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RESPONSE TO NRC IE BULLETIN 79-01B

MUGLEM

TENNESSEE

ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

8012010 557

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EWS CLARIFICATION

The following explanation of the use of certain columns in the Evaluation Work Sheets (EWS) applies to those worksheets dealing with original NSSS equipment which was purchased under TVA contract 90744 and 91750.

- The operating times listed under the "QUALIFICATION" portion of the "ENVIRONMENT" section refer to the actual time duration of the qualification test referenced. They do not imply that the device is not qualified or qualifiable to longer operating times. Specific discussions of actual or postulated operating times can be found in the appendixes.
- 2. The values given for radiation doses under "QUALIFICATION" either refer to actual type-tested doses or doses determined by a materials consideration. The source of the radiation value is clarified in the appendix.

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BROWNS FERRY NUCLEAR PLANT - NEB EVALUATION WORKSHEET INDEX



1			
EWS Number	Description	Manufacturer	Model Number
NEB-1-002	Solenoid operator	Target Rock	1/2SMS-A-01
NEB-1-002A	Solenoid operator	Asco	WPHT8300B68F
NEB-1-003	Diff press indicator sw	Barton	278
NEB-1-005	Solenoid operator	Automatic Valve	C-5497
NEB-1-007	Solenoid operator	Automatic Valve	C-5497
NEB-1-008	Temperature switch	Fenwal	17002-40
NEB-1-012	Motor operator	Limitorque	SMB-000
NEB-1-013	Motor operator	Limitorque	SMB-000
NEB-1-015	Pressure switch	Barksdale	B2T-A12SS
NEB-3-016	Level indicator switch	Yarway	4418C
NEB-3-017	Level indicator switch	Yarway	4418C
NEB-3-018	Pressure switch	Barksdale	*B2T-A12SS
NEB-3-019	Level indicator switch	Yarway	4418C
NEB-3-020	Level switch	Yarway	4418CE
NEB-3-021	Pressure switch	Barksdale	B2T-M12SS
NEB-3-021A	Pressure switch	Barton	288
NEB-3-022	Level indicator switch	Yarway	44180
NEB-3-023	Level indicator switch	Barton	288A
NEB-23-025	Temperature element	Calimatic	158B7061P016
NEB-23-026	Motor operator	Limitorque	SMB-2
NEB-23-027	Temperature element	Calimatic	158B7051P016
NEB-23-028	Flow transmitters	GEMAC	50-555111BDAA
NEB-23-029	Motor operator	Limitorque	SMB-00
NEB-43-030	Solenoid valve	Asco	WPHTX8300B68E
NEB-43-031	Limit switch	Microswitch	OPD-AR
NEB-43-032	Solenoid valve	Asco	X8300-B61F
NEB-43-033	Limit switch	Microswitch	OPD-AR
NEB-63-035	Temperature element	Fenwal	28-232105-304
NEB-63-037	Pump motors	General Electric	5K326PK-234A
NEB-63-038	Explosive valve	Conax	1823-117
NEB-64-039	Solenoid valve	Asco	WPHTX8300B45E
NEB-64-040	Solenoid valve	Asco	WPHTX8300B45E
NEB-64-041	Limit switch	Namco	D1200G
NEB-04-043	Limit switch	Namco	D1200G
NEB-04-045	Limit switch	Nameo	D1200G
NEB-04-040	Pressure switch	Barton	289
NEB-64-047	Solenoid valve	Asco	WPHTX8300B45E
NEB-64-048	Limit switch	Namco	D1200G
NEB-64-049A	Solenoid valve	ASCO	HB030001F
NEB-64-050	Limit switch	Namco	D1200G
NEB-64-052	Limit switch	Namco	D1200G
NEB-64-053	Solenoid valve	ASCO	WPHTX0300B45E
NEB-64-053A	Solenoid valve	Asco	HB830081F
NEB-64-054	Limit switch	Namco	D1200G
NEB-054-050	Limit switch	Namco	D1200G
NEB-04-050A	Limit switch	Namco	D1200G
NEB-04-050	rressure transmitter	GEMAU '	551032KAAT1
NEB-04-059	rressure transmitter	GEMAC	551032CAAETAL
NEB-04-000	rower supply	General Electric	570012FAAC1
NEB-04-001	Level transmitter	Rosemount	1151
NEB-04-002*	remperature elements	American Standard	158B7079P051
NEB-64-063	Temperature elements	American Standard	158B7079P001
NEB-64-064	Pressure switch	Static-O-Ring	12N/AA4
NEB-64-065	Pressure switch	Static-O-Ring	12N/AA4

B-000 T-A12SS 180 180 T-A12SS 18C 18CE T-M12SS 8 18C A8 8B7061P016 B-2 8B7061P016 -555111BDAA3AAA B-00 HTX8300B68F D-AR 300-B61F D-AR -232106-304 326PK-234A 23-117 HTX8300B45F HTX8300B45F 200G 200G 200G 9 HTX8300B45F 200G 830081F 200G 200G HTX8300B45F 830081F 200G 200G 200G 1032KAAT1 1032CAAE1AL1 0012FAAC1 51 8B7079P051 8B7079P001 N/AA4 N/AA4

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NEB-64-066	Pressure switch	Static-O-Ring	B2T-M12SS
NEB-64-067	Level transmitter	Rosemount	1151
NEB-64-068	Pressure transmitter	GEMAC	556110BAAA1
NEB-68-069	Motor operator	Limitorque	SMB-2
NEB-68-070	Motor operator	Limitorque	SMB-3
NEB-68-072A	Pressure switch	Barton	288
NEB-69-073	Motor operator	Limitorque	SMB-0
NEB-69-074	Motor operator	Limitorque '	SMB-0
NEB-69-076	Temperature element	Scam	S51-1
NEB-69-077	Temperature element	Scam	S51–1
NEB-69-078	Temperature element	Scam	S51-1
NEB-69-079	Temperature element	Scam	S51-1
NEB-69-080	Temperature element	Scam	\$51-1
NEB-69-081	Temperature element	Fenwal	17002-40
NEB-70-082	Motor operator	Limitorque	SMB-00
NEB-71-083	Pressure diff switch	Barton	288
NEB-71-084	Pressure switch	Barksdale	B2T-M12SS
NEB-71-085	Motor operator	Limitorque	SMB-00
NEB-71-089	Temperature switch	Fenwal	17023-6
NEB-71-089A	Temperature switch	Fenwal	17023-6
NEB-71-090	Temperature switch	Fenwal	17023-6
NEB-71-096	Motor operator	Limitorque	SMB-00
NEB-71-097	Pressure transmitter	GEMAC	50-5551032GAAK1
NEB-71-098	Power supply	General Electric	583001AAGK1
NEB-71-100	Motor operator	Limitorque	SMB-0
NEB-71-101	Turbine cont. valve	Terry Turbine	Type GS
NEB-71-102	Turbine cont, valve	Terry Turbine	Type GS
NEB-71-103	Turbine cont. speed cont	Terry Turbine	Type GS
NEB-71-104	Pressure switch	Barksdale	PIH-M85SSV
NEB-71-105	Pressure transmitter	GEMAC	50-551032EAAE1
NEB-71-106	Pressure switch	Mercoid	DA-7043-804
NEB-71-107	Motor operator	Limitorque	SMB-00
NEB-71-108	Motor operator	Limitorque	SMB-00
NEB-71-109	Motor operator	Limitorque	SMB-00
NEB-71-110	Pressure transmitter	GEMAC	50-551032CAAY1
NEB-71-112	Pressure switch	Static-O-Ring	6N-AA21
NEB-71-114	Sa root converter	General Electric	565100AAAC1
NEB-71-115	Flow switch	Barton	280
NEB-71-116	Flow transmitter	GEMAC	50-555111BD443444
NEB_71_117	Motor operator	Limitorque	SMB_1
NEB-71-118	Motor operator	Limitorque	SMD-1
NEB_71_110	Motor operator	Limitorque	
NFB_71_120	Temponatuna alement	Soom	
NEB-71-121	Temperature element	Soam	SD1-1 SE11
NEB_71_122	Turb cont gread alement	Tonny Tunbing	
NEB_71_122	Turb cont, speed erement	Terry Turbine	Type do
NFB_71_12U	Turb cont, press switch		Type dS
NFB_71_125	Turb cont, temp switch	Terry Turbine	Type GS
NFB_71_126	Moton operator	lerry furbine	Type GS
NED-77-120	Programa and tab	Banka da la	
NEB_72_120	Prosp diff and the	Darksuare	DC1-HICDD
NER_72 120	Moton operator	Darton Limitar	200A, 209
NED-13-13V	Tomonotimo cuitat	Limitorque	ord-2
NED-13-131	Temperature SW1CCN	renwal	17023-0
NED 72 125	Temperature Switch	renwal	17023-0
100-13-132	remperature Switch *	renwai	17023-0



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BROWNS FERRY NUCLEAR PLANT - NEB EVALUATION WORKSHEET INDEX

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NEB-73-136	Temperature switch	Fenwal	17023-6
NEB-73-141	Temperature switch	Fenwal	17023-6
NEB-73-142	Temperature switch	Fenwal	17023-6
NEB-73-147	Motor operator	Limitorque	SMB-2
NEB-73-148	Turb cont, speed element	Terry Turbine	Type CCS
NEB-73-149	Motor operator	Limitorque	SMB-00
NEB-73-151	Turbine cont, stop vlv	Terry Turbine	Type CCS
NEB-73-154	Turb cont, speed cont	Terry Turbine	Type CCS
NEB-73-155	Turb cont, valve	Terry Turbine	Type CCS
NEB-73-156	Pressure switch	Barksdale	D2H-M150SS
NEB-73-157	Pressure switch	GEMAC	50-551032EAAE1
NEB-73-150	Pressure switch	Mercold	DA-23-804
NEB-73-100	Motor operator	Limitorque	SMB-0
NEB-73-160A	Motor operator	Limitorque	SMB-0
NEB-73-101	Motor operator	Limitorque	SMB-0
NEB-/3-102	Pressure switch	Statie-U-Ring	0N-AA-21-V
NED-73-105	Pressure transmitter	GEMAC	2200220AAK 1
NED-13-104	Flow Switch Flow transmitten	CEMAC	
NED-/3-105 NED 72 166	Flow transmitter	GEMAC	SAD NUL
NED-72-167	Moton operator	Limitorque	SMB_UT
NFR-73-168	Motor operator	Limitorque	SMB-2
NEB-73-1684	Motor operator	Limitorque	SMB-2
NEB-73-168B	Motor operator	Limitorque	SMB-2
NEB-73-169	Motor operator	Limitorque	SMB-0
NEB-73-170	Motor operator	Limitorque	SMB-4T
NEB-73-171	Turb cont.aux oil pump	Terry Turbine	Type CCS
NEB-73-172	Turb cont, press switch	Terry Turbine	Type CCS
NEB-73-173	Turb cont, temp switch	Terry Turbine	Type CCS
NEB-73-173A	Turb cont, diff pr sw	Terry Turbine	Type CCS
NEB-73-174	Temperature element	Scam	S51-1
NEB-73-175	Temperature element	Seam	S51-1
NEB-73-176	Level switch	Robertshaw	SL-202-A2X
NEB-73-177	HPCI lube oil cooler	Terry Turbine	Type CCS
NEB-74-179	Motor operator	Limitorque	SMB-1
NEB-74-179A	Motor operator	Limitorque	SMB-0
NEB-74-180	Pressure switch	Static-O-Ring	5N-AA3
NEB-74-180A	Pressure switch	Static-O-Ring	5A-AA#
NEB-74-101	Temperature element	Scam	S51-1
NEB-(4-104	Pressure switch	Static-U-Ring	5N-AA3 Series
NEB- (4-104A	Pressure switch	Static-U-Ring	SA-AA3 Series
NED-(4-100	Motor operator	Limitorque	SMB-3
NED-14-101	Motor operator	Limitorque	5mB-2
NED-[4-100 NED 71 180	Play transmittan	Barton .	209 750 55511100442444
NED-14-109	Programs transmitter	CEMAC	50-551022PAAK1
NED-74-190	Fressure transmitter	GEMAC	50-555111BDAA3AA
NEB_74_190A	Motor operator	Limitorque	SMB_5T
NER_71_102	Motor operator	Limitorque	SMB_1
NEB-74-192	Motor operator	Limitorque	SMB=2
NEB-74-194	Motor operator	Limitorque	SMB-00
NEB-74-195	Motor operator	Limitorque	SMB-2
NEB-74-196	Motor operator	Limitorque	SMB-2
NEB-74-196A	Motor operator	Limitorque	SMB-2
NEB-74-197	Motor operator	Limitorque	SMB-2





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BROWNS FERRY NUCLEAR PLANT - NEB EVALUATION WORKSHEET INDEX



NEB-74-197A	Motor operator
NEB-74-198	Diff press indicator
NEB-74-199	Flow transmitter
NEB-74-200	Pressure transmitter
NEB-74-202	Motor operator
NEB-74-203	Flow transmitter
NEP-71-201	Moton energian
	Notor operator
NEB-74-205	motor operator
NEB-74-206	Motor operator
NEB-74-207	Motor operator
NEB-74-208	Motor operator
NEB-74-209	Temperature element
NEB-74-210	Pressure transmitter
NEB-74-211	Pump motor
NEB-74-212	Pump motor
NEB-74-212	Tomponotupo olomont
	Temperature element
	Temperature element
NEB-74-213B	Temperature element
NEB-74-213C	Temperature element
NEB-74-213D	Temperature element
NEB-75-214	Motor operator
NEB-75-216	Pressure switch
NEB-75-217	Motor operator
NEB-75-219	Flow switch
NEB-75-220	Flow transmitter
NFR_75_221	Motor operator
NEP.75.222	Motor operator
NED-19-222	Motor operator
NEB-/5-224	Motor operator
NEB-75-226	Diff press switch
NEB-75-227	Motor operator
NEB-75-229	Pressure switch
NEB-75-230	Motor operator
NEb-75-232	Flow switch
NEB-75-233	Flow transmitter
NEB-75-234	Motor operator
NEB-75-235	Motor operator
NEB-75-237	Motor operator
NEB-75-238	Pump motor
NEB-75-228A	Rump motor
NED-75-230A	runp motor
NED-10-239	Limit Switch
NEB-70-239A	Limit switch
NEB-76-239B	Limit switch
NEB-76-239C	Limit switch
NEB-76-240	Solenoid valve
NEB-76-241	Solenoid valve
NEB-76-242	Solenoid valve
NEB-76-243	H _o element
NEB-77-244	Level switch
NEB-77-249	Solenoid valve
NEB-77-249A	Limit switch
NEB_77_2LOR	Limit auttab
NFR_77_250	Land anti-ap
NED 77 051	LEVEL SWITCH
NED-//-231	Level Switch
NEB-77-252	Temperature element
NEB-77-259	Temperature element

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Limitorque SMB-2 Barton 289A GEMAC 50-555111BDAA3AAA GEMAC 50-551032EAAK1 Limitorque SMB-4 50-555111BDAA3AA GEMAC Limitorque SMB-2 Limitorque SMB-2 Limitorque SMB-2 Limitorque SMB-00 Limitorque SMB-00 Calimatic 158B7061P016 GEMAC 5510326AAN1 5K6348XC23A General Electric 5K6348XC23A General Electric Scam S51-1 Scam S51-1 Scam S51-1 Scam S51-1 Scam S51-1 Limitorque SMB-0 Mercoid DA-7043-804 Limitorque SMB-2 Barton 289 GEMAC 50-555111BDAA3AAA Limitorque SMB-1 Limitorque SMB-2 SMB-2 Limitorque 288 Barton Limitorque SMB-0 Mercoid DA-7043-804 Limitorque SMB-00 Barton 289 GEMAC 50-555111BDAA3AAA Limitorque SMB-2 Limitorque SMB-2 Limitorque SMB-2 General Electric 5K6336XC198A General Electric 5K6336XC198A Namco D1200G Namco D1200G Namco D1200G Namco D1200G Asco X8315 Asco X8315C28 Asco WPHTX8300B45R General Electric 47E226428G2 GEMS XM-36425 Versa VSG-3521 Microswitch BZE6-2RN Microswitch BZE6-2RN Autocon M-4 Autocon M_{-4} Thermo-Elect B7582-1 Thermo-Elect B7582-1

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BROWNS FERRY NUCLEAR PLANT - NEB EVALUATION WORKSHEET INDEX

NEB-77-260	Level switch
NEB-77-261	Level switch
NEB-78-262	Level switch
NEB-78-265	Level switch
NEB-85-267	Solenoid valve
NEB-85-268	Solenoid valve
NEB-85-268A	Limit switch
NEB-85-272	Position switch
NEB-85-272	Position switch
NEB-85-274	Solenoid valve
NEB-85-276	Level switch
NEB-90-279	Ion chamber
NEB-90-280	Ion chamber
NEB-90-281	Ion chamber
NEB-90-282	Ion chamber
NEB-90-283	Sensor and converter
NEB-90-284	Sensor and converter
NEB-90-286	Fission product monitor
NEB-90-286A	Fission product monitor
NEB-NM-287	Valve Assembly

M-5 Autocon M-4 Autocon 9241-6SS10A Meletron D2H-M18SS Barksdale HVA86-030 Asco HVA90-405 Asco Namco D1200G BZE6-2RN Microswitch BZE6-2RN Microswitch HVA90-405-2A Asco Robertshaw SL305-E3-X General Electric 237X731G001 General Electric 237X731G001 General Electric 237X731G001 General Electric 237X731G001 General Electric 194X927G014 194X927G014 General Electric General Electric General Electric General Electric 136B1302G2

E7901B.21





SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant 1 2 2 Unit

(3) Sheet No. NEB-1-002 . .

Unit: 1,2,3						Kevision U		
Docket: 50-259, 50-260, 50-296						Date 10/27/80		
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS	
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation			
System: Main steam Plant ID No. See Appx 1 Note 1	Operating Time	1 year	92.hours	(1)	See Appx 1 Note 2	See Appx 1 Note 3	See NCR NEBBFN8013	
Component: Pressure solenoid operator Manufacturer: menest Deck	Temperature (F)	Figure B.0(1,2,3)	347 F	(11)	See Appx 1 Note 2	Type test	None	
Model No.: 1/2SMS-A-01	Pressure (PSTA)	Figure B.0(1,2,3)	80	· · · ·		n 	ıı	
Function: Main steam Ln A	Relative Humidity(%)	100	100	(4)	11	11	n [•]	
Accuracy: Req'd: Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A	
Category: ^{A,B} Service: HPCI logic [.] Bus II cont.	Radiation (RAD)	χ ^{2x10⁸} β ^{4x109}	8 3.4×10 ⁷	(4)	See Appx 1 Note 2	See Appx 1 Note 4	See NCR NEBBFN8013	
Location: 0	Aging	N/A		(2)	-	Appx 1 Note 5		
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A ·	N/A	N/A	

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

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

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

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

Prepared by: <u>Alex Melinhow</u> Reviewed by: <u>Charles</u> Tusk

QA Acceptance:

1. This worksheet applies to the following items:

PSV-1-4, -5, -19, -22, -23, -31, -34, -41, -42 (All MPL #2-71)

- 2. Target Rock Qualification Test Report No. 2199A.
- 3. The operating time of one year is a conservative assumption by TVA regarding the possible long term use of the safety relief valves to dump reactor cooling water directly to the suppression chamber should a single failure cause loss of the RHR cooling mode. In actuality, should use of the solenoid to open the SRV for this purpose become necessary, the solenoid would most likely be used only until the single failure could be corrected. In any case, TVA's engineering judgement is that aging-type effects over a one-year period would not significantly affect performance of the solenoid.
- 4. Valves passed rad dose of 3.4 X 10⁷ in Target Rock test report #2199A. It is still considered Seasible that the valves could operate following dose of 2 X 10 rad; however, TVA will commit to further type testing and/or materials analysis of the solenoid valves to ensure qualification of the solenoids. Justification of beta radiation dose tolerance is given by section 4.1.4 of the report.
- 5. At present the available documentation is insufficient to determine the thermal or radiation aging effects on this equipment; however, in TVA's engineering judgement, aging should not present a problem over the interim period required to determine actual aging effects. TVA will commit, therefore, to perform further type testing or analysis to assess the effects of aging on this equipment.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. <u>NEB- 1-002A</u> Revision 0

Unit: 1,2,3 Docket: 50-259, 50-260, 50-296

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Docket: 50-259, 50-260, 50-2	296					Date 10/27/80		
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation			
System: Main Steam Plant ID No. Appendix 1 Note 1	Operating Time	B 1 year A 30 days	30 days	(1)	See Appx 1 Note 2	See Appx 1 Note 4	None	
Component: Pressure Solenoid Operator	Temperature (F)	Figure B.0(1,2,3	290 F	(1.)	11	Type Test	None	
ASCO				(4)				
Model No.: WPHTX8300B68F	Pressure (PSIA)	Table B.0(1,2,3)	60	· (4)	".	u . ·	н	
Function: Main Steam Line "A"	Relative Humidity(%)	100	100	(4)	11	11	11	
Accuracy: Req'd: Demon:	Chemical Spray	• N/A	: N/A _	(4)	N/A ···	N/A	N/A	
Category: A Service: ^{Steam}	Radiation (RAD)	$\begin{cases} 2 \times 10^8 \\ \beta 4 \times 10^9 \end{cases}$	1.0x10 ⁶	(4)	See Appx 1 Note 3	See Appx 1 Note 4	See NCR BFNNEB8031	
Location: 0	Aging	N/A		(2)		Appx 1 Note 4	11 °	
Flood Level Elev:552' Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A	

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

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

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

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

Prepared by:	alex	Meliuhow
Reviewed by:	Charle	1 Turk

QA Acceptance:

NEB-1-002A, APPENDIX 1, REVISION 0

- 1. This sheet applies to items PSV-1-18 and -30 (both MPL #2-71).
- 2. ASCO report number AQ5-21678/TR This report covered an 8300 series and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of Buna-N material which can withstand doses of 1 X 10 rad
 Beta dose can be justified by section 4.1.4 of the report.
- 4. This solenoid valve is required to open for accident mitigation purposes. No credit is taken for closing the valve. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in opening of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in closure of the valve. Not withstanding this justification, TVA will commit to either a type testing or replacement program for this valve.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclea	r Plant					Sheet No. NEB- 1-003	
Unit: 1,2,3	00() ·					Revision 0	80
Docket: 50-259, 50-260, 50-	<u>296</u> E	ENVIRONMENT			TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Main Steam Plant ID No. Appx,Note 1	Operating Time	1 hour	_	(1)		Appx 1 Note 2 .	See NCR BFNNEB8010
Component: Diff Press Indicator Sw	Temperature (F)	Figure B.3(1) B.3(2,3)	-	(4)		n -	n
Model No.: 278	Pressure (PSIA)	Table B.1(1,2,3)		(4)	• •	п ,	17 -
Function: Main Steam Line "A"	Relative Humidity(%)	100	;	(4)		U -	11 ·
Accuracy: Req'd: See Sect. Demon: 4.1.3 in rpt/	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: A Service: Steam	Radiation (RAD)	3x10 ⁷		(4)		Appx 1 Note 2	See NCR BFNNEB8010
Location: 4	Aging	N/A	- a	(2)		19	11
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/Ą	(4)	NA	, NA	NA .

