. N-109-00R, revision 3

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ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-RLY-46-1	EREL	NUTHERM	MDR 138-8	Qualified; NUTHERM International report No. N-109-00R, revision 3
1-XSW-46-1AC	XFSW	Powell Electrical Manufacturing Company		Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-XSW-46-1AC	XFSW	Powell Electrical Manufacturing Company		Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-XSW-46-1DC	XFSW	Powell Electrical Manufacturing Company		Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-XSW-46-1DC	XFSW	Powell Electrical Manufacturing Company		Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-RLY-46-2	EREL	NUTHERM	MDR 138-8	Qualified; NUTHERM International report No. N-109-00R, revision 3
2-RLY-46-2	EREL	NUTHERM	MDR 138-8	Qualified; NUTHERM International report No. N-109-00R, revision 3
1-RLY-46-3	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
2-RLY-46-3	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
1-RLY-46-4	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
2-RLY-46-4	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3

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ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-RLY-46-5	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
2-RLY-46-5	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
1-RLY-46-6	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
2-RLY-46-6	EREL	NUTHERM	MDR 134-1	Qualified; NUTHERM International report No. N-109-00R, revision 3
1-FIC-46-57	EFIC	Beckman	8952-02	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-FIC-46-57	EFIC	Beckman	8952-02	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-XS-46-57	CTSW	Electroswitch	Series 24 PN24909B-2	Qualified; Electroswitch report 2392-2
2-XS-46-57	CTSW	Electroswitch	Series 24 PN24909B-2	Qualified; Electroswitch report 2392-2
1-ZS-46-57A	SGCV	Beckman	8952-02	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
2-ZS-46-57A	SGCV	Beckman	8952-02	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
1-FSV-62-69	SNDV	ASCO	NP8316A74E	Qualified; ASCO Report No. AQS21678/TR, Rev. A

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ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FSV-62-69	SNDV	ASCO	NP8316A74E	Qualified; ASCO Report No. AQS21678/TR, Rev. A
1-MTR-63-10A	ELMO	Westinghouse	69F43503	Qualified; WCAP-8754
2-MTR-63-10A	ELMO	Westinghouse	69F43503	Qualified; WCAP-8754
1-MTR-63-15B	ELMO	Westinghouse	69F43503	Qualified; WCAP-8754
2-MTR-63-15B	ELMO	Westinghouse	69F43503	Qualified; WCAP-8754
2-FSV-63-71	SNDV	ASCO	NP8316A74E	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FSV-65-4 (LS)	LMSW	NAMCO	EA-170	Qualified; NAMCO TR EA-170
2-FCV-65-4	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FCV-65-5 (LS)	LMSW	NAMCO	EA-170	Qualified; NAMCO TR EA-170
1-FSV-65-5	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FSV-65-5	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
2-FSV-65-9	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
0-MC-65-16	HMCT	Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-ME-65-16	HMSR	Hy-Cal	HS-3552-B-8-120H5	Qualified; Nutherm Report N-166-R

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ADDITIC EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
0-MM-65-16	HMTR	Hy-Cal	CT-822H-H-0-100X	Qualified; Nutherm Report N-166-R
0-MS-65-16	CVRG	Rochester	ET-1219	Qualified; Nutherm Report N-166-R
0-MS-65-17	TPPL	Indeeco & Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-MS-65-17	TPSW	Thermo-Disc	60T-11	Qualified; Nutherm Report N-166-R
0-FSV-65-24	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
0-FS-65-25A/B	FLSW	ITT Barton	288	Replace with Fluid Component Model 12-64-3/S; Qualified by Report No. 708053: JCO No. LEB-6
0-FS-65-25B/A	FLSW	ITT Barton	288	Replace with Fluid Component Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
2-FSV-65-29	SNDV	ASCO	206-381-3RF	Qualified; ASCO Report No. AQS21678/TR, Rev. A
0-FS-65-31A/B	FLSW	ITT Barton	288	Replace with Fluid Component Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
0-FS-65-31B/A	FLSW	ITT Barton	288	Replace with Fluid Component Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
0-MC-65-36	HMCT	Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-ME-65-36	HMSR	Hy-Cal	HS-3552-B-8-120H5	Qualified; Nutherm Report N-166-R

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ADDITIO EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
0-MM-65-36	HMTR	Hy-Cal	CT-822H-H-0-100X	Qualified; Nutherm Report N-166-R
0-MS-65-36	CVRG	Rochester	ET-1219	Qualified; Nutherm Report N-166-R
0-MS-65-37	TPPL	Indeeco & Nutherm International	N/A	Qualified; Nutherm Report N-166-R
0-MS-65-37	TPSW	Thermo-Disc	60T-11	Qualified; Nutherm Report N-166-R
0-FSV-65-43	SNDV	ASCO	206-380-2	Qualified; ASCO Report No. AQS21678/TR
0-FS-65-44A/B	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
0-FS-65-44B/A	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
2-FSV-65-45	SNDV	ASCO	206-382-2	Qualified; ASCO Report No. AQS21678/TR
2-FSV-65-46	SNDV	ASCO	206-382-2	Qualified; ASCO Report No. AQS21678/TR
1-FCV-65-52 (LS)	LMSW	NAMCO	EA-170	Qualified; NAMCO Report No. QTR-105
0-FS-65-55A/B	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
0-FS-65-55B/A	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6

ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
0-FS-65-56A/B	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
0-FS-65-56B/A	FLSW	ITT Barton	288	Replace with Fluid Components Model 12-64-3/S; Qualified by Report No. 708053: JCO No. EEB-6
1-FSV-67-162	SNDV	ASCO	HB 8300	Replace with ASCO Model 206-380/2RU; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. EEB-8
1-FSV-67-164	SNDV	ASCO	HB 8300	Replace with ASCO Model 206-380/2RU; Qualified by Report No. AQS21678/TR, Rev. A: JCO No. EEB-8
1-FCV-67-223	MVAC	Electrodyne	TN200	Replace with Limitorque SMB-000. Qualified by TR B0003: JCO No. MEB-104
2-FCV-67-223	MVAC	Electrodyne	TN200	Replace with Limitorque SMB-000. Qualified by TR B0003: JCO No. MEB-104
2-PT-68-66	PRTR	Barton	763 Lot 2	Qualified; WCAP-9885
1-XE-68-334	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
2-XE-68-334	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-334	SGCV	TEC	504A	Qualified; 517-TR-01
2-XT-68-334	SGCV	TEC	504A	Qualified; 517-TR-01
1-XE-68-340A	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01

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ADDITI EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-XE-68-340A	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-340A	SGCV	TEC	504A	Qualified; 517-TR-01
2-XT-68-340A	SCCV	TEC	504A	Qualified; 517-TR-01
1-XE-68-363	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
2-XE-68-363	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-363	SGCV	TEC	504A	Qualified; 517-TR-01
2-XT-68-363	SGCV	TEC	504A	Qualified; 517-TR-01
1-XE-68-364	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
2-XE-68-364	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-364	SGCV	TEC	504A	Qualified; 517-TR-01
2-XT-68-364	SGCV	TEC	504A	Qualified; 517-TR-01
1-XE-68-365	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
2-XE-68-365	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-365	SGCV	TEC	504A	Qualified; 517-TR-01
2-XT-68-365	SGCV	TEC	504A	Qualified; 517-TR-01
1-XE-68-366	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
2-XE-68-366	XDCR	ENDEVCO	2273A	Qualified; 517-TR-01
1-XT-68-366	SGCV	TEC	504A	Qualified; 517-TR-01

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ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-Xt-68-366	SGCV	TEC	504A	Qualified; 517-TR-01
1-LT-68-367	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-367	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-LT-68-368	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-368	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-LT-68-369	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-369	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-LT-68-370	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-370	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)

ADDITIO. EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-LT-68-371	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-371	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-LT-68-372	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-LT-68-372	LVTR	Barton	752	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-TE-68-373	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-373	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-374	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-374	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-375	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-375	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-376	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-376	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-377	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-378	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A

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ADDITIONAL EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-TE-68-378	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-379	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-379	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-380	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-380	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-381	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-381	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-382	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-382	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-383	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-383	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-384	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-384	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-385	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-385	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-TE-68-386	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-386	TPEL	Minco	S8809	Qualified; WCAP-8687, Supp 2 E42A
1-FSV-68-396	SNDV	Target Rock	79AB-003	Qualified; WCAP-8687, Supp 2-HE-10C

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ADDITL. EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
2-FSV-68-396	SNDV	Target Rock	79AB-003	Qualified; WCAP-8687, Supp 2-HE-10C
1-FM-68-396	FLCT	Target Rock	300592-1	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-FM-68-396	FLCT	Target Rock	300592-1	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-FM-68-397	FLCT	Target Rock	300592-1	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
2-FM-68-397	FLCT	Target Rock	300592-1	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
1-FSV-68-397	SNDV	Target Rock	79AB-003	Qualified; WCAP-8687, Supp 2-HE-10C
2-FSV-68-397	SNDV	Target Rock	79AB-003	Qualified; WCAP-8687, Supp 2-HE-10C
1-TE-68-398	TPEL	Minco	58809	Qualified; WCAP-8687, Supp 2 E42A
2-TE-68-398	TPEL	Minco	58809	Qualified; WCAP-8687, Supp 2 E42A
1-FCV-70-85	LMSW	Masoneilan	496-2	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. EEB-7
2-FCV-70-85	LMSW	Masoneilan	496-2	Replace with NAMCO Model EA-180; Qualified by Report No. QTR-105: JCO No. EEB-7
0-FSV-77-241	SNDV	ASCO	HB 8300	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)

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ADDITI EQUIPMENT

<u>TVA ID No.</u>	<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Status</u>
1-HTR-83-1A	H2RE	Westinghouse	546-GXF-175205-EM	Qualified; WCAP-7709L, Supp 7
2-HTR-83-1A	H2RE	Westinghouse	546-GXF-175205-EM	Qualified; WCAP-7709L, Supp 7
1-HTR-83-2B	H2RE	Westinghouse	546-GXF-175205-EM	Qualified; WCAP-7709L, Supp 7
2-HTR-83-2B	H2RE	Westinghouse	546-GXF-175205-EM	Qualified; WCAP-7709L, Supp 7
1-RE-90-271	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
2-RE-90-271	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
1-RE-90-272	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
2-RE-90-272	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
1-RE-90-273	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
2-RE-90-273	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
1-RE-90-274	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
2-RE-90-274	RADM	GA Technologies Inc. (see note 1)		Qualified; GA test report E-254-960, rev
-----	CSA	Conax Corporation	ECSA	Qualified; Various Conax Test Reports
-----	Conduit	ServicAir Corporation	5563	Qualified; Wyle Labs Report NES 26303

Note 1: Detector model RC-23; readout model RP-2C; power supply model RP-23; panel bin assembly model RP-20-01.
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6.0 Additional Equipment JCOs

JCO NO. EEB-1

TVA ID NO. 2-ZS-1-181, -182, -183, -184

MANUFACTURER/MODEL NO.

Namco Controls/Model EA700

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Limit switches 2-ZS-1-181, -182, -183, and -184 are located in the reactor building, lower containment, Elev. 712. They are required to operate for 5 minutes after start of an accident and not to fail in a manner detrimental to plant safety for 100 days thereafter (depending on which accident occurs).
2. Limit switches are subject to LOCA/HELB conditions. They are required to operate and not to fail in the following environment:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	120°F	130°F	327°F
Pressure:	14.7 psia	14.7 psia	26.4 psia
Relative Humidity:	80%	100%	100%
Radiation:	2x10 ⁷ rads (40 yr. TID)	N/A	1x10 ⁸ rads
Spray/Flooding:	N/A		Spray only

3. The manufacturer's specifications for the switches are:

Temperature:	194°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. The above information indicates that the limit switches are not qualified for their required operating accident environment.
5. Limit switches 2-ZS-1-181, -182, -183, and -184 are part of the control circuit for the steam generator blowdown containment isolation valves. Following an event inside containment it is possible for these unqualified limit switches to fail in the closed position, allowing the inboard isolation valve to reopen when the Phase A containment isolation signal is reset. In the event of a main steam line or feedwater line break, no radiation is released, therefore, containment integrity is not of vital concern. In the event of a LOCA, RHR, or CVCS line break, there is a radiation release. However, the blowdown lines inside containment are Class B piping and are considered part of the containment boundary with no direct communication with the Reactor Coolant System. Therefore, failure of the inboard blowdown isolation valves to close will not result in any significant release of radioactive material outside containment even with a single random failure of the respective outboard containment isolation valve.

JCO NO. EEB-2

TVA ID NO. 1, 2-PS-3-121A, -121B, -121D

MANUFACTURER/MODEL NO.

Custom Components/Model 604G

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION

1. Pressure switches 1, 2-PS-3-121A, -121B, and -121D are located in the auxiliary building (669 A6, A26). They are required to operate for 100 days after the start of a LOCA/HELB inside containment.
2. The pressure switches are subject to HELB (Volume 5) and LOCA conditions. They are required to operate in the following environments:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	110°F
Pressure:	Atm	Atm
Relative Humidity:	80%	90%
Radiation:	5x10 ² rads (40 yr. TID)	1x10 ⁴ rads
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the switches are:

Temperature:	160°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. The above information shows that the pressure switches will function properly as required and are, therefore, qualified for an interim period. However, due to the lack of documentation required by NUREG-0588, TVA will replace these devices, as determined by NCR SQNTEB8303.

JCO NO. EEB-3

TVA ID NO. 1, 2-FT-3-147, -155, -163, -170

MANUFACTURER/MODEL NO.

Bailey/Model 555

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Flow Transmitters 1, 2-FT-3-147 and -155 are located in the auxiliary building (714/A6, A10). Flow transmitters 1, 2-FT-3-163 and -170 are located in the auxiliary building (690/A6, A19). They are required to operate for 100 days after the start of a LOCA/HELB inside containment and for 1 month after the start of all HELBs outside containment.
2. Flow transmitters 1, 2-FT-3-147 and -155 are subject to HELB (Volume 14) and LOCA conditions. They are required to operate in the following environments:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	192°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100
Radiation:	3.5x10 ⁴ rads (40 yr. TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

Flow transmitters 1, 2-FT-3-163 and -170 are subject to HELB and LOCA conditions (Volume 15). They are required to operate in the following environments:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	196°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100
Radiation:	U1 - 1.75x10 ³ rads (40 yr. TID) U2 - 3.5.10 rads (40 yr. TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the flow transmitters are:

Temperature:	-20°F to 185°F
Pressure:	Atm
Relative Humidity:	Not specified*
Radiation:	Not specified

*Rated for all outdoor installations.

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. The maximum normal operating temperature is 104°F. During an HELB, the temperature will rise to 196°F within 625 seconds, and then decrease linearly to the maximum normal operating temperature within 24 hours. The 11°F temperature rise above the manufacturer's specified maximum operating temperature of 185°F is of such short duration that it will not effect the operation of the transmitters.
6. The above information shows that the flow transmitters will function properly as required and are, therefore, qualified for an interim period. However due to the lack of documentation required by NUREG-0588, TVA will replace these devices as determined by NCR SQNEEB8308.

JCO NO. EEB-4

TVA ID NO. Positioners on 1, 2-LCV-3-148, -156, -164, -171, -172, -173, -174, -175

MANUFACTURER/MODEL NO.

Masoneilan/Model 8012

STATUS III

JUSTIFICATION FOR CONTINUED OPERATION

- I. 1. Positioners on each of 1, 2-LCV-3-148, -156, -164, and -171 are located in the auxiliary building (714/A1). They are required to operate for 100 days after the start of a LOCA/HELB inside containment and for 1 month after the start of all HELBs outside containment.
2. The positioners are subject to HELB (Volume 12) and LOCA conditions. They are required to operate in the following environments¹:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	129°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	5x10 ⁴ rads (40 yr. TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the positioners are:

Temperature:	180°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. An accident simulation test to temperatures in excess of 320 °F has been performed at Wyle Laboratories and has shown that these positioners will function properly as required and are, therefore, qualified for an interim period. Further testing is being done at Wyle Laboratories in Huntsville, Alabama, to provide qualification documentation as required by NUREG-0588.
- II. 1. Positioners on each of 1, 2-LCV-3-172, and -173 are located in the auxiliary building (714/A6, A10). They are required to operate for 100 days after the start of a LOCA/HELB inside containment and for 1 month after the start of all HELBs, except for an AFW pump

¹See SQN/WBN Environmental Data Drawing 473235-49, -50.

turbine steam line break, outside containment. For an AFW pump turbine steam line break, positioners are classified category C.

2. The positioners are subject to HELL (Volume 14) and LOCA conditions. They are required to operate in the following environments²:

	<u>Normal</u>	<u>Accident</u>
Temperature:	104°F	192°F
Pressure:	Atm	Atm
Relative Humidity:	80%	100%
Radiation:	1x10 ⁶ rads (40 yr. TID)	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A

3. The manufacturer's specifications for the positioners are:

Temperature:	180°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
 5. An accident simulation test to temperatures in excess of 320 F has been performed at Wyle Laboratories and has shown that these positioners will function properly as required and are, therefore, qualified for an interim period. Further testing is being done at Wyle Laboratories in Huntsville, Alabama, to provide qualification documentation as required by NUREG-0588.
- III. 1. Positioners on each of 1, 2-LCV-3-174, and -175 are located in the auxiliary building (west valve vaults, 706/A1, A11). They are required to operate for 100 days after being subjected to a main steam line break or a feedwater line break inside valve vaults.
2. The positioners are required to operate in the following environments³:

	<u>Normal</u>	<u>Accident</u>
Temperature:	130°F	307°F
Pressure:	Atm	Atm
Relative Humidity:	50%	100%
Radiation:	1x75x10 ³ rads (40 yr. TID)	N/A (LOCA)
Spray/Flooding:	N/A	N/A

²See SQN/WBN Environmental Data Drawing 47E235-83, -52.

³See SQN/WBN Environmental Data Drawing 47E235-79.

3. The manufacturer's specifications for the positioners are:

Temperature:	180°C
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. An accident simulation test to temperatures in excess of 320 F has been performed at Wyle Laboratories and has shown that these positioners will function properly as required and are, therefore, qualified for an interim period. Further testing is being done at Wyle Laboratories in Huntsville, Alabama, to provide qualification documentation as required by NUREG-0588.

JCO NO. EEB-5

TVA ID NO. 1, 2-PS-3-160A, -160B, -165A, -165B

MANUFACTURER/MODEL NO.

Custom Components/Model 604G

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Pressure switches 1, 2-PS-3-160A, -160B, -165A, and -165B are located in the auxiliary building (west valve vaults, 706/A1, A11). They are required to operate for 5 minutes after being subjected to a main steam line break or a feedwater line break inside valve vaults and not to fail detrimental to plant safety for 100 days thereafter.

2. The pressure switches are required to operate in the following environments¹:

	<u>Normal</u>	<u>Accident</u>
Temperature:	130 ^o F	307 ^o F
Pressure:	Atm	22.9 psia
Relative Humidity:	50%	100
Radiation:	1.75x10 ³ rads (40 yr. TID)	N/A
Spray/Flooding:	N/A	N/A

3. The manufacturer's specification for the pressure switches are:

Temperature:	160 ^o F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.
5. The above information indicates that these switches are not qualified for their accident environment. 1, 2-PS-3-160A, -160B, -165A, and -165B are components used to sense low steam generator pressure and to isolate the turbine driven auxiliary feedwater (TDAFW) supply to the faulted steam generators (SG). The automatic closure of these feedwater valves from the pressure switches is not taken credit for in any TVA accident analysis. FSAR Table 10.4.7-9, "Auxiliary Feedwater Flow to Steam Generators Following an Accident/Transient With Selected Single Failure," states that for the two events which will cause PS-3-160, etc., to fail (main feedwater and main steam line breaks) 10 minute operator action is required to isolate the AFW flow to the faulted SG (this table does not take credit for the automatic isolation of the TPAFW supply valves). EOI-2, "Loss of Secondary Coolant,"

¹See SQN/WBN Environmental Drawing 47E235-79.

instructs the operator to isolate AFW flow to the faulted SG, therefore, the TDAFW supply valve will be closed by the operator even if the valve does not automatically close from the ppressure switch input.

These switches will be relocated to a less harsh environment and replaced with fully qualified devices as determined by the resolution of NCR SQNEEB8004.

JCO NO. EEB-6

TVA ID NO. O-FS-65-25A/B, B/A; -31A/B, -31B/A; -44A/B, -44B/A;
-55A/B, -55B/A; -56A/B, -56B/A

MANUFACTURER/MODEL NO.

ITT Barton/Model 288

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. For flow switches

O-FS-65-25A/B
O-FS-65-25B/A
O-FS-65-31A/B
O-FS-65-31B/A
O-FS-65-44A/B
O-FS-65-44B/A
O-FS-65-55A/B
O-FS-65-55B/A
O-FS-65-56A/B
O-FS-65-56B/A

2. Flow switches are located in the auxiliary building (734/A16). They are required to operate for 100 days following a LOCA inside containment. For all HELBs, flow switches are classified category C.

3. Flow switches are required to operate in the following environments¹:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104 ^o F	110 ^o F	110 ^o F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	3.5x10 ² rads (40 yr. TID)	N/A	1x10 ⁷ rads
Spray/Flooding:	N/A	N/A	N/A

4. The manufacturer's specifications for limit switches are as follows:

Temperature: 200^oF
Pressure: Atm
Relative Humidity: NEMA 4 Enclosure
Radiation: Not specified

5. See generic position 4.1.8 for relative humidity.

6. Flow switches are not qualified for their accident radiation environment. TVA will electrically remove (per EGN L-5124) flow switches from control circuit to eliminate their safety function until environmentally qualified replacements are installed by NCR SQNEEB8031.

¹See SQN/WBN Environmental Data Drawing 47E235-81.

JCO NO. EEB-7

TVA ID NO. Limit switches on 1, 2-FCV-70-85

MANUFACTURER/MODEL NO. Masoneilan/Model 496-2

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION: For equipment added to SQN
10CFR50.49, Table ii.

1. Limit switches associated with 1, 2-FCV-70-85 are located in the auxiliary building (pipe chase area, Elev. 690/A28, A29). They are required to operate for 5 minutes after the start of an accident and not to fail detrimental to plant safety for 100 days thereafter.

2. Limit switches are required to operate in the following environments¹:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	110°F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	N/A
Radiation:	3.5x10 ⁵ rads (40 yr. TID)	N/A	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer's specifications for limit switches are as follows:

Temperature:	180°F
Pressure:	Atm
Relative Humidity:	NEMA 4 Enclosure
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.

5. The above information shows that the limit switches will function properly as required and are, therefore, qualified for an interim period. However, due to the lack of documentation required by NUREG-0588, TVA will replace these devices as determined by NCR SQNZEB8302.