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

- · (2) See Section 4.1.2 in 79-01B report.
 - (3) All notes and other information not on these sheets are on the attached appendix sheets.
 - (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Mehrihow · Prepared by: Reviewed by:

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QA Acceptance: -



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1. This sheet applies to items:

PDIS-1-13 (A-D) MPL #2-116 -25 (A-D) MPL #2-117 -36 (A-D) MPL #2-118 -50 (A-D) MPL #2-119

2. To date TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

As a result of the worst case HELB, the temperature spike will be at 146° within two minutes. The accident radiation dose for the required operating time is 6 X 10°. In TVA's engineering judgement, the component will not be adversely affected; therefore, interim operation can be justified. Furthermore, these PDIS's isolate MSIV's on high flow. Sufficient redundancy is provided by the low pressure instrumentation for MSIV's.



Facility, Broune Ferry Nuclear	Plant	System Compon	IENT EVALUATI	ON WORK SHEET	(Rev 2)	(3) Sheet No. NEB-1-	005
Unit: 1.2.3	1 Juno					Revision 0	
Docket: 50-259, 50-260, 50-2	296					Date 10/27/	80
	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION	OUTSTANDING
EQUIPMENT DESCRIPTION		Specifi-	Qualifia	Specifi-	Qualifi-	METHOD	11EMS
	Parameter	cation	cation '	cation	cation		
System: Main steam							
Plant ID No. See Appx 1 Note 1	Operating Time	$\begin{array}{c} A = 1 \text{ hr} \\ B = 1 \text{ yr} \end{array}$		(1)		Note 2	BFNNEB8018
Component: MSIV - solenoid operator assy	Temperature (F)	Figure B.0(1,2,3)					n
Manufacturer: Automatic			<u></u>	(4)			·····
		Table		•		u .	tt
Model No.: 6-5497	Pressure (PSIA)	B.U(1,2,3)		(4)	•		
Function: Main stm In Inbd isol	Relative Humidity(\$)	100		(4)		ττ -	11 -
Accuracy: Reg'd:					•		
Demon:	Chemical Spray	N/A	- N/A .	-(4)	N/A · ·	N/A ~	N/A .
Category: A,B		Y 2×10 ⁸			***	Soo Appy 1	Soo NCP
Service: Steam	Radiation (RAD)	\$ 4x109		(4)		Note 2	BFNNEB8018
Location: 0	Aging	N/A	-	(2)		Appx 1 Note 2	11
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A ·
Notes: (1) See Section 2 11 in	70-018 pepont						

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Chaslis Junk</u>

QA Acceptance:

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NEB 1-005, APPENDIX 1, REVISION 0

1. This sheet applies to the following items:

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FSV-1-14, -26, -37, -51 (All A-C) (All MPL #2-80)

2. Based on safety analysis, the solenoid valves must close for accident mitigation. No credit is taken for reopening the valves. Analysis of actual physical configuration of solenoid valves indicates that all postulated solenoid failures would result in closing of the MSIV's; thus these valves will failsafe. Ultimate failure of all O-rings due to radiation damage could not result in reopening of the valves. Not withstanding this argument, TVA will commit to type testing program or replacement with qualified equipment.





	:	System Compoi	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	•
Facility: Browns Ferry Nuclear Unit: 1,2,3	Plant					Sheet No. NEB-1- Revision 0	007
Docket: 50-259, 50-260, 50-2	296			DOCUMENTA	TON PEP	Date 10/2//	UU OUTSTANDING
FOUTPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	iion rep	METHOD	ITEMS
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-		
Suctors Main steam	Parameter	cation	eation	cation	cation		
Plant ID No. Apox 1 Note	Operating Time	A - 1 day B - 1 yea	r	(1)		See Appx 1 Note 2	See NCR BFNNEB8018
Component: MSIV - solenoid operator assy	Temperature (F)	Figure B.7(1,2,3)				11	11
Manufacturer: Automatic				(4)			
		Table		•		n	11
Model No.: C-5497	Pressure (PSIA)	B.1(1,2,3)		、(4)			
Function: Main stm In	Relative Humidity(%)	100	1	(4)		11	11
Accuracy: NA Req'd: Demon:	Chemical	N/A	N/A	(4)			
Category: A,B	Spray	6			· · · ·		
Service: Steam	Radiation (RAD)	2x10		(4)		See Appx 1 Note 2	BFNNEB8018
Location: 7	Aging	N/A	3	<u>`(2)</u>		- 11	u
Flood Level Elev:552, N/A Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: <u>Alex Melinhow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:

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- 1. This sheet applies to the following items: FSV-:-15, -27, -38, -52 (All A-C) ALL MPL ##
- 2. Based on safety analysis, the solenoid valves must close for accident mitigation. No credit is taken for reopening the valves. Analysis of actual physical configuration of solenoid valves indicates that all postulated solenoid failures would result in closing of the MSIV's; thus these valves will failsafe. Ultimate failure of all O-rings due to radiation damage could not result in reopening of the valves. Not withstanding this argument, TVA will commit to type testing program or replacement with qualified equipment.





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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclea	r Plant					Sheet No. <u>NEB-1-</u>	008
Unit: $1,2,3$	296			, •		$\frac{10/27}{2}$	30
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	•	
System: Main steam Plant ID No. TS-1-17(A-D) NPL #1-121	Operating Time	1 hour	2 hours	(1)	See Appx 1 Note 1	Type test	None
Component: Temperature ` Switch	Temperature (F)	Figure B.7(1,2,3)	305 F	(1)	. 11	11	11
Manufacturer: Fenwal				(4)			
Model No.: 17002-40	Pressure (PSIA)	Table B.1(1,2,3)	25	(4)	n.	. н 	U
Function: Heat detection	Relative Humidity(%)	100	100	(4)	11	11	11
Accuracy: Req'd: Demon:	Chemical Spray	N/A	N/A .	(4)	N/A	N/A	N/A [·]
Category: A Service: Main steam ·	Radiation (RAD)	2x10 ⁶	, 1.7x10 ⁵	(4)	See Appx 1 Note 1	See Appx 1 Note 2 ·	See NCR BFNNEB8009
Location: 7	Aging	N/A		· · (2)		Appx 1 Note 3	None ·
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence.	N/A	N/A	(4)	N/A	N/A	N/A

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

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

(3) All notes and other information not on these sheets are on the attached appendix sheets.(4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared	by:_	alex Melnikow
Reviewed	by:_	Charles Jusk

QA Acceptance:

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1. Fenwal Engineering Report 6350.

2. These switches were subjected to a radiation dose of 1.7x10⁵ rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10 rad which is well above the postulated accident dose of 2x10 rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

(3) Sheet No. NEB- 1-012

Unit: 1,2,3					n ¹	Revision 0	
Docket: 50-259, 50-260, 50-	-296					Date 10/27/	80
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Main steam							
Plant ID No. FCV-1-55 MPL # 2-74	Operating Time	A - 1 hour B - 1 year	24 hours	(1)	See Appx 1 Note 1	Type test	NCR BFNNEB8034
Component: Motor	Temperature					1	· · · · · · · · · · · · · · · · · · ·
operator,	(F)	Figure B.0(1,2,3)	250 F		11	See App 1 Note 2	
Limitorque				(4)		•	
, Model No.: SMB-000	Pressure	Figure B.O(1.2.3)	40	· ·· ,	η.	Type test.	None .
	(PSIA)			(4)			
Function: Steam leads Drn inner isol	Relative Humidity(4)	100	100 .	(11)	11	11	
Accuracy: Reg'd: N/A	numicity (p)			(4)			
Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: A		8 1	8		A		
Service: Steam	Radiation (RAD)	$\frac{2\times10}{4\times10^9} \frac{3}{\beta}$	2x10 Y	(4)	See Appx 1 Note 1	Type Test	None
Location: 0	Aging	N/A		(2)		Appx 1 Note 2	None
Flood Level Elev:552' N/A Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

No

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

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

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

Uex Melnihow Prepared by: Reviewed by:

QA Acceptance:

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NEB-1-OL2, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports#600198, B-0027, and B-0003
- Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (class B insulation) was successfully tested to 250° for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The effects of beta radiation are insignificant; see section 4.1.4 of report.

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		SYSTEM COMPON	IENT EVALUATIO	ON WORK SHEET	(Rev 2)	(3)	·	
Facility: Browns Ferry Nuclear Plant						Sheet No. <u>NEB- 1-013</u> Revision 0		
	E	ENVIRONMENT			DOCUMENTATION REF		OUTSTANDING	
EQUIPMENT DESCRIPTION						METHOD	ITEMS	
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-			
•	Parameter	cation	cation	cation	cation			
System: Main								
steam	Operating	A - 1 day	/ 1 day		See Appx 1	Type test	NCR	
Plant ID No. FCV-1-56 MPL # 2-77	Time	B - 1 year		(1)	Note 1		BFNNEB8034	
Component: Motor	Temperature							
operator	(F)	Figure	250 F		11	·See App 1	t t	
	h	B.7(1)				Note 2		
Manufacturer: Limitorque		B.7(2,3)		(4)				
	•		1			1		
		Table	40		" .			
Model No.: SMB-000	Pressure	B.1(1,2,3)						
	(PSIA)	<u> </u>		(4)				
Function: Steam Leads		1 100	100		11	Duna haab	Nama	
drain	Relative	001	100			Type test	None	
	Humidity(%)			(4)		<u> </u>	[
Accuracy:					·			
Red. q: 11/2				(11)	N/A	N/A	N/A	
Demon:	Chemical	N/A	N/A .	(4)				
A A	Spray			·	-,			
category:	Dediction	2x10 ⁶	2x10 ⁸		See Appx 1	Type Test	None	
Sonution Steam	(RAD)			()))	Note 1			
Setvide:	(IRD)			(9)			· · · · · · · · · · · · · · · · · · ·	
Loostion. 7	Aging	11/0		(2)		Appx 1 Note 3	None	
Locación.		N/A		(2)				
Flood Level Elev:5521 N/A			â					
Above Flood Level: Yes	Submergence	N/A	NZA	വാ	N/A	N/A	N/A	
No			.,,					

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:
NEB-1-OL3, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2 This particular type operator (class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 308°F in two seconds, 225 F at four seconds, and continues to decrease to 118 at 150 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. <u>NEB- 3.015</u> Revision 0

0110. 1,2,5							
Docket: 50-259, 50-260, 50	-296					Date 10/27/	/80
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Reactor feedwater system Plant ID No. PS-3-22(A-D) MPL #2-3-55	Operating Time	1 day	1 hour	(1)	See Appx 1 Note 1	See Appx 1 Note 3	NCR BFNNEB8011
Component: Pressure Switch Manufacturer: Barksdale	Temperature (F)	Figure B.9(1,2,3)	212 F	(4)	n -	Generic test	NONE
Model No.: B2T-A12SS	Pressure (PSIA)	Table B.1(1,2,3)	15	· · · · ·	- 11 ,	". ~	17 -
Function: Intlk	Relative Humidity(%)	100	100	(4)	11	11	
Accuracy: Reg'd: Demon:	Chemical Spray	N/A -	N/A	(4)	N/A	N/A	N/A
Service: Reactor	Radiation A (RAD) C	$\begin{array}{c} B & 2.1 \times 10^{7} \\ D & 2.3 \times 10^{6} \end{array}$	1x10 ⁶	(4)	See Appx 1 Note 2	See Appx 1 Note 3	None
Location: 9	Aging	N/A		(2)	,	Appx 1 Note 3	None
Flood Level Elev:552: N/A Above Flood Level: Yes No	Submergence	N/A`.	N/A	- (4)	N/A	N/A	N/A

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

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

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

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

alex Melinhow Prepared by: harles 7. Reviewed by:

QA Acceptance:

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- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furnished in bulletin 79-01B, are acceptable up to a dose of 1 X 10⁶ rad.
- .3. The radiation doses given are based upon a total accident dose plus normal dose. Since this device is required to operate for only one day, the actual dose was calculated to be approximately 8 X 10° rad; therefore, this device should not be adversely affected by radiation over its operating time period.

Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of one year has been considered and TVA has identified no adverse effects from temperature or any other parameter on the functioning of this device.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB-3-016 Unit: 1,2,3 Revision 0 Docket: 50-259, 50-260, 50-296 Date 10/27/80 ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Reactor feedwater Operating svstem 1 year See Appx 1 See Appx 1 NCR Plant ID No. LITS-3-46A,B Time (1)Note 1 Note 3 BFNNEB8017 MPL #2-3-59 Component: Level indicator Temperature Figures (F) switch B.9(1) 212 F 11 Type test None B.9(2,3) Manufacturer: (4) Yarway Table ••••• $B.1(1,2,\beta)$ 14.7 н. See Appx 1 NCR Model No.: 4418C Pressure Note 4 BFNNEB8017 (PSIA) (4) Function: Level cont Relative 100 98 11 See Appx 1 11 5 Humidity(%) (4) Note 5 Accuracy: Reg'd: See section ¢ Demon: 4.1.3 of report ي شر بر Chemical N/A N/A N/A N/A (4) N/A • Spray Category: A A 2x10⁵ 1x10⁷ See Appx 1 Radiation Material None Service: B 2.3×106 (RAD) (4) NOTE 2 Reactor water analysis Location: 9 Aging N/A (2) Appx 1 note 3 NCRBFNNEB80T Flood Level Elev:552' Above Flood Level: Yes N/A Submergence N/A N/A (4) N/A No N/A N/A

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

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

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

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

alex Melnihow Prepared by: Reviewed by: Charles Turk

QA Acceptance:

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- Lockheed Electronic Company Laboratory test No. 3232-3155, 3/22/73
- 2. A material anlaysis of the instrument indicates the limiting components to be neoprene dust plugs and cover gaskets and Buna-N. O-rings. 79-01B, Table C-1, reports a radiation tolerance of 10' rads for neoprene. 70RNL, October 1970, reports a radiation tolerance of 1 X 10' rads.
- 3. Although further evaluation is necessary to determine the qualified operating time, it is TVA's opinion the instruments will adequately meet the operating time requirements.

A material analysis indicates Buna-N, EPT, neoprene, cork and rubber parts which are subject to some thermal aging; however, this degradation is slow and, in TVA's engineering judgement, this instrument would not be adversely affected by aging considerations.

- 4. The 0.3 psia difference between the required and tested pressures is considered insignificant, and in TVA's engineering judgement would not adversely affect the proper functioning of the instrument.
- 5. The 2% difference between the required and tested relative humidities is insignificant, and in TVA's judgement would not adversely affect the proper functioning of the instrument.

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

Docket: 50-259, 50-260, 50-2	296					Date 10/27/	80
EQUIPMENT DESCRIPTION	E	ENVIRONMENT		DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	-	
System: Reactor feedwater system Plant ID No. LIS-3-56(A-D) MPL A,B:2-3-57; C,D:2-3-58	Operating Time	1 year		(1)	See Appx 1 Note 1	See Appx 1 Note 3	NCR BFNNEB8017
Component: Level indicator switch	Temperature (F)	Figures B.9(1) B.9(2,3)	212 F		tt	Type test	None
Manufacturer: Yarway		Table		(4)			
Model No.: 4418C	Pressure (PSTA)	B.1(1,2,	3) 14.7	, 		See Appx 1 Note 4	NCR BFNNEB8017
Function: Interlock	Relative Humidity(%)	100	98 .	(4)	* 11	See Appz 1 Note 5	"
Accuracy: Req'd: See section Demon: 4.1.3 of report	Chemical Spray	·N/A	N/A :	(4)	N/A	N/A	N/A
Category: A Service: Reactor water	Radiation (RAD)	2.3x10 ⁶	1x.10 ⁷	(4)	See Appx 1 Note 2	Material , analysis	None
Location: 9	Aging	N/A		(2)		Appx 1 note 3	NCRBFNNEB80
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: <u>alex Melnikow</u> Reviewed by: Charles Turk Reviewed by: (

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Sheet No. NEB- 3-017

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QA Acceptance:

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NEB-3-017, APPENDIX 1, REVISION O

- Lockheed Electronic Company Laboratory test No. 3232-3155, 3/22/73
- 2. A material anlaysis of the instrument indicates the limiting components to be neoprene dust plugs and cover gaskets and Buna-N O-rings. 79-01B, Table C-1, reports a radiation tolerance of 10 rads for neoprene. 70RNL, October 1970, reports a radiation tolerance of 1 X 10 rads.
- 3. Although further evaluation is necessary to determine the qualified operating time, it is TVA's opinion the instruments will adequately meet the operating time requirements.

A material analysis indicates Buna-N, EPT, neoprene, cork and rubber parts which are subject to some thermal aging; however, this degradation is slow and, in TVA's engineering judgement, this instrument would not be adversely affected by aging considerations.

- 4. The 0.3 psia difference between the required and tested pressures is considered insignificant, and in TVA's engineering judgement would not adversely affect the proper functioning of the instrument.
- 5. The 2% difference between the required and tested relative humidities is insignificant, and in TVA's judgement would not adversely affect the proper functioning of the instrument.



•		SYSTEM COMPON	ENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclea Unit: 1,2,3	er Plant		*			Sheet No. NEB-3-6 Revision 0	018
Docket: 50-259, 50-260, 50-	-296			2000000000		Date 10/2//0	OUMORANDING
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTAT	rion Ref	METHOD	ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	•	
System: Reactor feedwater system Plant ID No. PS-3-57(A-D) MPL #2-3-51	Operating Time	1 hour	1 hour	(1)	See Appx 1 Note 1	Generic test	None
Component: Pressure Switch	Temperature (F)	Figure B.9(1,2,3)	212 F	Ł	11	11	IT
Manufacturer: Barksdale				(4)	1		
Model No.: B2T-A12SS	Pressure	Table B.1(1,2,3)	15	• •••	".	11 14	17
	(PSIA)		-	(4)			
Function: Intlk	Relative Humidity(%)	100	100	(4)	U _	11	17
Accuracy: Req'd: Demon:	Chemical Spray	·N/A	N/A :	(4)	N/A	N/A	N/A
Category: A Service: Reactor -	Radiation *	A,B 2.1x10 ⁷ C,D 2.3x10 ⁶	1x10 ⁶	(4)	Sëe Appx 1 Note 2	See Appx 1 Note 3	None
Press 9 Location:	Aging	N/A	-	(2)		Appx 1 Note 3	None -
Flood Level Elev:552' Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Julk</u>

QA Acceptance:

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NEB-3-018, APPENDIX 1, REVISION 0

- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.
- 3. The radiation doses given are based upon a total accident dose plus normal dose. Since this device is required to operate for only 1₄hour, the actual dose was calculated to be approximately 8 X 10⁴ rad; therefore, this device should not be adversely affected by radiation over its operating time period.

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Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement.



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•		SISTEM COMPON	CUI CANCONITA	JA NORK SHEET	(Nev 2)
Facility: Browns Ferry Nuclean Unit: 1,2,3 Docket: 50-259, 50-260, 50-2	r Plant 296				
EQUITPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTAT	TION REF
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qual cati
System: Reactor feedwater system Plant ID No. LIS-3-58A,C MPL #2-3-72	Operating Time	1 year		(1)	See Note
Component: Level indicator switch	Temperature (F)	Figures B.9(1) B.9(2,3)	212 F	(11)	ts

53556						••	
Plant ID No. LIS-3-58A,C MPL #2-3-72	Time	·		(1)	Note 1	Note 3	BFNNEB8017
Component: Level indicator switch	Temperature (F)	Figures B.9(1) B.9(2,3)	212 F		ti	Tvpe test	None
Manufacturer: Yarway				(4)		r	
		Table B.1(1,2,	3) 14.7	* •• <i>•</i>	н	See Appx 1	NCR
Model No.: 4418C	Pressure (PSIA)		L	(4)		Note 4	- BFNNEB8017
Function: Interlock	Relative Humidity(%)	100	98	(4)	11	See Appx 1 Note 5	11
Accuracy: Req'd: See section			:	-	N/A	NZA	N/6
Demon: 4.1.5 of report	Chemical Spray	N/A	N/A .	(4)		- W A	W A
Category: A	Radiation	2.3x10 ⁶	1x10 7		See Appx 1	Material	None
Service: Reactor water.	(RAD)			(4)	Note 2	analysis	
Location: 9	Aging	N/A		(2)		Appx 1 note 3	NCRBFNNEB801
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared	by: alex M	elinkow-
Reviewed	by: Charles	Juck

(3) Sheet No. NEB- 3-019

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QUALIFICATION

METHOD

See Appx 1

10/27/80

OUTSTANDING ITEMS

NCR

Revision

Date

Qualification

See Appx 1

QA Acceptance:

- Lockheed Electronic Company Laboratory test No. 3232-3155, 3/22/73
- 2. A material anlaysis of the instrument indicates the limiting components to be neoprene dust plugs and cover gaskets and Buna-N O-rings. 79-01B, Table C-1, reports a radiation tolerance of 10 rads for neoprene. ORNL, October 1970, reports a radiation tolerance of 1 X 10 rads.
- 3. Although further evaluation is necessary to determine the qualified operating time, it is TVA's opinion the instruments will adequately meet the operating time requirements.

A material analysis indicates Buna-N, EPT, neoprene, cork and rubber parts which are subject to some thermal aging; however, this degradation is slow and, in TVA's engineering judgement, this instrument would not be adversely affected by aging considerations.

- 4. The 0.3 psia difference between the required and tested pressures is considered insignificant, and in TVA's engineering judgement would not adversely affect the proper functioning of the instrument.
- 5. The 2% difference between the required and tested relative humidities is insignificant, and in TVA's judgement would not adversely affect the proper functioning of the instrument.