¹See SQN/WBN Environmental Data Drawing 47E235-64.

JCO NO. EEB-8

TVA ID NO. 1-FSV-67-162, 1-FSV-67-164

MANUFACTURER/MODEL NO.

ASCO HB8300C58RU

STATUS IV

JUSTIFICATION FOR CONTINUED OPERATION:

1. Solenoid valves 1-FSV-67-162 and 1-FSV-67-164 are located in the auxiliary building (Elev. 690//A1). They are required to operate for 100 days after the start of a LOCA and for 1 month following an HELB outside of containment.

2. The valves are required to operate in the following environments¹:

	<u>Normal</u>	<u>Abnormal</u>	<u>Accident</u>
Temperature:	104°F	110°F	116°F
Pressure:	Atm	Atm	N/A
Relative Humidity:	80%	90%	100%
Radiation:	5x10 ² rads (40 yr. TID)	N/A	1x10 ⁴ rads (LOCA)
Spray/Flooding:	N/A	N/A	N/A

3. The manufacturer's specifications for valves are as follows:

Temperature:	140°F
Pressure:	Atm
Relative Humidity:	Not specified
Radiation:	Not specified

4. See generic positions 4.1.5 for radiation and 4.1.8 for relative humidity.

5. The above information shows that the valves will function properly as required and are, therefore, qualified for an interim period. However due to the lack of documentation required by NURE-0588, TVA will replace these devices as determined by NCR SQNEEB8046.

¹See SQN/WBN Environmental Data Drawing 47E235-55, -58.

SEQUOYAH NUCLEAR PLANT
JUSTIFICATION FOR CONTINUED OPERATION:
"TEMPERATURE SWITCHES - COOLERS"

TEMP. SW. NO. - 2-TS-30-184, 2-TS-30-185
 1-TS-30-194, 1-TS-30-195
 2-TS-30-194, 2-TS-30-195

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation -

Subject temperature switches are to be replaced with 1E qualified switches (already onsite). Installation of replacements is scheduled as follows:

- Unit 1 - no later than cycle 3 fuel outage period (November 1985)
 as previously requested in exemption from 10CFR50.49 rules.
- Unit 2 - no later than the end of cycle 2 fuel outage -
 November 24, 1984.

For JCO, see attached appendix I -
EQS No. MEB-30-64.

Prepared by:

R. H. Louder 6/20/84

Reviewed by:

H. E. Burton 6/20/84

Appendix 1

	Revision	R1			
Preparer/Date	RH Lowden	1/5/84			
Reviewer/Date	W. V. Chen	5/1/84			

Unit No. 182
 EOS No. MEB-30-64
 TVA ID No. see Appendix I
Temperature
switches

SON EQUIPMENT QUALIFICATION SHEET (R3)

Manufacturer and Model No. Penn A19BBC-2
 Verification of Table Information (Eqpt List - outside cont. 459-65)

- ✓ Equipment Type - The equipment has been identified as per TVA ID number designations (such as, MOV, SOV).
- ✓ Location - The location has been identified (such as, inside primary containment, annulus; individually cooled rooms, general spaces, or area affected by HELB outside primary containment).
- ✓ Component - A unique TVA ID number has been assigned (such as, 1-FSV-68-308).
- ✓ Function - A functional description of the component has been given (such as, steam generator blowdown).
- ✓ Contract No., Manufacturer, and Model No. - The contract number, manufacturer, and model number have been given.
- ✓ Abnormal or Accident Environment - All abnormal or accident environmental conditions applicable to this equipment have been identified either in tables or by references to figures from tables.
- ✓ Environment to Which Qualified - The environment to which the equipment has been qualified is addressed in either the tables or the environmental analysis attached.
- ✓ Category - A category of a, b, c, or d has been defined for the equipment.
- ✓ Operation and Accuracy Required and Demonstrated - The operation and accuracy required and demonstrated have been defined.

Qualification Status (check if applicable, NA if not)

- Qualified Life (If equipment is qualified, indicate the qualified life with a numerical entry):
- NA Qualification Report and Method - A qualification report and the method of qualification has been identified on the Table Input Data Sheet (TIDS).
- ✓ Environmental Analysis - An environmental analysis has been done, attached to the EOS, and independently reviewed by the responsible organization.
- NA Qualification by Similarity (If applicable) - A justification for qualification by similarity is attached to the EOS considering all the above factors and referenced to the appropriate tables.
- ✓ Qualification of Several Exact Components (If applicable) - When an EOS is used for more than one item, a list of all exact components is given as an appendix with all references to appropriate tables with justification for qualification considering all the above factors.
- ✓ Interim Qualification (If applicable) - (Open item) - Component has been determined to be qualified only for a limited interim operation, an NCR has been written, and plan of action has been determined to yield a qualified component.
- Term of Interim Qualification Dec. 86
- ✓ NCR No. SONMEB8301
- ✓ Unqualified Component - (Open item) - (If applicable) - Component has been determined to be unqualified; the following is attached to EOS: NCR number, reason for non-qualification, and justification of continued operation.
- NCR No. SONMEB8301

Appendix 1

ADDITIONAL EQUIPMENT

Temperature Switches

TVA ID No. - 2-TS-30-184 and -185

~~1-TS-30-186 and -187~~

~~2-TS-30-186 and -187~~

~~1-TS-30-190 and -191~~

~~2-TS-30-192 and -193~~

1-TS-30-194 and -195

2-TS-30-194 and -195

~~1-TS-30-196 and -197~~

~~2-TS-30-196 and -197~~

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation and/or
Resolution of Deficiencies -

The temperature switches are subjected to the following accident conditions (worst case - penetration room el 714.0 - HELB):

Temperature - 110°F max (30 days max - LOCA)
 193°F maximum (decreasing to 140°F over 4 hr. pd.)
Pressure - 14.4 psia maximum
Relative Humidity - 100% maximum (24 hr. max)
Radiation - $<1 \times 10^4$ rads (LOCA)

The temperature switches functions are to start the pipe chase coolers to provide cooling to the motor operated valves in pipe chase. The switches can operate at a maximum temperature of 140°F (see attachment 1). Per Johnson Controls: since 100% relative humidity occurs only over a 24 hour time period, there would be no adverse affects on subject switches. The maximum temperature of 193°F ; however, could have adverse affects on the switches. This maximum temperature occurs during a residual heat removal pipe rupture and is an extremely conservative figure. Probability of occurrence is extremely low.

It is our engineering judgement that due to the mass of the valves and the short duration of the line break, the valves will not significantly be affected by failure of the temperature switches to continue to provide cooling. The subject switches can operate for all other line breaks; therefore, we feel the temperature switches can continue to operate until they are replaced with qualified temperature switches. A replacement schedule is immediately being implemented to rectify this situation.

Ref.: TVA Environmental Data drawings 47E235- 49 thru 52;
55 thru 60, 69 & 70

COILED BULB THERMOSTATS



A19BAC-3

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Bulb and Capillary	Range Adjuster	Electrical Rating 120V. A.C. (See page 14)	Shipping Wt. Lbs.
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VENTILATING, HEATING

A19BAC-3	SPST, Open High "No Heat" position	35 to 95	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16.0 A. Table 3	1.0
A19BAC-7	SPDT	30 to 110	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16.0 A. Table 3	0.9
A19BAC-1	SPDT	30 to 110	2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	4.0 A. Table 4	1.0

COOLING

A19BAC-2	SPDT	-30 to +100	3 to 12	1 1/2" x 2 1/4" Coiled	Screwdriver Slot	16.0 A. Table 3	1.0
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Maximum bulb temperature is 140° F.

THERMOSTAT FOR PORTABLE HEATERS

Catalog No. A19BAG-1 is a sturdy, compact thermostat with visible scale and adjusting knob. Designed to take heavy duty use encountered in portable heater applications. Liquid charged, copper coiled air bulb for rapid response and dependability. 6' long extension cord with rubber covered polarized 3 prong plug and "series" socket for 120 V. service. 15 Amp. rating. 7" beaded chain hanger supplied to permit supporting the thermostat in any convenient location.

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.
A.C. Full Load Amps.	15.0
A.C. Locked Rotor Amps.	90 C
Non-inductive	1800 Watts
Pilot Duty — 125 VA.	24 to 120 V. A.C.

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Shipping Wt. Lbs.
A19BAG-1	SPST Open High "No-Heat" Position	35 to 95	3 1/2 Non-Adj.	1.4

Maximum bulb temperature is 140° F.

AUTOMATIC CHANGEOVER

Changeover control for use with combination heating and cooling thermostats. Control feels water temperature and automatically selects correct thermostat function. Recommended for convectors, fan coils and blast coil units, etc.

A19CAC-2 may be mounted directly on either vertical or horizontal pipe by mounting strap supplied with control. A19CAC-1 has remote bulb for greater wiring and mounting convenience.

Max. Case Ambient Temperature: 140° F.

Max. Sensing Element Temperature: 250° F.

Shipping Weight: 1.2 lbs. each.

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.	240 V.
A.C. Full Load Amps.	10.0	4.0
A.C. Locked Rotor Amps.	60.0	36.0
Pilot Duty — 125 VA.	120 to 240 V. A.C.	



A19CAC-1

(Remote Bulb Model)

Catalog Number	Switch Action	Range (° F.)	Diff. (° F.)	Mounting
A19CAC-1	SPDT	60 to 90	10 Fixed	42" Cap.
A19CAC-2	SPDT	60 to 90	10 Fixed	Direct

► Universal Replacement.

PENN DIV.

System Engineering? Oak Brook, IL.
REC'D April 22 (215) 637-1700

JCO NO. MEB-101
TVA ID NO. SEE ATTACHMENT
MANUFACTURER/MODEL NO. - NAMCO/EA 170
STATUS - TO BE REPLACED

Justification for Continued Operation:

These limit switches are similar to limit switches tested in Namco's test report for model EA 170-302 limit switches. The switching mechanisms are the same, but the EA 170-100 has an aluminum housing instead of zinc and is sealed with BUNA-N instead of EPDM and VITON. These limit switches are required to operate for 5 minutes, after which they are "fail as is". For 3 years of operation and accident the radiation level is less than or equal to 2.5×10^6 RADS. Materials analysis shows that the above materials are capable of surviving for the required period of time. Based on the above, we consider these switches qualified for operation until they can be replaced.

Prepared by:

DF Cox 6/20/84

Reviewed by:

Joe Hodges 6/20/84

JCO NO. MEB-101
ATTACHMENT I
SHEET 1 OF 1

2-FCV-30-2 (LS)

2-FCV-30-5 (LS)

2-ZS-30-7

2-FCV-30-16 (LS)

2-ZS-30-51

2-ZS-30-53

2-FCV-30-54 (LS)

2-ZS-30-57

2-ZS-30-59

2-FCV-30-61 (LS)

2-FCV-30-62 (LS)

2-ZS-30-19

2-FCV-30-37 (LS)

Prepared by:

DJ C 6/20/84

Reviewed by:

J. W. Hodges 6/20/84

RI
TRW 10-10-84
CBW 10/10/84

G24171.12

JCO NO. MEB-102
TVA ID NO. SEE ATTACHMENT
MANUFACTURER/MODEL NO. AVCO/C-5439
STATUS: TO BE REPLACED

Justification for Continued Operation:

While we are unable to obtain qualification documentation for this model valve, we have obtained manufacturer's literature which shows that this valve is manufactured from bronze and viton. For the environments that this valve will be exposed to these materials should not experience debilitating degradation.

Prepared by:

DJ Cox 6/20/84

Reviewed by:

JW Hodges 6/20/84

JCO NO. MEB-102
ATTACHMENT I
SHEET 1 OF 1

1-FSV-30-7
2-FSV-30-7
1-FSV-30-9
2-FSV-30-9
1-FSV-30-12
2-FSV-30-12
1-FSV-30-14
2-FSV-30-14
1-FSV-30-19
2-FSV-30-19
1-FSV-30-53
2-FSV-30-53
1-FSV-30-54
2-FSV-30-54
1-FSV-30-59
2-FSV-30-59
1-FSV-30-61
2-FSV-30-61
1-FSV-30-62
2-FSV-30-62
1-FSV-30-51
2-FSV-30-51
1-FSV-30-57
2-FSV-30-57

Prepared by: D J C 6/20/84

Reviewed by: J W Hodges 6/20/84

JCO NO. MEB-103
TVA ID NO. - SEE ATTACHMENT
MANUFACTURER/MODEL NO. ASCO/8316
STATUS - TO BE REPLACED

Justification for Continued Operation:

This model solenoid valve was subjected to environmental testing in ASCO Test Report AQS21678/TR Revision A; and survived a 346° F temperature transient, 5×10^7 RADS Radiation and 100% Relative Humidity. While not covering a 100 day accident, these conditions cover the time required to perform the safety function of this valve.

Prepared by:

DJ Cur 6/20/84

Reviewed by:

JW Rodgers 6/20/84

JCO NO. MEB-103
ATTACHMENT 1
SHEET 1 OF 1

1-FSV-30-16
2-FSV-30-16
1-FSV-30-37
2-FSV-30-37

Prepared by:

DA Cox 6/20/84

Reviewed by:

J. H. Rogers 6/20/84

JCO NO. MEB-104
TVA ID NO. - SEE ATTACHMENT
MANUFACTURER/MODEL NO. - ELECTRODYNE/TN 200
STATUS - TO BE REPLACED

Justification for Continued Operation:

The valve motor operators are qualified by test of a model TN-200 motor operator in Franklin Institute Research Laboratories Report No. F-C2883.

The test sequence was as follows:

1. Radiation 1×10^8 RADS
2. Seismic
3. 6-Day steam and simultaneous 5-hour chemical spray exposure starting at 90 psig/330° F and reduced gradually to 5 psig/225° F.

^{NOT}
This test does ^{NOT} qualify these actuators for a 100-day accident but the test conditions do envelope the required operating time for these actuators. Based on the above, these actuators are qualified for continued operation until replacement.

Installation of replacements is scheduled as follows:

- Unit 1 - no later than cycle 3 fuel outage period (November 1985)
as previously requested in exemption from 10CFR50.49 rules
Unit 2 - no later than the end of cycle 2 fuel outage -
November 24, 1984.

Prepared by:

DJ Cox 6/2/84

Reviewed by:

Joe Hodges 6/2/84

JCO NO. MEB-104
ATTACHMENT I
SHEET 1 OF 1

1-FCV-67-223
2-FCV-67-223

Prepared by: D. J. Cox 6/20/84

Reviewed by: J. R. Holder 6/20/84

JCO No. MEB-105
TVA ID No. - See Attachment
Manufacturer/Model No. - Namco/EA 180
Status - To be replaced

JUSTIFICATION FOR CONTINUED OPERATION

The limit switches are in the seal-in (control) circuit for the containment purge supply and exhaust isolation valves. These valves close upon receipt of a containment vent isolation signal. After an accident inside containment, the limit switches may fail in the closed position allowing the associated valves to reopen (if open at time of accident) when the containment vent accident signal is reset. Taking a single failure of the outboard isolation valve (failing open), a path to outside containment would exist. Although there are isolation valves downstream which receive the same closure signal, there is a rubber expansion joint in the line which is only rated to 3 lb/in²g. We believe JCO is provided until the next refueling outage for the following reasons.

1. It is highly unlikely that spring-loaded fail-closed valve in the annulus (which receives the same closure signal as the inboard valve) would fail in the open position. Only one pair of containment purge isolation valves would be open with the unit in modes 1, 2, 3, and 4. In addition, operation with purge valves opened is limited to less than or equal to 1,000 hrs/yr.
2. Resetting the containment vent isolation signal is included in emergency procedure ES-0.2, "SI Termination." After a large break loss of coolant accident (LOCA), safety injection (SI) will not be terminated until very late in the event. By this time, containment pressure will be reduced below the 3 lb/in²g rated limit of the expansion joint. The downstream isolation valve will be closed, and any radioactive leak-off in the annulus will be handled by the emergency gas treatment system (EGTS).
3. After a small break LOCA, SI will be terminated (and subsequently containment vent isolation reset) after reactor coolant system (RCS) pressure re-established. The small break LOCA, though, will only result in pressures of approximately 2-3 lb/in²g, which is within the limits of the expansion joints.
4. ES-0.2 cautions the operator to determine whether, after a LOCA, the containment ventilation systems should be returned to normal alignment. It is highly unlikely that the operator will reset containment vent isolation if there is any significant release of radiation into the containment.

Prepared by: D J Cox 12/3/84
Reviewed by: CL Mill 12/3/84

REVISION	1		-	
PREPARED BY/DATE	DC 2/5/85			
REVIEWED BY/DATE	AM 2/15/85			

G05042.01

JCO No. MEB-105
Attachment 1
Sheet 1 of 1

Unit	Tag No.
1	ZS-30-8
1	ZS-30-10
1	ZS-30-15
1	ZS-30-20
1	ZS-30-50
1	ZS-30-52
1	ZS-30-56
1	ZS-30-58

Prepared by: Q. J. Cox 12/3/84
Reviewed by: C. L. Hall 12/3/84

Appendix I

ADDITIONAL EQUIPMENT

Temperature Switches

TVA ID No. - ~~2-30-186 and -187~~

1-TS-30-186 and -187

2-TS-30-186 and -187

1-TS-30-190 and -191

0-TS-30-192 and -193

~~1-TS-30-196 and -197~~

2-TS-30-196 and -197

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation and/or
Resolution of Deficiencies -

The temperature switches are subjected to the following accident conditions (worst case - penetration room el 714.0 - HELB):

Temperature - ~~143°F maximum~~ ^{(110°F max (30 days max - LOCA))} (decreasing to 140°F over 4 hr)
Pressure - 14.4 psia maximum
Relative Humidity - 100% maximum (24 hr. max)
Radiation - $< 1 \times 10^4$ rads (LOCA)

The temperature switches functions are to start the pipe chase coolers to provide cooling to the motor operated valves in pipe chase. The switches can operate at a maximum temperature of 140°F (see attachment 1). Per Johnson Controls: since 100% relative humidity occurs only over a 24 hour time period, there would be no adverse affects on subject switches. The maximum temperature of 143°F; however, could have adverse affects on the switches. This maximum temperature occurs during a residual heat removal pipe rupture and is an extremely conservative figure. Probability of occurrence is extremely low.

It is our engineering judgement that due to the mass of the valves and the short duration of the line break, the valves will not significantly be affected by failure of the temperature switches to continue to provide cooling. The subject switches can operate for all other line breaks; therefore, we feel the temperature switches can continue to operate until they are replaced with qualified temperature switches. A replacement schedule is immediately being implemented to rectify this situation.

Ref.: TVA Environmental Data drawings 47E235- 49 thru 52
55 thru 60, 69 & 70

Appendix II

ADDITIONAL EQUIPMENT

Temperature Switches

TVA ID No. - 1-TS-30-201 and -202
2-TS-30-201 and -202

Manufacturer/Model No. - Penn A19BBC-2

Status - IV

Justification for Continued Operation and/or
Resolution of Deficiencies -

The temperature switches are subjected to the following accident conditions (HELB):

Temperature - 209°F maximum (24 hr max); 110°F (30 days max.)
Pressure - 14.4 psia maximum
Relative humidity - 100% (24 hr max)
Radiation - ~~acc~~ Accident: $< 1 \times 10^4$ rads (LOCA)

The temperature switches functions are to start the pipe chase coolers to provide cooling to the motor operated valves in pipe chase. The switches can operate at a maximum temperature of 140°F (see attachment 1). Per Johnson Controls: since 100% relative humidity occurs only over a 24 hour time period, there would be no adverse affects on subject switches. The maximum temperature of 209°F; however, could have adverse affects on the switches. This maximum temperature occurs during a residual heat removal pipe rupture and is an extremely conservative figure. Probability of occurrence is extremely low.

It is our engineering judgement that due to the mass of the valves and the short duration of the line break, the valves will not significantly be affected by failure of the temperature switches to continue to provide cooling. The subject switches can operate for all other line breaks; therefore, we feel the temperature switches can continue to operate until they are replaced with qualified temperature switches. A replacement schedule is immediately being implemented to rectify this situation.

Ref.: TVA Environmental Data drawings 47E235-62 & -63.
LEON.4 for SQN.

A19-SERIES TEMPERATURE CONTROLS

ATTACHMENT N

COILED BULB THERMOSTATS



A19BAC-1

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Bulb and Capillary	Range Adjuster	Electrical Rating 120V. A.C. (See page 14)	Shipping Wt. Lbs.
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VENTILATING, HEATING

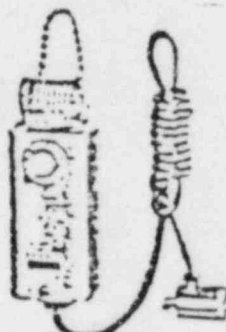
A19BAB-3	SPST, Open High "No Heat" position	35 to 95	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16 D.A. Table 3	1.8
A19BAC-1	SPDT	50 to 110	3 1/2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	16 D.A. Table 3	0.9
A19BAF-1	SPDT	50 to 110	2 Fixed	1 1/2" x 2 1/4" Coiled	Knob	4.0 A. Table 4	1.0

COOLING

A19BAC-2	SPDT	-20 to +100	3 to 12	1 1/2" x 2 1/4" Coiled	Screwdriver Slot	16 D.A. Table 3	1.8
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Maximum bulb temperature is 140° F.

THERMOSTAT FOR PORTABLE HEATERS



A19BAG-1

Catalog No. A19BAG-1 is a sturdy, compact thermostat with visible scale and adjusting knob. Designed to take heavy duty use in portable heater applications. Liquid charged, copper coiled air bulb for rapid response and dependability. 6' loop extension cord with rubber covered polarized 3 prong plug and "series" socket for 120 V. service. 15 Amp. rating. 7" beaded chain hanger supplied to permit supporting the thermostat in any convenient location.

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.
A.C. Full Load Amperes	15.0
A.C. Locked Rotor Amperes	90.0
Max. Incandescent	1800 Watts
First Duty — 125 V.A.	24 to 120 V. A.C.

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Shipping Wt. Lbs.
A19BAG-1	SPST Open High "No Heat" Position	35 to 95	3 1/2 Non-Adj.	1.8

Maximum bulb temperature is 140° F.

AUTOMATIC CHANGEOVER



A19CAC-1

(Remote Bulb Model)

Changeover control for use with combination heating and cooling thermostats. Control feels water temperature and automatically selects correct thermostat function. Recommended for convectors, fan coils and blast coil units, etc.

Catalog Number	Switch Action	Range (° F.)	Differential (° F.)	Mounting
A19CAC-1	SPDT	60 to 90	10 Fixed	47" Cap
A19CAC-2	SPDT	60 to 90	10 Fixed	Direct

A19CAC-2 may be mounted directly on either vertical or horizontal pipe by mounting strap supplied with control. A19CAC-1 has remote bulb for greater wiring and mounting convenience.

Max. Case Ambient Temperature: 140° F.

Max. Sensing Element Temperature: 250° F.

Shipping Weight: 1.2 lbs. each

TO ORDER: Specify Catalog Number only.

ELECTRICAL RATINGS

Motor Ratings	120 V.	240 V.
A.C. Full Load Amperes	10.0	4.0
A.C. Locked Rotor Amperes	60.0	24.0
First Duty — 125 V.A.	120 to 240 V. A.C.	

7.0 Replacement Listing

REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-PSV-1-6A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
2-PSV-1-6A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
1-PSV-1-6B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
2-PSV-1-6B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
1-FSV-1-7	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-7	ASCO	206-381-3RVU	AQS21678/TR, Rev. A	123 (Note 1)
1-PSV-1-13A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-PSV-1-13A	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-PSV-1-13B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-PSV-1-13B	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FSV-1-14	ASCO	206-381-38FV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-14	ASCO	206-381-3RVU	AQS21678/TR, Rev. A	123 (Note 1)
1-PSV-1-24A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-PSV-1-24A	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-PSV-1-24B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-PSV-1-24B	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FSV-1-25	ASCO	206-381-3RVF/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)

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REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-1-25	ASCO	206-381-3RVF	AQS21678/TR, Rev. A	123 (Note 1)
1-PSV-1-31A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
2-PSV-1-31A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
1-PSV-1-31B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
2-PSV-1-31B	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	104 (Note 1)
1-FSV-1-32	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-32	ASCO	206-381-3RFV	AQS21678/TR, Rev. A	123 (Note 1)
1-FSV-1-147	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-147	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
1-FCV-1-147 (LS)	NAMCO	EA 740-20100	QTR-111	143 (Note 2)
2-FCV-1-147 (LS)	NAMCO	EA 740-20100	QTR-111	143 (Note 2)
1-FSV-1-148	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-148	ASCO	206-381-2-RVO	AQS21678/TR, Rev. A	123 (Note 1)
1-FCV-1-148 (LS)	NAMCO	EA 180	QTR-111	143 (Note 1)
2-FCV-1-148 (LS)	NAMCO	EA-740	QTR-111	143 (Note 1)
1-FSV-1-149	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)

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REPLA/ T LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-1-149	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 1)
1-FCV-1-149 (LS)	NAMCO	EA 740-20100	QTR-111	143 (Note 2)
2-FCV-1-149 (LS)	NAMCO	EA 740-20100	QTR-111	143 (Note 2)
1-FSV-1-150	ASCO	206-381-3RFV/ 206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 2)
2-FSV-1-150	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	123 (Note 1)
1-FCV-1-150 (LS)	NAMCO	EA 740-20100	QTR-111	143 (Note 2)
2-FCV-1-150 (LS)				143 (Notes 2 and 3)
1-FSV-1-181	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-FSV-1-181	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-ZS-1-181	NAMCO	EA-740	QTR 111	Add Equip
1-FSV-1-182	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-FSV-1-182	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-ZS-1-182	NAMCO	EA-740	QTR 111	Add Equip
1-FSV-1-183	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-FSV-1-183	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-ZS-1-183				Add Equip (Notes 2 & 3)
1-FSV-1-184	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)
2-FSV-1-184	ASCO	206-381-3RF	AQS21678/TR, Rev. A	121 (Note 1)

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REPLA' IT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-ZS-1-184				Add Equip (Notes 2 & 3)
1-LT-3-39	Barton	764	WCAP-9885, WCAP-8687 Supp. 2-E03A, WCAP-8587 Supp. 1- EQDP-ESE-3A	171 (U1) (Note 1)
1-LT-3-42	Barton	764	WCAP-9885, WCAP-8687 Supp. 2-E03A, WCAP-8587 Supp. 1- EQDP-ESE-3A	171 (U1) (Note 1)
1-LT-3-52	Barton	764	WCAP-9885, WCAP-8687 Supp. 2-E03A, WCAP-8587 Supp. 1- EQDP-ESE-3A	171 (U1) (Note 1)
1-LT-3-106	Barton	764	WCAP-9885, WCAP-8687 Supp. 2-E03A, WCAP-8587 Supp. 1- EQDP-ESE-3A	171 (U1) (Note 1)
1-PS-3-138A	ASCO	TG13A42R	AQR-101083, Rev. 0	60 (Note 1)
1-PS-3-138B	ASCO	TG13A42R	AQR-101083, Rev. 0	60 (Note 1)
1-PS-3-139A	ASCO	SB11AKR/TG13A42R	AQR-101083, Rev. 0	54 (Note 2)
2-PS-3-139A	ASCO	SB31AKR/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-139B	ASCO	SB11AKR/TG13A42R	AQR-101083, Rev. 0	54 (Note 2)
2-PS-3-139B	ASCO	SB31AKR/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-139D	ASCO	SB11AKR/TG13A42R	AQR-101083, Rev. 0	54 (Note 2)

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REPLA' IT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-PS-3-139D	ASCO	SB31AKR/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-140A	ASCO	TG13A42R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-140B	ASCO	SB11AKR/TG13A42R	AQR-101083, Rev. 0	54 (Note 2)
1-FT-3-142	Rosemount	1153DB5PB	Report 108025	61 (Note 1)
2-FT-3-142	Rosemount	1153DB5PB	Report 108025	61 (Note 1)
1-PS-3-144A	ASCO	SB31AKR	AQR-101083, Rev. 0	54 (Note 1)
2-PS-3-144A	ASCO	SB31AKR/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-144B	ASCO	SB31AKR	AQR-101083, Rev. 0	54 (Note 1)
2-PS-3-144B	ASCO	SB31AKP/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-PS-3-144D	ASCO	SB31AKR	AQR-101083, Rev. 0	54 (Note 1)
2-PS-3-144D	ASCO	SB31AKR/TD30A32R	AQR-101083, Rev. 0	54 (Note 1)
1-FT-3-147	Rosemount	1153DB5PB	Report 108025	Add Equip (Note 1)
2-FT-3-147	Rosemount	1153DB5PB	Report 108025	Add Equip (Note 1)
2-LCV-3-148				Add Equip (Notes 2 & 3)
1-LSV-3-148	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LSV-3-148	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
1-PS-3-148	ASCO	TL10A32R	AQR-101083, Rev. 0	60 (Note 1)
1-LSV-3-148A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)

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REPLA T LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-LSV-3-148A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
1-PS-3-150A	ASCO	TG13A42R	AQR-101083, Rev. A	54 (Note 1)
1-PS-3-150B	ASCO	SB11AKR/TG13A42R	AQR-101083, Rev. A	54 (Note 2)
1-FT-3-155	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-FT-3-155	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-LCV-3-156				Add Equip (Notes 2 & 3)
1-LSV-3-156	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LSV-3-156	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
1-PS-3-156	ASCO	TL10A32R	AQR-101083, Rev. 0	60 (Note 1)
1-LSV-3-156A	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
2-LSV-3-156A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
1-FT-3-163	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-FT-3-163	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-LCV-3-164				Add Equip (Notes 2 & 3)
1-LSV-3-164	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
1-LSV-3-164	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
1-PS-3-164	ASCO	TL10A32R	AQR-101083, 10	60 (Note 1)
2-PS-3-164	ASCO	TL10A32R	AQR-101083, 10	60 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-LSV-3-164A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
2-LSV-3-164A	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
1-FT-3-170	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-FT-3-170	Rosemount	1153DB5PB	108025	Add Equip (Note 1)
2-LCV-3-171				Add Equip (Notes 2 & 3)
1-LSV-3-171	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LSV-3-171	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
1-PS-3-171	ASCO	TL10A32R	AQR-101083, Rev. 0	60 (Note 1)
1-LSV-3-171A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
2-LSV-3-171A	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	109 (Note 1)
2-LCV-3-172				Add Equip (Notes 2 & 3)
1-LSV-3-172	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LSV-3-172	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LCV-3-173				Add Equip (Notes 2 & 3)
1-LSV-3-173	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LSV-3-173	ASCO	HV206-381-2RVU	AQS21678/TR, Rev. A	108 (Note 1)
2-LCV-3-174				Add Equip (Notes 2 & 3)
2-LCV-3-175				Add Equip (Notes 2 & 3)

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REPLA F LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
0-FSV-12-79	ASCO	206-380-2RU	AQS21678/TR, Rev. A	106 (Note 1)
2-TS-12-91A				153 (Notes 2 & 3)
2-TS-12-91B				153 (Notes 2 & 3)
2-TS-12-92A				153 (Notes 2 & 3)
0-TS-12-92B	Fenwall	18023-7	17509-1	153
0-TS-12-93A	Fenwall	18023-7	17509-1	153
0-TS-12-93B	Fenwall	18023-7	17509-1	153
0-TS-12-94A	Fenwall	18023-7	17509-1	153
0-TS-12-94B	Fenwall	18023-7	17509-1	153
0-TS-12-95A	Fenwall	18023-7	17509-1	153
0-TS-12-95B	Fenwall	18023-7	17509-1	153
0-TS-12-96A	Fenwall	18023-7	17509-1	153
0-TS-12-96B	Fenwall	18023-7	17509-1	153
0-TS-12-97A	Fenwall	18023-7	17509-1	153
0-TS-12-97B	Fenwall	18023-7	17509-1	153
0-TS-12-98A	Fenwall	18023-7	17509-1	153
0-TS-12-98B	Fenwall	18023-7	17509-1	153
0-TS-12-99A	Fenwall	18023-7	17509-1	153

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REPLA⁰ f LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
0-TS-12-99B	Fenwall	18023-7	17509-1	153
1-FCV-30-2 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FCV-30-2 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-2				100 (Notes 2 & 3)
1-FCV-30-5 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FCV-30-5 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-5				100 (Notes 2 & 3)
2-FCV-30-7				Add Equip (Notes 2 & 3)
2-FSV-30-7				Add Equip (Notes 2 & 3)
1-ZS-30-7	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-ZS-30-7	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-8	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
2-FCV-30-9				Add Equip (Notes 2 & 3)
2-FSV-30-9				Add Equip (Notes 2 & 3)
1-ZS-30-9	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-10	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
1-FCV-30-12 (LS)	NAMCO	EA180	QTR-105	140 (Note 1)
2-FCV-30-12				Add Equip (Notes 2 & 3)

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REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-30-12				Add Equip (Notes 2 & 3)
2-FCV-30-14				Add Equip (Notes 2 & 3)
2-FSV-30-14	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	Add Equip (Notes 2 & 3)
1-ZS-30-14	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-15	ASCO	NP8316A74E	AQS-216/8/TR, Rev. A	99
1-FCV-30-16 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FCV-30-16 (LS)				Add Equip (Notes 2 & 3)
2-FCV-30-16				Add Equip (Notes 2 & 3)
2-FSV-30-16				Add Equip (Notes 2 & 3)
2-FSV-30-17				99 (Notes 2 & 3)
2-FCV-30-19				Add Equip (Notes 2 & 3)
2-FSV-30-19				Add Equip (Notes 2 & 3)
1-ZS-30-19	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-ZS-30-19				Add Equip (Notes 2 & 3)
2-FSV-30-20				99 (Notes 2 & 3)
2-FSV-30-22	ASCO	206-381-2R	AQS21678/TR Rev. A	Add Equip (Note 1)
2-FCO-30-22 (LS)	NAMCO	EA740-20100	QTR-111	Add Equip (Note 1)
1-FCV-30-37 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)

DE03;TERRPT

REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FCV-30-37 (LS)				Add Equip (Notes 2 & 3)
2-FCV-30-37				Add Equip (Notes 2 & 3)
2-FSV-30-37				Add Equip (Notes 2 & 3)
2-FSV-30-40				99 (Notes 2 & 3)
2-PS-30-46A	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
2-PS-30-46B	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
1-ZS-30-46	NAMCO	EA180	QTR-105	175 (U1) (Note 2)
2-PS-30-47A	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
2-PS-30-47B	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
1-ZS-30-47	NAMCO	EA180	QTR-105	175 (U1) (Note 2)
2-PS-30-48A	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
2-PS-30-48B	SOR	12TA-BB4NKC1AJJX6	17344-82N-C, Rev. 1	58
1-ZS-30-48	NAMCO	EA180	QTR-105	175 (U1) (Note 2)
2-FSV-30-50	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
2-FCV-30-51				Add Equip (Notes 2 & 3)
2-FSV-30-51				Add Equip (Notes 2 & 3)
1-ZS-30-51	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-ZS-30-51	NAMCO	EA180	QTR-105	Add Equip (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-30-52	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
2-FCV-30-53				Add Equip (Notes 2 & 3)
2-FSV-30-53				Add Equip (Notes 2 & 3)
1-ZS-30-53	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-ZS-30-53				Add Equip (Notes 2 & 3)
1-FCV-30-54 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FCV-30-54 (LS)				Add Equip (Notes 2 & 3)
2-FCV-30-54				Add Equip (Notes 2 & 3)
2-FSV-30-54	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	Add Equip (Notes 2 & 3)
2-FSV-30-56	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
2-FCV-30-57				Add Equip (Notes 2 & 3)
2-FSV-30-57	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
1-ZS-30-57	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-ZS-30-57	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FSV-30-58	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	99
2-FCV-30-59				Add Equip (Notes 2 & 3)
2-FSV-30-59				Add Equip (Notes 2 & 3)
1-ZS-30-59	NAMCO	EA180	QTR-105	Add Equip (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-ZS-30-59				Add Equip (Notes 2 & 3)
2-FSV-30-60				100 (Notes 2 & 3)
1-FCV-30-61 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
2-FCV-30-61 (LS)				Add Equip (Notes 2 & 3)
2-FCV-30-61				Add Equip (Notes 2 & 3)
2-FSV-30-61				100 (Notes 2 & 3)
2-FSV-30-61				Add Equip (Notes 2 & 3)
1-FCV-30-62 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 2)
2-FCV-30-62 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 2)
2-FCV-30-62				Add Equip (Notes 2 & 3)
2-FSV-30-62				Add Equip (Notes 2 & 3)
1-FSV-30-87	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FCO-30-87 (LS)	NAMCO	EA740-20100	QTR-111	Add Equip (Note 1)
1-FSV-30-107	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	103 (Note 1)
1-FCO-30-107 (LS)	NAMCO	EA740-20100	QTR-111	103 (Note 1)
2-FSV-30-109	ASCO	206-381-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FCO-30-109 (LS)	NAMCO	EA740-20100	QTR-111	Add Equip (Note 1)
0-Mtr-30-146A	Reliance Electric Co.	4YF-882998	NUC-9	34 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-FSV-30-146A	ASCO	206-380-2RVU	AQ ^c 21678/TR, Rev. A	122 (Note 1)
1-FSV-30-146B	ASCO	206-380-2RVU	AQS21678/TR, Rev. A	122 (Note 1)
0-FS-30-147	CEMCO	RH15-05-D1	N-166-R	Add Equip
0-TC-30-147	Edwin L. Weigand & Nutherm International	126-027959-001	N-166-R	Add Equip
0-TS-30-147	Thermo-Disc	60T-11	N-166-R	Add Equip
0-FS-30-156	CEMCO	RH15-05-D1	N-166-R	Add Equip
0-Htr-30-156B				Add Equip (Notes 2 & 3)
0-TC-30-156	Edwin L. Weigand & Nutherm International	126-027959-001	N-166-R	Add Equip
0-TS-30-156	Thermo-Disc	60T-11	N-166-R	Add Equip
2-FSV-30-157A	ASCO	H18320A185	AQS21678/TR, Rev. A	128 (Note 1)
2-FSV-30-157B	ASCO	H18320A185	AQS21678/TR, Rev. A	128 (Note 1)
0-Mtr-30-157B	Reliance Electric Co.	4YF-882998	NUC-9	34 (Note 1)
1-Mtr-30-175	Reliance Electric Co.	1YF-882998	NUC-9	30 (Note 1)
2-Mtr-30-175	Reliance Electric Co.	1YF-882998	NUC-9	30 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-Mtr-30-176	Reliance Electric Co.	1YF-882998	NUC-9	30 (Note 1)
2-Mtr-30-176	Reliance Electric Co.	1YF-882998	NUC-9	30 (Note 1)
1-Mtr-30-177	Reliance Electric Co.	2YF-882998	NUC-9	28 (Note 2)
2-Mtr-30-177	Reliance Electric Co.	2YF-882998	NUC-9	28 (Note 1)
1-Mtr-30-178	Reliance Electric Co.	2YF-882998	NUC-9	28 (Note 2)
2-Mtr-30-178	Reliance Electric Co.	2YF-882998	NUC-9	28 (Note 1)
1-Mtr-30-179	Reliance Electric Co.	1YF-882998	NUC-9	31 (Note 2)
2-Mtr-30-179	Reliance Electric Co.	1YF-882998	NUC-9	31 (Note 2)
1-Mtr-30-180	Reliance Electric Co.	1YF-882998	NUC-9	31 (Note 1)
2-Mtr-30-180	Reliance Electric Co.	1YF-882998	NUC-9	31 (Note 1)
1-Mtr-30-182	Reliance Electric Co.	2YF-882998	NUC-9	32 (Note 1)
2-Mtr-30-182	Reliance Electric Co.	2YF-882998	NUC-9	32 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-Mtr-30-183	Reliance Electric Co.	2YF-882998	NUC-9	32 (Note 1)
2-Mtr-30-184	Reliance Electric Co.	2YF-882998	NUC-9	Add Equip (Note 1)
2-TS-30-184				Add Equip (Notes 2 & 3)
1-Mtr-30-185	Reliance Electric Co.	2YF-882998	NUC-9	32 (Note 1)
2-Mtr-30-185	Reliance Electric Co.	2YF-882998	NUC-9	Add Equip (Note 1)
2-TS-30-185				Add Equip (Notes 2 & 3)
2-Mtr-30-186	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
1-Mtr-30-187	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-Mtr-30-187	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-TS-30-187				151 (Notes 2 & 3)
1-Mtr-30-190A	Reliance Electric Co.	3YF-882998	NUC-9	33 (Note 1)
1-Mtr-30-191B	Reliance Electric Co.	3YF-882998	NUC-9	33 (Note 1)
0-Mtr-30-192	Reliance Electric Co.	2YF-882998	NUC-9	37 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
0-Mtr-30-193	Reliance Electric Co.	2YF-882998	NUC-9	37 (Note 1)
2-FS-30-194	Fluid Components	FR72-4R	708053 W/Add. C	59
1-Mtr-30-194	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-Mtr-30-194	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-TS-30-194				Add Equip (Notes 2 & 3)
2-FS-30-195	Fluid Components	FR72-4R	708053 W/Add. C	59
1-Mtr-30-195	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-Mtr-30-195	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-TS-30-195				Add Equip (Notes 2 & 3)
2-FS-30-196	Fluid Components	FR72-4R	708053 W/Add. C	59
1-Mtr-30-196	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-Mtr-30-196	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-TS-30-196				151 (Notes 2 & 3)
2-FS-30-197	Fluid Components	FR72-4R	708053 W/Add. C	59

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-Mtr-30-197	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-Mtr-30-197	Reliance Electric Co.	2YF-882998	NUC-9	29 (Note 1)
2-TS-30-197				151 (Notes 2 & 3)
2-Mtr-30-200	Reliance Electric Co.	4YF-882998	NUC-9	36 (Note 1)
1-Mtr-30-201	Reliance Electric Co.	5YF-882998	NUC-9	Add Equip (Note 1)
2-Mtr-30-201	Reliance Electric Co.	5YF-882998	NUC-9	Add Equip (Note 1)
2-TS-30-201				151 (Notes 2 & 3)
1-Mtr-30-202	Reliance Electric Co.	5YF-882998	NUC-9	Add Equip (Note 1)
2-Mtr-30-202	Reliance Electric Co.	5YF-882998	NUC-9	Add Equip (Note 1)
2-TS-30-202				151 (Notes 2 & 3)
2-Mtr-30-207	Reliance Electric Co.	4YF-882998	NUC-9	Add Equip (Note 1)
0-MC-30-319	Nutherm International	N/A	N-166-R	Add Equip
0-ME-30-319	Hy-Cal	HS-3552-B-8-120H5	N-166-R	Add Equip
0-MM-30-319 DE03;TERRPT	Hy-Cal	CT-822H-H-0-100X	N-166-R	Add Equip