		SYSTEM COMPON	ENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclea	r Plant				2	Sheet No. NEB-3.	
Unit: 1.2.3					1	Revision 0	
Docket: 50-259, 50-260, 50-	296		•		1	Date 10/27/8	30
	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION	OUTSTANDING
EQUIPMENT DESCRIPTION			0.1101	0	0	METHOD	
Contract 90744 & 91750	Panamatan	Specifi-	Qualifi-	Specifi-	Qualifi-		
System: Reactor feeduater	Tarameter	Catton	Cation	cation	0001011		
system	Operating	1 vear			See Appx 1	See Appx 1	NCR
Plant ID No. LITS-3-58B MPL #2-3-79	Time			(1)	Note 1	Note 3	BFNNEB8017
Component: Level	Temperature	Figures					
switch	(F)	B.9(1)	212 F		11	Type test	None
North Construction		B.9(2,3)		(11)			
Yarway		Table		(4)			
		B.1(1.2.8) 14.7	•••	а.	See Appx 1	NCR
Model No.: 4418CE	Pressure					Note 4	BFNNEB8017
	(PSIA)			(4)			
Function: Water level check		100	(I	-		0 1	
	Kelative Rumiditu(4)	100	90	(1)		Note 5	
Accuracy:	· Humildicy (#)			(4)	•		
Regid: See section							
Demon: 4.1.3 of report	Chemical	N/A	N/A	(4)	N/A · "*	N/A	N/A
	Spray				•.		
Category: A	Deddahdau	2×10 ⁵	1×10 ⁶		See Anny 1	Material	None
Service: Reactor water	(RAD)		in to	(4)	Note 2	analysis	, Mone
level A	(·
Location: 9	Aging	N/A		(2)	-	Appx 1 note 3	NCRBFNNEB8017
31/A							
Flood Level Elev:552' N/A	Cubmannar		XI / A		N/A	N/A	N/A
NOVE F1000 LEVEL: IES	Submergence	N/A	N/ A	(4)			

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

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

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

Prepared by: <u>Alex Melnikous</u> Reviewed by: Charles Turk Reviewed by:____

QA Acceptance:

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NEB-3-020, APPENDIX 1, REVISION 0

- Lockheed Electronic Company Laboratory test No. 3232-3155, 3/22/73
- 2. A material anlaysis of the instrument indicates the limiting components to be neoprene dust plugs and cover gaskets and Buna-N O-rings. 79-01B, Table C-1, reports a radiation tolerance of 10' rads for neoprene. ORNL, October 1970, reports a radiation tolerance of 1 X 10' rads.
- 3. Although further evaluation is necessary to determine the qualified operating time, it is TVA's opinion the instruments will adequately meet the operating time requirements.

A material analysis indicates Buna-N, EPT, neoprene, cork and rubber parts which are subject to some thermal aging; however, this degradation is slow and, in TVA's engineering judgement, this instrument would not be adversely affected by aging considerations.

- 4. The 0.3 psia difference between the required and tested pressures is considered insignificant, and in TVA's engineering judgement would not adversely affect the proper functioning of the instrument.
- 5. The 2% difference between the required and tested relative humidities is insignificant, and in TVA's judgement would not adversely affect the proper functioning of the instrument.

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Faatlituu Bhaims Fenny Nuales	n Plant	SYSTEM COMPON	VENT EVALUATIO	ON WORK SHEET	(Rev 2)	(3) Sheet No. NEB	
Unit: 1,2,3				Y		Revision 0	-021
Docket: 50-259, 50-260, 50-	-296	WTDOWCONT		DOCIDICNIPA	TTON DEP	Date 10/2//	OUTSTANDING
FOULPMENT DESCRIPTION	Er	VIRONMENT		DOCOMENTA	IION NEP	METHOD	ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- ` cation	Specifi- cation	Qualifi- cation		
System: Reactor feedwater system Plant ID No. PS-3-74A	Operating Time	1 year	1 hour	(1) ·	See Appx 1 Note 1	See Appx 1 Note 3	NCR BFNNEB8011
MPL #2-3-52 Component: Pressure Switch Manufacturer:	Temperature (F)	Figure B. 9 (1,2,3)	212 F	(4)		Generic test	11
Barksdale Model No.: B2T-M12SS	Pressure (PSTA)	Table B.1(1,2,3)	15	• ••	11 .	11	
Function: Intlk	Relative Humidity(%)	100	100	(4)	- 11	11	n
Accuracy: Req'd: Demon:	Chemical Spray	- N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: Reactor	Radiation U (RAD) U2&	$\begin{array}{c} 5.2 \times 10^{5}_{4} \\ 8 & 4.5 \times 10^{4} \end{array}$	1x10 ⁶	(4)	See Appx 1 Note 2	See Appx 1 Note 3	None
press A Location: 9	Aging	N/A	· · · · · · · · · · · · · · · · · · ·	(2)		Appx 1 Note 3	None
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A
iotes: (1) See Section 2.4 ir	1 79-018 report.	•					

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

(3) All notes and other information not on these

sheets are on the attached appendix sheets.

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

Prepared by: <u>Alex Mehichow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

NEB-3-021, APPENDIX 1, REVISION O

- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.

Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of one year has been considered and TVA has identified no adverse effects from temperature or any other parameter on the functioning of this device.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Unit:

(3) NEB- 3-021A Sheet No. Revision 0

1,2,3 50-260, 50-296 Dookat .

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Docket: 50-259, 50-260, 50-2					I	Date 10/27/8	0
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		-
System: Reactor feedwater Plant ID No. PS-3-74B MPL # 3-52	Operating Time	1 year	6 hours	(1)	See Appx 1 Note 1	See Appx 1 Note 2	NCR BFNNEB8010
Component: Pressure Switch Manufacturer: Banton	Temperature (F)	Figures B.9(1) B.9(2,3)	212 F	(4)	n	Type test	None
Model No.: 288	Pressure (PSIA)	Table B.1(1,2,3)	15	• (4)	IT .	11 	None
Function: Intlk	Relative Humidity(%)	100	100	(4)	11	17	11
Accuracy: Req'd: See Section Demon: 4.1.3 in report	Chemical Spray	N/A	: N/A :	(4)	N/A	N∕A	N/A
Category: A Service: Reactor	Radiation (RAD)	5.2x10 ⁵	3x10 ⁶	(4)	"See Appx 1 Note 1	Type test	None
Location: 9	Aging	N/A		(2)		Appx 1 Note 2	None .
Flood Level Elev:552' N/A Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:



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NEB-3-021A, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that operating time of one year will adversely affect the instrument. Similarly, due to the relatively low temperature and radiation levels encountered, aging is not expected to significantly affect this device (based on TVA's engineering judgement).



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 3-022 Revision 0

Facility: Browns Ferry Nuclear Plant Unit: 1.2.3

50-259, 50-260, 50-296 Docket:

OUALIFICATION DOCUMENTATION REF OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualification cation cation cation Parameter System: Reactor feedwater Operating See Appx 1 See Appx 1 NCR system 1 year Plant ID No. Appx 1 Time (1)Note 2 Note 4 BFNNEB8017 Note 1 Temperature Component: Level indicator Figures ... (F) B.9(1) 212 F Type test None switch B.9(2,3) Manufacturer: Yarway (4) Table •• .• $B.1(1,2,\beta)$ 11 NCR 14.7 See Appx 1 BFNNEB8017 Note 5 Model No.: 4418C Pressure (4)(PSIA) Function: Interlock 11 11 98 See Appx 1 100 Relative Note 6 Humidity(%) (4) Accuracy: , See section Rea'd: N/A N/A N/A 4.1.3 of report (4) Demon: N/A N/A Chemical • •. Spray Category: A 1x10⁶ 2.5x10⁵ See Appx 1 Material None Radiation

N/A

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

No

Reactor water

level A

9

Flood Level Elev:552' N/A

Above Flood Level: Yes

Service:

Location:

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

(3) All notes and other information not on these

sheets are on the attached appendix sheets.

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

(RAD)

Submergence

N/A

N/A

Aging

Prepared by: alex Meluikow Reviewed by: Charles Turk

analysis

Appx 1 note 4

NCRBFNNEB8017

N/A

Note 3

N/A

(4)

(2)

(4)





(3)

Date

10/27/80



N/A

QA Acceptance:

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1. This sheet applies to the following items:

LIS-3-184, -185 (both MPL #2-3-83)

- Lockheed Electronic Company Laboratory test No. 3232-3155, 3/22/73
- 3. A material anlaysis of the instrument indicates the limiting components to be neoprene dust plugs and cover gaskets and Buna-N O-rings. 79-01B, Table C-1, reports a radiation tolerance of 10' rads for neoprene. _ORNL, October 1970, reports a radiation tolerance of 1 X 10' rads.
- 4. Although further evaluation is necessary to determine the qualified operating time, it is TVA's opinion the instruments will adequately meet the operating time requirements.

A material analysis indicates Buna-N, EPT, neoprene, cork and rubber parts which are subject to some thermal aging; however, this degradation is slow and, in TVA's engineering judgement, this instrument would not be adversely affected by aging considerations.

- 5. The 0.3 psia difference between the required and tested pressures is considered insignificant, and in TVA's engineering judgement would not adversely affect the proper functioning of the instrument.
- 6. The 2% difference between the required and tested relative humidities is insignificant, and in TVA's judgement would not adversely affect the proper functioning of the instrument.



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		SYSTEM COMPO	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclear	Plant				\$	Sheet No. <u>NEB-3-</u>	023
Unit: 1,2,3					1	Revision <u>0.</u>	
Docket: 50-259, 50-260, 50-2	296]	Date 10/27/8	0
FOULT DESCRIPTION	E	VIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-		
	Parameter	cation	cation	eation	cation	х. Х	
System: Reactor feedwater system Plant TD No. Appx 1	Operating Time	1 year	6 hours	(1)	See Appx 1 Note 2	See Appx 1 Note 4	NCR BFNNEB8010
Note 1							
Component: Level indicator , Switch	Temperature (F)	Figures B.9(1)	212 F		11	Type test	None
Manufacturer: Banton		B.9(2,3)		(4)			
Model No.: 288A	Pressure (PSIA)	Table B.1(1,2,3)	· 15		".	11 - -	None
Function: Water level	Relative Humidity(%)	100	100	(4)	u	11	11
Accuracy: Regid: See Section Demon: 4.1.3 in report	Chemical Spray	N/A	: N/A .	(4)	N/A	N/A ,	N/A
Category: " Service: Reactor lvls 3&8	Radiation (RAD)	2.1x10 ⁷	3x10 ⁶	(4)	Šee Appx 1 Note 2	Type test	NCR BFNNEB8010
Location: 9	Aging	N/A		(2)		Appx 1 Note 4	None 🗸
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A -	N/A	N/A

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>alex Melnihour</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

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- 1. This sheet applies to items LIS-3-203 (A-D) MPL #2-3-101 LIS-3-208 (A-D) MPL #2-3-103
- Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 3. The radiation dose of 2.1 X 10⁷ rad is based upon several conservative assumptions and could be reduced by more accurate specific modeling techniques. In TVA's opinion, such modeling analysis should be able to reduce the actual dose to 3 X 10[°] rads or lower.
- 4. Based on a study of materials used in this device, it is not ' expected that an operating time of one year would adversely affect the instrument. Similarly, due to the relatively low temperature levels encountered, aging is not expected to significantly affect this device (based on TVA's engineering judgement).



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 23-025 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 50-259, 50-260, 50-296 10/27/80 Docket: Date DOCUMENTATION REF ENVIRONMENT OUALIFICATION OUTSTANDING EOUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: RHR Service Water . Operating 1 vear Appendix 1 NCR Plant ID No. Appendix 1 Time (1)Note 2 BFNNEB8015 Note 1 Component: Temperature Temperature Element (F) Figures 11 11 B.8(1) Manufacturer: B.8(2,3) (4) Calmatic •• • Table ... н Model No.: 158B7061P016 B.1(1,2,3) Pressure (PSIA) (4) Function: RHR HTX A 100 11 Relative 11 (4) Humidity(%) Accuracy: Req'd: ÷ Demon: Chemical N/A N/A N/A N/A (4) N/A Spray · •. Category: A 3x10⁷ -Radiation Appendix 1 NCR Water Service: Note 2 BFNNEB8015 (RAD) (4) 8 11 Location: Appx 1 Note 2 Aging N/A (2) Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A Submergence N/A . N/A (4) No

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

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

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

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

alex Mehihow Prepared by: Reviewed by: Charlis

QA Acceptance:

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NEB-23-025

Appendix 1, Rev 0

1.	This s	heet	applies	to	items	TE-23-32, -38,	MPL #	10-95A. B.	
		•				-44,		С.	
						-50,		Đ.	

2. To date, qualification information is unavailable for the above items. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. Continued plant operation is justified based on a limited amount of information available on the calimatic temperature elements; it is not that the devices are of simple construction, typical of most temperature elements used on an industry-wide basis, and would be reasonably expected to withstand environmental extremes.



(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 23-026 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF OUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualification cation cation cation Parameter RHR Service System: NCR 24 hours See Appx 1 See Appx 1 1 yearb water 47 Operating BFNNEB8034 Note 2 Note 1 Appx 1 Plant ID No. Time (1)Note 4B Motor Component: Temperature 11 Type test None Figure 250 F operator (F) B.8(1) B.8(2,3) Manufacturer: Limitorque (4) 11 None 40 ••• Type test Table B.1(1,2,3) SMB-2 Pressure Model No.: (4) (PSIA) RHR HTX "A" Function: tt tt 11 100 100 Relative Humidity(%) (4) Accuracy: N/A Req'd: ÷. N/A N/A N/A Demon: Chemical N/A N/A (4) 1 . Spray A 2x10⁸ Category: 3.5x10⁵ See Appx 1 Type Test None Radiation Note 1 Water Service: (RAD) (4) ŧ Appx 1 Note 2 None . 8 Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes (4) Submergence N/A N/A No

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

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

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

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

Prepared by: alex Meluihow Reviewed by: Charles Turk

NEB-23-026, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

3. This sheet applies to the following:

FCV 23-34, -40, -46, -52 (MPL #10-89)



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

7/80
OUTSTANDING
NCR BFNNEB8015
11
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N/A
NCR BFNNEB8015
11
N/A
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(2) See Section 4.1.2 in 79-01B report.

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

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

Prepared by	alex	Melnihow
Reviewed by	Charle	Jule

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NEB-23-27

Appendix 1, Rev 0

1.	This	sheet	applies	to	items	TE-23-35,	MPL	#	10-94A.
						-41,			Β.
						-47,			С.
						-53,			D.

2. To date, qualification information is unavailable for the above items. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. Continued plant operation is justified based on a limited amount of information available on the calimatic temperature elements; it is not that the devices are of simple construction, typical of most temperature elements used on an industry-wide basis, and would be reasonably expected to withstand environmental extremes.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

(3) Sheet No. <u>NEB-23-028</u> Revision <u>0</u>

Unit: 1,2,3

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DOCKEC: 50-259, 50-200, 50-2	290					Date 10/27/	80
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi-	Qualifi-	Specifi-	Qualifi-		
System: RHR service water		Cacion	Cation	Cation	cation		
Plant ID No. Appx 1 Note 2	Operating Time	1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8012
Component: Flow transmitters	Temperature (F)	Figures B.8(1)				11	11
Manufacturer: GEMAC (GE)		B.8(2,3)		(4)			ч
Model No.: 50-555111BDAA3AAA	Pressure	Table B.1(1,2,3)		• •• •		n ~	
Function: RHR Htx "A"	(ISIR)			(4)			
	Relative Humidity(%)	_, 100	:	(4)		11	n
Accuracy: Req'd: See Section Demon: 4.1.3 in report	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: Water	Radiation (RAD)	3x10 ⁷		(4)		See Appx 1° Note 1	NCR BFNNEB8012
Location: 8	Aging	N/A		(2)		li	tî.
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A -	N/A

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

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

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

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

Prepared by:	alex Melinhow
Reviewed by:	Charles Jule

QA Acceptance:

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NEB-23-28 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

	Temperature	•	185	^D F
••	Pressure ·	-	Atm	ospheric
•	Relative Humidity	-	Not	Specified
	Radiation		Not	Specified

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of 1×10^4 per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than $2x10^4$), with an accident dose of only $6x10^4$, which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

(3) Sheet No. NEB- 23-029

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Unit: 1,2,3

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Revision 0 10/27/80 Date

50-259, 50-260, 50-296 Docket: DOCUMENTATION REF QUALIFICATION OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Contract 90744 & 91750 Qualifi-Specification cation Parameter cation cation System: RHR service See Appx 1 NCR 24 hours See Appx 1 1 year water Operating BFNNEB8034 Note 1 Note 2 Plant ID No. FCV-23-57 (1) Time MPL # 10-169 Component: Motor Temperature 250 F 11 Type test None Figures operator (F) B.8(1) Manufacturer: Limitorque B.8(2,3) (4) -• • 40 11 Type test None Table B.1(1,2,3) Model No.: SMB-00 Pressure (4) (PSIA) Crosstie Function: 11 11 17 100 100 valve Relative (4) Humidity(%) Accuracy: Req'd: N/A N/A N/A N/A Demon: N/A N/A (4) Chemical Spray A 2x.10⁸ Category: 2.4x10⁶ See Appx 1 Type Test None Radiation Note 1 Water -Service: (RAD) (4) -Appx 1 Note 2 None 8 Location: (2) N/A Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

Prepared by: (alex Mel	inhow
Reviewed by:	hardes Ju	sk

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NEB-23-029., APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.



Facility: Browns Ferry Nuclea Unit: 1,2,3 Docket: 50-259, 50-260, 50-	r Plant 296	-				Sheet No. <u>NEB-43</u> Revision <u>0</u> Date <u>10/27/</u>	<u>-030</u> 80
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDIN
Contract 90744 & 91750	Parameter	Specifi- cation`	Qualifi- cation	Specifi- cation	Qualifi- cation	•	·
System: Sampling & water quality Plant ID No. FSV-43-13 MPL #2-298	Operating Time	A l hour B 1 year	30 days	· (1)	See Appx 1 Note 1	Appx 1 Note 3	NCR BFNNEB8031
Component: Solenoid Valve	Temperature, (F)	Figure B.O(1,2,3)	290 F		11	Type Test	None
Asco Model No.: WPHTX8300B68F	Pressure (PSIA)	Figure B.0(1,2,3)	60	(4)	с. К.	11	11
Function: Reac Recir INBD isolation	Relative Humidity(%)	- 100	100	(4)	11	11	11
Accuracy: Req'd: Demon:	Chemical Spray	N/A	: N/A .	(4)	N/A	N/A	NZĄ
Category: A Service: Water	Radiation (RAD)	8.2×10 ⁸ β.4×10 ⁹	1x10 ⁶	(4)	See Appx 1 Note 2	Appx 1 Note 3	NCR BFNNEB8031
ocation: 0	Aging	N/A		(2)		Appx 1 Note 3	11 -
Flood Level Elev:552' N/A Nove Flood Level: Yes 629'4" No	Submergence	N/A	N/A	. (4)	N/A	N/A	N/A .

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

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

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

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

Prepared by: <u>Alex Mehikow</u> Charles Tu Reviewed by: (



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NEB-43-030, APPENDIX 1, REVISION 0

- 1. ASCO report number AQ5-21678/TR This report covered an 8300 series and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 2. The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of Buna-N material which can withstand doses of 1 X 10[°] rad
- 3. This solenoid valve is required to open for accident mitigation purposes. No credit is taken for closing the valve. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in opening of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in closure of the valve. Not withstanding this justification, TVA will commit to either a type testing or replacement program for this valve.



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Facility: Browns Ferry Nuclean Unit: 1,2,3 Docket: 50-259, 50-260, 50-2	r Plant 296					Sheet No. NEB- 43 Revision 0 Date 10/27/8	-031 30
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Sampling and water quality Plant ID No. FCV-43-13 MPL #2-298	Operating Time	1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8006
Component: Limit switch	•Temperature (F)	Figure B.0(1,2,	3)			11	11
Manufacturer: Microswitch	÷			(4)			
Model No.: OPD-AR, OPD-AR30	Pressure	FIGURE B.O(1,2,	3)	• •• -		11	tt
Function: Position	Relative Humidity(%)	100		<u>(4)</u>		11	11
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: Inboard -	Radiation (RAD)	2x10 ⁸ γ 4x10 ⁹ β		(4)	·	See Appx 1 Note 1	NCR BFNNEB8006
Location: 0	Aging	N/A		(2)		11	31
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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(2) See Section 4.1.2 in 79-01B report.
(3) All notes and other information not on these sheets are on the attached appendix sheets.
(4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by:	alex Melnihow
Reviewed by:	Charles Juck

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NEB-43-031

Appendix 1, Rev 0

 Micro Switch has a line of standard basic switches which have a wide range of operating characteristics, temperature tolerances, and sealing materials. Their basic switch is comprized of phenolic, beryllium copper, and silver with capabilities of 400° F. Although qualified documentation is not available at this time, it is TVA's engineering judgment, based on past experience, that the switch will perform satisfactorily. TVA will commit to type tests or a replacement program in order to ensure the utilization of qualified components.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-43-032 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF OUALIFICATION OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Oualifi-Contract 90744 & 91750 Qualifi-Specification cation cation cation Parameter System: Sampling and Water Quality Operating A-1 day 30 days See Appx 1 See Appx 1 None Plant ID No. FSV-43-14 B-1 year Note 1 Note 3 Time (1)MPL #2-299 Component: Solenoid Temperature = Ħ Valve (F) Figure 290 F Type Test B.12(1) -Manufacturer: ASCO B.12(2,3)(4) •• . Π. 11 11 60 Table Model No.: X8300-B61F B.1(1,2,3) Pressure (4) (PSIA) Outbd Function: Isolation 100 100 11 11 11 Relative . (4) p Humidity(%) Accuracy: Req'd: ÷ N/A N/A N/A N/A Demon: Chemical N/A (4) Spray Category: 3.1x10⁴ 1x10⁶ See Appx 1 See Appx 1 None Radiation Reactor Note 2 Note 3 Service: (4) (RAD) Recirculation Appx 1 Note 3 None · 12 Location: (2) N/A Aging Flood Level Elev:552' N/A 3 N/A N/A N/A Above Flood Level: Yes N/A (4) Submergence N/A No

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jurb</u>

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NEB-43-032, APPENDIX 1, REVISION 0

- 1. ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 2. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10⁶ rad.
- 3. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.