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-61-192	ASCO	206-381-3RF	AQS21678/TR, Rev. A	102 (Note 1)
1-FSV-61-194	ASCO	206-381-3RF	AQS21678/TR, Rev. A	102 (Note 1)
2-FSV-61-194	ASCO	206-381-3RF	AQS21678/TR, Rev. A	102 (Note 1)
2-FSV-62-69	ASCO	NP831654E	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-62-69 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-62-69 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
1-FSV-62-70	ASCO	NP831654E	AQS21678/TR, Rev. A	119 (Note 2)
2-FSV-62-70	ASCO	NP831654E	AQS21678/TR, Rev. A	119 (Note 1)
1-FCV-62-70 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-62-70 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
1-FSV-62-74	ASCO	LB83654	AQS21678/TR, Rev. A	119 (Note 1)
2-FSV-62-74	ASCO	NP831654E	AQS21678/TR, Rev. A	119 (Note 1)
1-FCV-62-77 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-62-77 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
1-FCV-63-3 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-63-3 (LS)				Add Equip (Notes 2 & 3)
1-FCV-63-4 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-63-4 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-63-71	ASCO	HT831654	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FCV-63-172				23 (Notes 2 & 3)
1-FCV-63-175 (LS)	NAMCO	EA180	QTR-105	145 (Note 1)
2-FCV-63-175				18 (Notes 2 & 3)
1-LT-63-176	Barton	764	WCAP-9885, WCAP-8687, Supp.-2-E03A, WCAP-8587, Supp.-1- EQDP-ESE-3A	170 (U1) (Note 1)
1-LT-63-177	Barton	764	WCAP-9885, WCAP-8687, Supp.-2-E03A, WCAP-8587, Supp.-1- EQDP-ESE-3A	170 (U1) (Note 1)
2-FSV-65-4	ASCO	206-381-3RF	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FSV-65-5	ASCO	206-381-3RF	AQS21678/TR, Rev. A	Add Equip (Note 2)
2-FCV-65-7				100 (Notes 2 & 3)
2-FSV-65-7	ASCO	NP8316A74E	AQS21678/TR, Rev. A	100
1-FCV-65-8 (LS)	ASCO	206-381-3RF	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-65-8				100 (Notes 2 & 3)
2-FSV-65-9	ASCO	206-381-3RF	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FCO-65-10				142 (Notes 2 & 3)
1-FSV-65-10	ASCO	206-381-3RF	AQS21678/TR, Rev. A	122 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
0-MC-65-16	Nutherm International	N/A	N-166-R	Add Equip
0-ME-65-16	Hy-Cal	HS-3552-B-8-120HS	N-166-R	Add Equip
0-MM-65-16	Hy-Cal	CT-822H-H-0-100X	N-166-R	Add Equip
0-MS-65-16	Rochester	ET-1219	N-166-R	Add Equip
0-TC-65-17	Indeeco & Nutherm Intern.	N/A	N-166-R	Add Equip
0-TS-65-17	Thermo-Disc	60T-11	N-166-R	Add Equip
0-Mtr-65-23A	Reliance Electric Co.	2YF-882998	NUC-9	26 (Note 1)
1-FSV-65-24	ASCO	206-380-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
0-FS-65-25A/B	Fluid Components	12-64-3	708053	Add Equip (Note 1)
2-FCO-65-26				142 (Notes 2 & 3)
2-FCO-65-27				142 (Notes 2 & 3)
0-FCV-65-28A (LS)	NAMCO	EA180	QTR-105	144 (Note 1)
0-FCV-65-28B (LS)	NAMCO	EA180	QTR-105	144 (Note 1)
0-FSV-65-28A	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	100
0-FSV-65-28B	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	100
2-FSV-65-28A				100 (Notes 2 & 3)
2-FSV-65-28B				100 (Notes 2 & 3)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-65-29	ASCO	206-381-3RF	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FCO-65-30				142 (Notes 2 & 3)
0-FS-65-31A/B	Fluid Components	12-64-3	708053	Add Equip (Note 1)
0-MC-65-36	Nutherm International	N/A	N-166-R	Add Equip
0-ME-65-36	Hy-Cal	HS-3552-B-8-120H5	N-166-R	Add Equip
0-MM-65-36	Hy-Cal	CT-822H-H-0-100X	N-166-R	Add Equip
0-MS-65-36	Rochester	ET-1219	N-166-R	Add Equip
0-TC-65-37	Indeeco & Nutherm Intern.	N/A	N-166-R	Add Equip
0-TS-65-37	Thermo-Disc	60T-11	N-166-R	Add Equip
0-Mtr-65-42B	Reliance Electric Co.	2YF-882998	NUC-9	26 (Note 1)
1-FSV-65-43	ASCO	206-380-2RVU	AQS21678/TR, Rev. A	Add Equip (Note 1)
0-FS-65-44A/B	Fluid Components	12-64-3	708053	Add Equip (Note 1)
2-FSV-65-45	ASCO	206-382-2	AQS21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-65-46	ASCO	206-382-2	AQS21678/TR, Rev. A	Add Equip (Note 1)
0-FSV-65-47A	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	100
0-FSV-65-47B	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	100

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-65-47A				100 (Notes 2 & 3)
2-FSV-65-47B				100 (Notes 2 & 3)
2-FSV-65-50	ASCO	NP8316A74E	AQS-21678/TR, Rev. A	100
2-FSV-65-51				142 (Notes 2 & 3)
1-FCV-65-51 (LS)	NAMCO	EA180	QTR-105	144 (Note 1)
2-FCO-65-52				142 (Notes 2 & 3)
2-FCO-65-53				142 (Notes 2 & 3)
0-FS-65-55A/B	Fluid Components	12-64-3	708053	Add Equip (Note 1)
1-PDT-65-80	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
2-PDT-65-80	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
1-PCV-65-81 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
1-PDT-65-82	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
2-PDT-65-82	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
1-PCV-65-83 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
1-PCV-65-86 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
1-PCV-65-87 (LS)	NAMCO	EA180	QTR-105	Add Equip (Note 1)
1-PDT-65-90	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
2-PDT-65-90	Rosemount	1153DB3PB	Report 108025	62 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-PDT-65-97	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
2-PDT-65-97	Rosemount	1153DB3PB	Report 108025	62 (Note 1)
2-FCV-67-83	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-88	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-91	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-96	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-99	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-104	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-107	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-112	Limitorque	SMB-000	Limitorque 600456	1
2-FCV-67-123	Limitorque	SMB-000	Limitorque B00003	1
2-FCV-67-124	Limitorque	SMB-000	Limitorque B00003	1
2-FCV-67-125	Limitorque	SMB-000	Limitorque B00003	1
2-FCV-67-126	Limitorque	SMB-000	Limitorque B00003	1
2-FCV-67-146	Limitorque	SMB-000	Limitorque B00003	1
0-FCV-67-152	Limitorque	SMB-000	Limitorque B00003	1
1-FSV-67-162	ASCO	206-380-2RU	AQS21678/TR, Rev. A	Add Equip (Note 1)
1-FSV-67-164	ASCO	206-380-2RU	AQS21678/TR, Rev. A	Add Equip (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-FSV-67-168	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-168	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-170	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-170	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-176	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-176	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-182	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-182	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-184	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-184	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-186	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-186	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-188	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-188	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-190	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-190	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
1-FSV-67-213	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)
2-FSV-67-215	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)

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REPLAO : LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-67-217	ASCO	206-380-2RU	AQS21678/TR, Rev. A	120 (Note 1)
2-FSV-67-219	ASCO	206-380-2RU	AQS21678/TR, Rev. A	120 (Note 1)
2-FCV-67-243				Add Equip (Notes 2 & 3)
2-FSV-67-336	ASCO	206-380-2RVU	AQS21678/TR, Rev. A	120 (Note 1)
2-FSV-67-338	ASCO	206-380-2RVU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-342	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-342	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-344	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-344	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-346	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-346	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-348	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-348	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-350	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-350	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-352	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
2-FSV-67-352	ASCO	206-380-2RU	AQS21678/TR, Rev. A	110 (Note 1)
1-FSV-67-354	ASCO	206-380-2RU	AQS21678/TR, Rev. A	111 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FSV-67-354	ASCO	206-380-2RU	AQS 21678/TR, Rev. A	111 (Note 1)
1-FSV-67-356	ASCO	206-380-2RU	AQS 21678/TR, Rev. A	111 (Note 1)
2-FSV-67-356	ASCO	206-380-2RU	AQS 21678/TR, Rev. A	111 (Note 1)
1-TE-68-1	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-18	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-24	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-41	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-43	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-60	Weed	N9001S-2A240	548-8854-2, Rev. B	157 (Note 2)
1-TE-68-65	Weed	N9001S-2A240	548-8854-2, Rev. B	157 (Note 2)
1-PT-68-66	Barton	763	WCAP-9885, WCAP-8687, Supp 2-E01A	172 (U1) (Note 1)
1-PT-68-69	Barton	763	WCAP-8587, Supp 1-EQDP-ESE-1A	172 (U1) (Note 1)
1-TE-68-83	Weed	N9001S-2A-240	548-8854-2, Rev. B	157 (Note 2)
1-LT-68-320	Barton	764	WCAP-9885; WCAP-8687, Supp. 2-E03A; WCAP- 8587, Supp. 1-EQDP- ESE-3A	176 (U1) (Note 1)
2-FCV-68-332				25 (Notes 2 & 3)
2-FCV-68-333				25 (Notes 2 & 3)
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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-PSV-68-334	Target Rock	82UU-001	3543	118 (Note 1)
1-PSV-68-334	Target Rock	82UU-001	3543	118 (Note 1)
1-PSV-68-339	Barton	764	WCAP-9885; WCAP-8687, Supp. 2-EQ3A; WCAP- 8587, Supp. 1-EQDP- ESE-3A	176 (U1) (Note 1)
1-PSV-68-340A	Target Rock	82UU-001	3543	118 (Note 1)
1-PSV-68-340A	Target Rock	82UU-001	3543	118 (Note 1)
1-PSV-68-340AB	Target Rock	82UU-001	3543	118 (Note 2)
0-FCV-70-1	Limitorque	SMB-000	B0003	2
0-FCV-70-11	Limitorque	SMB-000	B0003	2
0-FCV-70-34	Limitorque	SMB-000	B0003	2
1-Mtr-70-38	Seimens-Allis	8-5110-90396-1	TVA Evaluation and NQ-8-90396-1	44 (Note 1)
0-FCV-70-39	Limitorque	SMB-000	B0003	2 (Note 1)
0-FCV-70-40	Limitorque	SMB-000	B0003	2
0-FCV-70-41	Limitorque	SMB-000	B0003	2
1-Mtr-70-46	Seimens-Allis	8-5110-90396-1	TVA Evaluation and NQ-8-90396-1	44 (Note 1)
1-Mtr-70-51	Seimens-Allis	8-5110-90396-1	TVA Evaluation and NQ-8-90396-1	44 (Note 1)

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<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-Mtr-70-51				44 (Notes 2 & 3)
2-Mtr-70-59				44 (Notes 2 & 3)
1-FSV-70-85	ASCO	206-381-2RVU	AQS 21678/TR, Rev. A	110 (Note 1)
2-FSV-70-85	ASCO	206-381-2RVU	AQS 21678/TR, Rev. A	110 (Note 1)
1-FCV-70-85 (LS)	NAMCO	EA-180	QTR 105	Add Equip (Note 2)
2-FCV-70-85 (LS)	NAMCO	EA-180	QTR 105	Add Equip (Note 2)
2-FCV-70-92	Liritorque	SMB-000	B0003	2
0-FCV-70-111	Limitorque	SMB-000	B0003	2
2-FCV-70-140	Limitorque	SMB-000	B0003	2
2-FCV-70-143	Limitorque	SMB-000	B0003	2
2-FCV-70-153	Limitorque	SMB-000	B0003	2
2-FCV-70-156	Limitorque	SMB-000	B0003	2
0-FCV-70-193	Limitorque	SMB-000	B0003	2
0-FCV-70-194	Limitorque	SMB-000	B0003	2
0-FCV-70-197	Limitorque	SMB-000	B0003	2
0-FCV-70-198	Limitorque	SMB-000	B0003	2
2-FCV-72-2	Limitorque	SB-1	B0003	8 (Note 1)
1-FT-72-13	Rosemount	1153DB4PB	Report 108025	64 (Note 1)

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REPL/ NT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FT-72-13	Rosemount	1153DB4PB	Report 108025	64 (Note 1)
2-FCV-72-20				8 (Notes 2 & 3)
2-FCV-72-21	Limitorque	SB-1	B0003	8 (Note 1)
2-FCV-72-22	Limitorque	SB-1	B0003	8 (Note 1)
2-FCV-72-23				8 (Notes 2 & 3)
1-FT-72-34	Rosemount	153DB4PB	Report 108025	64 (Note 1)
2-FT-72-34	Rosemount	153DB4PB	Report 108025	64 (Note 1)
2-FCV-72-39	Limitorque	SB-1	B0003	8 (Note 1)
2-FCV-72-40				8 (Notes 2 & 3)
2-FCV-72-111	Limitorque	SB-2	B0003	8 (Note 1)
1-FSV-77-127	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
2-FSV-77-127	ASCO	HV206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
1-FSV-77-128	ASCO	206-381-2RVU/ 206-381-2RU	AQS 21678/TR, Rev. A	109 (Note 2)
2-FSV-77-128	ASCO	206-381-2RVU	AQS 21678/TR, Rev. A	109 (Note 1)
1-FSV-81-12	ASCO	206-381-3RFV	AQS21678/TR, Rev. A	105 (Note 1)
2-FSV-81-12				105 (Notes 2 & 3)
1-FSV-90-107	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
2-FSV-90-107				107 (Note 1)

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REPLA T LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-FSV-90-108	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-108	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-109	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-109	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-110	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-110	ASCO	206-381-2RU	AWS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-111	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
2-FSV-90-111	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
1-FSV-90-113	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
2-FSV-90-113	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
1-FSV-90-114	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-114	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-115	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-115	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-116	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
2-FSV-90-116	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	121 (Note 1)
1-FSV-90-117	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)
2-FSV-90-117	ASCO	206-381-2RU	AQS 21678/TR, Rev. A	107 (Note 1)

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REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
1-FSV-313-222	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-222	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-222 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
2-FCV-313-222 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
1-FSV-313-223	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-223	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-223 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
1-FSV-313-224	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-224	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-224 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
2-FCV-313-224 (LS)	NAMCO	EA 180	QTR 105	140 (Note 1)
1-FSV-313-225	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-225	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-225 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
2-FCV-313-229				140 (Notes 2 & 3)
1-FSV-313-229	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-229	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-229 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)

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REPLA T LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FCV-313-230				140 (Notes 2 & 3)
1-FSV-313-230	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-230	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-230 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
2-FCV-313-231				140 (Notes 2 & 3)
1-FSV-313-231	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-231	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-231 (LS)	NAMCO	EA 108	QTR-105	140 (Note 1)
2-FCV-313-232				140 (Notes 2 & 3)
1-FSV-313-232	ASCO	206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
2-FSV-313-232	ASCO	HV206-381-3RF	AQS 21678/TR, Rev. A	Add Equip (Note 1)
1-FCV-313-232 (LS)	NAMCO	EA 180	QTR-105	140 (Note 1)
0-Mtr-313-303A	Reliance Electric Co.	2YF-882997	NUC-9	42 (Note 2)
0-Mtr-313-338A	Reliance Electric Co.	2YF-882997	NUC-9	42 (Note 2)
2-FCV-90-107 (LS)	NAMCO	EA 180	QTR-105	135 (Note 1)
2-FCV-90-111 (LS)	NAMCO	EA 180	QTR-105	135 (Note 1)

REPLACEMENT LISTING

<u>TVA ID No.</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Qualification Report</u>	<u>TER No.</u>
2-FCV-90-113 (LS)	NAMCO	EA 180	QTR-105	135 (Note 1)
2-FCV-90-117 (LS)	NAMCO	EA 180	QTR-105	135 (Note 1)

Note 1: This equipment has been replaced and QA field verification documentation is available in our files.

Note 2: This equipment has been replaced but full QA field verification documentation is not yet available.

Note 3: This information will be added to our QA files when the QA field verification documentation is received.

8.0 Specific TER Deficiency Tables
for TER Categories I.A, I.B, II.A, II.B, II.C, III.A, III.B, IV

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY I.A
(EQUIPMENT QUALIFIED)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
86	General Electric Model Vulkene	None	N/A
87	Not Given	None	N/A
88	Not Given	None	N/A
124	ASCO Model 206-381-3RF	None	N/A
125	ASCO Model 206-381-3RF	None	N/A
126	ASCO Model NP831654E	None	N/A
127	ASCO Model 206-381-3RF	None	N/A
128	ASCO Model 206-381-3RF	None	N/A
133	ASCO Model 206-381	None	N/A
134	Target Rock Model 775001	None	N/A
136	NAMCO Model EA-170-302	None	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
162	VALCOR Model V70900-301	None	N/A
173 (U1)	ASCO Model NP831654E	None	N/A
183 (U2)	ASCO Model 206-381	None	N/A

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SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY I.B
(EQUIPMENT QUALIFICATION PENDING MODIFICATION)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
26	Reliance Model 3Y362208	Documentation	Qualified: Reliance Electric Company Model 2YF-88 2998; Qualified by Report No. NUC-9
29	Lincoln Model T2523	Documentation	Qualified: Reliance Electric Company Model 2YF-88 2998; Qualified by Report No. NUC-9
30	Lincoln Model T2518	Documentation	Qualified: Reliance Electric Company Model 1YF-882998; Qualified by Report No. NUC-9
31	Lincoln Model T2518	Documentation	Replace with Reliance Electric Company Model 1YF-882998; Qualified by Report No. NUC-9
32	Lincoln Model T2518	Documentation	Qualified: Reliance Electric Company Model 2YF-882998; Qualified by Report No. NUC-9
33	Lincoln Model T2556	Documentation	Qualified: Reliance Electric Company Model 3YF-882998; Qualified by Report No. NUC-9
34	Reliance Model 3Y362208	Documentation	Qualified: Reliance Electric Company Model 4YF-882998; Qualified by Report No. NUC-9

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
35	Westinghouse Model 76D55052	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
36	Lincoln Model T2518	Documentation	Qualified: Reliance Company Model 4YF-882998; Qualified by Report No. NUC-9
37	Lincoln Model T2523	Documentation	Qualified: Reliance Electric Company Model 2YF-882998; Qualified by Report No. NUC-9
38	Lincoln Model TDUP	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
39	Westinghouse Model 5809P24	Documentation	Qualified; WCAP-8754
40	Westinghouse Model TBDP	Documentation	Qualified; TVA evaluation
41	Allis-Chalmers Model 30R56	Documentation	Qualified; TVA evaluation/Siemens- Allis report No. NQ-8-90396-1
42	Lincoln	Documentation	Qualified; Reliance Company Model 2YF-882997; Qualified by Report No. NUC-9
43	General Electric Model 5K256AN205	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
44	Siemens-Allis	Documentation	Replace with Seimens-Allis Model 8- 5110-90396-1; Qualified by TVA evaluation and report No. NQ-8- 90396-1

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
46	Westinghouse Model 0524H4-SBDP-MKB	Documentation	Qualified; WCAP-8754
47	Cutler-Hammer Model 10250T	Documentation	Qualified; Wyle test report 17503-1
48	Cutler-Hammer Model 10250T	Documentation	Qualified; Wyle test report 17503-1
50	Barton Model 288	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
51	Dwyer Model 3301	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
52	Barton Model 288	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (No longer considered safety-related)
53	Barton Model 288	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
54	Custom Component Model 604G	Documentation	PS-32-62, 82, 85, 88 - Equipment no considered to be within the scope of 10CFR50.49 (Located in a mild environment); PS-3-140A, 150A, 139A, 139B, 139D, 144A, 144B, 144D, 140B, 150B (replace with ASCO Model SB11AKR/TG13A42R; Qualified by Report No. AQR-101083, Rev. 0)
56	Dwyer Model 1627	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
57	Dwyer Model 1627	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
58	Barton Model 288A	Documentation	Replace with Static-O-Ring Model 12TA-B4-NX-CLA-JJTTX6; Qualified by Report Nos. 17344-82N-C, 18577-83N, 17344-82N-0, and 18441-83N
59	Dwyer Model 1627	Documentation	FS-30-146, 157, 202 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment); FS-30-200, 207 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588) FS-30-194, 195, 196, 197 (replace with FCI Model FR72-4; Qualified by Report No. 70805)
60	Custom Components	Documentation	PS-70-209, 210; Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); PS-3-148, 156, 164, 171, 138A, 138B (replace with ASCO Models SB11AKR/TL10A32, SB11AKR/TGL3A42R; Qualified by Report No. AQR-101083, Rev. 0)
61	Bailey Model 555	Documentation	Replace with Rosemount Model 1153DB3; Qualified by Report No. 108025

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
62	Foxboro Model EI306	Documentation	Replace with Rosemount Models 1153DB3 and 1153DB5; Qualified by Report No. 108025
63	Bailey Model 555	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
64	Bailey Model 555	Documentation	Replace with Rosemount Model 1153D84; Qualified by Report No. 108025
66	Johnson Controls Model PL-4000-2	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
67	Transmation Model SW123-1T	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
68	Pall Trinity Model 101HA1-64D9810-331	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
70	Terry Model GS-2	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
71	Ingersol-Rand Model 7X4 ESV-1P-NL-2	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
72	E.L. Wrigan Model 04265379001	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
73	ITT Hammel Dahl Model T-25	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
74	Masoneilan Model 8005	Documentation	Qualified; Wyle test No. 17506-1
75	Robertshaw Model 445-C3	Documentation	Relocate to mild environment
98	Westinghouse Model Liquid Filled	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
101	ASCO Model 8320A19	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment);
102	ASCO Model HT8300	Documentation	Replace with ASCO Model 206-381-3RFV; Qualified by Report No. AQS21678/TR, Rev. A
103	ASCO Model HT8302B25RF	Documentation	FSV-30-106 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment) FSV-30-122, 123, 102 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); FSV-30-129, 130 (No longer considered to be within the scope of 10CFR50.49) FSV-30-107 (Qualified with ASCO Model 206-381-2RU; Qualified by Report No. AQS21678/TR, Rev. A)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
104	ASCO Model HT8300	Documentation	Qualified: ASCO Model 206-381-2RU; Qualified by Report No. AQS2178/TR, Rev. A
105	ASCO Model HV202300LRV	Documentation	Replace with ASCO Model 206-380-2RVU; Qualified by Report No. AQS21678/TR, Rev. A
106	ASCO Model HV-200-924-2F	Documentation	Replace with ASCO Model 206-381-2RU; Qualified by Report No. AQS21678/TR, Rev. A
107	ASCO Model HTX8320	Documentation	Replace with ASCO Model 206-381-2RVa; Qualified by Report No. AQS21678/TR, Rev. A
108	ASCO Model HT8300	Documentation	Replace with ASCO Model 206-381-2RVa; Qualified by Report No. AQS21678/TR, Rev. A
109	ASCO Model WPX-HV-202-301-1F	Documentation	Replace with ASCO Models 206-381-2RUV and 206-381-2RU; Qualified by Report No. AQS21678/TR, Rev. A
110	ASCO Model HB8300	Documentation	Replace with ASCO Models 206-381-2RUV, 206-380-2RU, 206-380-2RVU, 206-380-2R4; and 206-381-2RUV; Qualified by Report No. AQS21678/TR, Rev. A
111	ASCO Model HB8300	Documentation	Replace with ASCO Model 206-380-2RU; Qualified by Report No. AQS21678/TR, Rev. A

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
112	ASCO Model HV-200-921-1RF	Documentation	Replace with ASCO Model 206-380-2RU; Qualified by Report No. AQS21678/TR, Rev. A
113	ASCO Models 8300 and 8302	Documentation	2-FSV-61-96, 110 (replace with ASCO Model 206-381-3RFV; Qualified by AQS21678/TR, Rev. A); FSV-30-279, 280; FSV-61-191A, 193A, 1-FSV-61-96, 110 - Equipment no longer considered to be within the scope of 10CFR50.49 (located in a mild environment)
114	ASCO Model 832654	Documentation	FSV-62-143, 144 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); FSV-62-120 (Equipment no longer considered to be within the scope of 10CFR50.49); FSV-63-38; FSV-77-20 (qualified, analysis NS-CE-755)
115	ASCO Model 831654	Documentation	FSV-87-9, 10 - Equipment no longer considered to be within the scope of 10CFR50.49 (located in a mild environment); FSV-62-77; FSV-68-305; FSV-63-23, 41, 42, 64, 84 (qualified; analysis NS-CE-755)
116	ASCO Model LB8300B64RU	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
117	ASCO Model HT831654	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (located in a mild environment)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
118	Target Rock Model 82UU-001	Documentation	Qualified: Target Rock Model 82UU-001; Qualified by Report No. 3543
119	ASCO Model NP831654E	Documentation	Qualified: ASCO Model NP831654E; Qualified by Report No. AQS21678/TR, Rev. A
120	ASCO Model HB8300C58RU	Documentation	Qualified: ASCO Models 206-380-2RUV and 206-380-2RV; Qualified by Report No. AQS21678/TR, Rev. A
121	ASCO Model HT8300 Series/WPXHV2023011	Documentation	Replace with ASCO Models 206-381-3RVF and 206-381-2RV; Qualified by Report No. AQS21678/TR, Rev. A
122	ASCO Model 8320	Documentation	FSV-30-3, 6, 60, 69 - Equipment no longer considered to be within the scope of 10CFR50.49 (Power has been disconnected); FSV-30-146A, 146B; FSV-65-10; (Qualified: ASCO Model 206-380-2RVU; Qualified by Report No. AQS21678/TR, Rev. A)
123	ASCO Model 8300	Documentation	Replace with ASCO Models 206-381-3RFV and 206-381-2RVU; Qualified by Report No. AQS21678/TR, Rev. A
141	NAMCO Model EA700	Documentation	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-105

TFR No.Manufacturer/Model No.DeficiencyResolution

143	NAMCO Model EA700	Documentation	FCV-1-7, 14, 25, 32 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); FCV-1-147, 148, 149, 150 (replace with NAMCO Model EA-740; Qualified by Report No. QTR-111)
145	NAMCO Model EA-170	-	FCV-61-192, FCV-62-69, 70, 77, FCV-63-3, 4, 175, (replace with NAMCO Model EA-180; Qualified by Report No. QTR-105); FCV-68-307, FCV-77-10, 17, 19, 20, FCV-74-3, 21, ZS-63-1, 5, 67, 80, 98 118 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); FCV-61-96, 110, 191, 193, FCV-63-23, 38, 41, 42, 64, FCV-87-21, 22, 23, 24; FCV-63-8, 11 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
148	General Atomic	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
149	Bailey Model 556	-	Equipment no longer considered to be within the scope of 10CFR50.49
150	Mercoïd Model 2036810C1160	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
151	Penn Model A19BAC	-	TS-30-175, 176, 177, 178, 179, 180, 182, 183 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); TS-30-190, 191, 192, 193, 186, 187, 196, 197, 201, 202 (replace with Static-O-Ring Model 201TA; Qualified by Report No. 18441-83N)
152	Honeywell Model T675A1540	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
153	Fenwal Model 27120-50	-	Replace with Fenwal Model 18023-7; Qualified by Report No. 17509-1
154	Fenwal Model 18003-7	-	TS-30-103 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment); TS-30-214 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
155	Fenwal Model 17323-0	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
156	Fenwal Model T675A1540	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
157	Rosemount Model 176KS	-	Replace with Weed RTD; Qualified by Report No. 548-8854-2, Rev. B

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
158	Comsip Model K-111M	-	Qualified; The analyzer is qualified to IEE 323-1971 as demonstrated by Comsip "K" systems specifications dated September 1981 supplemented by Wyle test report 17502-1. As a result of the supplemental test, TVA has decided to move a portion of the analyzer to a mild environment.
159	Foxboro Model E11GM	-	PT-1-2A, 27A, 5 (qualified; WCAP-8541); PT-1-30 (Equipment no longer considered to be within the scope of 10CFR50.49)
166	Johnson Controls Model PC-4000-2	-	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
170(U1)	Barton Model 764 (Lot 1)	Aging, Qualification Life, Aging, Program, Accuracy	Replace with Barton Model 764 Lots 2 and 7; Qualified by Report Nos. WCAP-9885, WCAP-8687, Supp.-2-E03A, and WCAP-8587 Supp.-1-EQDP-ESE-3A
170(U2)	Cutler-Hammer Model 10250T	Documentation	Qualified; Wyle test report 17503-1
171(U1)	Barton Model 764 (Lot 1)	Aging, Qualification Life, Aging, Program, Accuracy	Replace with Barton Model 764 Lots 2 and 7; Qualified by Report Nos. WCAP-9885, WCAP-8687, Supp.-2-E03A and WCAP-8587 Supp.-1-EQDP-ESE-3A
171(U2)	Cutler-Hammer Model 10250T	Documentation	Qualified; Wyle test report 17503-1

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
172(U1)	Barton Model 763 (Lot 1)	Aging, Qualification Life, Aging, Program, Accuracy	Replace with Barton Model 763 Lots 2 and 4; Qualified by Reports Nos. WCAP-9885, WCAP-8687 Supp.-2-E01A, and WCAP-8587 Supp.-1-EQDP-ESE-1A
172(U2)	Dwyer Model 1627	Documentation	FS-30-200, 207 - Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588); FS-30-157, 184, 185 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
173(U2)	Honeywell Model T675A 1540	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
174(U1)	NAMCO Model EA-170	-	Replace 1-FCV-81-12 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment); 1-PCV-68-334, 340A - Qualified: Target Rock Model 8244-001; Qualified by Report No. 3543
174(U2)	Fenwal Model 18003-7	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
175(U1)	NAMCO Model EA-080	-	Replace with NAMCO EA-180; Qualified by Report No. QTR-105
176(U1)	Barton Model 764 (Lot 1)	Aging, Qualification Life, Aging, Program, Accuracy	Qualified: Barton Model 764 Lots 2 and 7; Qualified by Report Nos. WCAP-9885, WCAP-8687, Supp.-2-E03A, and WCAP-8587 Supp.-1-EQDP-ESE-3A

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
180(U2)	Target Rock Model 8244-001	Humidity, Aging, Margin	2-FCV-72-12 - Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment); 2-PCV-68-334 (Qualified: Target Rock Model 8244-001; Qualified: Target Rock Report No. 3543); 2-FCV-63-72, 73 (Qualified; NAMCO Report No. QTR-105)
181(U2)	NAMCO Model EA700	Documentation	Replace with NAMCO Model EA-740; Qualified by Report No. QTR-111
182(U2)	NAMCO Model EA700	Documentation	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY II.A
(EQUIPMENT QUALIFICATION NOT ESTABLISHED)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
1	Link-Belt Models TN200/ TN2000	Similarity, Aging, Qualified Life, Aging Simulation	Replace with Limitorque Model SMB- 000; Qualified by Report No. B0003
2	Link-Belt Models TN200/ TN2000	Similarity, Aging, Qualified Life, Aging Simulation	Replace with Limitorque Model SBM- 000; Qualified by Report No. B0003
5	MEA Model MEA119 K2	Documentation	Function being replaced with non- electrical devices, therefore, not in scope of 10CFR50.49
6	Limitorque Model SMB; Sizes 00,000	Similarity, Aging, Qualified Life, (Peak Temperature and Pressure FCV-70-133 and 134)	Qualified; Limitorque Report No. B0003
7	Limotorque Model SMB;	Similarity, Aging, Qualified Life,	Qualified; Limitorque Report No. B0003
8	Limitorque Model SMB; Sizes 1, 2	Similarity, Aging, Qualified Life, Radiation	Replace with Limitorque Models SB-1 00 and SMB-2; Qualified by Report No. B0003
9	Limitorque Model SMB;	Similarity, Aging, Qualified Life,	Qualified; Limitorque Report No. B0003
10	Limitorque Model SMB; Size 00	Similarity, Aging, Qualified Life, Peak Temperature and Pressure	Qualified; Limitorque Report No. B0003
11	Limitorque Model SMB; Size 4	Similarity, Aging, Qualified Life, Peak Temperature and Pressure	Qualified; Limitorque Report No. F-C3271, B0003, B0027, and B0058

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
12	Limitorque Model SMB;	Similarity, Aging, Qualified Life,	Qualified; Limitorque Report No. B0003
13	Limitorque Model SMB; Size 000	Similarity, Aging, Qualified Life, Peak Temperature and Pressure	Qualified; Limitorque Report No. 600456
14	Limitorque Model SMB;	Similarity, Aging, Qualified Life,	Qualified by Limitorque Report No. F-C3271
15	Limitorque Model SMB;	Similarity, Aging, Qualified Life,	Awaiting vendor documentation of similarity
16	Limitorque Model SMB; Size 4	Similarity, Aging, Qualified Life, Peak Temperature and Pressure	Qualified; Limitorque Report No. F-C3271, B0003, B0027, and B0058
17	Limitorque Model SMB; Size 000	Similarity, Aging, Qualified Life, Peak Temperature and Pressure	Awaiting vendor documentation of similarity
18	Limitorque Model SMB;	Similarity, Aging, Qualified Life,	FCV-62-90, 91, 98, 99, FCV-63-4, 152, 153, 156, 157; FCV-74-3, 12, 21, 24; 1-FCV-63-175 (qualified; Limitorque reports B07003 and B0058); 2-FCV-63-1; FCV-63-5, 6, 7, 47, 48, 1; FCV-62-63 (qualified; Limitorque test report F-C3271); FCV-63-72, 73 (qualified; Limitorque reports 600198 and 600376); FCV-63-8; 1-FCV-63-1; 2-FCV-63-11, 175 (replace, Manufacturer and Model No. of replacement equipment is not presently available); FCV-63-22, 25, 26, 39, 40, 93, 94; FCV-62-135, 136; Equipment no longer considered within the scope of 10CFR50.49 (Located in a mild environment)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
19	Limatorque Model SMB;	Similarity, Aging, Qualified Life,	LCV-62-132, 11 (qualified; Limatorque test reports F-C3271 and B-003); LCV-62-152, 153 (do not exist)
20	Limatorque Model SMB; Size 00	Documentation	Equipment no longer considered within the scope of 10CFR50.49 (Located in a mild environment)
21	Limatorque Model SMB; Size 00	Documentation	Equipment no longer considered within the scope of 10CFR50.49 (Located in a mild environment)
22	Limatorque Model SMB;	Similarity, Aging, Qualified Life,	Equipment no longer considered within the scope of 10CFR50.49 (Category C per NUREG-0588 with Limatorque Model SMB-00; Qualified by Report No. B0003)
23	Limatorque Model SMB;	Similarity, Aging, Qualified Life,	FCV-63-172 (replace); FCV-63-67, 80, 98, 118 - Equipment no longer considered within the scope of 10CFR50.49 (Category C per NUREG-0588); FCV-62-61 (Qualified; Limatorque Report No. B0058).
24	Limatorque Model SMB;	Similarity, Aging, Qualified Life,	Equipment no longer considered to be within the scope of 10CFR50.49 (Category C per NUREG-0588)
25	Limatorque Model SMB;	Similarity, Aging, Qualified Life,	Replace with Limatorque Model SBM-00; Qualified by Report No. B0003
27	Reliance Model X-328203	Documentation, Similarity	Qualified; Joy Manufacturing Company Test X-604

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
28	Lincoln Model T2557	Documentation	Replace with Reliance Electric Company Model 2YF-882998; Qualified by Report No. NUC-9
45	Westinghouse Model HSW1	Similarity	Qualified; WCAP-8754 and supplemental information
55	Dwyer Model 1627	Radiation, Temperature, Pressure, Qualification Time, Humidity, Aging, Margin, Qualification Method, Qualification Information	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment)
78	American Insulated Wire	Similarity	Qualified; Test report No. F-C5119
79	Rockbestos	Similarity	Qualified; Rockbestos report "Qualification of FIREWALL SR, Class 1E Cables"
80	Anaconda/Continental	Similarity, Aging, Qualified Life, Peak Temperature	Qualified; Anaconda Continental report No. 79117
81	Anaconda/Continental	Similarity	Qualified; Franklin Institute report No. F-C4836-3
82	Rockbestos	Similarity	Qualified; Rockbestos report, "Qualification of FIREWALL III, Class 1E Cables, 2/17/77" and Clarification of Certain Matters Related to Class 1E Qualification of Rockbestos Cables, 3/7/78
83	ITT Surprenant	Similarity	Qualified; Isomedix test report Nos. 375-02 and Franklin Institute Research Laboratories F-C3961

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
84	Brand Rex	Similarity	Qualified; Franklin Institute report No. F-C4113
89	Okonite	Similarity	Qualified; Okonite test report Nos. 6-3 and Franklin Institute report F-C4836-3
90	Various	Similarity	Qualified; Wyle test report Nos. 43854-3; Franklin Institute test reports F-C4113, F-C5120-1, F-C5285-1, etc.
91	Various	Similarity	Qualified; Various test reports as referenced in TER
92	Various	Documentation, Similarity	Qualified; Okonite test reports Nos. K-0-1 and "Engineering Report No. 344, revision 1"
93	Westinghouse Types WX-32198 through WX-32212	Aging, Qualified Life, Spray, Radiation, Margin, Qualification Method	Qualified; Okonite Engineering Report No. 141 and Franklin Institute Report No. F-C2709
94	Not Given	Similarity	Qualified; Various Franklin Institute reports; Wyle test report No. 43854-3; and Essex report No. PE-53
97	Various	Documentation	Qualified; Wyle Test Report 17503-1
99	AVCO Model C5439	Documentation	Replace with ASCO Model NP8316A74E; Qualified by Report No. AQS21678/TR, Rev. A
100	AVCO Model C5439	Documentation	Replace with ASCO Model NP8316A746; Qualified by Report No. AQS21678/TR, Rev. A

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
135	NAMCO Model EA170	Peak Temperature and Pressure, Duration, Steam Exposure, Test Sequence	Limit switch on O-FCV-12-79 is no longer within the scope of 10CFR50.49. Replace switch 90 limit switches with NAMCO Model EA 180; Qualified by Report No. QTR-105
137	NAMCO Model EA-180	Similarity, Duration	Qualified; TVA evaluation
138	NAMCO Model EA180	Similarity	Qualified; TVA evaluation
139	NAMCO Model EA180	Similarity, Submergence	Equipment no longer considered to be within the scope of 10CFR50.49
140	Micro Switch Model OPDAR 7905	Documentation	Replace with NAMCO Model EA180; Qualified by Report No. QTR-105
142	NAMCO Model EA700	Documentation	LS on FCO-65-26, 27 and LS on FCO-65-10, 30 on TER item No. 144 replaced by FSV-65-10, 30 on this TER. Not within scope of 10CFR50.49 (Category C); LS on FCO-65-52, 53 on TER item No. 144 replaced by FSV-65-52, 53 on this TER, qualified by Test Report QTR-150.
146	NAMCO Model EA740	Similarity, Duration	Qualified; TVA evaluation
147	NAMCO Model EA740	Similarity, Aging, Qualified Life,	Qualified; TVA Evaluation
161	Rosemount Model 176KF	Aging, Qualified Life, Profile, Functional Testing, Accuracy, Spray	Qualified; WCAP-9157

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
135	NAMCO Model EA170	Peak Temperature and Pressure, Duration, Steam Exposure, Test Sequence	Qualified; NAMCO letter dated November 9, 1979
137	NAMCO Model EA-180	Similarity, Duration	Qualified; TVA evaluation
138	NAMCO Model EA180	Similarity	Qualified; TVA evaluation
139	NAMCO Model EA180	Similarity, Submergence	Equipment no longer considered to be within the scope of 10CFR50.49
140	Micro Switch Model OTDAR 7905	Documentation	Replace with NAMCO Model EA180; Qualified by Report No. QTR-105
142	NAMCO Model EA700	Documentation	LS on FCO-65-26, 27 and LS on FCO-65-10, 30 on TER item No. 144 replaced by FSV-65-10, 30 on this TER. Not within scope of 10CFR50.49 (Category C); LS on FCO-65-52, 53 on TER item No. 144 replaced by FSV-65-52, 53 on this TER, qualified by Test Report QTR-150.
146	NAMCO Model EA740	Similarity, Duration	Qualified; TVA evaluation
147	NAMCO Model EA740	Similarity, Aging, Qualified Life,	Qualified; TVA Evaluation
161	Rosemount Model 176KF	Aging, Qualified Life, Profile, Functional Testing, Accuracy, Spray	Qualified; WCAP-9157

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
164	Foxboro Model EllGM (MCA)	Aging, Qualified Life, Aging Program, Qualified; Peak Temperature and Pressure, NS-PLC-5023 Duration, Profile, Steam Exposure, Radiation, Test Sequence, Accuracy, Test Duration Margin	Westinghouse letter
165	Foxboro Model EllGM (MGA)	Aging, Qualified Life, Aging Program, Qualified; Radiation, Test Sequence, Accuracy NS-PLC-5023	Westinghouse letter
167	Barton Model 764 (Lot 2)	Aging, Qualified Life, Aging Program, Qualified; Radiation, Accuracy	WCAP-9885
168	Barton Model 763 (Lot 2)	Aging, Qualified Life, Aging Program, Qualified; Radiation, Accuracy	WCAP-9885
169 (U1)	Barton Model 764 (Lot 2)	Aging, Qualified Life, Aging Program, Qualified; Radiation, Accuracy	WCAP-9885
169 (U2)	Barton Model 764 (Lot 2)	Aging, Qualified Life, Aging Program, Qualified; Radiation, Accuracy	WCAP-9885
175 (U2)	Eaton Corp.	Similarity	Qualified; Franklin Institute report No. F-C4113
176 (U2)	Samuel Noore	Similarity	Qualified; Isomedix qualification reports dated June 1978 and January 1980
177 (U2)	Samuel Moore	Similarity	Qualified; Isomedix qualification reports dated June 1978 and January 1980
178 (U2)	Anaconda	Similarity	Qualified; Franklin Institute report No. F-C4836-3

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
179 (U2)	NAMCO Model EA 180/740	Peak Temperature and Pressure, Duration, Steam Exposure, Test Sequence	Qualified; Either NAMCO EA 180 qualified by Test Report OTR-105 or NAMCO EA-740 qualified by Test Report Q7R-111 will be installed during the present unit 2 outage

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY II.B
(EQUIPMENT NOT QUALIFIED)

Franklin Research Center's evaluation did not result in any equipment being categorized as category II.B.

DE03;TERRPT

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY III.A
(EQUIPMENT EXEMPT FROM QUALIFICATION)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
76	International Switchboard	N/A	Exempt from Qualification
95	Not Stated	N/A	Exempt from Qualification
96	TVA	N/A	Exempt from Qualification

DE03;TERRPT

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SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY III.B
(EQUIPMENT NOT IN THE SCOPE OF THE REVIEW)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
49	Electro Switch Model Series 24	N/A	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
85	ITT Supernant Model Triaxial	N/A	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).
163	Westinghouse	N/A	Equipment no longer considered to be within the scope of 10CFR50.49 (Located in a mild environment).

SPECIFIC EQUIPMENT DEFICIENCIES
CATEGORY IV
(DOCUMENTATION NOT MADE AVAILABLE)

<u>TER No.</u>	<u>Manufacturer/Model No.</u>	<u>Deficiency</u>	<u>Resolution</u>
3	Chicago Fluid Power Model TVA-01-0577	Documentation	Qualified; Atwood & Morrill test report 201-39500
4	Chicago Fluid Power Model TVA-01-0577	Documentation	Qualified; Atwood & Morrill test report 201-39500
65	Barton Model 764 Lot 2	Documentation	Qualified; WCAP 9885
69	Power Electric Model CCB	Documentation	Equipment no longer considered to be within the scope of 10CFR50.59 (Located in a mild environment).
160	Foxboro Model E-13DM	Documentation	Qualified; Documentation made available by Westinghouse letter No. NS-PLC-5023

DE03;TERRPT

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9.0 TER Number/TVA ID Number

Correlation Table

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
1	Motorized Valve Actuator	II.A	FCV-67-123, 125, 127, 128, 146, 147, 151, 152, 233, 205, 208, 81, 82, 126, 124, 83, 88, 91, 96, 99, 104, 107, 112,
2	Motorized Valve Actuator	II.A	FCV-70-2, 3, 4, 8, 9, 10, 11, 12, 15, 40, 41, 193, 194, 195, 196, 197, 198, 13, 22, 23, 25, 26, 27, 34, 39, 64, 74, 14, 16, 18, 28, 29, 75, 168, 76, 78, 111, 153, 156, 92, 139, 140, 143, 1
3	Motorized Valve Actuator	IV	FSV-1-4A, 4B, 4D, 4E, 4F, 4G, 4H, 4J, 29A, 29B, 29D, 29E, 29F, 29G, 29H, 29J
4	Motorized Valve Actuator	IV	FSV-1-11A, 11B, 11D, 11E, 11F, 11G, 11H, 11J, 22A, 22B, 22D, 22E, 22F, 22G, 22H, 22J
5	Electrohydraulic Valve Actuator	II.A	PM-3-122, 132
6	Motorized Valve Actuator	II.A	FCV-70-183, 90, 206, 207, 208, 133, 134
7	Motorized Valve Actuator	II.A	FCV-72-13, 34
8	Motorized Valve Actuator	II.A	FCV-72-2, 39, 20, 23, 21, 22, 40, 41
9	Motorized Valve Actuator	II.A	FCV-3-116A, 116B, 126A, 126B; FCV-3-136A, 136B, 179A, 179B
10	Motorized Valve Actuator	II.A	FCV-1-15, 16, 17, 18
11	Motorized Valve Actuator	I.B	FCV-3-47, 87
12	Motorized Valve Actuator	II.A	FCV-26-240, 241, 242, 243, 244, 245
13	Motorized Valve Actuator	II.A	FCV-67-87, 95, 103, 111, 295, 296, 297, 298
14	Motorized Valve Actuator	II.A	FCV-67-424

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
15	Motorized Valve Actuator	II.A	FCV-67-130, 131, 133, 134, 138, 139, 141, 142
16	Motorized Valve Actuator	I.B	FCV-3-33, 100
17	Motorized Valve Actuator	II.A	FCV-70-87, 89
18	Motorized Valve Actuator	II.A	LCV-62-135, 136; FCV-74-3, 21; FCV-63-4, 175, 47, 48, 72, 73, 152, 153, 156, 157, 93, 94, 22, 25, 26, 39, 40; FCV-62-63, 98, 99, 90, 91; FCV-63-1, 3, 5, 6, 7, 8, 11; FCV-74-12, 24
19	Motorized Valve Actuator	II.A	LCV-62-152, 153, 132, 133; FCV-74-33, 35
20	Motorized Valve Actuator	II.A	FCV-87-21, 24
21	Motorized Valve Actuator	II.A	FCV-87-22, 23
22	Motorized Valve Actuator	II.A	FCV-62-138
23	Motorized Valve Actuator	II.A	FCV-62-61; FCV-63-67, 80, 98, 118, 172
24	Motorized Valve Actuator	II.A	FCV-74-1, 2
25	Motorized Valve Actuator	II.A	FCV-68-332, 333
26	Electric Motor	I.B	Emergency Gas Treatment Fan Motor
27	Electric Motor	II.A	30-1AAA, 1BBB
28	Electric Motor	II.A	Containment Spray Pump AHU Motor
29	Electric Motor	I.B	Pentration Room Cooler Motor
30	Electric Motor	I.B	RHR Pump Cooler Fan Motor
31	Electric Motor	I.B	SIS Pump Cooler Fan Motor
32	Electric Motor	I.B	Centrifugal Charging Pump Cooler Fan Motor
33	Electric Motor	I.B	CCS Pump and AFP Pump AHU Motor