TON LIOPK SHEET

Facility: Browns Ferry Nuclean Unit: 1,2,3	r Plant	System Compo	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3) Sheet No. <u>NEB-43</u> Revision <u>0</u> Date <u>10/27/</u>	-033
Docket: 50-259, 50-200, 50-	<u> </u>	NVIRONMENT	1	DOCUMENTAT	TION REF	QUALIFICATION	OUTSTANDING
EQUIPMENT DESCRIPTION						, METHOD	ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	¢.	
System: Sampling and water quality Plant ID No. FCV-43-14 MPL #2-299	Operating Time	1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8006
Component: Limit switch	Temperature (F)	Figures B.O(1,2,	3)	1		n	33
Manufacturer:				(4)			
Microswitch		Figur <i>ES</i> B.0(1,2,	3)	· ·· .		n	e e e e e e e e e e e e e e e e e e e
Model No.: OPD-AR, OPD-AR30	Pressure (PSIA)			(4)		·	
Function: Position	Relative Humidity(%)	100		(4)	•	11	H
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: Outboard isolation	Radiation (RAD)	2x10 ⁸ ¥ 4x10 ⁹ ß	•	(4)	•••	See Appx 1 Note 1	NCR BFNNEB8006
valve /	Aging	N/A	•	(2)		11	11 -
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by:	alex me	hibow
Reviewed by:	Charles ~	unte

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NEB-43-033

Appendix 1, Rev 0

1. Micro Switch has a line of standard basic switches which have a wide range of operating characteristics, temperature tolerances, and sealing materials. Their basic switch is comprized of phenolic, beryllium copper, and silver with capabilities of 400° F. Although qualified documentation is not available at this time, it is TVA's engineering judgment, based on past experience, that the switch will perform satisfactorily. TVA will commit to type tests or a replacement program in order to ensure the utilization of qualified components.

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Facility: Browns Ferry Nuclear	r Plant	SISTEM COMPO	NENI EVALUA	TON NORK SHEET	(1164 2)	Sheet No. <u>NEB-63</u> Revision 0	3-034
Unit: $1, 2, 3$					Date $10/27/80$		
EQUIPMENT DESCRIPTION Contract 90744 & 91750	ENVIRONMENT			DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specifi- cation	Qualifi- cation .	Specifi- cation	Qualifi- cation		
System: Standby Liquid Control System Plant ID No. TIC-63-2 MPL #11-18	Operating Time	1 year		• (1)	-	Appx 1 Note 1	NCR BFNNEB8009
Component: Temperature Switch	Temperature (F) [.]	Figure B.14(1,2	3)		11	11	11
Fenwal				(4)			
Model No.: 40-104014-103	Pressure (PSIA)	Table B.1(1,2,3)		(4)	ft _		
Function: Heater controller	Relative Humidity(\$)	100	1	(4)	11	11	12
Accuracy: Reg'd: Demon:	Chemical Spray	N/A	N/A	: (4)	N/A	N/A	N/A
Category: A Service: SLC Storage [.]	Radiation (RAD)	4 3.1x10		(4)	•••	Appx 1 Note 1	NCR BFNNEB8009
Tank Location: 14	Aging	N/A.		(2)		11	11 -
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jurk</u>

1. Although no specific qualification data was located for this temperature element, it is expected that the device will not be adversely affected by the accident environment. This is based upon TVA's study of the materials used in this instrument. According to available information, the only material used in this device which is possibly susceptible to environment is a neoprene gasket.

Because neoprene radiation tolerance is at least 10⁶ rads, this gasket should see no appreciable effects from the postulated dose of 3.1 X 10⁴ rads. Based on TVA's engineering judgement, the simple nature of construction of the device, plus the relatively low temperature, pressure, and radiation dose, lead to the conclusion that the instrument will perform properly during accident environment. However, TVA will commit to either a type type or replacement of the device with a qualified substitute.

The effects of aging have been considered on this device, and in TVA's engineering judgement are negligible. Aging will be addressed, however, in the type test or replacement program.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Sheet No. NEB- 63-035 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF QUALIFICATION OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Qualifi-Specifi-Qualifi-Specification Parameter cation cation cation System: Standby Liquid A-1 dav Operating See NCR Control B-1 year Appx 1 Plant ID No. TE-63-2 Time (1)BFNNEB8009 Note 1 MPL #11-49 Component: Temperature Temperature Figure Ħ 11 (F) Element B.14(1) B.14(2,3) Manufacturer: (4) Fenwal •••• Table ' 11 11 B.1(1,2,3) - . Model No.: 28-232106-304 Pressure (4)(PSIA) Function: Meas. Heater H . Temp Relative 100 Humidity(%) (4) Accuracy: Req'd: ł. ~ N/A (4) N/A N/A Demon: Chemical N/A N/A • Spray Category: A 5 3.1x10⁴ See App 1 See NCR Radiation Note 1 BFNNEB8009 Service: SLC Storage (RAD) (4) Tank 11 • 14 Aging N/A (2) Location: Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

Prepared	by:_	alex	Melnibou	<u>_ر</u>
Reviewed	by:_	Charl	es Junk	

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QA Acceptance:_____

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1. Although no specific qualification data was located for this temperature element, it is expected that the device will not be adversely affected by the accident environment. This is based upon TVA's study of the materials used in this instrument. According to available information, the only material used in this device which is possibly susceptible to environment is a neoprene gasket.

Because neoprene radiation tolerance is at least 10^6 rads, this gasket should see no appreciable effects from the postulated dose of 3.1 X 10^6 rads. Based on TVA's engineering judgement, the simple nature of construction of the device plus the relatively low temperature pressure, and radiation dose, lead to the conclusion that the instrument will perform properly during accident environment. However, TVA will commit to either a type type or replacement of the device with a qualified substitute.

The effects of aging have been considered on this device, and in TVA's engineering judgement are negligible. Aging will be addressed, however, in the type test or replacement program.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB- 63-037 Facility: Browns Ferry Nuclear Plant Revision 0 10/27/80 Date 50-259, 50-260, 50-296 ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Contract 90744 & 91750 Specifi-Parameter cation cation cation cation System: Standby Liquid NCR 30 davs Appx 1 Control Operating NCRNEB8034 Note 1 Plant ID No. SLC Pump Mtrs (1) Time Appx 1, Note 2 Component: Standby Liquid Temperature 11 11 Cntl Pump Mtr 154 U1 (F) ' 174 02,3 (4) GE •••• 11 11 . . 5K326PK-234A 15 Pressure (PSIA) (4) Pump Mtr u ~ * 67

100 Relative (4) Humidity(%) Accuracy: N/A Req'd: , A. N/A N/A N/A N/A (4) Demon: Chemical N/A . Spray A Category: 3.1x10⁴ -----NCR Appx 1 Radiation Note 1 BFNNEB8034 Pump Service: (RAD) (4) 11 n 14 (2) Location: Aging N/A N/A Flood Level Elev:552' N/A N/A N/A (4) Above Flood Level: Yes N/A N/A Submergence No

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

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Docket:

Manufacturer:

Model No.:

Function:

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

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

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

Prepared by: alex Melnihow Reviewed by: Charles Turk



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NEB-63-037, APPENDIX 1, REVISION 0

1. To date, qualification information is unavailable for this GE model motor; however, TVA plans to pursue through GE the location of the appropriate information.

The BFN Emergency Operating Procedure A41, 9/30/80, has given credit to the Standby Liquid Control System as an additional source of high pressure water makeup to the reactor vessel under extreme or unusual conditions. The Standby Liquid Control System may deliver a small quantity of water (approximately 5,000 gallons) to the vessel if, in the most unusual circumstances, other redundant sources of high pressure water makeup fails to function properly. Therefore, it is TVA's opinion that should the failure of this system occur, it is not absolutely relied upon to mitigate the accident.

 This sheet applies to standby liquid control motors 1A, 1B, 2A, 2B, 3A, 3B, all MPL #11-2.

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EQUIPMENT DESCRIPTION Contract 90744 & 91750

System: Standby liquid control

Component: Explosive

Model No.: 1832-117

Function: Injection

valve

Manufacturer:

Accuracy: NA Req'd:

Demon:

Service:

Location:

Category: A

Plant ID No. FCV-63-8(A&B)

valve

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N/A

2.2x10⁴

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N/A

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100 davs

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

DOCUMENTATION REF

Qualifi-

See Appx 1

cation

Note 1

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N/A

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Note 1

N/A

See Appx 1

Specifi-

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(4)

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cation

Facility: Browns Ferry Nuclear Plant Unit: 1.2.3

MPL #11-14

Conax

Standby liquid

. control

14

Flood Level Elev:552'

Above Flood Level: Yes

(3) Sheet No. NEB- 63-038

QUALIFICATION

METHOD

See Appx 1

Type test

Type test

See Appx 1

Appx 1 note 3

Prepared by: alex Melnihour

Note 2

N/A

Note 3

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N/A

10/27/80

OUTSTANDING

ITEMS

None

None

11

None

N/A

None

11

N/A

.

Revision 0

Date

ENVIRONMENT

Specifi-

30 days

Figures

B.14(1)

Table

100

N/A

N/A

N/A

3.1x10⁴

B.14(2,3)

 $B.1(1,2,\beta)$

cation

Parameter

Operating

Temperature

Time

(F)

Pressure

Relative Humidity(%)

Chemical

Radiation

Submergence

Spray

(RAD)

Aging

(PSIA)

Reviewed by: Charles June QA Acceptance:

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

N/A

No Notes: (1) See Section 2.4 in 79-01B report.

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

(4) See Section 3.0 and/or Appendix B in 79-01B report.
NEB-63-038, APPENDIX 1, REVISION 0

1. CONAX test report TR-39 and Wyle summary report QSR-146-A-01

- 2. The radiation dose of 3.1 X 10⁴ is based upon the 40-year normal dose plus total accident dose for room 14. Since the operating time for the valve would be no greater than 30 days, the actual dose to the valve before use would be no greater than 1 X 10 rad. Therefore the valve is qualified to this radiation dose.
- 3. Based on the relatively low temperature and radiation doses, aging effects on this defice would be minimal and have no adverse effects on the functioning of this device (in TVA's engineering judgement).

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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Sheet No.	NEB-61-020-
Revision	0
Date	10/27/80

Docket: 50-259, 50-260, 50-296

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DOCUMENTATION REF OUALIFICATION ENVIRONMENT OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Oualifi-Contract 90744 & 91750 Qualifi-Specification cation Parameter cation cation System: Primary Containment Operating A-1 hour 30 days See Appx 1 See Appx 1 None Plant ID No. FSV-64-17 (1)Time B-1 year Note 1 Note 3 MPL #16-19-9 Component: Solenoid Temperature Valve (F) 12 Figure 290 F 11 Type Test B.8(1) (4) Manufacturer: B.8(2.3) ASCO •• • Table 60 n . 11 11 Model No.: WPHTX8300B45F Pressure B.1(1,2,3) (PSIA) (4) Function: DW PSC Isolation Valve 100 11 Relative 100 11 11 (4) Humidity(%) Accuracy: Req'd: * N/A (4) Demon: N/A N/A N/A N/A Chemical ۰, Spray Category: A 1x10⁶ • • • 2.9x10⁵ See Appx 1 See Appx 1 Radiation None Service: FCV-64-17 (4) Note 2 Note 3 (RAD) Control 8 Location: N/A (2)Appx 1 Note 3 None Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes (4) Submergence N/A N/A No

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

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

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

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

Prepared by	: alex Melnihow	
Reviewed by	: Charles Junk	•
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NEB-64-039, APPENDIX 1, REVISION 0

 ASCO report number AQ5-21678/TR - This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.

2. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10⁶ rad.

3. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.

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SYSTEM COMPONENT E	VALUATION	WORK	SHEET	(Rev	2)
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Facility: Browns Ferry Nuclear Plant Unit:

- (3) Sheet No. NEB-64-040 Revision 0

1,2,3 50-259, 50-260, 50-296 Docket:

10/27/80 Date

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary Containment Plant ID No. See Appx 1 Note 1	Operating Time	A-1 hour B-1 year	30 days	(1)	See Appx 1 Note 2	See Appx 1 Note 4	None
Component: Solenoid Valve Manufacturer:	Temperature (F)	Figure B.8(1) B.8(2,3)	290 F	(4)	n	Type Test	H _
ASCO Model No.WPHTX8300B45F	Pressure (PSIA)	[•] Table B.1(1,2,3)	60	 (4)	".	н • • •	11
Function: DW Air Supply Isolation Valve	Relative Humidity(\$)	100	100	(4)	11	17	n .
Accuracy: Req'd: Demon:	Chemical Spray	N/A	: N/A .	(4)	N/A	N/A	N/A .
Category: A Service: FCV-64-18	Radiation (RAD)	5.1x10 ⁵	1x10 ⁶	(4)	See Appx 1 Note 3	See Appx 1 Note 4	None .
Control Location: ⁸	Aging	N/A		(2)		Appx 1 Note 4	None -
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared	by: alex Melnikow	
Reviewed	by: Charles Turk	

NEB-64-040, APPENDIX 1, REVISION 0

1. This sheet applies to the following items:

FSV	64-18	MPL #16-19-8
FSV	64-19	MPL #16-19-10
fsv	64-20	MPL #16-19-11
FSV	64-21	MPL #16-19-11

- ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 3. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10⁶ rad.
- 4. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation. p.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclea	r Plant		5	1-041			
Unit: 1,2,3	_				I	levision 0	
Docket: 50-259, 50-260, 50-	296		······································			Date 10/27/0	
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENȚA	FION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary Containment Plant ID No. FCV-64-18 MPL #16-19-8	Operating Time	'1 year		(1)		Appx 1 Note 1	NCR BFNNEB8019
Component: Limit Switch	Temperature (F)	Figure B.8(1,2,3)				Ħ	ta
Manufacturer: Namco		-		(4)			
Model No.: D1200G	Pressure (PSTA)	Table B.1(1,2,3)		· ·· ·	••	п ~ ``	
Function: Inb isol . vlv	Relative Humidity(\$)	100	;	(4)		18	 n
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: A Service: 'Dw atm	Radiation (RAD)	5.1x10 ⁵	ज -	(4)		Appx 1 Note 1	NCR BFNNEB80,19
supp Location: ⁸	Aging	N/A		(2)		Appx 1 Note 1	**
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	· N/A
Notes: (1) See Section 2.4 in (2) See Section # 1.2	1 79-01B report	• •			Proposed by	. alex M	alaila -

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

sheets are on the attached appendix sheets.

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

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Prepared by:	alex Melinhow
Reviewed by:	Charles Junk

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NEB-64-041, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nucleas Unit: 1,2,3		Sheet No. <u>NEB-64-043</u> Revision <u>0</u>					
Docket: 50-259, 50-260, 50-	296					Date 10/27/	80
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary Containment Plant ID No. FCV-64-19 MPL #16-19-10	Operating Time	1 year		(1)		Appx 1 Note 1.	NCR BFNNEB8019
Component: Limit Switch	Temperature (F)	Figure B.8(1,2,3)				11	15
Manufacturer: Namco	i.			(4)			
Model No.: D1200G	Pressure (PSIA)	Table B.1(1,2,3)	-	· ·· . (4)		11 • •	11
Function: Inb isol vlv	Relative Humidity(%)	100		(4)		11	tt -
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A -	N/A
Category: ^A Service: Supp chamber .	Radiation (RAD)	5.1x10 ⁵	•	(4)		Appx 1 Note 1	NCR BFNNEB8019
Location:	Aging	N/A		(2)		Appx 1 Note 1	11 -
Flood Lovol Elov:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

alex Melinhour Prepared by: he Jurk Reviewed by:

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NEB-64-043, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.





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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclea Unit: 1,2,3 Docket: 50-259, 50-260, 50-	r Plant .	-				Sheet No. <u>NEB-64</u> Revision <u>0</u> Date 10/27/0	<u>-045</u> 30
EQUIPMENT DESCRIPTION	E	NVIRONMENT	, ,	DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary containment Plant ID No. Appx 1 Note 1	Operating Time	1 year		(1)		Appx 1 Note 1	NCR BFNNEB8019
Component: Limit Switches Manufacturer:	Temperature (F)	Figure B.8(1,2,3)		(4)		u .	n .
Model No.: D1200G	Pressure (PSIA)	Table B.1(1,2,3)		(4)	•	11	11
Function: Vacuum relief	Relative Humidity(%)	100	:	(4)		17	17
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: Supp chamber -	Radiation (RAD)	5.1x10 ⁵	•	(4)	· · · ·	Appx 1 Note 1	NCR BFNNEB8019
Location: 8	Aging	N/A		(2)		Appx 1 Note 1	H ,
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: alex Meluihow Reviewed by:

NEB-64-045, APPENDIX 1, REVISION 0

- 1. This sheet applies to FCV-64-20 (MPL #16-19-11A) and 64-21 (MPL #16-19-11B)
- 2. To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90°C ($194^{\circ}F$). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 (3) Sheet No. <u>NEB-64-046</u> Revision 0

Unit: 1,2,3 .					-			•
Docket: 50-259, 50-260, 50-2	.96				I	ate 10/27/8	30	•
EQUIPMENT DESCRIPTION	E	VIRONMENT		DOCUMENTAT	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS	
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-			
• • • • • •	Parameter	cation	cation	cation	cation			
System: Primary containment system Plant ID No. Appx 1 Note 1	Operating Time	A - 1 hour B - 1 year	6 hours	(1)	See Appx 1 Note 2	Type test	None	
Component: Pressure switch	Temperature (F)	Figures B.8(1) B.8(2,2)	212 F .	-	tt	n	£t.	•
Manufacturer: Barton		Table			ft _	. 11	None	
Model No.: 289	Pressure (PSIA)	B.1(1,2,3)		(4)	•	*		
Function: ABS press	Relative Humidity(\$)	100	100	(4)	17	EF	"	
Accuracy: Req'd: See Section Demon: 4.1.3 in report	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A	
Category: A Service: Supp	Radiation (RAD)	5.1x10 ⁵	3x10 ⁶	(4)	See Appx 1 Note 2	Type test	None	
cnamber Location: ⁸	Aging	N/A		(2)		Appx 1 Note 3	· None ·	
Flood Level Elev:552: N/A Above Flood Level: Yes No	Submergence	N/A	H/A	(4)	N/A	N/A	N/A	

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

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

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

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

Prepared by: alex Melnihow	_
Reviewed by: Charles Junk	

QA Acceptance:

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NEB-64-046, APPENDIX 1, REVISION 0

- 1. This sheet applies to PDIS-64-20, -21 (both MPL #-16-19-32)
- 2. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-029-A-01, E12-3(E12-N010).
- 3. Based on a study of materials used in this device and TVA's engineering judgement, aging is not considered to adversely affect this device. This is due to the low temperature and radiation

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Sheet No. NEB-64-047 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2 10/27/80 Date 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF OUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualification cation cation Parameter cation System: Primary See Appx.1 Containment A-1 hour 30 days See Appx 1 None Operating Note 4 Plant ID No. See B-1 year (1)Note 2 Time Appendix 1 Note 1 Component: Solenoid Temperature TYPE 11 n 290 Valve (F) Figure TEST B.12(1) Manufacturer: ASCO B.12(2,3) (4) •• • Π. 60 11 11 Table - . B.1(1,2,3) Model No.: WPHTX8300B45F Pressure (4) (PSIA) DW Exh. Inboard Function: 11 Ħ 100 11 Isol. Valve 100 Relative (4) Humidity(%) Accuracy: Req'd: N/A . . N/A N/A N/A N/A (4) Demon: Chemical • : . Spray Category: A 3.1x10⁴ 1x10⁶ See Appx 1 See Appx 1 None Radiation Service: FCV-64-29 Note 3 Note 4 (RAD) (4) Control Appx 1 Note 4 12 None · Location: Aging N/A (2)Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes (4) N/A N/A Submergence No

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

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

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

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

alex Melnihow Prepared by: Reviewed by: Charles July

(3)

NEB-64-047, APPENDIX 1, REVISION 0

1. This sheet applies to the following items:

FSV-64-29	MPL ⊉16-19-7A
FSV-64-30	MPL #16-19-4
FSV-64-31	MPL #16-19-6A

- 2. ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 3. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10⁶ rad.
- 4. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.

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Facility: Browns Ferry Nuclea	r Plant				5	Sheet No: <u>NEB- 61</u>	1-048
Unit: 1,2,3					I	Revision 0	80
Docket: 50-259, 50-260, 50-	296	NUTDONMENT		DOCIMENTA	TTON REF	OUAL TETCATION	OUTSTANDING
EQUITEMENT DESCRIPTION	ENVIRONMENT			DOCOMENTATION NEP		METHOD	ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation	- -	,
System: Primary containment Plant ID No. FCV-64-29 MPL #16-19-7A	Operating Time	1 year		(1)		Appx 1 Note 1	NCR BFNNEB8019
Component: Limit Switch Manufacturer:	Temperature (F)	Figures B.12(1) B.12(2,3)		(4)	-	Π	Ħ
Model No.: D1200G	Pressure (PSIA)	Table B.1(1,2,3)		(4)		n • • • •	n ,
Function: Inbd isol valve	Relative Humidity(%)	100	;	(4)		n	
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	- N/A
Category: A Service: DW exhaust	Radiation (RAD)	3.1x10 ⁴	٩.	(4)	Y 20.00	Appx 1 Note 1	NCR BFNNEB80 <u>1</u> 9
Location: 12	Aging	N/A		(2)		Appx 1 Note ⁻ 1	ti -
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	- (4)	N/A	N/A	N/A
Notes: (1) See Section 2.4 in	79-01B report	•	•		– • • •	Olice Ma	0:0

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

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

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

Prepared by:	alex Melinhow
Reviewed by:	Charles Turk

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NEB-64-048, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90 C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB-64-49A Facility: Browns Ferry Nuclear Plant Revision 0 Unit: :,3 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF ENVIRONMENT OUALIFICATION OUTSTANDING METHOD ITEMS EOUTPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualification cation cation cation Parameter System: Primary Containment A-1 hour 30 days See Appx 1 See Appx 1 None Operating Plant ID No. Appendix 1 Note 2 Note 4 Time B-1 year (1)Note 1 Component: Solenoid Temperature Valve Figure 290 F n Type Test Ħ (F) B.12(1) B.12(2,3) (4) Manufacturer: ASCO •••• Table 60 11 11 n HB830081F B.1(1,2,3) ~ Model No.: Pressure (PSIA) (4) DW Exh. Outboard Function: 11 = Isolation Valve 100 100 tt Relative (4) Humidity(%) Accuracy: Req'd: 2 N/A N/A N/A Demon: Chemical N/A N/A (4) З, Spray A Category: 3.1x10⁴ 1x10⁶ ... See Appx 1 See Appx 1 None Radiation Note 4 FCV-64-30 Note 3 Service: (RAD) (4) Control 12 Appx 1 Note 4 None • (2) Location: Aging N/A N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes (4) N/A N/A Submergence No

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

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

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

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

Prepared by:	alex Melnihow	
Reviewed by:	Charles Turk	

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NEB-64-049A, APPENDIX 1, REVISION O

1. This sheet applies to the following items: FSV-64-30 MPL #16-19-4 FSV-64-29 MPL #16-19-7 FSV-64-31 MPL #16-19-6

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- 2. ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 3. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10⁶ rad.
- 4. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.

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	2	SYSTEM COMPON	IENT EVALUATI	ON WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclear	• Plant				5	Sheet No. NEB- 64	-050
Unit: 1,2,3	- -				1	$\frac{10}{10}$	20
Docket: 50-259, 50-260, 50-2	296	ULT DOUBLEUM			TTON DEE	Date 10/2//C	OUTSTANDING
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		METHOD	ITEMS
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-		-
	Parameter	cation	cation	cation	cation		······
System: Primary containment Plant ID No. FCV-64-30 MPL #16-19-4	Operating Time	1 year		(1)	μ 	Appx 1 Note 1	NCR BFNNEB8019
Component: Limit Switch	Temperature (F)	Figure B.12(1,2,3)				11	11
Nameo	ļ	<u>├</u>		(1)			
Model No.: D1200G	Pressure	Table B.1(1,2,3)					n
Functions Outb isol	(POIR)	·	·	(4)		<u> </u>	
valve	Relative Humidity(%)	100		(4)	-	11	n .
Accuracy: Req'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: A Service: DW exhaust ·	Radiation (RAD)	3.1x10 ⁴	•	(4)		Appx 1 Note 1	NCR BFNNEB8019
Location: 8	Aging	N/A		(2)		Appx 1 Note 1	tt -
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	. (4)	N/A	N/A	N/A

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>

NEB-64-050, APPENDIX 1, REVISION 0

1. To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. NEB- 64-052 Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date ENVIRONMENT DOCUMENTATION REF OUTSTANDING OUALIFICATION EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Qualifi-Specifi-Specifi-Qualifi-Parameter cation cation cation cation System: Primary containment 1 year Operating NCR ADDX 1 Plant ID No. FCV-64-31 Note 1 Time BFNNEB8019 (1)- MPL #16-19-6A Component: Limit Temperature Switch Figure 11 (F) 11 B.12(1,2,3) Manufacturer: Namco (4) ·· , Table n 11 × . D1200G B.1(1,2,3) Model No.: Pressure . . (PSIA) (4) Inbd isol Function: valve 100 11 Relative Humidity(%) (4) Accuracy: N/A Reg'd: 3 ·N/A 1. 44 N/A N/A Demon: Chemical N/A (4) N/A • Spray A Category: 3.1x10⁴ • • • Appx 1 NCR Radiation Standby gas Service: Note 1 BFNNEB8019 (RAD) (4) Appx 1 Note 1 11 12 Location: Aging N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

alex Mehikow Prepared by: Charles Junk Reviewed by:

QA Acceptance:

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NEB-64-052, APPENDIX 1, REVISION 0

1. To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90°C (194°F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.
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		SYSTEM COMPON	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclea	ar Plant					Sheet No. NEB-6	4-053
Jnit: 1,2,3					1	Revision 0	
Docket: 50-259, 50-260, 50-	-296					Date <u>10/27/</u>	/80
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary Containment Plant ID No. See Appendix 1 Note 1	Operating Time	A-1 hour B-1 year	30 days	(1)	Appxl Note 2	Appx 1 Note 4	See NCR BFNNEB8031
Component: Solenoid Valve	Temperature (F)	Figure B.8(1) B.8(2,3)	290	(4)	tî	Type Test [.]	None
ASCO -		Table	60	• •• ,	tt _	11	11
Model No.: WPHTX8300B45F	Pressure (PSIA)	B.1(1,2,3)		(4)	·		
Function: Supp. Chamber Exh. Inbd. Isol. Valve	Relative Humidity(%)	100	100	(4)	11	12	11
Accuracy: Req'd: Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: ^A Service: FCV-64-32	Radiation (RAD)	2.1x10 ⁷	1x 10 ⁶	· (4)	See Appx 1 Note 3	See Appx 1 Note 4	See NCR BFNNEB8031
Cont. Location: 8	Aging	N/A		(2)		tt	n
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: <u>Alex Mehnikow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

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NEB-64-053

Appendix 1, Rev 0

1. This sheet applies to the following items:

 FSV-64-32
 MPL #16-19-7B (Units 1 and 2 only)

 FSV-64-33
 MPL #16-19-4

 FSV-64-34
 MPL #16-19-6

- 2. ASCO report No. AQ5-21678/TR This report covered an 8300 series and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 3. The radiation dose of 1 x 10^6 rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of buna-N material which can withstand doses of 1 x 10^6 rad.
- 4. This solenoid valve is required to close for accident mitigation purposes. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in closing of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in opening of the valve. Notwithstanding this justification, TVA will commit to either a type testing or replacement program for this valve.



Facility: Browns Ferry Nuclea	r Plant	System Compo	NENT EVALUATIC	on-Work Sheet	(Rev 2)	(3) Sheet No. <u>NEB-64</u>	-053A
Unit: $1,2,3$	206		e.	-		Date 10/27/2	80
EQUIPMENT DESCRIPTION	E	NVIRONMENT	•	DOCUMENTAT	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary containment Plant ID No. FSV 64-32 MPL #16-19-7	Operating Time	A - 1 hon B - 1 yea	r 30 days r	(1)	See Appx 1 Note 2	See Appx 1 Note 3	See NCR BFNNEB8031
Component: Solenoid Valve	Temperature · (F)	Figure B.8(1,2,3)	290 F	· ·	şt	Type test.	None
Asco				(4)			
Model No.: HB830081F	Pressure (PSIA)	Table B.1(1,2,3)	60 _.	(4)	π • •	, n ,	-
Function: Supp chamber EXH. INBD. isol valve	Relative Humidity(%)	100	100	(4)	IT	11	H .
Accuracy: Req'd: Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: ^A Service: FCV-64-32	Radiation (RAD)	2.1x10 ⁷	1x10 ⁶	. (4)	See Appx_1 Note 1	See Appx 1 Note 2	See NCR BFNNEB8031
Location:	Aging	N/A		(2)		Appx 1 Note 3	11
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by: alex Meliihow Reviewed by: Charles A

QA Acceptance:

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NEB-64-053A

Appendix 1, Rev 0

- ASCO report No. AQ5-21678/TR This report covered an 8300 series and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 2. The radiation dose of 1×10^6 rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of buna-N material which can withstand doses of 1×10^6 rad.
- 3. This solenoid value is required to close for accident mitigation purposes. Analysis of actual physical configuration of the solenoid value indicates that all postulated solenoid failures would result in closing of the value, thus the value will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in opening of the value. Notwithstanding this justification, TVA will commit to either a type testing or replacement program for this value.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 64-054 Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Revision 0 Docket: 50-259, 50-260, 50-296 10/27/80 Date ENVIRONMENT DOCUMENTATION REF OUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Primary containment Operating A = 1 hour ADDX 1 NCR Plant ID No. FCV-64-32 Time B - 1 year (1) Note 1 BFNNEB8019 MPL #16-19-7B Component: Limit Temperature Switch (F) Figure 11 Ħ B.8(1,2,3) Manufacturer: (4) Namco · · , Table 11 n Model No.: D1200G Pressure B.1(1,2,3) (PSIA) (4) Function: Inb isol valve 100 Relative Ħ 11 Humidity(%) (4) Accuracy: Req'd: N/A ÷ Demon: Chemical · N/A N/A N/A N/A (4) N/A • Spray Category: A 2.1x10⁷ Radiation Appx 1 NCR Supp chamb Service: (RAD) Note 1 BFNNEB8019 (4) 8 Location: Aging Appx 1 Note 1 . Ħ N/A (2) - -Flood Level Elev:552' N/A . Above Flood Level: Yes N/A N/A Submergence N/A N/A N/A (4) No

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

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

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

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

Prepared b	y: alex	Meliikow
Reviewed b	: Charle	s Jurk

-QA Acceptance:_

NEB-64-054, APPENDIX 1, REVISION 0

1. To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models. . . .

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

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· (3) Sheet No. NEB-64-056

Unit: $1.2.3$					1	Revision 0	
Docket: 50-259, 50-260, 50-3	296]	Date 10/27/8	30
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary containment Plant ID No. FCV-64-33 MPL #16-19-4	Operating Time	1 year	-	(1)		Appx 1 Note 1	NCR BFNNEB8019
Component: Limit Switch	Temperature (F)	Figure B.8(1,2,3)				n	11 -
Manufacturer: Namco	-	Table		(4)		n	
Model No.: D1200G	Pressure (PSIA)	B.1(1,2,3)		(4)		~	
Function: Inboard isol valve	Relative Humidity(%)	100		(4)		11	11
Accuracy: Reg'd: N/A Demon:	Chemical Spray	N/A	N/A	(4)	N/A	N/A	N/A
Category: ^A Service: Supp cham	Radiation (RAD)	2.1x10 ⁷	•	· (4)		Appx 1 Note 1	NCR BFNNEB8019
exhaust Location: ⁸	Aging	N/A		(2)		Appx 1 Note 1	11 -
Flood Level Elev:552' ^{N/A} Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

Prepared by:	alex Melnihow
الو	P. N.
Reviewed by:_	Charles Jup

QA Acceptance:



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NEB-64-056, APPENDIX 1, REVISION O

]. To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Sheet No. NEB- 64-056A Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Revision 0 50-259, 50-260, 50-296 10/27/80 Docket: Date DOCUMENTATION REF ENVIRONMENT OUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: CRD system . Operating 1 vear NCR Appx 1 Plant ID No. FCV-64-34 Time (1)Note 1 BFNNEB8019 MPL 16-19-68 Component: Limit Temperature Switch (F) Figure 11 Ħ B.8(1,2,3) Manufacturer: (4) Namco •• • Table 11 tt. . . D1200G • • • Model No.: B.1(1,2,3) Pressure (PSIA) (4) Function: INB ISOL. 100 Relative n 11 VALVE Humidity(%) (4) Accuracy: Reg'd: N/A ÷ Demon: Chemical N/A 'N/A · N/A N/A (4) N/A Spray. Category: A 2.1x10 Radiation Appx 1 NCR Service: (RAD) Note 1 BFNNEB8019 (4) SUPP CHAM EXHAUST Location: 8 Appx 1 Note 1 11 Aging N/A (2) N/A Flood Level Elev:552' Above Flood Level: Yes N/A N/A N/A Submergence N/A N/A (4) No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Prepared by: alex Melnikow Reviewed by: Charles Junk

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QA Acceptance:

NEB-64-056A, APPENDIX 1, REVISION O

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90° C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.

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- SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 64-058 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Contract 90744 & 91750 Specifi-Qualifi-Specification cation cation cation Parameter System: Primary containment NCR See Appx 1 Operating 1 year system BFNNEB8012 Note 1 Plant ID No. PT-64-50 Time (1) MPL # 16-19-28 Component: Pressure Temperature 11 Figures (F) transmitter B.9(1) B.9(2,3) (4) Manufacturer: GEMAC (GE) •••• Ħ 11 Table B.1(1,2,3) Model No.: 552032KAAT1 Pressure (PSIA) (4)Function: Detection 11 ' 11 100 Relative Humidity(%) (4) Accuracy: Req'd: See Section N/A N/A , int N/A 4.1.3 in report Demon: Chemical N/A N/A (4) • 2 Spray Category: A 2.1x10⁷ ----NCR See Appx 1 Radiation BFNNEB8012 Note 1 Service: Drywell press (4) (RAD) 9 Aging N/A (2) Location: N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes (4) N/A N/A Submergence No Notes: (1) See Section 2.4 in 79-01B report. alex Melnihow Prepared by: (2) See Section 4.1.2 in 79-01B report. (3) All notes and other information not on these

sheets are on the attached appendix sheets.

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

Reviewed by: Charles QA Acceptance:

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. NEB-64-58 Appendix 1 Revision O

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- The manufacturer's specifications for the pressure transmitters are as follows:

Temperature '	'- 185 ⁰ F
Pressure ·	- Atmospheric
Relative Humidity	- Not Specified
Radiation	- Not Specified

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of 1×10^4 per Table C-l of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than $2x10^4$), with an accident dose of only $6x10^4$, which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

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Sheet No. NEB- 64-059

(3)

Unit: 1,2,3						Kevision 0	
Docket: 50-259, 50-260, 50-	-296	Ŧ			1	Date 10/27/	/80
EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary containment system Plant ID No. PT-64-51 MPL # 16-19-36	Operating Time	A - 1 day B - 1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8012
Component: Pressure transmitter Manufacturer: GEMAC (GE)	Temperature (F)	Figures B.6(1) B.6(2,3)		(4)		ξ ι .	It
Model No.: 551032CAAE1	Pressure (PSIA)	Table B.1(1,2,3)		`···. (4)		11 ~	TT .
Function: Pressure	Relative Humidity(%)	100	· · ·	(4)		11	11 -
Accuracy: Req'd: See Section Demon: 4.1.3 in report	Chemical Spray	N/A ·	N/A .	(4)	N/A	N/A ·	N/A
Category: ^A Service: ^{Supp} chamb .	Radiation (RAD)	3.1x10 ⁷		(4)	`	See Appx 1 Note 1	NCR BFNNEB8012
Location: 6	Aging	N/A		(2)		ti	и.
Flood Level Elev:552' N/A Above Flood Level: Yes	Submergence	NZA	N/A	(4)	N/A	N/A	N/A

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

No

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

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

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

repared by recurrent	
Reviewed by: Charles Jurk	

QA Acceptance:

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. NEB-64-59 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

Temperature [.]	'- 185 ⁰ F
Pressure	- Atmospheric
Relative Humidity	- Not Specified
Radiation .	- Not Specified

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of 1×10^4 per Table C-l of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than $2x10^4$), with an accident dose of only $6x10^4$, which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



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Facility: Browns Ferry Nuclear Unit: 1,2,3 Docket: 50-259 50-260 50-2	Plant	System Compon	IENT EVALUATIO	ON WORK SHEET	(Rev [°] 2)	(3) Sheet No. <u>NEB- 6</u> Revision <u>0</u> Date <u>10/27</u> /	1-060
EQUIPMENT DESCRIPTION	E	NVIRONMENT		DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
Contract 90744 & 91750	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		,
System: Primary containment system Plant ID No. PX-64-51 MPL # 16-19-43	Operating Time	A - 1 hour B - 1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8005
Component: Power supply	Temperature (F)	FIGURES B.12(1) B.12(2,3)	*			TI	11
Manufacturer: General Electri	c '			(4)			
Model No.: 570012FAAC1	Pressure (PSIA)	TABLE B.1(1,2,3)		· · · · (4)		н 19 х	11 • ·
Function: Pressure	Relative Humidity(%)	100	:	(4)	2		11
Accuracy: Req'd: See Section Demon: 4.1.3 in report	Chemical Spray	N/A	N/A .	(4)	N/A	N/A	N/A
Category: A Service: Supp chamb	Radiation (RAD)	3.1x10 ⁴		(4)		See Appx 1 Note 1	NCR BFNNEB8005
Location: 12	Aging	N/A		(2)		11	11
Flood Level Elev:552: N/A Above Flood Level: Yes	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

alex Mehikow Prepared by: Reviewed by: harlos-

QA Acceptance:

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NEB-64-060

Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. GE Power Supplies are well known to be high quality equipment and have performed well throughout the industry in normal plant service. Depending on the results of this continued analysis, TVA will type test or replace this equipment.



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	:	SYSTEM COMPO	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclean	r Plant			-	2	Sheet No. NEB-64.	-061
Unit: 1,2,3					1	$\frac{10/27/8}{10/27/8}$	20
Docket: 50-259, 50-260, 50-2	290 T Ei	UNTRONMENT		DOCUMENTA	TTON REF		OUTSTANDING
FOUTPMENT DESCRIPTION				DOCOLLATA		METHOD	ITEMS
Contract 90744 & 91750		Specifi-	Qualifi-	Specifi-	Qualifi-		
	Parameter	cation	cation	cation	cation		
System: Primary containment Plant ID No. LT-64-54	Operating Time	$\begin{array}{c} A = 1 \ hr \\ B = 1 \ yr \end{array}$	2 hours	(1)	See Appx 1 Note 1	See Appx 1 Note 2	See NCR BFNNEB8023
MPL #16-19-38	Town one tune	·					
transmitter	(F)	Figure	300 F		11	Type testing	None
Manufacturer:		B.0(1,2,3)		(4)			
Rosemount				······			· · · ·
		Table	25	** *	· · ·	11	u
Model No.: 1151 series	Pressure (PSIA)	B.1(1,2,3)		(4)			-
Function: Supp pool water level	Relative Humidity(%)	100	100	(4)	11	11	12
Accuracy: Reg ¹ d:							
Demon:	Chemical Spray	N/A	N/A :	(4)	N/A	N/A	N/A
Category: A,B		7	a 10 ⁶				0 1100
Service: Power supply .	Radiation (RAD)	3.1x10	2x10	(4)	Note 1	See Appx 1 Note 2	See NCR BFNNEB8023
Location: 6	Aging	N/A	ι	(2)		Appx 1 Note 2	n
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	N/A	N/A	N/A

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

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

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

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

alex Mehil Prepared by:___ Charles Time Reviewed by:

QA Acceptance:___

NEB-64-061, APPENDIX 1, REVISION 0

- 1. Rosemount test report 37327B and 127227, revision B (Wyle summary report QSR 048-A-01).
- 2. The operating time of one hour (category A) is surpassed by the two-hour test duration. The category B operating time of one year requires only that the transmitter not fail in a manner detrimental to plant safety or accident mitigation. TVA's examination of the functioning of this device has not revealed any reasonable probability of such a failure occurring.

The radiation dose of 3.1 X 10⁷ is based on the worst case dose at surface of pipes. The transmitter is located several feet from the pipe. It is expected that further analysis and modeling of pipes will reduce the actual dose to the transmitter to the dose at which the transmitter is qualified. Such analyses and modeling programs will be performed to confirm these assumptions. If these assumptions cannot be verified, the instruments will be either type tested or replaced.

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		SYSTEM COMPO	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3)	
Facility: Browns Ferry Nuclear	Plant				<u> </u>	Sheet No. NEB- 64	-062
Unit: 1.2.3	• • • • • • • • • • • • • • • • • • • •				F	Revision 0	
Docket: 50-259, 50-260, 50-2	96				- I	Date 10/27/2	30
	E	NVIRONMENT		DOCUMENTA	TION REF	QUALIFICATION	OUTSTANDING
EQUIPMENT DESCRIPTION		1			0.1101	METHOD	ITEMS
Contract 90744 & 91750	D	Specifi-	Qualiri-	Specifi-	Qualifi-		ŝ
Sustant Primary	Parameter	cation	cation	cation	cation		
containment	Oňersting	1 vear				See Appx 1	NCR
Plant TD No TE- 64-55A.D.E.F	Time			(1)		Note I	BENNEB8034
MPL # 16-19-33	1 Inte						
Component: Temperature	Temperature		i			j1	11
elements	(F)	Figures		×			
-		B.6(1,2,	3)		{		
Manufacturer: American				(4)			
Standard .		Tabla		• •• .		21	น
158B7070P051	_	R 1(1 2	21		•	· ·	
Model No.: 150010191091	Pressure	5.1(1,2,		(11)		-	
Function, Temp	(PSIA)			(4)			<u> </u>
indicator	Rolativo	100				n .	n .
	Humidity(%)		1	(4)			
Accuracy:							
Reg'd: N/A							
Demon:	Chemical	N/A	N/A	(4)	N/A	N/A	N/A
	Spray				· •.		
Category: ^A		2 1/107			****	See Annu 1	Con NOR
Suppression	Radiation	5.1210				Noto 1	DEENNEDSO16
Service: Pool	(RAD)			(4)			DEMMEDOUIO
6				(α)		Appx 1 Note 1	None
Location:	Aging	N/A		(2)			
Flood Level Flev:5521 N/A							
Above Flood Level • Yes	Submergence	N/A	N/A	(U)	N/A	· N/A	N/A
	Propiner Renner		117 A	(1)			
			II		[l	

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

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

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

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

Prepared	by:_	alex	Melnihow	
Reviewed	by:_	Charle	1 Junk	_

QA Acceptance:



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NEB-64-62, APPENDIX 1, REVISION 0

1. Qualification to the specified environmental conditions cannot be documented as this time. However, due to the nature of the materials involved (type 304 SS, copper constrantan, magnesium oxide insulation), it is reasonable to conclude that interim operation is justified. TVA will pursue documented qualification or commit to type testing or replacement.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant						Sheet No. <u>NEB-64-063</u>		
Unit: 1,2,3						Revision 0	80	
FOUTPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING '	
Contract 90744 & 91750	· · ·	Specifi-	· Qualifi-	Specifi-	Qualifi-			
	Parameter	cation	cation	cation	cation			
System: Primary containment Plant ID No. TE-64-55(B&C) MPL # 16-19-25	Operating · Time	1 year		(1)		See Appx 1 Note 1	NCR BFNNEB8016	
Component: Temperature Elements	Temperature (F)	Figures B.6(1,2,	3)	(11)	~	H	H	
Standard			·	(4)			•	
Model No.: 158B7079P001	Pressure (PSIA)	Table B.1(1,2,1)	3)	(4)	• .	n ~	u	
Function: Temp indicator	Relative Humidity(%)	100	;	(4)	II	n	11	
Accuracy: Req'd: Demon:	Chemical Spray	N/A	: N/A .	(4)	N/A	- N/A	N/A	
Category: A Service: Suppression .	Radiation (RAD)	3.1x10 ⁷		(4)	•••	See Appx 1 Note 1	See NCR BFNNEB8016	
Location: 6	Aging	N/A		(2)		Appx 1 Note 1	n -	
Flood Level Elev:552' N/A Above Flood Level: Yes No	Submergence	N/A	N/A	(4)	NŻA 🛓	N/A	N/A	
Notes: (1) See Section 2.4 in (2) See Section 4.1.2 (3) All potes and other	79-01B report in 79-01B repo	rt.	<u>م</u>		Prepared 1	by: alex M	lebuihow	

hese (3) ATT sheets are on the attached appendix sheets.