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
34	Electric Motor	I.B	Auxiliary Building Gas Treatment System Fan Motor
35	Electric Motor	I.B	480V Board Room AHU Motor
36	Electric Motor	I.B	Emergency Gas Treatment AHU Motor
37	Electric Motor	I.B	Spent Fuel Pit Pump AHU Motor
38	Electric Motor	I.B	MTRB-62-230A, 232B
39	Electric Motor	I.B	MTRA-74-10A, 20B
40	Electric Motor	I.B	MTRD-78-35T, 12A, 9B
41	Electric Motor	I.B	Auxiliary Feed Pump Motor (1A-A, 1B-B, 2A-A, 2B-B)
42	Electric Motor	I.B	E1 734 A/C Pump Motor (A-A, B-B)
43	Electric Motor	I.B	Auxiliary Air Compressor Motor (A-A, B-B)
44	Electric Motor	I.B	Component Cooling Water Pump Motor
45	Electric Motor	II.A	Containment Spray Pump Motor (1AA, 1BB)
46	Electric Motor	I.B	MTRB-62-108A-A, 104A-B
47	Handswitch	I.B	Local Control (Various) Auxiliary Building
48	Handswitch	I.B	Local Control (Various) Containment
49	Transfer Switch	III.B	Transfer Switch (Various) Auxiliary Building
50	Differential Pressure Switch	I.B	FIS-70-81, PDIS-313-305, 340
51	Pressure Switch	I.B	PDIS-30-148, 149
52	Pressure Switch	I.B	PDIS-1-17, 18

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
53	Flow Switch	I.B	FIS-74-12, 24
54	Pressure Switch	I.B	PS-32-62, 82, 85, 88; PS-3-140A, 150A, 139A, 139B, 139D, 144A, 144B, 144D, 140B, 150B
55	Pressure Switch	II.A	FS-30-184, 185, 190, 191, 192, 193
56	Flow Switch	I.B	FS-30-201
57	Flow Switch	I.B	FS-30-186, 187
58	Pressure Switch	I.B	PS-30-46A, 46B, 47A, 47B, 48A, 48B
59	Pressure Switch	I.B	FS-30-146, 157, 194, 195, 196, 197, 200, 202, 207
60	Pressure Switch	I.B	PS-3-148, 156, 164, 171, 138A, 138B, PS-70-209, 210
61	Differential Pressure Transmitter	I.B	FT-3-142
62	D/P Transmitter	I.B	PDT-65-80, 82, 90, 97
63	D/P Transmitter	I.B	FT-70-81A, 81B, 81D, 81E
64	Flow Transmitter	I.B	FT-72-13, 34
65	D/P Transmitter	IV	FT-1-3A, 3B, 10A, 10B, 21A, 21B, 28A, 28B
66	Pressure Controller	I.B	FC-30-148, 149
67	Signal Converter	I.B	FM-30-148A, 149A
68	Air Dryers	I.B	Essential Control Air Dryers A and B
69	Distribution Panel	IV	B/U-1A-A, 1B-B, 1C, 1D
70	Turbine Control Panel	I.B	Panel 326, 381
71	Control Panel	I.B	Auxiliary Control Air Control Panel

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
72	Electric Heater	I.B	Backup Pressurizer Heater Elements (Various)
73	Transducer	I.B	FM-30-148, 149
74	I/P Transducer	I.B	LM-3-148A, 156A, 164A, 171A
75	I/P Transducer	I.B	PDM-65-80, 82
76	Relay Panel	III.A	Reactor Coolant Pump Undervoltage Relay Boards (1A, 1B, 2A, 2B)
77	Electric Cable Splice	II.C	Cable Connection and Termination
78	Electric Cable	II.A	SROAJ Cable (Electrical Distribution)
79	Electric Cable	II.A	SROAJ and SROAJ-H (Electrical Distribution)
80	Electric Cable	II.A	Electrical Distribution (SROAJ and SROAJ-H)
81	Electric Cable	II.A	Electrical Distribution (WVA and WVC)
82	Electric Cable	II.A	Electrical Distribution (WVA)
83	Electric Cable	II.A	Electrical Distribution
84	Electric Cable	II.A	Electrical Distribution (WVC(XLPE))
85	Electric Cable	III.B	Instrument Cable
86	Electric Cable	I.A	Control and Instrumentation (CPJ)
87	Electric Cable	I.A	Electrical Distribution
88	Electric Cable	I.A	Instrument Cable (CPST)
89	Electric Cable	II.A	EPSJ
90	Electric Cable	II.A	Various (PXJ)
91	Electric Cable	II.A	Electric Distribution (XLPE)

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
92	Electric Cable	II.A	Electrical Distribution (Special Cable)
93	Electric Penetration	II.A	Pressure Boundary and Electrical Continuity
94	Electric Cable	II.A	Various (PXNJ)
95	Electric Cable	III.A	Electrical Distribution (PJJ)
96	Junction Box	III.A	Protect Electrical Termination
97	Terminal Block	II.A	Electrical Termination
98	Transformer	I.B	Backup Pressurizer Heater Power Supply
99	Solenoid Valve	II.A	FSV-30-8, 10, 50, 52, 15, 17, 40, 56, 20, 58
100	Solenoid Valve	II.A	FSV-30-2, 5; FSV-65, 7, 8, 28A, 28B, 47A, 47B, 50, 51
101	Solenoid Valve	I.B	FSV-30-86, 137, 138, 140, 141, 160, 161, 166, 167, 271, 272, 275, 276
102	Solenoid Valve	I.B	FSV-61-192, 194, 122, 97
103	Solenoid Valve	I.B	FSV-30-129, 130, 106, 107, 122, 123, 102
104	Solenoid Valve	I.B	PSV-1-6A, 6B, 31A, 31B
105	Solenoid Valve	I.B	FSV-18-12
106	Solenoid Valve	I.B	FSV-12-79
107	Solenoid Valve	I.B	FSV-90-107, 111, 113, 117
108	Solenoid Valve	I.B	LSV-3-148, 156, 164, 171, 172, 173
109	Solenoid Valve	I.B	LSV-3-148A, 156A, 164A, 171A; FSV-77-128
110	Solenoid Valve	I.B	FSV-67-338, 344, 346, 348, 350, 352, 342; FSV-70-85

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
111	Solenoid Valve	I.B	FSV-67-168, 170, 176, 182, 184, 186, 188, 190, 213, 215, 354, 356
112	Solenoid Valve	I.B	2-FSV-67-184
113	Solenoid Valve	I.B	FSV-30-279, 280; FSV-61-191A, 193A, 96, 110
114	Solenoid Valve	I.B	FSV-77-20; FSV-62-143, 144, 120; FSV-63-38
115	Solenoid Valve	I.B	FSV-87-9, 10; FSV-62-77; FSV-68-305; FSV-63-23, 64, 84, 41, 42
116	Solenoid Valve	I.B	FSV-62-140A, 140B
117	Solenoid Valve	I.B	FSV-87-11
118	Solenoid Valve	I.B	PSV-68-334A, 334B, 340AA, 340AB
119	Solenoid Valve	I.B	FSV-62-70, 74
120	Solenoid Valve	I.B	FSV-67-336, 338, 217, 219
121	Solenoid Valve	I.B	FSV-1-181, 182, 183, 184; FSV-77-127; FSV-90-108, 109, 110, 114, 115, 116
122	Solenoid Valve	I.B	FSV-65-10; FSV-30-3, 6, 60, 69, 146A, 146B
123	Solenoid Valve	I.B	FSV-1-7, 14, 25, 32, 147, 148, 149, 150
124	Solenoid Valve	I.A	FSV-77-18, 9
125	Solenoid Valve	I.A	FSV-68-307
126	Solenoid Valve	I.A	FSV-87-7, 8; FSV-62-73, 72
127	Solenoid Valve	I.A	FSV-77-16
128	Solenoid Valve	I.A	FSV-65-52, 53, 30, 26, 27; FSV-30-157B

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
129	Solenoid Valve	II.C	FSV-32-81A, 81B, 103A, 111A, 111B, 103B
130	Solenoid Valve	II.C	PSV-65-81, 83; FSV-32-80A, 80B, 102A, 102B, 110A, 110B; FSV-43-77, 3, 12, 23, 35; FSV-68-308
131	Solenoid Valve	II.C	LSV-3-174, 175
132	Solenoid Valve	II.C	FSV-65-52, 53, 30, 26, 27
133	Solenoid Valve	I.A	FSV-43-2, 11, 22, 34, 74, 201, 202, 308
134	Solenoid Valve	I.A	FSV-30-134, 135
135	Limit Switch	II.A	FLV-90-107, 111, 113, 117; FCV-12-79
136	Limit Switch	I.A	FCV-87-9, 10, 11
137	Limit Switch	II.A	Position Indication (Various)
138	Limit Switch	II.A	FCV-63-72, 73
139	Limit Switch	II.A	FCV-62-72, 73, 74; FCV-77- 16; FCV-87-7, 8
140	Limit Switch	II.A	Annulus Isolation Valve (Not Defined)
141	Limit Switch	I.B	Reactor Building Isolation (Not Defined)
142	Limit Switch	II.A	Unit 1 Shield Building Exhaust (Not Defined)
143	Limit Switch	I.B	FCV-1-147, 148, 149, 150, 14, 32, 7, 25
144	Limit Switch	II.C	FCV-65-47A, 47B, 28A, 28B, 8, 51; FCO-65-10, 30, 52, 53

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
145	Limit Switch	I.B	FCV-61-96, 110, 191, 192, 193; FCV-62-128, 140, 143, 144, 69, 70, 77; FCV-63-3, 4, 8, 11, 23, 38, 41, 42, 64, 84, 175; FCV-68-305, 307; FCV-74-3, 21; FCV-77-10, 17, 19, 20; FCV-87-21, 22, 23, 24; ZS-63-1, 5, 67, 80, 98, 118
146	Limit Switch	II.A	FCV-77-127
147	Limit Switch	II.A	FCV-77-128
148	Radiation Monitor	I.B	RE-90-130, 131, 102, 103, 106, 112, 140, 141, 133, 134
149	Pressure Transmitter	I.B	PT-3-132A
150	Level Switch	I.B	LS-313-305, 340
151	Temperature Switch	I.B	TS-30-190, 191, 192, 193, 175, 176, 177, 178, 179, 180, 182, 183, 186, 187, 196, 197, 201, 202
152	Temperature Switch	I.B	TS-30-103A
153	Temperature Switch	I.B	TS-12-91A, 91B, 92A, 92B, 99A, 99B, 96B, 97A, 97B, 98A, 98B, 94A, 94B, 95A, 95B, 96A, 93A, 93B
154	Temperature Switch	I.B	TS-30-103, 214
155	Temperature Switch	I.B	TS-1-17A, 17B, 18A, 18B
156	Temperature Switch	I.B	TS-74-43, 44, 45, 46
157	Temperature Element	I.B	TE-68-1, 18, 24, 41, 43, 60, 65, 83
158	Hydrogen Analyzer	I.B	Hydrogen Monitor
159	Pressure Transmitter	I.B	PT-1-2A, 27A, 5, 30
160	Level Transmitter	IV	LT-3-148, 156, 164, 171, 172, 173, 174, 175

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
161	Temperature Element	II.A	TE-68-2A, 2B, 14, 25, 37, 44, 56, 67, 79
162	Solenoid Valve	I.A	FSV-30-46A, 47A, 48A
163	Power Supply	III.B	Hydrogen Recombiner Power Supply
164	Pressure Transmitter	II.A	PT-1-2B, 27B
165	Pressure Transmitter	II.A	PT-1-9A, 9B, 20A, 20B, 12, 23
166	Pressure Controller	I.B	FC-30-148, 149
167	Level Transmitter	II.A	LT-3-43, 49, 56, 111
168	Pressure Transmitter	II.A	PT-68-322, 323, 334, 340
169(U1)	Level Transmitter	II.A	1-LT-63-179
169(U2)	Level Transmitter	II.A	2-LT-3-38, 39, 42, 51, 52, 97, 106, 107; 2-LT-63-176, 177, 178, 179; 2-LT-68-320, 335, 339
170(U1)	Level Transmitter	I.B	1-LT-63-176, 177, 178
170(U2)	Control Switch	I.B	Local Control (Various)
171(U1)	Level Transmitter	I.B	1-LT-3-38, 39, 42, 51, 52, 55, 93, 94, 106, 107, 110
171(U2)	Control Switch	I.B	Local Control (Various)
172(U1)	Pressure Transmitter	I.B	1-PT-68-66, 69
172(U2)	Flow Switch	I.B	FS-30-157, 184, 185, 200, 207
173(U1)	Solenoid Valve	I.A	FSV-62-69; FSV-63-71
173(U2)	Temperature Switch	I.B	TS-30-140A
174(U1)	Limit Switch	I.B	1-FCV-81-12; 1-PCV-68-334, 340A
174(U2)	Temperature Switch	I.B	TS-30-140
175(U1)	Limit Switch	I.B	1-ZS-30-46, 47, 48

<u>TER No.</u>	<u>Equipment</u>	<u>Category</u>	<u>TVA Identification Nos.</u>
175(U2)	Electrical Cable	II.A	Electrical Distribution (WVA)
176(U1)	Level Transmitter	I.B	1-LT-68-320, 335, 339
176(U2)	Electrical Cable	II.A	Electrical Distribution (WVA)
177(U2)	Electrical Cable	II.A	Electrical Distribution (WVA)
178(U2)	Electrical Cable	II.A	Electrical Distribution (WVA (FREP))
179(U2)	Limit Switch	II.A	2-ZS-30-46, 47, 48; FCV-81-12
180(U2)	Limit Switch	I.B	2-FCV-63-72, 73; 2-FCV-81-12; 2-PCV-68-334, 340A
181(U2)	Limit Switch	I.B	FCV-32-81, 103, 111
182(U2)	Limit Switch	I.B	ZS-67-217, 219, 336, 338
183(U2)	Solenoid Valve	I.A	2-FSV-43-207, 208

10.0 10CFR50.49 MASTERLIST

SEQUENCE MASTER LIST OF ELECTRICAL EQUIPMENT - 10CPR50.49

<u>Unit</u>		<u>TVA ID No.</u>	
1	PT (PAM)	- 1-	2A
2	PT (PAM)	- 1-	2A
1	PT (PAM)	- 1-	2B
2	PT (PAM)	- 1-	2B
1	FT	- 1-	3A
2	FT	- 1-	3A
1	FT	- 1-	3B
2	FT	- 1-	3B
1	FSV A,B, D,E,F, G,H,J	- 1-	4
2	FSV A,B, D,E,F, G,H,J	- 1-	4
1	PCV (LS)	- 1-	5
2	PCV (LS)	- 1-	5
1	PT	- 1-	5
2	PT	- 1-	5
1	PSV	- 1-	6A
2	PSV	- 1-	6A
1	PSV	- 1-	6B
2	PSV	- 1-	6B

SEOUQYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FSV - 1- 7
2	FSV - 1- 7
1	PT - 1- 9A (PAM)
2	PT - 1- 9A (PAM)
1	PT - 1- 9B (PAM)
2	PT - 1- 9B (PAM)
1	FT - 1- 10A
2	FT - 1- 10A
1	FT - 1- 10B
2	FT - 1- 10B
1	FCV - 1- 11 (LS)
2	FCV - 1- 11 (LS)
2	FSV - 1- 11 A,B,D, E,F,G,H,J
1	FSV - 1- 11 A,B, D,E,F G,H,J
1	ZS - 1- 11F
2	ZS - 1- 11F
1	ZS - 1- 11J
2	ZS - 1- 11J

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	PCV (LS)	- 1- 12
2	PCV (LS)	- 1- 12
1	PT	- 1- 12
2	PT	- 1- 12
1	PSV	- 1- 13A
2	PSV	- 1- 13A
1	PSV	- 1- 13B
2	PSV	- 1- 13B
1	FSV	- 1- 14
2	FSV	- 1- 14
2	FCV	- 1- 15
1	FCV	- 1- 15
1	FCV (TMI)	- 1- 16
2	FCV (TMI)	- 1- 16
1	FCV (TMI)	- 1- 17
2	FCV (TMI)	- 1- 17
1	FCV (TMI)	- 1- 18
2	FCV (TMI)	- 1- 18
1	TS	- 1- 18A
2	TS	- 1- 18A

SEDOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	TS - 1- 18B
2	TS - 1- 18B
1	PT - 1- 20A (PAM)
2	PT - 1- 20A (PAM)
1	PT - 1- 20B (PAM)
2	PT - 1- 20B (PAM)
1	FT - 1- 21A
2	FT - 1- 21A
1	FT - 1- 21B
2	FT - 1- 21B
2	FCV - 1- 22 (LS)
1	FCV - 1- 22 (LS)
1	FSV - 1- 22 A,B, D,E,F G,H,J
2	FSV - 1- 22 A,B, D,E,F G,H,J
1	ZS - 1- 22F
2	ZS - 1- 22F
1	ZS - 1- 22J
2	ZS - 1- 22J

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	PCV (LS)	- 1- 23
2	PCV (LS)	- 1- 23
1	PT	- 1- 23
2	PT	- 1- 23
1	PSV	- 1- 24A
2	PSV	- 1- 24A
1	FSV	- 1- 24B
2	FSV	- 1- 24B
1	FSV	- 1- 25
2	FSV	- 1- 25
1	PT (PAM)	- 1- 27A
2	PT (PAM)	- 1- 27A
1	PT (PAM)	- 1- 27B
2	PT (PAM)	- 1- 27B
1	FT	- 1- 28A
2	FT	- 1- 28A
1	FT	- 1- 28B
2	FT	- 1- 28B
1	PCV (LS)	- 1- 29

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FSV - 1- 29 A,B, D,E,F G,H,J
2	FSV - 1- 29 A,B, D,E,F, G,H,J
1	ZS - 1- 29F
2	ZS - 1- 29F
1	ZS - 1- 29J
2	ZS - 1- 29J
1	PCV - 1- 30 (LS)
2	PCV - 1- 30 (LS)
1	PSV - 1- 31A
2	PSV - 1- 31A
1	PSV - 1- 31B
2	PSV - 1- 31B
1	FSV - 1- 32
2	FSV - 1- 32
1	FCV - 1- 147 (LS)
2	FCV - 1- 147 (LS)
1	FSV - 1- 147
2	FSV - 1- 147
1	PCV - 1- 148 (LS)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FCV (LS)	- 1- 148
	FSV	- 1- 148
	FSV	- 1- 148
	FCV (LS)	- 1- 149
	FCV (LS)	- 1- 149
1	FSV	- 1- 149
2	FSV	- 1- 149
1	FCV (LS)	- 1- 150
2	FCV (LS)	- 1- 150
1	FSV	- 1- 150
2	FSV	- 1- 150
1	FSV	- 1- 181
2	FSV	- 1- 181
1	ZS	- 1- 181
2	ZS	- 1- 181
1	FSV	- 1- 182
2	FSV	- 1- 182
1	ZS	- 1- 182
2	ZS	- 1- 182
1	FSV	- 1- 183
2	FSV	- 1- 183

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1 ZS	- 1- 183
2 ZS	- 1- 183
1 FSV	- 1- 184
2 FSV	- 1- 184
1 ZS	- 1- 184
2 ZS	- 1- 184
2 FCV (LS)	- 1- 29
1 FCV	- 3- 33
2 FCV	- 3- 33
1 LT (PAM- TMI)	- 3- 38
2 LT (PAM- TMI)	- 3- 38
1 LT (PAM- TMI)	- 3- 39
2 LT (PAM- TMI)	- 3- 39
1 LT (TMI)	- 3- 42
2 LT (TMI)	- 3- 42
1 FCV	- 3- 47
2 FCV	- 3- 47
1 LT (PAM- TMI)	- 3- 51

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
2	LT - 3- 51 (PAM- TMI)
1	LT - 3- 52 (PAM- TMI)
2	LT - 3- 52 (PAM- TMI)
1	LT - 3- 55 (TMI)
2	LT - 3- 55 (TMI)
1	PCV - 3- 87
2	PCV - 3- 87
1	PSV - 3- 87
2	PSV - 3- 87
1	LT - 3- 93 (PAM- TMI)
2	LT - 3- 93 (PAM- TMI)
1	LT - 3- 94 (PAM- TMI)
2	LT - 3- 94 (PAM- TMI)
1	LT - 3- 97 (TMI)
2	LT - 3- 97 (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FCV - 3- 100
2	FCV - 3- 100
1	LT - 3- 106 (PAM- TMI)
2	LT - 3- 106 (PAM- TMI)
1	LT - 3- 107 (PAM- TMI)
2	LT - 3- 107 (PAM- TMI)
1	LT - 3- 110 (PAM- TMI)
2	LT - 3- 110 (TMI)
1	FCV - 3- 116 A&B (TMI)
2	FCV - 3- 116A (TMI)
2	FCV - 3- 116B (TMI)
1	MTR - 3- 118 (TMI)
2	MTR - 3- 118 (TMI)
1	PS - 3- 121 A,B,D (TMI)
2	PS - 3- 121 A,B,D (TMI)

SEOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>	
1	PM - 3- 122 (TMI)	Being removed
2	PM - 3- 122 (TMI)	Being removed
1	PT - 3- 122A (TMI)	Being removed
2	PT - 3- 122A (TMI)	Being removed
1	FCV - 3- 126 A&B (TMI)	
2	FCV - 3- 126A (TMI)	
2	FCV - 3- 126B (TMI)	
1	MTR - 3- 128 (TMI)	
2	MTR - 3- 128 (TMI)	
1	PM - 3- 132 (TMI)	Being removed
2	PM - 3- 132 (TMI)	Being removed
1	PT - 3- 132A (TMI)	Being removed
2	PT - 3- 132A (TMI)	Being removed
1	FCV - 3- 136A (TMI)	
2	FCV - 3- 136A (TMI)	
1	FCV - 3- 136B (TMI)	

SEOUOYAE MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
2	PCV - 3- 136B (TMI)
1	PS - 3- 138A (TMI)
2	PS - 3- 138A (TMI)
1	PS - 3- 138B (TMI)
2	PS - 3- 138B (TMI)
1	PS - 3- 139 A,B,D (TMI)
2	PS - 3- 139 A,B,D (TMI)
1	PS - 3- 140A (TMI)
2	PS - 3- 140A (TMI)
.	PS - 3- 140B
2	PS - 3- 140B
1	FT - 3- 142 (TMI)
2	FT - 3- 142 (TMI)
1	PS - 3- 144 A,B,D (TMI)
2	PS - 3- 144 A,B,D (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

Unit TVA ID No.