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

Prepared by:	alex Melnihow
Reviewed by:	Charles Turk
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(3)

QA Acceptance:

NEB-64-063, APPENDIX 1, REVISION 0

1. Qualification to the specified environmental conditions cannot be documented at this time. However, due to the nature of the materials involved (type 304 SS, copper constrantan, magnesium oxide insulation), it is reasonable to conclude that interim operation is justified. TVA will pursue documented qualification or commit to type testing or replacement.

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Preilitus Promo Ponny Nuclea	. Plant	System Compo	NENT EVALUATIO	N WORK SHEET	(Rev 2)	(3) Sheet No. NEB- cu	·
Unit: 1.2.3	TIANC					Revision 0	-00
Docket: 50-259, 50-260, 50-2	296			1	۰	Date 10/27/8	0
EQUIPMENT DESCRIPTION Contract 90744 & 91750	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specifi- cation	Qualifi- cation	Specifi- cation	Qualifi- cation		
System: Primary containment system Plant ID No. PS-64-56(A-D) MPL # 5-12(A-D)	Operating Time	1 day	6 hours ·	(1)	See Appx 1 Note 1	See Appx 1 Note 3	NCR BFNNEB8020
Component: Pressure switch Manufacturer: Static-O-Ring Model No.: 12N/AA4 Function: Half scram	Temperature (F)	Figures B.9(1) B.9(2,3)	212 F	(4)	11	Generic test	None
	Pressure (PSIA)	Table B.1(1,2,	3) 15	· · · · · · · · · · · · · · · · · · ·	11	11 ~	None
	Relative Humidity(%)	100	100	(4)	LT	11	11
Accuracy: Req'd: See section Demon: 4.1.3 of report	Chemical Spray	N/A	: N/A 、	(4)	N/A	N/A	N/A
Category: A Service:	Radiation 4 (RAD)	B 2.1x10 ⁷ 6	1x10 ⁶	(4)	See Appx 1 Note 2	See Appx 1 Note 3	None
Drywell press Location:	Aging	D 2.3x10 N/A		(2)		APPX NOTE 3	NONE
9 Flood Level Elev:552' Above Flood Level: Yes N/A No	Submergence	N/A	N/A	(4)	N/A	N/A	None N/A
Notes: (1) See Section 2.4 in (2) See Section 4.1.2	79-01B report in 79-01B repo	rt.	-	**************************************	Prepared by	: alex Me	likow

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

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

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Prepared	by: alex Melnihow	
Reviewed	by: Charles Surks	_

QA Acceptance:
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- 1. Viking lab report 30203-2 (generic component)
- 2. The radiation dose of 1 X 10⁶ rad is based upon a materials analysis of the pressure switch. The material in the device which limits the allowable radiation dose are the seals (Buna-N) which, according to several studies including the guidelines furnished in bulletin 79-01B, are acceptable up to a dose of 1 X 10[°] rad.
- 3. The radiation dose specified is based upon a total accident dose plus normal dose. Since this device is required to operate for only one day, the actual dose was calculated to be approximately 8 X 10[°] rad; therefore, this device should not be adverse affected by radiation over its operating time period.

Based on the materials evaluation and the temperature and radiation doses encountered by this device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 1 day has been considered, and TVA has identified no adverse effects from temperature (or other parameters) on the functioning of this device. • •

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#### SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. <u>NEB-64-065</u> Revision 0

Date

10/27/80

OUTSTANDING

ITEMS

BFNNEB8020

NCR

None

None

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N/A

None

None

N/A

t

DOCUMENTATION REF QUALIFICATION ENVIRONMENT METHOD EQUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Specifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Primary containment Operating 30 days 6 hours See Appx 1 See Appx 1 system Plant ID No. PS-64-57(A-D) (1)Time Note 1 Note 3 MPL ∉ 10-100 Component: Pressure Temperature Figures 11 (F) 212 F switch B.9(1) Generic test B.9(2,3) (4) Manufacturer: Static-O-Ring Table • • •  $B.1(1,2,\beta)$ π. 11 15 Model No.: 12N/AA4 Pressure (PSIA) (4) Function: High 11 11 100 100 Relative L. Humidity(%) (4) Accuracy: See section Req'd: ÷ 4.1.3 of report N/A N/A · N/A (4) Demon: Chemical N/A · •, Spray Category: A 1x10<sup>6</sup> A, C 2. 3x10<sup>6</sup> .... See Appx 1 See Appx 1 Radiation NOTE 2 (4) Service: (RAD) Drywell press B, D 2. 1X 10 APPX 1 NOTE 3 (2) Location: Aging NZA

N/A

(4)

No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Submergence

N/A

| Prepared by:  | alex   | Melinkow |
|---------------|--------|----------|
| Reviewed by:_ | Charle | + Jurk   |

N/A

QA Acceptance:

N/A

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Flood Level Elev:552' Above Flood Level: Yes N/A



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- 1. Viking lab report 30203-2 (generic component)
  - 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The material in the device which limits the allowable radiation dose are the seals (Buna-N) which, according to several studies including the guidelines fugnished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.
  - 3. The radiation dose specified is based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad. This dose is based upon several conservative assumptions and could be reduced by more accurate specific modeling techniques. In TVA's opinion, such modeling analysis should be able to reduce the actual dose to below 1 X 10° rads.

Based on the materials evaluation and the temperature and radiation doses encountered by this device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or other parameters) on the functioning of this device.

TVA will commit to perform the necessary analysis to model the actual dose levels to this device. Should the results prove inconclusive, TVA will type test the device or replace it with a qualified substitute.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)



(3)

Sheet No. NEB- 61 056 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date Docket: 50-259, 50-260, 50-296 QUALIFICATION ENVIRONMENT DOCUMENTATION REF OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Specifi-Qualifi-Contract 90744 & 91750 Qualifi-Parameter cation cation cation cation System: Primary containment Operating system Plant ID No. PS-64-58(A-D) See Appx 1 NCR 6 hours See Appx 1 30 days Time (1)Note 1 Note 3 BFNNEB8020 MPL # 10-101(A-D) Component: Pressure Temperature Figures (F) 11 B.9(1) 212 F Generic test None switch B.9(2,3) (4) Manufacturer: Static-O-Ring Table •••• 11 . B.1(1,2,3) \*\* 15 None Model No.: BZT-M12SS Pressure (PSIA) (4) Function: High 11 Relative 11 Ħ 100 100 (4) Humidity(%) Accuracy: Req'd: See section ÷ . . . . N/A Demon: 4:1.3 of report N/A N/A (4) Chemical N/A N/A Spray Category: A • • • 1x10<sup>6</sup> A C 2.3x10<sup>6</sup> NCR See Appx 1 See Appx 1 Radiation BFNNEB8020 BC 2.1x10 Note 2 Note 3 (4) Service: Drywell press (RAD) ς. Appx 1 Note 3 N/A (2) None Location: 9 Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence

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

No

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

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

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

Mehrikow alex. Prepared by: harles Reviewed by: /

QA Acceptance:

#### NEB-64-066, APPENDIX 1, REVISION 0

- 1. Viking lab report 30203-2 (generic component)
- 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The material in the device which limits the allowable radiation dose are the seals (Buna-N) which, according to several studies including the guidelines fugnished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.
- 3. The radiation dose specified is based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad. This dose is based upon several conservative assumptions and could be reduced by more accurate specific modeling techniques. In TVA's opinion, such modeling analysis should be able to reduce the actual dose to below 1 X 10° rads.

Based on the materials evaluation and the temperature and radiation doses encountered by this device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or other parameters) on the functioning of this device.

TVA will commit to perform the necessary analysis to model the actual dose levels to this device. Should the results prove inconclusive, TVA will type test the device or replace it with a qualified substitute. ,

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| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | r Plant                  | SYSTEM COMPO         | NENT EVALUATIO<br>- | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-64</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -067                  |
|-------------------------------------------------------------------------------|--------------------------|----------------------|---------------------|--------------------|----------------------|----------------------------------------------------------------------------|-----------------------|
| EQUIPMENT DESCRIPTION                                                         | E                        | NVIRONMENT           |                     | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                        | Parameter                | Specifi-<br>cation   | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                                                                            |                       |
| System: Primary<br>containment<br>Plant ID No. LT-64-66<br>MPL #16-19-24      | Operating<br>Time        | 1 year               | 2 hours             | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                       | See NCR<br>BFNNEB8023 |
| Component: Level<br>transmitter                                               | Temperature<br>(F)       | Figure<br>B.6(1,2,3) | 300 F               |                    | 19                   | Type test                                                                  | None                  |
| Manufacturer: Rosemount                                                       |                          |                      | 5                   | (4)                |                      |                                                                            | *                     |
| Model No.: 1151 series                                                        | Pressure<br>(PSTA)       | Table<br>B.1(1,2,3)  | 25                  | ••••               |                      | H<br>                                                                      | n<br>-                |
| Function: Water level<br>indicator                                            | Relative<br>Humidity(\$) | 100                  | 100                 | (4)                | tt                   | 11                                                                         | u •                   |
| Accuracy:<br>Reg'd:<br>Demon:                                                 | Chemical<br>Spray        | N/A                  | :<br>N/A .          | (4)                | N/A                  | N/A                                                                        | N/A                   |
| Category: A<br>Suppression<br>Service: Chambon unter                          | Radiation<br>(RAD)       | 3.1x10 <sup>7</sup>  | 2 × 10 <sup>6</sup> | (4)                | See Appx 1<br>Note 1 | See App 1<br>Note 2                                                        | See NCR<br>BFNNEB8023 |
| Location:                                                                     | Aging                    | N/A                  | 4                   | (2)                | ÷                    | Appx 1 Note 2                                                              | ti                    |
| N/A<br>Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                  | Submergence              | N/A -                | N/A                 | (4)                | N/A                  | N/A .                                                                      | N/A                   |

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

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

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

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

alex Mehilow Prepared by: Charles Junk Reviewed by:

QA Acceptance:

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### NEB-64-067, APPENDIX 1, REVISION O

- 1. Rosemount test report 37327B and 127227, revision B (Wyle summary report QSR 048-A-01).
- 2. The radiation dose of 3.1 X 10<sup>7</sup> rad is based on the worst case dose in the room (surface of RHR pipe). The transmitter is located several feet from the pipe. It is expected that further analysis and modeling of radiation sources (pipes) will reduce the actual dose to the dose at which the transmitter is qualified. Such analyses and modeling programs will be performed to confirm these assumptions.

Although the test performed was of a 2-hour duration, the oeprating time of one year is not expected to be a problem. The radiation dose over the one-year period (based on the above assumptions) was fully imparted in the test. The effects of pressure over one year should not appreciably differ from the effects during the test period. Temperature effects are also seen to have no appreciable effects upon the functioning of this device.

Similarly, the aging effects are expected to have little effect on the proper functioning of this equipment. TVA will commit, however, to a program of further analysis or type testing since insufficient documentation is available to make a conclusive judgement.

| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2    | r Plant<br>296          | System Compon                 | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 6<sup>1</sup></u><br>Revision <u>0</u><br>Date <u>10/27/</u> | I-068<br>80          |
|----------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|---------------------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                            | E                       | NVIRONMENT                    | •                  | DOCUMENTAT         | TION REF           | QUALIFICATION<br>METHOD                                                               | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                           | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                                       |                      |
| System: Primary containment<br>system<br>Plant ID No. PT-64-67<br>MPL # 16-19-23 | Operating<br>Time       | 1 year                        |                    | (1)                |                    | See Appx 1<br>Note 1                                                                  | NCR<br>BFNNEB8012    |
| Component: Pressure<br>transmitter<br>Manufacturer: CEMAC (CE)                   | Temperature<br>(F)      | Figures<br>B.9(1)<br>B.9(2,3) |                    | (4)                |                    | 11                                                                                    | 11                   |
| Model No.: 556220BAAA1                                                           | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           |                    | (4)                |                    | 11                                                                                    | **                   |
| Function: Detection                                                              | Relative<br>Humidity(%) | 100 <sup>.</sup>              |                    | (4)                |                    | 11                                                                                    | 17                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                        | Chemical<br>Spray       | N/A                           | N/A _              | (4)                | N/A                | N/A                                                                                   | N/A                  |
| Category: A<br>Service: Drywell press                                            | Radiation<br>(RAD)      | 2.3x10 <sup>6</sup>           | •                  | (4)                | ****               | See Appx 1<br>Note 1                                                                  | NCR<br>BFNNEB8012    |
| Location: 9                                                                      | Aging                   | N/A                           |                    | (2)                |                    | ١١                                                                                    | N .                  |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No             | Submergence             | N/A                           | N/A                | (4)                | N/A                | N/A                                                                                   | N/A                  |

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

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

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

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

| Prepared | by: | alex Melinkow |
|----------|-----|---------------|
| Reviewed | by: | Charles Junk  |

QA Acceptance:

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#### . NEB-64-68 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

|   | Temperature <sup>.</sup> | '- '185 <sup>0</sup> F |               |  |  |  |  |
|---|--------------------------|------------------------|---------------|--|--|--|--|
|   | Pressure                 | -                      | Atmospheric   |  |  |  |  |
| • | Relative Humidity        |                        | Not Specified |  |  |  |  |
|   | Radiation                | _                      | Not Specified |  |  |  |  |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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| Facility: Browns Ferry Nuclear                                          | Plant                   | SYSTEM COMPO         | NENT EVALUATIO      | n work sheet       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-68</u><br>Bevision 0 | -069                 |
|-------------------------------------------------------------------------|-------------------------|----------------------|---------------------|--------------------|----------------------|----------------------------------------------|----------------------|
| UNIC: 1,2,3<br>Dookat: 50-250 50-260 50-2                               | 206                     |                      |                     |                    |                      | Date 10/27/8                                 | 30                   |
| EQUIPMENT DESCRIPTION                                                   | Ei                      | NVIRONMENT           |                     | DOCUMENTA          | FION REF             | QUALIFICATION<br>METHOD                      | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                  | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                                              |                      |
| System: Reactor water<br>recirculating<br>Plant ID No. Appx 1<br>Note 5 | Operating<br>Time       | 1 year               | 24 hours            | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                         | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                            | Temperature<br>(F)      | Figure<br>B.0(1,2,3) | 250 F               |                    | 11                   | See Appx 1<br>Note 2                         | n                    |
| Manufacturer: Limitorque                                                | <u>م</u>                |                      |                     | (4)                |                      |                                              |                      |
| Model No.: SMB-2                                                        | Pressure<br>(PSIA)      | Figure<br>B.0(1,2,3) | 40                  | · · · · · (4)      | H .                  | H .                                          | и                    |
| Function: Recirc pump<br>"A" suction                                    | Relative<br>Humidity(%) | 100                  | 100                 | (4)                | tt                   | Type test                                    | None                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                       | Chemical<br>Spray       | N/A                  | N/A .               | (4)                | N/A                  | N/A                                          | N/A                  |
| Category: <sup>A</sup><br>Service:                                      | Radiation<br>(RAD)      | 2x10 <sup>8</sup> ¥  | 2x10 <sup>8</sup> ¥ | (4)                | See Appx 1           | See Appx 1                                   | None .               |
| Water<br>Location:                                                      | Aging                   | N/A                  |                     | (2)                |                      | Appy_1_Noto_2                                | None                 |
| Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                   | Submergence             | N/A                  | N/A                 | (4)                | N/A                  | N/A                                          | N/A                  |

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

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

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

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

| Prepared by:      | alex Mehipow |
|-------------------|--------------|
| -<br>Reviewed by: | Charles Turk |

QA Acceptance:

#### NEB-68-69, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement, the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand  $325^{\circ}$  F for five minutes  $\cdot$ followed by a gradual decline to  $250^{\circ}$  F after one hour without allowing the motor temperature and internals to exceed  $280^{\circ}$  F. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to  $280^{\circ}$  F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise the tests for Limitorques with Class B insulation

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

- 4. The effects of beta radiation is insignificant; see 4.1.4 of the report.
- 5. This sheet applies to the following:

FCV 68-1, -77 (MPL #2-43)

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| Unit: 1,2,3<br>Docket: 50-259,50-260,50-2                                            | 296                     |                                            |                    |                    |                      | Revision 0<br>Date 10/27/8 | )                    |
|--------------------------------------------------------------------------------------|-------------------------|--------------------------------------------|--------------------|--------------------|----------------------|----------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                                | E                       | NVIRONMENT                                 |                    | DOCUMENTAT         | TION REF             | QUALIFICATION<br>METHOD    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                               | Parameter               | Specifi-<br>cation                         | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                            |                      |
| System: Reactor water<br>recirculating<br>Plant ID No. <sup>•</sup> Appx 1<br>Note 5 | Operating<br>Time       | 1 year                                     | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3       | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                         | Temperature<br>(F)      | Figures<br>B.1(1,2,3                       | ) 250 F            |                    | ti                   | See Appx 1<br>`Note 2      | 11                   |
| Limitorque                                                                           |                         | TABLE<br>B.1(1,2,3                         | ) 40               | · ··               | и.                   | 11                         | ti                   |
| Model No.: SMB-3                                                                     | Pressure<br>(PSIA)      |                                            |                    | (4)                |                      |                            |                      |
| Function: Recirc pump "A"<br>disch                                                   | Relative<br>Humidity(%) | 100                                        | 100                | (4)                | - (t                 | Type test                  | None                 |
| Accuracy: NA<br>Req'd:<br>Demon:                                                     | Chemical<br>Spray       | N/A                                        | N/A .              | (4)                | N/A                  | N/A                        | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Water</sup> -                                | Radiation<br>(RAD)      | δ 2x10 <sup>8</sup><br>β 4x10 <sup>9</sup> | 2x10 <sup>8</sup>  | (4)                | Sëe Appx 1<br>Note 1 | See Appx 1<br>Note 4       | None                 |
| Location: 0                                                                          | Aging                   | N/A                                        |                    | (2)                |                      | Appx 1 Note 3              |                      |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes 584':                            | , Submergence           | N/A                                        | N/A                | (4)                | N/A                  | N/A .                      | N/A                  |

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

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

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

| Prepared | by: alex Meluhow |
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| Reviewed | by: Charles Turk |

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QA Acceptance:

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#### NEB-68-070, APPENDIX 1, REVISION 0

- 1. Limitorque test reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

- 4. The effects of beta radiation is insignificant; see 4.1.4 of the report.
- 5. This sheet applies to the following:

FCV-68-3, -79 (MPL #2-53)

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Unit:

(3) Sheet No. NEB-68-72A Revision 0 10/27/80 Date

1,2,3 50-260, 50-296 Dookat .

| EQUIPMENT DESCRIPTION                                                           | ENVIRONMENT                       |                              |                   | DOCUMENTATION REF  |                        | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|---------------------------------------------------------------------------------|-----------------------------------|------------------------------|-------------------|--------------------|------------------------|-------------------------|----------------------|
| Contract 90744 & 91750                                                          | Parameter                         | Specifi-<br>cation           | Qualifi-          | Specifi-<br>cation | Qualifi-<br>cation     |                         |                      |
| System: Reactor Water<br>Recirc System<br>Plant ID No. PS-68-96<br>MPL #2-3-52D | Operating<br>Time                 | 1 year                       | б hours           | (1)                | - See Appx 1<br>Note 1 | Appx 1<br>Note 2        | ncr<br>Bfnneb8010    |
| Component: Pressure<br>Switch                                                   | Temperature<br>(F)                | Figure<br>B.4(1)<br>B.4(2,3) | 212 F             | (4)                | n                      | Test                    | None                 |
| Model No.: 288                                                                  | Pressure                          | Table<br>B.1(1,2,3)          | 15                | · · ·              | Π.                     | Test                    | None                 |
| Function: Core<br>Spray                                                         | (PSIA)<br>Relative<br>Humidity(%) | 100                          | 100               | (4)                | 11                     | Test                    | None                 |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in rpt                          | Chemical<br>Spray                 | N/A                          | N/A .             | (4)                | N/A                    | N/A                     | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> Inter-                        | Radiation<br>(RAD)                | · 3x10 7                     | 3x10 <sup>6</sup> | (4)                | Šee Appx 1<br>Note 1   | Appx 1<br>Note 3        | NCRe<br>BFNNEB8010   |
| Location:                                                                       | Aging                             | N/A                          |                   | (2)                |                        | Appx 1 Note 2           | None ·               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                       | Submergence                       | N/A                          | N/A               | (4)                | N4                     | NA                      | NA                   |

See Section 2.4 in 79-01B report.

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

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

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

alex Melnikow Prepared by: Reviewed by:

QA Acceptance:

#### NEB-68-72A, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that an operating time of one year would create problems with the proper functioning of this device. Similarly, aging is not expected to adversely affect the proper functioning of the instrument; however, the available data is inconclusive.
- 3. The test for this device does not meet the accident requirements for radiation; however, it is expected, based on further modeling analysis and a materials analysis, that this device could pass a test for radiation. TVA will type test this device to confirm the above or replace it with qualified equipment.

| Beedlakus Busima Ponny Nuclon                                            | . Plant                        | System Compon                            | NENT EVALUATIO     | ON WORK SHEET                           | (Rev 2)              | (3)<br>Sheet No. NEB- co |                      |
|--------------------------------------------------------------------------|--------------------------------|------------------------------------------|--------------------|-----------------------------------------|----------------------|--------------------------|----------------------|
| racility: browns rerry nuclear<br>Unit: 123                              | r Flant                        |                                          |                    |                                         |                      | Revision 0               |                      |
| Docket: 50-259, 50-260, 50-2                                             | 296                            |                                          | <                  |                                         |                      | Date 10/27/0             | 30                   |
| EQUIPMENT DESCRIPTION                                                    | E                              | NVIRONMENT                               |                    | DOCUMENTA                               | TION REF             | QUALIFICATION<br>METHOD  | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                   | Parameter                      | Specifi-<br>cation                       | Qualifi-<br>cation | Specifi-<br>cation                      | Qualifi-<br>cation   |                          |                      |
| System: Reactor Water<br>Cleanup<br>Plant ID No. FCV-69-1<br>MPL # 12-15 | Operating<br>Time              | A - 1 hour<br>B - 1 ỳear                 | 24 hours           | (1)                                     | See Appx 1<br>Note 1 | Type Test                | None                 |
| Component: Motor<br>operator<br>Manufacturer:                            | Temperature<br>(F)             | Figure<br>B.0(1,2,3)                     | 250 F              | . (4)                                   | 11                   | 11                       | 11                   |
| Limitorque<br>Model No.: SMB-0                                           | Pressure<br>(PSIA)             | Figure<br>B.0(1,2,3)                     | 40                 | • • • • • • • • • • • • • • • • • • • • | Π.                   | Appendix 1<br>Note       | NCR<br>BFNNEB8034    |
| Function: Clean Inner .<br>Isolation                                     | Relative<br>Humidity(%)        | 100                                      | 100                | (4)                                     | 11                   | Type Test                | None                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                        | Chemical <sup>^</sup><br>Spray | N/A ·                                    | N/A :              | (4)                                     | N/A                  | N/A                      | N/A                  |
| Category: A<br>Service: Water                                            | Radiation<br>(RAD)             | 2x10 <sup>8</sup> -<br>4x10 <sup>9</sup> | 2x10 <sup>8</sup>  | (4)                                     | See Appx 1<br>Note 4 | Type Test                | None .               |
| Location: 0                                                              | Aging                          | N/A                                      |                    | (2)                                     |                      | Appx 1 Note 2            | None *               |
| Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                    | Submergence                    | N/Å                                      | N/A                | (4)                                     | N/A ,                | N/A                      | N/A <sup>°</sup>     |

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

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

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

Prepared by: alex Melinhow Reviewed by: Charles Turk

QA Acceptance: -



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#### NEB-69-73, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accidental environment, in TVA's engineering judgement, the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model oeprator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand  $325^{\circ}$  F for five minutes followed by a gradual decline to  $250^{\circ}$  F after one hour without allowing the motor temperature and internals to exceed  $280^{\circ}$  F. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to  $280^{\circ}$  F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with class B insulation.

Effects of beta radiation are insignificant; see section 4.1.4 of report.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. <u>NEB-69-74</u> Revision <u>0</u> Date <u>10/27/80</u>

| Docket: 50-259, 50-200, 50-2                                            | .90                     |                                |                    | · · · · ·          | L                    |                         | <u></u> _            |
|-------------------------------------------------------------------------|-------------------------|--------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                   | ENVIRONMENT             |                                |                    | DOCUMENTAT         | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                  | Parameter               | Specifi-<br>cation             | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | -                       |                      |
| System: Reactor water<br>cleanup<br>Plant ID No. FCV-69-2<br>MPL #12-18 | Operating<br>Time       | A - 1 day<br>B - 1 year        | 1 day              | (1)                | See Appx 1<br>Note 1 | Type test               | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:                           | Temperature<br>(F)      | Figure<br>B.11(1)<br>B.11(2,3) | 250 F              | (4)                | 11                   | 11                      | None                 |
| Model No.: SMB-0                                                        | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)            | 40                 | · · · .<br>(4)     | 11                   | Type test               | None                 |
| Function: Isolation<br>valve                                            | Relative<br>Humidity(%) | 100                            | 100                | (4)                | 11                   | H<br>-                  | 11                   |
| Accuracy:<br>Req <sup>*</sup> d: N/A<br>Demon:                          | Chemical<br>Spray       | N/A                            | N/A                | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: Cleanup                                         | Radiation<br>(RAD)      | 1.5x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None                 |
| Location: 11                                                            | Aging                   | N/A                            |                    | (2)                |                      | Appx 1 Note 2           | None ·               |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No    | Submergence             | N/A                            | N/A                | (4)                | N/A ·                | N/A                     | N/A                  |

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

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

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

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

alex Melinhow Prepared by: Reviewed by:

QA Acceptance:

#### NEB-69-74, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

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## SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

| Facility: Browns Ferry Nuclear Plant                                                        |                          |                      |                    |                    |                    | Sheet No. NEB-69-76     |                         |
|---------------------------------------------------------------------------------------------|--------------------------|----------------------|--------------------|--------------------|--------------------|-------------------------|-------------------------|
| Unit: 1,2,3                                                                                 | 206                      |                      |                    |                    | 1                  | Revision 0              | 80                      |
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                                             | ENVIRONMENT              |                      |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS    |
|                                                                                             | Parameter                | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                         |
| System: Reactor water<br>cleanup<br>Plant ID No. TE-69-29A<br>MPL #12-117A                  | Operating<br>Time        | 1 day                |                    | . (1)              | -                  | Appx 1<br>Note 1        | NCR<br>BFNNEB8022       |
| Component: Temperature<br>Element                                                           | Temperature<br>(F)       | Figure<br>B.9(1,2,3) |                    |                    |                    | 11                      | 17                      |
| Manufacturer: Scam                                                                          | ]                        |                      |                    | (4)                |                    |                         | ·                       |
| Model No.: S51-1<br>Function: Temp<br>detector                                              | Pressure<br>(PSIA)       | Table<br>B.1(1,2,3)  |                    | · · · .<br>(4)     | •                  | п<br>• ~ •              | <b>u</b>                |
|                                                                                             | Relative<br>Humidity(\$) | 98                   | r                  | (4)                |                    | 11                      | tr -                    |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                                             | Chemical<br>Spray        | N/A                  | N/A :              | (4)                | N/A                | N/A                     | N/A                     |
| Category: <sup>A</sup><br>Service: <sup>CU</sup> system<br>area<br>Location: <sup>17A</sup> | Radiation<br>(RAD)       | 2.1x10 <sup>8</sup>  |                    | (4)                | ···-               | Appx 1<br>Note 1        | NCR<br>BFNNEB8022       |
|                                                                                             | Aging                    | N/A                  |                    | (2)                |                    | Appx 1 Note 1           | 11                      |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                   | Submergence              | N/A                  | N/A                | (4)                | N/A                | N/A                     | N/A                     |
| Notes: (1) See Section 2.4 in                                                               | 79-01B report            | •                    |                    |                    |                    | DD DAA                  | $\Lambda \cdot \Lambda$ |

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

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

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

| Prepared | by:_ | alex Melinhow |
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| Reviewed | by:_ | Charles Junk  |

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QA Acceptance:

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#### NEB-69-76, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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

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

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

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

معد مد لامه مرسامه المحدثة باله مربعه

Prepared by: alex Melnihour Reviewed by: Charles Juk

**OA** Acceptance:
# NEB-69-77, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-69-78 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: OUALIFICATION OUTSTANDING DOCUMENTATION REF ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi-Contract 90744 & 91750 Specifi-Qualification cation cation cation Parameter System: Reactor water 1 day Appx 1 NCR cleanup Operating Plant ID No. TE-69-29C&D BFNNEB8022 Note 1 (1)Time MPL #12-117C&D Component: Temperature Temperature n ... Figure Element (F) B.9(1,2,3) (4) Manufacturer: Seam •• , 11 Table Ħ B.1(1,2,3) Model No.: S51-1 Pressure (4) (PSIA) Function: Temp 98 11 11 detector Relative (4) Humidity(%) Accuracy: Req'd: See section ł Demon: 4.1.3 N/A N/A N/A N/A N/A (4) Chemical : : Spray Category: A 1.7x10<sup>5</sup> ----NCR Appx 1 Radiation Note 1 BFNNEB8022 CU system (4) Service: (RAD) area n 18 Appx 1 Note 1 Location: N/A (2) Aging . Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes (4) Submergence N/A N/A No

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

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

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

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

| Prepared by | :_ alex Melnihour |
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| Reviewed by | Charles Junk      |

# NEB-69-78, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-   | r Plant<br>296          | SYSTEM COMPO         | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)            | (3)<br>Sheet No. <u>NEB-69</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -79                  |
|-------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                         | E                       | NVIRONMENT           |                    | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                        | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                            |                      |
| System: Reactor water<br>cleanup<br>Plant ID No. TE-69-29E,G,H<br>MPL #12-117 | Operating<br>Time       | 1 day                |                    | (1)                |                    | Appx 1<br>Note 1                                                           | NCR<br>BFNNEB8022    |
| Component: Temperature<br>Element                                             | Temperature<br>(F)      | Figure<br>B.11(1,2,3 |                    | <u></u>            |                    | 72                                                                         | tt                   |
| Manufacturer: Scam                                                            |                         |                      |                    | (4)                |                    | •                                                                          |                      |
| Model No.: S51-1                                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | (4)                |                    | н .                                                                        | 1f                   |
| Function: Temp<br>detector                                                    | Relative<br>Humidity(%) | 100                  |                    | (4)                |                    | n                                                                          | ti                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                               | Chemical<br>Spray       | N/A                  | N/A :              | (4)                | N/A                | N/A                                                                        | N/A                  |
| Category: A<br>Service: CU system –                                           | Radiation<br>(RAD)      | 1.5x10 <sup>7</sup>  | •                  | (4)                | • •••              | Appx 1<br>Note 1                                                           | NCR<br>BFNNEB8022    |
| area<br>Location: <sup>11</sup>                                               | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 1                                                              | n -                  |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence             | N/A                  | N/A                | . (4)              | N/A                | N/A                                                                        | N/A                  |

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

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

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

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

| Prepared by: | alex Melnihow |  |
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| Reviewed by: | Charles Junk  |  |

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QA Acceptance:

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# NEB-69-79, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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|----------------------------------------------------------------------------|-------------------------|-----------------------|--------------------|--------------------|--------------------|-----------------------------------------------------|-------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                              | Plant                   | SYSTEM COMPON         | IENT EVALUATIO     | n hork sheet       | (Rev 2)            | (3)<br>Sheet No. <u>NEB-69</u><br>Revision <u>0</u> | -80               |
| Docket: 50-259, 50-260, 50-2                                               | 296<br>E                | IVIRONMENT            |                    | DOCUMENTA          | TION REF           | QUALIFICATION                                       | OUTSTANDING       |
| EQUIPMENT DESCRIPTION                                                      |                         | ·····                 |                    |                    |                    | METHOD                                              | ITEMS             |
| Contract 90744 & 91750                                                     | Parameter               | Specifi-<br>cation    | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                     |                   |
| System: Reactor water<br>cleanup<br>Plant ID No. TE-69-29F<br>MPL ∉12-117F | Operating<br>Time       | 1 day                 |                    | (1)                |                    | Appx 1<br>Note 1                                    | NCR<br>BFNNEB8022 |
| Component: Temperature<br>Element                                          | Temperature<br>(F)      | Figure<br>B.10(1,2,3) |                    | ,<br>,<br>, (11)   | -                  |                                                     | If                |
| Manufacturer: Scam                                                         |                         | <u>├</u>              |                    | (4)                |                    |                                                     |                   |
| Model No.: S51-1                                                           | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)   |                    | (4)                |                    | н · · ·                                             | n .               |
| Function: Temp<br>detection                                                | Relative<br>Humidity(%) | 100                   | :                  | (4)                |                    | 11                                                  |                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                            | Chemical<br>Spray       | N/A                   | N/A                | (4)                | N/A                | N/A                                                 | N/A               |
| Category: <sup>A</sup><br>Service: CU system                               | Radiation<br>(RAD)      | 1.5x10 <sup>7</sup>   |                    | (4)                | *                  | Appx 1<br>Note 1                                    | NCR<br>BFNNEB8022 |
| area<br>Location: 10                                                       | Aging                   | N/A                   |                    | (2)                | 1                  | Appx 1 Note 1                                       | n -               |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yés<br>No       | Submergence             | N/A                   | N/A                | (4)                | N/A                | N/A                                                 | N/A<br>·          |

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

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

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

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

| Prepared by:  | alex    | Melinhow |
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| Reviewed by:_ | Charles | Jule     |

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# NEB-69-80, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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|-----------------------------------------------------------------------------|-------------------------|-----------------------|------------------------------|--------------------|---------------------------------------|----------------------|-----------------------|
| Facility: Browns Ferry Nuclea                                               | r Plant                 |                       |                              |                    |                                       | Sheet No. NEB- 0     | <u>}-01</u>           |
| Jnit: 1,2,3                                                                 |                         |                       |                              |                    | -                                     | $\frac{10}{27}$      | 20                    |
| Docket: 50-259, 50-260, 50-                                                 | 296                     |                       | r                            | DOCIDICATION       | TTON DEP                              |                      | OUTSTANDING           |
| CONTRACTOR DESCRIPTION                                                      | 1                       | NATHORMENT            |                              | DOCOMENTA          | ITON NET                              | METHOD               | ITEMS                 |
| Contract 90744 & 91750                                                      | Parameter               | Specifi-              | Qualifi-                     | Specifi-<br>cation | Qualifi-<br>cation                    |                      |                       |
| System: Reactor water<br>cleanup<br>Plant ID No. TS-69-29(J-M)<br>MPL 12-83 | Operating<br>Time       | 1 hour                | 2 hours                      | (1)                | See Appż 1<br>Ncte 1                  | Type test            | None                  |
| Component: Temperature<br>Switch                                            | Temperature<br>(F)      | Figure<br>B.11(1,2,3) | 305 F                        | •                  | т <u>п</u>                            | 11 .                 | 11                    |
| Manufacturer: Fenwal                                                        |                         |                       |                              | (4)                |                                       |                      |                       |
| 17000 10                                                                    | -                       | Table                 | 25                           | • •• •             | ".                                    | n                    | . 11                  |
| Model No.: 17002-40                                                         | Pressure<br>(PSIA)      | D.1(1,2,5)            |                              | - (4)              |                                       |                      |                       |
| Function: Temp •<br>switch                                                  | Relative<br>Humidity(%) | 100                   | 100                          | (4)                | 11                                    | n                    | Π                     |
| Accuracy:<br>Req'd:<br>Demon:                                               | Chemical                | N/A                   | N/A ÷                        | (4)                | N/A                                   | N/A                  | N/A                   |
| <b>A</b>                                                                    | Spray                   |                       |                              |                    | * *·                                  |                      |                       |
| Category: <sup>A</sup><br>CU system                                         | Radiation               | 1.5x10 <sup>7</sup>   | 1. <u>7</u> x10 <sup>5</sup> |                    | Sëe Appx 1<br>Note 1                  | See Appx 1<br>Note 2 | See NCR<br>BFNNEB8009 |
| Location:                                                                   | Aging                   | N/A                   |                              | (2)                | · · · · · · · · · · · · · · · · · · · | Appx 1 Note 2        | None .                |
| N/A<br>Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                | Submergence             | N/A                   | N/A                          | - (4)              | N/A                                   | N/A                  | N/A                   |

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

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

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

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

alex Melrikow harles Turk Prepared by: Reviewed by:

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## NEB-69-81 APPENDIX 1, REVISION 0

- 1. Fenwal engineering report 6350 and Wyle report 43854-1. Also see Wyle summary report QSR-040-A-01.
- 2. These switches were subjected to a radiation dose of  $1.7 \times 10^{5}$ rad without failure. Based on a materials analysis; however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat<sub>0</sub> and electrical insulation properties following a dose of 1.3  $\times 10^{7}$  rad which is well above the postulated accident dose of 1.5  $\times 10^{7}$  rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

<u>Aging</u> - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of values encountered.



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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                                                 | Plant                   | SYSTEM COMPO                  | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-70</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -82 .                |
|-----------------------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|----------------------------------------------------------------------------|----------------------|
| CONTRACT DESCRIPTION                                                                          | E                       | NVIRONMENT                    | 1                  | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                        | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                            |                      |
| System: Reactor Building clos<br>cooling water system<br>Plant ID No. FCV-70-47<br>MPL #50-87 | ed<br>Operating<br>Time | 1 year                        | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                       | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                                  | Temperature<br>(F)      | Figures<br>B.6(1)<br>B.6(2,3) | 250 F              |                    | 11                   | Type test                                                                  | None                 |
| Manufacturer: Limitorque                                                                      |                         | Table<br>B.1(1.2.             | 3) 40              | <u>(4)</u>         | 11                   | n                                                                          | 17                   |
| Model No.: SMB-00                                                                             | Pressure<br>(PSIA)      |                               |                    | (4)                |                      | •••                                                                        | •                    |
| Function: Disch hdr<br>outlet vlv                                                             | Relative<br>Humidity(%) | 100                           | 100 :              | (4)                | tt                   | Type test                                                                  | Nonė                 |
| Accuracy: NA<br>Req'd:<br>Demon:                                                              | Chemical<br>Spray       | N/A                           | N/A :              | (4)`               | N/A                  | -<br>N/A                                                                   | N/A                  |
| Category: A<br>Service: RBCCW primary                                                         | Radiation<br>(RAD)      | 3.1x10 <sup>7</sup>           | 2x10 <sup>8</sup>  | (4)                | Sée Appx 1<br>Note 1 | Type test                                                                  | None .               |
| contmt vessel<br>Location: 6                                                                  | Aging                   | N/A                           |                    | (2)                |                      | Appx 1 note 2                                                              | 11                   |
| Flood Level Elev:552 <sup>4</sup> N/A<br>Above Flood Level: Yes<br>No                         | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                                                                        | N/A                  |

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

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

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

alex Mehrihow Prepared by: harles -Reviewed by: -Jur

# NEB-70-82, APPENDIX 1, REVISION 0

- 1. Limitorque test reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

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|                                                                                             |                         | SYSTEM COMPON                 | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                     | -                    |
|---------------------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclear                                                              | Plant                   |                               |                    |                    |                      | Sheet No. <u>NEB-71</u> | -83                  |
| Unit: 1,2,3                                                                                 | _                       |                               |                    |                    | I                    | Revision 0              |                      |
| Docket: 50-259, 50-260, 50-2                                                                | 96                      |                               |                    |                    | 1                    | Date 10/27/0            | 80                   |
| EQUIPMENT DESCRIPTION                                                                       | E                       | NVIRONMENT                    |                    | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | UUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                      | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Reactor core<br>isolation cooling sys<br>Plant ID No. PDIS-714A&B<br>MPL # 13-83,84 | Operating<br>Time       | 1 hour                        | 6 hours            | (1)                | See Appx 1<br>Note 1 | Type test               | None                 |
| Component: Pressure diff<br>indicator switch<br>Manufacturer: Banton                        | Temperature<br>(F)      | Figures<br>B.2(1)<br>B.2(2,3) | 212 F              | (4)                | Ħ                    | See Appx 1<br>Note 3    | н ,                  |
| Model No.: 288                                                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           | 15,                | · · · .<br>(4)     | Ħ .                  | Test .                  | None .               |
| Function: Excessive                                                                         | Relative<br>Humidity(%) | 100                           | 100                | (4)                | 11                   | U x                     | 13                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                                   | Chemical<br>Spray       | N/A                           | N/A :              | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: RCIC steam                                                          | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>            | 3x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    |                      |
| flow<br>Location: 2                                                                         | Aging                   | N/A                           |                    | (2)                |                      | Appx 1 Note 4           | None-                |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                   | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>

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### NEB-71-83, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. The radiation dose of 3 X 10<sup>7</sup> rad is based upon a total accident dose plus normal dose. Since this device is needed for only one hour, the actual dose was calculated to be approximately 6 X 10'. Therefore, this device qualifies for radiation dose.
- 3. A HPCI HELB in compartment #2 is the worst condition this area will see. However, if this does occur, a break in the RCIC line need not be considered. The next worst condition would be an RCIC line break in the torus (area #6). The maximum temperature area #2 will see as a result of the RCIC break is 145° F (unit 1) and 140° F (units 2 and 3). Therefore, the switches will meet the temperature requirements.
- 4. Based on a study of materials used in this device, it is not expected that aging considerations will adversely affect this equipment (in TVA's engineering judgement). This is based on the low temperature and radiation levels encountered for this instrument.





| Facility: Browns Ferry Nuclear<br>Unit: 1.2.3                                          | Plant                   | SYSTEM COMPO         | NENT EVALUATIO     | )n work sheet      | (Rev 2)              | (3)<br>Sheet No. <u>NEB-71</u><br>Revision <u>0</u> | _84                  |
|----------------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|----------------------|-----------------------------------------------------|----------------------|
| Docket: 50-259, 50-260, 50-2                                                           | 96                      |                      | ~                  |                    |                      | Date 10/27/                                         | 80                   |
| EQUIPMENT DESCRIPTION                                                                  | E                       | NVIRONMENT           | ,                  | DOCUMENTAT         | TION REF             | QUALIFICATION<br>METHOD                             | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                 | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                     | ,                    |
| System: Reactor core<br>isolation cooling sys<br>Plant ID No. PS-71-1A-D<br>MPL #13-87 | Operating<br>Time       | 30 days              | 1 hour             | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                | ncr<br>Bfnneb8011    |
| Component: Pressure<br>Switch                                                          | Temperature<br>(F)      | Figure<br>B.2(1,2,3) | 212 F              |                    | I                    | Generic<br>test                                     | NCR<br>BFNNEB8011    |
| Manufacturer: Barksdale                                                                |                         |                      |                    | (4)                |                      |                                                     |                      |
| Model No.: B2T-M12SS                                                                   | Pressure                | Table<br>B.1(1,2,3)  | 15                 | · · · ·            | ".                   | u .                                                 | None .               |
| Function: Low press                                                                    | Relative<br>Humidity(%) | 100                  | 100                | (4)                | tt.                  | tt                                                  |                      |
| Accuracy:<br>Req'd:<br>Demon:                                                          | Chemical<br>Spray       | N/A                  | N/A                | (4)                | N/A                  | . N/A                                               | N/A                  |
| Category: A<br>Service: RCIC steam                                                     | Radiation<br>(RAD)      | 3x10 <sup>7</sup>    | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 3                                | NCR<br>BFNNEB8011    |
| Location:                                                                              | Aging                   | N/A                  |                    | (2)                |                      | Appx 1 Note 3                                       | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                              | Submergence             | N/A                  | N/A                | (4)                | N/A                  | N/A                                                 | N/A                  |

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

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

(3) All notes and other information not on these

sheets are on the attached appendix sheets.

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

Prepared by: <u>Alix Melnihow</u> Reviewed by: <u>Charles Junk</u>



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- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furnished in bulletin 79-01B, are acceptable up to a
- Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.

The peak temperature due to a HPCI line break in room 1 is  $292^{\circ}$  F in 30 seconds. The temperature is approximately  $200^{\circ}$  F in only 80 seconds and continues to decrease thereafter. Due to the rapid temperature increase and decrease, it is highly unlikely that the critical elements of the device would be subjected to a temperature greater than 212°F, which is the temperature to which the device is qualified. Therefore, based on an engineering judgement, this instrument should not be adversely affected by the stated temperature.

3. The radiation doses given are based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad, which represents the dose at the surface of the RHR pipe. Since this instrument is located several feet from the RHR pipe, the actual dose is estimated to be approximately 7 X 10° rad; therefore, this instrument should qualify for the stated environment. Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or any other parameter) on the functioning of this device.