1 FT - 3- 147
 (PAM)(TMI)

2 FT - 3- 147
 (PAM)(TMI)

Positioner on:

1 LCV - 3- 148
 (TMI)

Positioner on:

2 LCV - 3- 148
 (TMI)

1 LSV - 3- 148
 (TMI)

2 LSV - 3- 148
 (TMI)

1 LT - 3- 148

2 LT - 3- 148

1 PS - 3- 148
 (TMI)

2 PS - 3- 148
 (TMI)

1 LM - 3- 148A

2 LM - 3- 148A

1 LSV - 3- 148A
 (TMI)

2 LSV - 3- 148A
 (TMI)

1 PS - 3- 150A
 (TMI)

2 PS - 3- 150A
 (TMI)

1 PS - 3- 150B

2 PS - 3- 150B

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

Unit TVA ID No.

1 FT - 3- 155
 (PAM)(TMI)

2 FT - 3- 155
 (PAM)(TMI)

Positioner on:

1 LCV - 3- 156
 (TMI)

Positioner on:

2 LCV - 3- 156
 (TMI)

1 LSV - 3- 156
 (TMI)

2 LSV - 3- 156
 (TMI)

1 LT - 3- 156

2 LT - 3- 156

1 PS - 3- 156
 (TMI)

2 PS - 3- 156
 (TMI)

1 LM - 3- 156A

2 LM - 3- 156A

1 LSV - 3- 156A

2 LSV - 3- 156A

1 PS - 3- 160A
 (TMI)

2 PS - 3- 160A
 (TMI)

1 PS - 3- 160B
 (TMI)

2 PS - 3- 160B
 (TMI)

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Unit TVA ID No.

1 FT - 3- 163
 (PAM)(TMI)

2 FT - 3- 163
 (PAM)(TMI)

Positioner on:

1 LCV - 3- 164
 (TMI)

Positioner on:

2 LCV - 3- 164
 (TMI)

1 LSV - 3- 164

2 LSV - 3- 164

1 LT - 3- 164

2 LT - 3- 164

1 PS - 3- 164
 (TMI)

2 PS - 3- 164
 (TMI)

1 LM - 3- 164A

2 LM - 3- 164A

1 LSV - 3- 164A

2 LSV - 3- 164A

1 PS - 3- 165
 A&B
 (TMI)

2 PS - 3- 165
 A & B
 (TMI)

1 FT - 3- 170
 (PAM)(TMI)

2 FT - 3- 170
 (PAM)(TMI)

FOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

Unit TVA ID No.

Positioner on:

1 LCV - 3- 171
 (TMI)

Positioner on:

2 LCV - 3- 171
 (TMI)

1 LSV - 3- 171

2 LSV - 3- 171

1 LT - 3- 171

2 LT - 3- 171

1 PS - 3- 171
 (TMI)

2 PS - 3- 171
 (TMI)

1 LM - 3- 171A

2 LM - 3- 171A

1 LSV - 3- 171A

2 LSV - 3- 171A

Positioner on:

1 LCV - 3- 172
 (TMI)

Positioner on:

2 LCV - 3- 172
 (TMI)

1 LSV - 3- 172

2 LSV - 3- 172

1 LT - 3- 172

2 LT - 3- 172

Positioner on:

1 LCV - 3- 173
 (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

Unit TVA ID No.

Positioner on:

2 LCV - 3- 173
 (TMI)

1 LSV - 3- 173

2 LSV - 3- 173

1 LT - 3- 173

2 LT - 3- 173

Positioner on:

1 LCV - 3- 174
 (TMI)

Positioner on:

2 LCV - 3- 174
 (TMI)

1 LSV - 3- 174

2 LSV - 3- 174

1 LT - 3- 174

2 LT - 3- 174

Positioner on:

1 LCV - 3- 175
 (TMI)

Positioner on:

2 LCV - 3- 175
 (TMI)

1 LSV - 3- 175

2 LSV - 3- 175

1 LT - 3- 175

2 LT - 3- 175

1 FCV - 3- 179A
 (TMI)

2 FCV - 3- 179A
 (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FCV - 3- 179B (TMI)
2	FCV - 3- 179B (TMI)
0	FCV - 12- 79 (LS)
0	FSV - 12- 79
0	TS - 12- 91A
0	TS - 12- 91B
0	TS - 12- 92A
0	TS - 12- 92B
0	TS - 12- 93A
0	TS - 12- 93B
0	TS - 12- 94A
0	TS - 12- 94B
0	TS - 12- 95A
0	TS - 12- 95B
0	TS - 12- 96A
0	TS - 12- 96B
0	TS - 12- 97A
0	TS - 12- 97B
0	TS - 12- 98A
0	TS - 12- 98B
0	TS - 12- 99A
0	TS - 12- 99B
1	FCV - 26- 240
2	FCV - 26- 240

SEQUOYAH MASTER LIST ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FCV	- 26- 241
2	FCV	- 26- 241
1	FCV	- 26- 242
2	FCV	- 26- 242
1	FCV	- 26- 243
2	FCV	- 26- 243
1	FCV	- 26- 244
2	FCV	- 26- 244
1	FCV	- 26- 245
2	FCV	- 26- 245
1	FCV (LS)	- 30- 2
2	FCV (LS)	- 30- 2
1	FSV	- 30- 2
2	FSV	- 30- 2
1	FCV (LS)	- 30- 5
2	FCV (LS)	- 30- 5
1	FSV	- 30- 5
2	FSV	- 30- 5
1	FSV	- 30- 7
2	FSV	- 30- 7
1	ZS	- 30- 7
2	ZS	- 30- 7
1	FSV	- 30- 8
2	FSV	- 30- 8

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>	
1	ZS	- 30-	8
2	ZS	- 30-	8
1	FSV	- 30-	9
2	FSV	- 30-	9
1	ZS	- 30-	9
2	ZS	- 30-	9
1	FSV	- 30-	10
2	FSV	- 30-	10
1	ZS	- 30-	10
2	ZS	- 30-	10
1	FCV (LS)	- 30-	12
2	FCV	- 30-	12
1	FSV	- 30-	12
2	FSV	- 30-	12
1	FSV	- 30-	14
2	FSV	- 30-	14
1	ZS	- 30-	14
2	ZS	- 30-	14
1	FSV	- 30-	15
2	FSV	- 30-	15
1	ZS	- 30-	15
2	ZS	- 30-	15
1	FCV (LS)	- 30-	16

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<u>Unit</u>		<u>TVA ID No.</u>
2	PCV (LS)	- 30- 16
1	FSV	- 30- 16
2	FSV	- 30- 16
1	FSV	- 30- 17
2	FSV	- 30- 17
1	FSV	- 30- 19
2	FSV	- 30- 19
1	ZS	- 30- 19
2	ZS	- 30- 19
1	FSV	- 30- 20
2	FSV	- 30- 20
1	ZS	- 30- 20
2	ZS	- 30- 20
2	PCO (LS)	- 30- 22
2	FSV	- 30- 22
1	PCV (LS)	- 30- 37
2	PCV (LS)	- 30- 37
1	FSV	- 30- 37
2	FSV	- 30- 37
1	MTRA	- 30- 38A
2	MTRA	- 30- 38A
1	MTRB	- 30- 39B

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<u>Unit</u>	<u>TVA ID No.</u>
2	MTRB - 30- 39B
1	FSV - 30- 40
2	FSV - 30- 40
1	PDT - 30- 42
2	PDT - 30- 42
1	PDT - 30- 43
2	PDT - 30- 43
1	PDT - 30- 44 (PAM)
2	PDT - 30- 44 (PAM)
1	PDT - 30- 45 (PAM)
2	PDT - 30- 45 (PAM)
1	PS - 30- 46 A&B
1	ZS - 30- 46
2	ZS - 30- 46
1	FSV - 30- 46A
2	FSV - 30- 46A
1	PS - 30- 46A
2	PS - 30- 46A
1	PS - 30- 46A
2	FS - 30- 46B
1	PS - 30- 47 A&B

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<u>Unit</u>		<u>TVA ID No.</u>
1	ZS	- 30- 47
2	ZS	- 30- 47
1	FSV	- 30- 47A
2	FSV	- 30- 47A
2	PS	- 30- 47A
2	PS	- 30- 47B
1	PS A&B	- 30- 48
1	ZS	- 30- 48
2	ZS	- 30- 48
1	FSV	- 30- 48A
2	FSV	- 30- 48A
2	PS	- 30- 48A
2	PS	- 30- 48B
1	FSV	- 30- 50
2	FSV	- 30- 50
1	ZS	- 30- 50
2	ZS	- 30- 50
1	FSV	- 30- 51
2	FSV	- 30- 51
1	ZS	- 30- 51
2	ZS	- 30- 51
1	FSV	- 30- 52
2	FSV	- 30- 52

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<u>Unit</u>		<u>TVA ID No.</u>
1	ZS	- 30- 52
2	ZS	- 30- 52
1	FSV	- 30- 53
2	FSV	- 30- 53
1	ZS	- 30- 53
2	ZS	- 30- 53
1	PCV (LS)	- 30- 54
2	PCV (LS)	- 30- 54
1	FSV	- 30- 54
2	FSV	- 30- 54
1	FSV	- 30- 56
2	FSV	- 30- 56
1	ZS	- 30- 56
2	ZS	- 30- 56
1	FSV	- 30- 57
2	FSV	- 30- 57
1	ZS	- 30- 57
2	ZS	- 30- 57
1	FSV	- 30- 58
2	FSV	- 30- 58
1	ZS	- 30- 58
2	ZS	- 30- 58
1	FSV	- 30- 59

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<u>Unit</u>		<u>TVA ID No.</u>
2	FSV	- 30- 59
1	ZS	- 30- 59
2	ZS	- 30- 59
1	FCV (LS)	- 30- 61
2	FCV (LS)	- 30- 61
1	FSV	- 30- 61
2	FSV	- 30- 61
1	FCV (LS)	- 30- 62
2	FCV (LS)	- 30- 62
1	FSV	- 30- 62
2	FSV	- 30- 62
1	FSV	- 30- 86
1	FCO (LS)	- 30- 87
1	FSV	- 30- 87
1	FCO (LS)	- 30- 107
1	FSV	- 30- 107
2	FCO	- 30- 109 (LS)
2	FSV	- 30- 109
1	FSV	- 30- 134
2	FSV	- 30- 134

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FSV	- 30- 135
2	FSV	- 30- 135
1	FSV A&B	- 30- 146
0	FS	- 30- 147
0	TC	- 30- 147
0	TS	- 30- 147
0	FS	- 30- 156
0	TC	- 30- 156
0	TS	- 30- 156
2	FSV	- 30- 157A
1	MTR	- 30- 146A
2	MTR	- 30- 157B
2	FSV	- 30- 157B
1	MTR	- 30- 175
2	MTR	- 30- 175
1	MTR	- 30- 176
2	MTR	- 30- 176
1	MTR	- 30- 177
2	MTR	- 30- 177
1	MTR	- 30- 178
2	MTR	- 30- 178
1	MTR	- 30- 179
2	MTR	- 30- 179
1	MTR	- 30- 180
2	MTR	- 30- 180

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	MTR	- 30- 182
2	MTR	- 30- 182
1	MTR	- 30- 183
2	MTR	- 30- 183
2	MTR	- 30- 184
2	TS	- 30- 184
2	MTR	- 30- 185
2	TS	- 30- 185
1	MTR	- 30- 186
2	MTR	- 30- 186
1	TS	- 30- 186
2	TS	- 30- 186
1	MTR	- 30- 187
2	MTR	- 30- 187
1	TS	- 30- 187
2	TS	- 30- 187
1	MTR	- 30- 190A
1	TS	- 30- 190
1	MTR	- 30- 191
1	TS	- 30- 191
0	MTR	- 30- 192
0	TS	- 30- 192
0	MTR	- 30- 193
0	TS	- 30- 193
1	FS	- 30- 194
2	FS	- 30- 194

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<u>Unit</u>		<u>TVA ID No.</u>
1	MTR	- 30- 194
2	MTR	- 30- 194
1	TS	- 30- 194
2	TS	- 30- 194
1	FS	- 30- 195
2	FS	- 30- 195
1	MTR	- 30- 195
2	MTR	- 30- 195
1	TS	- 30- 195
2	TS	- 30- 195
1	FS	- 30- 196
2	FS	- 30- 196
1	MTR	- 30- 196
2	MTR	- 30- 196
1	TS	- 30- 196
2	TS	- 30- 196
1	FS	- 30- 197
2	FS	- 30- 197
1	MTR	- 30- 197
2	MTR	- 30- 197
1	TS	- 30- 197
2	TS	- 30- 197
2	MTR	- 30- 200
1	MTR	- 30- 201

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	MTR	- 30- 201
1	TS	- 30- 201
2	TS	- 30- 201
1	MTR	- 30- 202
2	MTR	- 30- 202
1	TS	- 30- 202
2	TS	- 30- 202
2	MTR	- 30- 207
1	PT (PAM+, TMI)	- 30- 310
2	PT (PAM+, TMI)	- 30- 310
1	PT (PAM+, TMI)	- 30- 311
2	PT (PAM+, TMI)	- 30- 311
0	MC	- 30- 319
0	ME	- 30- 319
0	MM	- 30- 319
0	MS	- 30- 319
0	MC	- 30- 320
0	ME	- 30- 320
0	MM	- 30- 320
0	MS	- 30- 320
1	FCV (LS)	- 32- 80
1	FSV A&B	- 32- 80
2	FCV (LS)	- 32- 81

MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FSV	- 32- 81A
2	FSV	- 32- 81B
1	FCV (LS)	- 32- 102
1	FSV A&B	- 32- 102
2	FCV (LS)	- 32- 103
2	FSV	- 32- 103A
2	FSV	- 32- 103B
1	FCV (LS)	- 32- 110
1	FSV A&B	- 32- 110
2	FCV (LS)	- 32- 111
2	FSV	- 32- 111A
2	FSV	- 32- 111B
1	FSV	- 43- 2
2	FSV	- 43- 2
1	FSV	- 43- 3
2	FSV	- 43- 3
1	FSV	- 43- 11
2	FSV	- 43- 11
1	FSV	- 43- 12
2	FSV	- 43- 12
1	FSV	- 43- 22
2	FSV	- 43- 22
1	FSV	- 43- 23

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FSV	- 43- 23
1	FSV	- 43- 34
2	FSV	- 43- 34
1	FSV	- 43- 35
2	FSV	- 43- 35
1	FSV	- 43- 75
2	FSV	- 43- 75
1	FSV	- 43- 77
2	FSV	- 43- 77
1	H ₂ A (TMI)	- 43- 200
2	H ₂ A (TMI)	- 43- 200
1	FSV	- 43- 201
2	FSV	- 43- 201
1	FSV (TMI)	- 43- 202
2	FSV (TMI)	- 43- 202
1	FSV (TMI)	- 43- 207
2	FSV (TMI)	- 43- 207
1	FSV (TMI)	- 43- 208
2	FSV (TMI)	- 43- 208
1	H ₂ A (TMI)	- 43- 210

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<u>Unit</u>		<u>TVA ID No.</u>
2	H ₂ A (TMI)	- 43- 210
1	RLY	- 46- 1
2	RLY	- 46- 1
1	RLY	- 46- 2
2	RLY	- 46- 2
1	RLY	- 46- 3
2	RLY	- 46- 3
1	RLY	- 46- 4
2	RLY	- 46- 4
1	RLY	- 46- 5
2	RLY	- 46- 5
1	RLY	- 46- 6
2	RLY	- 46- 6
1	FSV	- 61- 96
2	FCV (LS)	- 61- 96
2	FSV	- 61- 96
1	FCV (LS)	- 61- 97
2	FCV (LS)	- 61- 97
1	FSV	- 61- 97
2	FSV	- 61- 97

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FCV (LS)	- 61- 110
2	FSV	- 61- 110
1	FCV (LS)	- 61- 122
2	FCV (LS)	- 61- 122
1	FSV	- 61- 122
2	FSV	- 61- 122
1	FCV (LS)	- 61- 192
2	FCV (LS)	- 61- 192
1	FSV	- 61- 192
2	FSV	- 61- 192
1	FCV (LS)	- 61- 194
2	FCV (LS)	- 61- 194
1	FSV	- 61- 194
2	FSV	- 61- 194
1	FCV	- 62- 61
2	FCV	- 62- 61
1	FCV	- 62- 63
2	FCV	- 62- 63
1	FCV (LS)	- 62- 69
2	FCV (LS)	- 62- 69

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FSV - 62- 69
2	FSV - 62- 69
1	FCV - 62- 70 (LS)
2	FCV - 62- 70 (LS)
1	FSV - 62- 70
2	FSV - 62- 70
1	FCV - 62- 72 (LS)
2	FCV - 62- 72 (LS)
1	FSV - 62- 72
2	FSV - 62- 72
1	FCV - 62- 73 (LS)
2	FCV - 62- 73 (LS)
1	FSV - 62- 73
2	FSV - 62- 73
1	FCV - 62- 74 (LS)
2	FCV - 62- 74
1	FSV - 62- 74
2	FSV - 62- 74
1	FCV - 62- 77 (LS)
2	FCV - 62- 77 (LS)

SEOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	FSV - 62- 77
2	FSV - 62- 77
1	FCV - 62- 90
2	FCV - 62- 90
1	FCV - 62- 91
2	FCV - 62- 91
1	FCV - 62- 98
2	FCV - 62- 98
1	FCV - 62- 99
2	FCV - 62- 99
1	MTRB - 62- 104B
2	MTRB - 62- 104B
1	MTRA - 62- 108A (PAM)
2	MTRA - 62- 108A
1	LCV - 62- 132
2	LCV - 62- 132
1	LCV - 62- 133
2	LCV - 62- 133
1	FCV - 63- 1
2	FCV - 63- 1
1	FCV - 63- 3
2	FCV - 63- 3
2	FCV - 63- 3 (LS)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR30.49

<u>Unit</u>		<u>TVA ID No.</u>	
1	PCV	- 63-	4
1	PCV (LS)	- 63-	4
2	PCV	- 63-	4
2	PCV (LS)	- 63-	4
1	PCV	- 63-	5
2	PCV	- 63-	5
1	PCV	- 63-	6
2	PCV	- 63-	6
1	PCV	- 63-	7
2	PCV	- 63-	7
1	PCV	- 63-	8
2	PCV	- 63-	8
1	MTR (PAM)	- 63-	10A
2	MTR (PAM)	- 63-	10A
1	PCV	- 63-	11
2	PCV	- 63-	11
1	MTR	- 63-	15B
2	MTR	- 63-	15B
1	PCV	- 63-	22
2	PCV	- 63-	22
1	FSV	- 63-	23
2	FSV	- 63-	23

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FCV	- 63- 25
2	FCV	- 63- 25
1	FCV	- 63- 26
2	FCV	- 63- 26
1	FSV	- 63- 38
2	FSV	- 63- 38
1	FCV	- 63- 39
2	FCV	- 63- 39
1	FCV	- 63- 40
2	FCV	- 63- 40
1	FSV	- 63- 41
2	FSV	- 63- 41
1	FSV	- 63- 42
2	FSV	- 63- 42
1	FCV	- 63- 47
2	FCV	- 63- 47
1	FCV	- 63- 48
2	FCV	- 63- 48
1	FSV	- 63- 64
2	FSV	- 63- 64
1	FCV (LS)	- 63- 71
2	FCV (LS)	- 63- 71
1	FSV	- 63- 71

SEOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
2	FSV - 63- 71
1	FCV - 63- 72
1	FCV - 63- 72 (LS)
2	FCV - 63- 72
2	FCV - 63- 72 (LS)
1	FCV - 63- 73
1	FCV - 63- 73 (LS)
2	FCV - 63- 73
2	FCV - 63- 73 (LS)
1	FSV - 63- 84
2	FSV - 63- 84
1	FCV - 63- 93
2	FCV - 63- 93
1	FCV - 63- 94
2	FCV - 63- 94
1	FCV - 63- 152
2	FCV - 63- 152
1	FCV - 63- 153
2	FCV - 63- 153
1	FCV - 63- 156
2	FCV - 63- 156
1	FCV - 63- 157

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
2	FCV - 63- 157
1	FCV - 63- 172
2	FCV - 63- 172
1	FCV - 63- 175
1	FCV - 63- 175 (LS)
2	FCV - 63- 175
2	FCV - 63- 175 (LS)
1	LT - 63- 176 (TMI)(PAM)
2	LT - 63- 176 (TMI)(PAM)
1	LT - 63- 177 (TMI)(PAM)
2	LT - 63- 177 (TMI)(PAM)
1	LT - 63- 178 (TMI)
2	LT - 63- 178 (TMI)
1	LT - 63- 179 (TMI)
2	LT - 63- 179 (TMI)
2	FCV - 65- 4 (LS)
2	FCV - 65- 5 (LS)
1	FSV - 65- 5

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>	
2	FSV	- 65-	5
2	FSV	- 65-	7
1	FCV (LS)	- 65-	8
1	FSV	- 65-	8
1	FSV	- 65-	9
2	FSV	- 65-	9
1	FSV	- 65-	10
0	MC	- 65-	16
0	ME	- 65-	16
0	MM	- 65-	16
0	MS	- 65-	16
0	TC	- 65-	17
0	TS	- 65-	17
0	MTR	- 65-	23A
0	FSV	- 65-	24
0	FS A/B, B/A	- 65-	25
1	FSV	- 65-	26
1	FSV	- 65-	27
0	FCO A&B (LS)	- 65-	28
0	FSV A&B	- 65-	28
2	FSV	- 65-	29
1	FSV	- 65-	30

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
0	FS A/B, B/A	- 65- 31
0	MC	- 65- 36
0	ME	- 65- 36
0	MM	- 65- 36
0	MS	- 65- 36
0	TC	- 65- 37
0	TS	- 65- 37
0	MTR	- 65- 42B
0	FSV	- 65- 43
0	FS A/B B/A	- 65- 44
2	FSV	- 65- 45
2	FSV	- 65- 46
0	FCO A&B (LS)	- 65- 47
0	FSV A&B	- 65- 47
2	FSV	- 65- 50
1	FCV (LS)	- 65- 51
1	FSV	- 65- 51
1	FCV (LS)	- 65- 52
1	FSV	- 65- 52
1	FCV (LS)	- 65- 53
1	FSV	- 65- 53

SEOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
0	FS A/B B/A	- 65- 55
0	FS A/B B/A	- 65- 56
1	PDT	- 65- 80
2	PDT	- 65- 80
1	PCV (LS)	- 65- 81
2	PCV	- 65- 81
1	PSV	- 65- 81
2	PSV	- 65- 81
1	PDT	- 65- 82
2	PDT	- 65- 82
1	PCV (LS)	- 65- 83
2	PCV (LS)	- 65- 83
1	PSV	- 65- 83
2	PSV	- 65- 83
1	PCV (LS)	- 65- 86
2	PCV (LS)	- 65- 86
1	PCV	- 65- 87
2	PCV (LS)	- 65- 87
1	PDT	- 65- 90
2	PDT	- 65- 90

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	PDT	- 65- 97
2	PDT	- 65- 97
1	FCV	- 67- 83
2	FCV	- 67- 83
1	FCV	- 67- 87
2	FCV	- 67- 87
1	FCV	- 67- 88
2	FCV	- 67- 88
1	FCV	- 67- 91
2	FCV	- 67- 91
1	FCV	- 67- 95
2	FCV	- 67- 95
1	FCV	- 67- 96
2	FCV	- 67- 96
1	FCV	- 67- 99
2	FCV	- 67- 99
1	FCV	- 67- 103
2	FCV	- 67- 103
1	FCV	- 67- 104
2	FCV	- 67- 104
1	FCV	- 67- 107
2	FCV	- 67- 107
1	FCV	- 67- 111
2	FCV	- 67- 111
1	FCV	- 67- 112
2	FCV	- 67- 112

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FCV	- 67- 123
2	FCV	- 67- 123
1	FCV	- 67- 124
2	FCV	- 67- 124
1	FCV	- 67- 125
2	FCV	- 67- 125
1	FCV	- 67- 126
2	FCV	- 67- 126
1	FCV	- 67- 130
2	FCV	- 67- 130
1	FCV	- 67- 131
2	FCV	- 67- 131
1	FCV	- 67- 133
2	FCV	- 67- 133
1	FCV	- 67- 134
2	FCV	- 67- 134
1	FCV	- 67- 138
2	FCV	- 67- 138
1	FCV	- 67- 139
2	FCV	- 67- 139

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FCV	- 67- 141
2	FCV	- 67- 141
1	FCV	- 67- 142
2	FCV	- 67- 142
1	FCV	- 67- 146
2	FCV	- 67- 146
0	FCV	- 67- 152
1	FSV	- 67- 162
1	FSV	- 67- 164
1	FSV	- 67- 168
2	FSV	- 67- 168
1	FSV	- 67- 170
2	FSV	- 67- 170
1	FSV	- 67- 176
2	FSV	- 67- 176
1	FSV	- 67- 182
2	FSV	- 67- 182
1	FSV	- 67- 184
2	FSV	- 67- 184
1	FSV	- 67- 186
2	FSV	- 67- 186

SEQUOYAH MASTER LIST OF ELECTRIC EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FSV	- 67- 188
2	FSV	- 67- 188
1	FSV	- 67- 190
2	FSV	- 67- 190
1	FSV	- 67- 213
1	FSV	- 67- 215
2	FSV	- 67- 217
2	ZS	- 67- 217
2	FSV	- 67- 219
2	ZS	- 67- 219
2	FCV	- 67- 223
1	FCV	- 67- 223
1	FCV	- 67- 295
2	FCV	- 67- 295
1	FCV	- 67- 296
2	FCV	- 67- 296
1	FCV	- 67- 297
2	FCV	- 67- 297
1	FCV	- 67- 298
2	FCV	- 67- 298
2	FSV	- 67- 336
2	FSV	- 67- 338

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 107R50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FSV	- 67- 342
2	FSV	- 67- 342
1	FSV	- 67- 344
2	FSV	- 67- 344
1	FSV	- 67- 346
2	FSV	- 67- 346
1	FSV	- 67- 348
2	FSV	- 67- 348
1	FSV	- 67- 350
2	FSV	- 67- 350
1	FSV	- 67- 352
2	FSV	- 67- 352
1	FSV	- 67- 354
2	FSV	- 67- 354
1	FSV	- 67- 356
2	FSV	- 67- 356
1	TE (PAM- TMI)	- 68- 1
2	TE (PAM- TMI)	- 68- 1
1	TE	- 68- 2A
2	TE	- 68- 2A
1	TE	- 68- 2B
2	TE	- 68- 2B

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	TE	- 68- 14A
2	TE	- 68- 14A
1	TE	- 68- 14B
2	TE	- 68- 14B
1	TE (PAM)	- 68- 18
2	TE (PAM)	- 68- 18
1	TE (TMI)(PAM)	- 68- 24
2	TE (TMI)(PAM)	- 68- 24
1	TE	- 68- 25A
2	TE	- 68- 25A
1	TE	- 68- 25B
2	TE	- 68- 25B
1	TE	- 68- 37A
2	TE	- 68- 37A
1	TE	- 68- 37B
2	TE	- 68- 37B
1	TE (PAM)	- 68- 41
2	TE (PAM)	- 68- 41
1	TE (PAM)	- 68- 43
2	TE (PAM)	- 68- 43

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	TE	- 68- 44A
2	TE	- 68- 44A
1	TE	- 68- 44B
2	TE	- 68- 44B
1	TE	- 68- 56A
2	TE	- 68- 56A
1	TE	- 68- 56B
2	TE	- 68- 56B
1	TE (PAM)	- 68- 60
2	TE (PAM)	- 68- 60
1	TE (PAM)	- 68- 65
2	TE (PAM)	- 68- 65
1	PT (PAM- TMI)	- 68- 66
2	PT (PAM- TMI)	- 68- 66
1	TE	- 68- 67A
1	TE	- 68- 67B
2	TE	- 68- 67A
2	TE	- 68- 67B
1	PT (PAM)	- 68- 68

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	PT (PAM)	- 68- 68
1	PT (PAM)	- 68- 69
2	PT (PAM)	- 68- 69
1	TE	- 68- 79A
2	TE	- 68- 79A
1	TE	- 68- 79B
2	TE	- 68- 79B
1	TE (PAM)	- 68- 83
2	TE (PAM)	- 68- 83
1	FSV	- 68- 305
2	FSV	- 68- 305
1	FSV	- 68- 307
2	FSV	- 68- 307
1	FCV (LS)	- 68- 308
2	FCV (LS)	- 68- 308
1	FSV	- 68- 308
2	FSV	- 68- 308
1	LT (PAM)	- 68- 320
2	LT (PAM)	- 68- 320

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	PT	- 68- 322
2	PT	- 68- 322
1	PT	- 68- 323
2	PT	- 68- 323
1	FCV	- 68- 332
2	FCV	- 68- 332
1	FCV	- 68- 333
2	FCV	- 68- 333
1	PCV (LS) (TMI)	- 68- 334
2	PCV (LS) (TMI)	- 68- 334
1	PT	- 68- 334
2	PT	- 68- 334
1	XE (TMI)	- 68- 334
2	XE (TMI)	- 68- 334
1	XT (TMI)	- 68- 334
2	XT (TMI)	- 68- 334
1	PSV (TMI)	- 68- 334
2	PSV (TMI)	- 68- 334
1	LT (PAM)	- 68- 335

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
2	LT - 68- 335 (PAM)
1	LT - 68- 339 (PAM- TMI)
2	LT - 68- 339 (PAM- TMI)
1	PSV - 68- 340A (TMI)
2	PSV - 68- 340A (TMI)
1	PT - 68- 340
2	PT - 68- 340
1	XE - 68- 340A (TMI)
2	XE - 68- 340A (TMI)
1	XT - 68- 340A (TMI)
2	XT - 68- 340A (TMI)
2	PSV - 68- 340AB (TMI)
1	XE - 68- 363 (TMI)
2	XE - 68- 363 (TMI)
1	XT - 68- 363 (TMI)
2	XT - 68- 363 (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	XE - 68- 364 (TMI)
2	XF - 68- 364 (TMI)
1	XT - 68- 364 (TMI)
2	XT - 68- 364 (TMI)
1	XE - 68- 365 (TMI)
2	XE - 68- 365 (TMI)
1	XT - 68- 365 (TMI)
2	XT - 68- 365 (TMI)
1	XE - 68- 366 (TMI)
2	XE - 68- 366 (TMI)
1	XT - 68- 366 (TMI)
2	XT - 68- 366 (TMI)
1	TE - 68- 373 (TMI)
2	TE - 68- 373 (TMI)
1	TE - 68- 374 (TMI)
2	TE - 68- 374 (TMI)

QUONAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>	<u>TVA ID No.</u>
1	TE - 68- 375 (TMI)
2	TE - 68- 375 (TMI)
1	TE - 68- 376 (TMI)
2	TE - 68- 376 (TMI)
1	TE - 68- 377 (TMI)
2	TE - 68- 377 (TMI)
1	TE - 68- 378 (TMI)
2	TE - 68- 378 (TMI)
1	TE - 68- 379 (TMI)
2	TE - 68- 379 (TMI)
1	TE - 68- 380 (TMI)
2	TE - 68- 380 (TMI)
1	TE - 68- 381 (TMI)
2	TE - 68- 381 (TMI)
1	TE - 68- 382 (TMI)
2	TE - 68- 382 (TMI)

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	TE (TMI)	- 68- 383
2	TE (TMI)	- 68- 383
1	TE (TMI)	- 68- 384
2	TE (TMI)	- 68- 384
1	TE (TMI)	- 68- 385
2	TE (TMI)	- 68- 385
1	TE (TMI)	- 68- 386
2	TE (TMI)	- 68- 386
1	FSV	- 68- 394
2	FSV	- 68- 394
1	FSV	- 68- 395
2	FSV	- 68- 395
1	FSV	- 68- 396
2	FSV	- 68- 396
1	FSV	- 68- 397
2	FSV	- 68- 397
1	TE (TMI)	- 68- 398
2	TE (TMI)	- 68- 398
0	FCV	- 70- 1

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
0	FCV	- 70- 11
0	MTR	- 70- 33
0	MTR	- 70- 38
0	FCV	- 70- 40
0	FCV	- 70- 41
0	MTR	- 70- 46
0	MTR	- 70- 51
0	MTR	- 70- 59
1	FSV	- 70- 85
2	FSV	- 70- 85
1	FCV (LS)	- 70- 85
2	FCV (LS)	- 70- 85
1	FCV	- 70- 87
2	FCV	- 70- 87
1	FCV	- 70- 89
2	FCV	- 70- 89
1	FCV	- 70- 90

SEOUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FCV	- 70- 90
1	FCV	- 70- 92
2	FCV	- 70- 92
0	FCV	- 70- 111
1	FCV	- 70- 133
2	FCV	- 70- 133
1	FCV	- 70- 134
2	FCV	- 70- 134
1	FCV	- 70- 140
2	FCV	- 70- 140
1	FCV	- 70- 143
2	FCV	- 70- 143
1	FCV	- 70- 153
2	FCV	- 70- 153
1	FCV	- 70- 156
2	FCV	- 70- 156
1	FCV	- 70- 183
2	FCV	- 70- 183
0	FCV	- 70- 193
0	FCV	- 70- 194

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
0	FCV	- 70- 197
0	FCV	- 70- 198
0	FCV	- 70- 206
1	FCV	- 70- 207
2	FCV	- 70- 207
0	FCV	- 70- 208
1	FCV	- 72- 2
2	FCV	- 72- 2
1	MTR	- 72- 10
2	MTR	- 72- 10
1	FCV	- 72- 13
2	FCV	- 72- 13
1	FT	- 72- 13
2	FT	- 72- 13
1	FCV	- 72- 20
2	FCV	- 72- 20
1	FCV	- 72- 21
2	FCV	- 72- 21
1	FCV	- 72- 22
2	FCV	- 72- 22
1	FCV	- 72- 23
2	FCV	- 72- 23

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<u>Unit</u>		<u>TVA ID No.</u>
1	MTR	- 72- 27
2	MTR	- 72- 27
1	FCV	- 72- 34
2	FCV	- 72- 34
1	FT	- 72- 34
2	FT	- 72- 34
1	FCV	- 72- 39
2	FCV	- 72- 39
1	FCV	- 72- 40
2	FCV	- 72- 40
1	FCV	- 72- 41
2	FCV	- 72- 41
1	FCV	- 74- 3
2	FCV	- 74- 3
1	MTRA	- 74- 10A
2	MTRA	- 74- 10A
1	FCV	- 74- 12
2	FCV	- 74- 12
1	MTRA	- 74- 20B
2	MTRA	- 74- 20B
1	FCV	- 74- 21
2	FCV	- 74- 21

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FCV	- 74- 24
2	FCV	- 74- 24
1	FCV (LS)	- 77- 9
2	FCV (LS)	- 77- 9
1	FSV	- 77- 9
2	FSV	- 77- 9
1	FSV	- 77- 10
2	FSV	- 77- 10
1	FCV (LS)	- 77- 16
2	FCV (LS)	- 77- 16
1	FSV	- 77- 16
2	FSV	- 77- 16
1	FSV	- 77- 17
2	FSV	- 77- 17
1	FCV (LS)	- 77- 18
2	FCV (LS)	- 77- 18
1	FSV	- 77- 18
2	FSV	- 77- 18
1	FSV	- 77- 19

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
2	FSV	- 77- 19
1	FSV	- 77- 20
2	FSV	- 77- 20
1	FCV (LS)	- 77- 127
2	FCV (LS)	- 77- 127
1	FSV	- 77- 127
2	FSV	- 77- 127
1	FCV (LS)	- 77- 128
2	FCV (LS)	- 77- 128
1	FSV	- 77- 128
2	FSV	- 77- 128
0	MTRB	- 78- 9B
0	MTRB	- 78- 12A
0	MTRB	- 78- 35C
1	FSV	- 81- 12
2	FSV	- 81- 12
1	HTR	- 83- 1A
2	HTR	- 83- 1A
1	HTR	- 83- 2B

SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>	
2	HTR	- 83-	2B
1	FSV	- 87-	7
2	FSV	- 87-	7
1	FSV	- 87-	8
2	FSV	- 87-	8
1	FCV (LS)	- 90-	107
2	FCV (LS)	- 90-	107
1	FSV	- 90-	107
2	FSV	- 90-	107
1	FCV (LS)	- 90-	108
2	FCV (LS)	- 90-	108
1	FSV	- 90-	108
2	FSV	- 90-	108
1	FCV (LS)	- 90-	109
2	FCV (LS)	- 90-	109

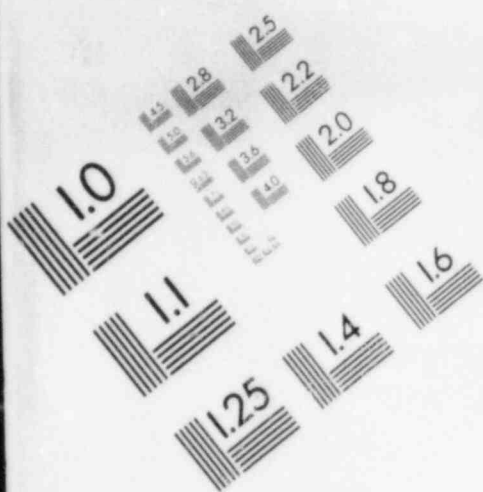
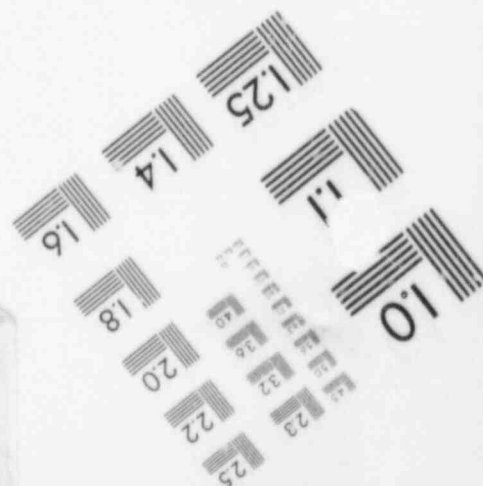
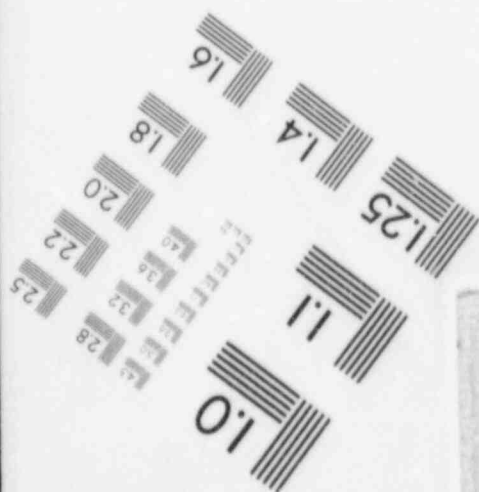
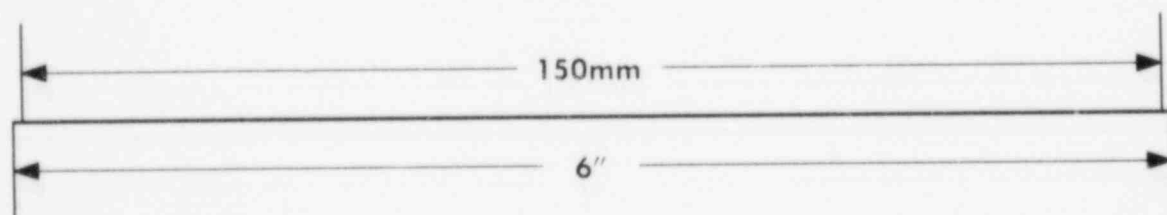
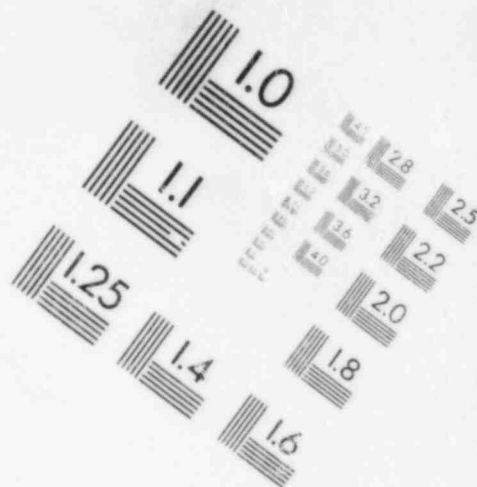


IMAGE EVALUATION
TEST TARGET (MT-3)



SEQUOYAH MASTER LIST OF ELECTRICAL EQUIPMENT - 10CFR50.49

<u>Unit</u>		<u>TVA ID No.</u>
1	FSV	- 90- 109
2	FSV	- 90- 109
1	FCV (LS)	- 90- 110
2	FCV (LS)	- 90- 110
1	FSV	- 90- 110
2	FSV	- 90- 110
1	FCV (LS)	- 90- 111
2	FCV (LS)	- 90- 111
1	FSV	- 90- 111
2	FSV	- 90- 111
1	FCV (LS)	- 90- 113
2	FCV (LS)	- 90- 113
1	FSV	- 90- 113
2	FSV	- 90- 113
1	FCV (LS)	- 90- 114
2	FCV (LS)	- 90- 114
1	FSV	- 90- 114
2	FSV	- 90- 114
1	FCV (LS)	- 90- 115

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<u>Unit</u>		<u>TVA ID No.</u>
2	FCV (LS)	- 90- 115
1	FSV	- 90- 115
2	FSV	- 90- 115
1	FCV (LS)	- 90- 116
2	FCV (LS)	- 90- 116
1	FSV	- 90- 116
2	FSV	- 90- 116
1	FCV (LS)	- 90- 117
2	FCV (LS)	- 90- 117
1	FSV	- 90- 117
2	FSV	- 90- 117
1	RE (PAM)(TMI)	- 90- 271
2	RE (PAM)(TMI)	- 90- 271
1	RE (PAM)(TMI)	- 90- 272
2	RE (PAM)(TMI)	- 90- 272
1	RE (PAM)(TMI)	- 90- 273
2	RE (PAM)(TMI)	- 90- 273
1	RE (PAM)(TMI)	- 90- 274

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<u>Unit</u>		<u>TVA ID No.</u>
2	RE (PAM)(TMI)	- 90- 274
1	FCV (LS)	-313- 222
2	FCV (LS)	-313- 222
1	FSV	-313- 222
2	FSV	-313- 222
1	FCV (LS)	-313- 223
2	FCV (LS)	-313- 223
1	FSV	-313- 223
2	FSV	-313- 223
1	FCV (LS)	-313- 224
2	FCV (LS)	-313- 224
1	FSV	-313- 224
2	FSV	-313- 224
1	FCV (LS)	-313- 225
2	FCV (LS)	-313- 225
1	FSV	-313- 225
2	FSV	-313- 225
1	FCV (LS)	-313- 229
2	FCV (LS)	-313- 229

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<u>Unit</u>		<u>TVA ID No.</u>
1	FSV	-313- 229
2	FSV	-313- 229
1	FCV (LS)	-313- 230
2	FCV (LS)	-313- 230
1	FSV	-313- 230
2	FSV	-313- 230
1	FCV (LS)	-313- 231
2	FCV (LS)	-313- 231
1	FSV	-313- 231
2	FSV	-313- 231
1	FCV (LS)	-313- 232
2	FCV (LS)	-313- 232
1	FSV	-313- 232
2	FSV	-313- 232
0	MTR B-A	-313- 303
0	FSV	-313- 305
0	LS	-313- 305
0	MTR B-A	-313- 338
1	FSV	-313- 340
0	LS	-313- 340

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<u>Unit</u>	<u>TVA ID No.</u>
Terminal Blocks	
Handswitches	
Cable (all types)	
Junction boxes	
Cable splices	
Penetrations (all types)	
Conduit Seal Assemblies	
Stainless Steel Flexible Conduit	

Notes:

1. (Limitorque Motor-Operators) - West provide additional analysis information on recommendations for operators. TVA expects this analysis information on recommendations for Analysis and evaluation (and, if re completed by April 1984.
2. (Target Rock Solenoid Valves) - West the needed information for qualification TVA by August 1983.
3. (Westinghouse Power Range Detectors to provide additional analysis information operation during a main steam time documentation for these detectors. expected by September 1983.

use is being requested to for these valve motor- give adequate qualification fic parts replacement. d, parts replacement) will be

ouse has committed to provide of these solenoid valves, to

estinghouse is being requested on, as to the requirements of , and the qualification ipt of this information is

DE05:TBLII.PB

DE05:TBLII.BR