TVA will commit to further analysis to confirm the actual radiation dose and temperature effects for this instrument, or type tests will be performed to qualify the device. Should the results prove inconclusive, TVA will replace the device with a qualified substitute.



|                       |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | S                                                                                                                                                                                                               | heet No. <u>NEB-71-</u>                                                                                                                                                                                                                      | 85                                                                                                                                                                        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| 30 days               | 24 hours                                                                                                | (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | See Appx 1<br>Note 1                                                                                                                                                                                            | See Appx 1<br>Note 3                                                                                                                                                                                                                         | NCR<br>BFNNEB8034                                                                                                                                                         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| Figures<br>B.1(1,2,3) | 250 F                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| Table<br>B.1(1,2,β)   | 40                                                                                                      | · ·· .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| $2 \times 10^8$       | 2x10 <sup>8</sup>                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|                       | Pable       3.1(1,2,3)       100       //A       2x10 <sup>8</sup> / <sub>9</sub> 4x10 <sup>9</sup> //A | Table       3.1(1,2,3)       40       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100 </td <td>Table       40       (4)         3.1(1,2,3)       40       (4)         100       100       (4)         100       100       (4)         1/A       N/A       (4)         <math>2x10^8</math>       2x10^8       (4)         <math>4x10^9</math>       (4)       (4)</td> <td>Table       3.1(1,2,3)       40       "         (4)       (4)       "         100       100       "         100       100       "         //A       N/A       (4)         <math>N/A</math>       (4)       N/A         <math>2x10^8</math> <math>2x10^8</math>       See Appx 1         <math>4x10^9</math>       (4)       Note 1</td> <td>Table       Ho       Image: Matrix and the second /td> | Table       40       (4)         3.1(1,2,3)       40       (4)         100       100       (4)         100       100       (4)         1/A       N/A       (4) $2x10^8$ 2x10^8       (4) $4x10^9$ (4)       (4) | Table       3.1(1,2,3)       40       "         (4)       (4)       "         100       100       "         100       100       "         //A       N/A       (4) $N/A$ (4)       N/A $2x10^8$ $2x10^8$ See Appx 1 $4x10^9$ (4)       Note 1 | Table       Ho       Image: Matrix and the second |

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

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

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

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

alex Melnihow harles Turk Prepared by: Reviewed by:

## NEB-71-85, APPENDIX 1, REVISION O

- 1. Limitorque test reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.





|                                                                       |                         | SYSTEM COMPON       | IENT EVALUATIO      | N WORK SHEET       | (Rev 2)              | (3)                                   |                       |
|-----------------------------------------------------------------------|-------------------------|---------------------|---------------------|--------------------|----------------------|---------------------------------------|-----------------------|
| Facility: Browns Ferry Nuclean                                        | r Plant                 |                     | •                   |                    | :                    | Sheet No. <u>NEB-71</u><br>Revision O | -089                  |
| Docket: 50-259, 50-260, 50-2                                          | 296                     |                     |                     |                    | 1                    | Date 10/27/                           | 80                    |
| EQUIPMENT DESCRIPTION                                                 | E                       | NVIRONMENT          |                     | DOCUMENTAT         | FION REF             | QUALIFICATION<br>METHOD               | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                                       |                       |
| System: Reactor core<br>isol cooling<br>Plant ID No. Appx 1<br>Note 1 | Operating<br>Time       | 1 hour              | 2 hours             | (1)                | See Appx 1<br>Note 2 | Type test                             | None                  |
| Component: Temperature<br>Switch                                      | Temperature<br>(F)      | Figure<br>B.3(2,3)  | 305 F               | -                  | tt ,                 | n<br>n                                | 11                    |
| Manufacturer: Fenwal                                                  | l í                     |                     |                     | (4)                | •                    |                                       |                       |
| Model No.: 17023-6                                                    | Pressure                | Table<br>B.1(1,2,3) | 25                  | •                  | и<br>`.              | н<br>Эм.                              | π                     |
| • •                                                                   | (PSIA)                  |                     | ÷                   | . (4)              |                      |                                       |                       |
| Function: Leak<br>detection                                           | Relative<br>Humidity(%) | 100                 | 100                 | (4)                | 11                   | 11                                    | "                     |
| Accuracy:<br>Reg'd:<br>Demon:                                         | Chemical<br>Spray       | N/A                 | :<br>N/A .          | (4)                | N/A                  | N/A                                   | N/A                   |
| Category: A<br>Service: RCIC Steam                                    | Radiation<br>(RAD)      | 3x10 <sup>7</sup>   | 1.7x10 <sup>5</sup> | (4)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 3                  | See NCR<br>BFNNEB8009 |
| Location:                                                             | Aging                   | N/A                 |                     | (2)                |                      | n                                     | None                  |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No  | Submergence             | N/A                 | N/A                 | (4)                | N/A                  | N/A                                   | N/A                   |

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

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

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

| Prepared | by:  | alex 1  | Melikow |
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| Reviewed | by:_ | Charles | Jurk    |
|          |      |         |         |

QA Acceptance:

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1. This sheet applies to items:

 TS
 71-2A
 MPL-13-79

 TS
 71-2B
 MPL-13-80

 TS
 71-2C
 MPL-13-81

 TS
 71-2D
 MPL-13-82

- 2. Fenwal Engineering Report 6350 and Wyle report 43854-1.
- 3. These switches were subjected to a radiation dose of 1.7x10<sup>2</sup> rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10 rad which is well above the postulated accident dose of 3.1x10' rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program. Please note that these switches in unit 1 do qualify for radiation.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.





| -                                    |             | SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) |          |           |            | (3)                                       |                                              |
|--------------------------------------|-------------|------------------------------------------------|----------|-----------|------------|-------------------------------------------|----------------------------------------------|
| Facility Browns Ferry Nucleau        | r Plant     |                                                |          |           |            | Sheet No. <u>NEB-71-89A</u><br>Revision 0 |                                              |
| Init: 1.2.3                          |             | - · · · ·                                      |          | ,         |            |                                           |                                              |
| Docket: $50-259$ , $50-260$ , $50-2$ | 296         |                                                |          |           | 1          | Date 10/27/8                              | 30.                                          |
|                                      | E           | VIRONMENT                                      |          | DOCUMENTA | TION REF   | QUALIFICATION                             | OUTSTANDING                                  |
| EQUIPMENT DESCRIPTION                | 6           |                                                |          |           |            | METHOD                                    | ITEMS ·                                      |
| Contract 90744 & 91750               |             | Specifi-                                       | Qualifi- | Specifi-  | Qualifi-   |                                           | •                                            |
|                                      | Parameter   | cation                                         | cation   | cation    | cation     |                                           |                                              |
| System: Reactor core                 |             |                                                |          |           |            |                                           |                                              |
| Isol cooling                         | Operating   | 1 hour                                         | 2 hours  |           | See Appx 1 | Type test                                 | None                                         |
| Plant ID No. Appx 1                  | Time        |                                                |          | (1)       | note 2     |                                           | -                                            |
| Note 1B                              |             |                                                |          |           |            |                                           |                                              |
| Component: Temperature               | Temperature |                                                | 005 5    |           | ]          |                                           | n                                            |
| Switch                               | (F)         | Figure                                         | 305 F    |           | " · · ·    |                                           |                                              |
|                                      |             | · B.1(1)                                       |          | 7.10.5    |            |                                           |                                              |
| Fenwal                               |             |                                                |          | (4)       |            | ······                                    |                                              |
|                                      |             | Table                                          | 25       | • • •     | n –        | 11                                        | π                                            |
| Madal No + 17022 6                   | Processo    | B 1(1 2 3)                                     | 25       |           | · · ·      | •••                                       | •                                            |
|                                      | (PSTA)      | D. ((1, 2, 5))                                 |          | (4)       |            |                                           |                                              |
| Function: Leakage                    | (1011)      | ·                                              |          |           |            |                                           |                                              |
| detection                            | Relative    | 100                                            | 100      | :         | 11         | , st                                      | ท                                            |
|                                      | Humidity(%) |                                                |          | (4)       |            |                                           |                                              |
| Accuracy:                            |             |                                                |          |           |            | •                                         |                                              |
| Reg'd:                               | 1           |                                                | :        | 1         |            |                                           |                                              |
| Demon:                               | Chemical    | N/A                                            | N/A :    | (4)       | N/A        | N/A                                       | N/A                                          |
|                                      | Spray       |                                                |          |           |            |                                           |                                              |
| Category: A                          |             | 1 1                                            | 5        |           |            |                                           | <u>``</u> `````````````````````````````````` |
|                                      | Radiation   | 5x10                                           | 1.7x10-  |           | See Appx 1 | Type Test                                 | None                                         |
| Service: RCIC steam                  | (RAD)       |                                                |          | (4)       | Note 2     |                                           |                                              |
| line                                 |             |                                                |          |           |            | Anny 1 Noto 2                             | Nono                                         |
| Location: 1 (unit 1 only)            | Aging ·     | N/A                                            |          | (2)       |            | Appx 1 Note 5.                            | NOIle                                        |
|                                      |             |                                                |          |           | 1          |                                           |                                              |
| Flood Level Elev:552' N/A            | •           |                                                |          | <i>.</i>  | N/A -      | N/A                                       | N/A                                          |
| Above Flood Level: Yes               | Submergence | N/A                                            | N/A      | (4)       |            |                                           |                                              |
| No                                   | 1           | <u> </u>                                       |          |           |            | I                                         | }                                            |

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

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

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

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

alex Melnihow Prepared by: harles I Reviewed by:\_\_\_ use

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1. This sheet applies to items:

 TS 71-2A
 MPL No. 13-79

 TS 71-2B
 MPL No. 13-80

 TS-71-2C
 MPL No. 13-81

 TS-71-2D
 MPL No. 13-82

- 2. Fenwal engineering report 6350 and Wyle report 43854-1.
- 3. Aging The effects of aging due to the environmental conditions over 40 years are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

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Unit: 1,2,3 50-259, 50-260, 50-296 Docket: EQUIPMENT DESCRIPTION Contract 90744 & 91750 Parameter System: Reactor core

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ITEMS See Appx 1 Type test None Operating 1 hour 2 hours isol cooling °(1) Note 2 Plant ID No. See Appx 1 Time Note 1 Component: Temperature Temperature n 11 11 (F) Figure 305 F Switch B.6(1,2,3) (4) Manufacturer: Fenwal •• . n 25 n . 21 Table B.1(1,2,3) Model No.: 17023-6 Pressure (PSIA) (4) Function: Leak n tt Ħ 100 100 detection Relative Humidity(%) (4) Accuracy: Req'd: ÷ . . . . N/A : N/A N/A (4) Demon: Chemical N/A N/A Spray Category: A 1.7x10<sup>5</sup> 3.1x10<sup>7</sup> See Appx 1 See Appx 1 See NCR Radiation BFNNEB8009 Note 2 Note 3 Service: RCIC Steam (4) (RAD) line Appx 1 Note 3 None 6 N/A (2) Location: Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence , No

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

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

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

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

| Prepared by: | alex Melinkour | - |
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| Reviewed by: | Charles Jul    |   |

OUTSTANDING

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- 1. This sheet applies to items TS-71-2 (E-H, J-N, P, R, S), MPL No. 13-79 through 13-82.
- 2. Fenwal Engineering Report 6350.

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3. These switches were subjected to a radiation dose of 1.7x10<sup>5</sup> rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10<sup>6</sup> rad which is well above the postulated accident dose of 3.1x10<sup>7</sup> rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.
| -                                                                                      | •                       |                              |                    |                                         |                      |                                                                  |                      |
|----------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|-----------------------------------------|----------------------|------------------------------------------------------------------|----------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                                          | Plant ·                 | System Compo                 | DNENT EVALUATIO    | N WORK SHEET                            | (Rev 2)              | (3)<br>Sheet No. <u>NEB-71</u><br>Revision $0$<br>Date $10/27/8$ | -96                  |
| FOULTPMENT DESCRIPTION                                                                 | El                      | VIRONMENT                    |                    | DOCUMENTAT                              | FION REF             | QUALIFICATION<br>METHOD                                          | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                 | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation                      | Qualifi-<br>cation   |                                                                  |                      |
| System: Reactor core<br>isolation cooling sys<br>Plant ID No. FCV-71-3<br>MPL # 13-16B | Operating<br>Time       | A - 30 d<br>B - 1 ye         | ays 24 hours<br>ar | (1)                                     | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                             | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:                                          | Temperature<br>(F)      | Figure<br>B.7(1)<br>B.7(2,3) | 250 F              | (4)                                     | 17                   | See Appx 1-<br>Note 2                                            | 11                   |
| Limitorque<br>Model No.: SMB-00                                                        | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40 <u>.</u>        | • • • • • • • • • • • • • • • • • • • • | п.                   | Type test                                                        | None .               |
| Function: Outboard<br>isln                                                             | Relative<br>Humidity(%) | 100                          | 100                | (4)                                     | 19                   | ti .                                                             | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                      | Chemical<br>Spray       | N/A                          | :<br>N/A .         | (4)                                     | N/A                  | N/A                                                              | N/A                  |
| Category: A<br>Service: RCIC steam •                                                   | Radiation<br>(RAD)      | 2x 10 <sup>6</sup>           | 2x10 <sup>8</sup>  | (4)                                     | See Appx 1<br>Note 1 | Type Test                                                        | None                 |
| Location: 7                                                                            | Aging                   | N/A                          |                    | (2)                                     |                      | Appx 1 Note 3                                                    | None '               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                              | Submergence             | N/A                          | N/A                | - (4)                                   | N/A_                 | N/A                                                              | N/A .                |

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Luck</u>

QA Acceptance:



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1. Limitorque Test Reports B0003, B-0027, #600198

 2. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. The peak temperature is  $308^{\circ}$  F at 2 seconds and is  $118^{\circ}$ F at 150 seconds It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than  $250^{\circ}$  F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Sheet No. NEB-71-97 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: OUTSTANDING DOCUMENTATION REF QUALIFICATION ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Contract 90744 & 91750 Specifi-Qualification cation Parameter cation cation System: Reactor core NCR See Appx 1 30 days Operating isolation cooling BFNNEB8012 Note 1 Plant ID No. PT-71-48 (1)Time MPL # 13-68 Component: Pressure Temperature ĸ 11 transmitter (F) Figures B.3(1) B.3(2,3) (4) Manufacturer: GEMAC (GE) •••• n 11 Table . . . B.1(1,2,3) 50-551032GAAK1 Pressure Model No.: (PSIA) (4) Steamline press signal Function: 11 11 100 Relative Humidity(%) (4) Accuracy: See Section Reg'd: N/A N/A N/A 1 ..... 4.1.3 in report N/A (4) Demon: Chemical N/A : : Spray A Category: 3x10<sup>7</sup> ..... NCR See Appx 1. Radiation BFNNEB8012 ' Note 1 Service: RCIC turbine (4) (RAD) . 11 £t \* 3 H/A · Location: (2)Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

Prepared by: alex Mehipow Reviewed by: Charles

QA Acceptance:

# .NEB-71-97 Appendix 1 Revision 0.

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature ·     | - 185 <sup>0</sup> F |
|-------------------|----------------------|
| Pressure          | - Atmospheric        |
| Relative Humidity | - Not Specified.     |
| Radiation         | , - Not Specified    |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-l of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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|-----------|----------------------------|------------------------------------------------|-----------|------------|
|           |                            | -                                              |           | •<br>•     |
|           |                            | SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) |           | (3)        |
| Facility: | Browns Ferry Nuclear Plant | · .                                            | Sheet No. | NEB- 71-98 |
| Unit:     | 1.2.3                      | , · · · · · · · · · · · · · · · · · · ·        | Revision  | 0          |
| Docket:   | 50-259, 50-260, 50-296     |                                                | Date      | 10/27/80   |

Unit: 1,2,3 /27/80 50-259, 50-260, 50-296 Docket: OUTSTANDING DOCUMENTATION REF QUALIFICATION ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Contract 90744 & 91750 Specifi-Qualifi-Specification cation cation cation Parameter System: Reactor core isol See Appx 1 NCR Operating cooling system 30 days BFNNEB8005 Note 1 Plant ID No. PX-71-4 (1)Time MPL Ø 3-92 Component: Unit power Temperature 11 11 Figures supply (F) B.12(1) B.12(2,3) (4) Manufacturer: General Electric •• . 11 Ħ Table . . B.1(1,2,3) Model No.: 583001AAGK1 Pressure (PSIA) (4) Function: Steam line press 11 100 Relative (4) Humidity(%) Accuracy: See Section Reg'd: ŝ . . 'N/A N/A N/A 4.1.3 in report N/A (4) Demon: Chemical N/A ۲ • 1 Spray Category: A 3.1x10<sup>4</sup> .... See Appx 1 NCR Radiation BFNNEB8005 Note 1 RCIC turbine Service: (4) (RAD) 11 11 12 Location: Aging N/A (2)

N/A

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

No

Flood Level Elev:552'

Above Flood Level: Yes

N/A

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

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

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

Submergence

N/A

alex Melnihour Prepared. by: haile Reviewed by:

N/A

N/A

QA Acceptance:

N/A

(4)

# NEB-71-98

# Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. GE Power Supplies are well known to be high quality equipment and have performed well throughout the industry in normal plant service. Depending on the results of this continued analysis, TVA will type test or replace this equipment.

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

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

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

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

Prepared by: <u>alex Mehihow</u> Reviewed by: Charles Junk

QA Acceptance:

## NEB-71-100, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 25 seconds and is 162°F at 120 in unit 1 and 160°F at 120 seconds for units 2 and 3. seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator:

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.





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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Link</u>

QA Acceptance:

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## NEB-71-101, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300° as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146° ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.



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| Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-                                         | 296                     |                              |                   |        |                    |                    | Revision <u>0</u><br>Date <u>10/27/</u> | 80                    |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|-------------------|--------|--------------------|--------------------|-----------------------------------------|-----------------------|
| EQUIPMENT DESCRIPTION                                                              | E                       | NVIRONMENT                   |                   |        | DOCUMENTAT         | TION REF           | QUALIFICATION<br>METHOD                 | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi<br>cation | -      | Specifi-<br>cation | Qualifi-<br>cation |                                         |                       |
| System: Reactor core 150.<br>cooling system<br>Plant ID No. FCV-71-10<br>MPL #13-2 | Operating<br>Time       | 30 days                      |                   |        | (1)                | -                  | Appx 1<br>Note 1                        | See NCR<br>BFNNEB8025 |
| Component: Turbine<br>Controls                                                     | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) |                   |        | (4)                |                    | n                                       | ri                    |
| Turbines                                                                           |                         | Table                        |                   |        | · · · ·            |                    | п                                       |                       |
| Model No.: Type GS                                                                 | Pressure<br>(PSIA)      | B.1(1,2,3)                   |                   |        | (4)                | •                  |                                         |                       |
| Function: Turbine<br>Control                                                       | Relative<br>Humidity(%) | 100                          |                   |        | (4)                |                    | 11                                      | 11                    |
| Accuracy:<br>Req'd:<br>Demon:                                                      | Chemical<br>Spray       | N/A                          | N/A               | ** * * | (4)                | N/A -              | N/A                                     | N/A                   |
| Category: <sup>A</sup><br>Service: <sup>RCIC Sys</sup>                             | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | · -               |        | (4)                | •••                | Appx 1<br>Note 1                        | See NCR<br>BFNNEB8025 |
| Location: 3                                                                        | Aging                   | N/A -                        |                   |        | (2)                |                    | 11                                      | 12 .                  |
| Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                              | Submergence             | N/A                          | N/A               |        | (4)                | n/A                | N/Я                                     | N/A                   |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Lurk</u>

QA Acceptance:\_

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. . 1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148 ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300 as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146 ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.





| r riant                 |                                                                                                                                                                                  |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                       | Sheet No. NFB- 7                                                                                                                                                                                                                                                                                                                                                  | -<br>1_102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | ×                                                                                                                                                                                |                                                                                                                                                                                                                                                   | -                                                                                                                                                                                                                                                                                                                                                          | I                                                                                                                                                                                                                                                                                                                     | Revision 0                                                                                                                                                                                                                                                                                                                                                        | 1-105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| -296                    |                                                                                                                                                                                  |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                            | • I                                                                                                                                                                                                                                                                                                                   | Date 10/27/                                                                                                                                                                                                                                                                                                                                                       | 80 .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| E                       | NVIRONMENT                                                                                                                                                                       |                                                                                                                                                                                                                                                   | DOCUMENTAT                                                                                                                                                                                                                                                                                                                                                 | TION REF                                                                                                                                                                                                                                                                                                              | QUALIFICATION<br>METHOD                                                                                                                                                                                                                                                                                                                                           | OUTSTANDING<br>ITEMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Parameter               | Specifi-<br>cation                                                                                                                                                               | Qualifi-<br>cation                                                                                                                                                                                                                                | Specifi-<br>cation                                                                                                                                                                                                                                                                                                                                         | Qualifi-<br>cation                                                                                                                                                                                                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Operating<br>Time       | 30 days                                                                                                                                                                          |                                                                                                                                                                                                                                                   | (1)                                                                                                                                                                                                                                                                                                                                                        | 4                                                                                                                                                                                                                                                                                                                     | Appx 1<br>Note 1                                                                                                                                                                                                                                                                                                                                                  | See NCR<br>BFNNEB8025                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3)                                                                                                                                                     |                                                                                                                                                                                                                                                   | (4)                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                       | 11                                                                                                                                                                                                                                                                                                                                                                | 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Progguno                | Table<br>B.1(1.2.3)                                                                                                                                                              | •                                                                                                                                                                                                                                                 | • •• .                                                                                                                                                                                                                                                                                                                                                     | •                                                                                                                                                                                                                                                                                                                     | "                                                                                                                                                                                                                                                                                                                                                                 | 11 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (PSIA)                  |                                                                                                                                                                                  | ,                                                                                                                                                                                                                                                 | (4)                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Relative<br>Humidity(%) | 100                                                                                                                                                                              | r<br>N                                                                                                                                                                                                                                            | . (4)                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                       | 17                                                                                                                                                                                                                                                                                                                                                                | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Chemical<br>Spray       | N/A                                                                                                                                                                              | N/A .                                                                                                                                                                                                                                             | (4)                                                                                                                                                                                                                                                                                                                                                        | N/A                                                                                                                                                                                                                                                                                                                   | N/A                                                                                                                                                                                                                                                                                                                                                               | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Radiation<br>(RAD)      | 3x10 <sup>7</sup>                                                                                                                                                                |                                                                                                                                                                                                                                                   | (4)                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                       | Appx 1<br>Note 1                                                                                                                                                                                                                                                                                                                                                  | See NCR<br>BFNNEB8025                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Aging                   | N/A                                                                                                                                                                              |                                                                                                                                                                                                                                                   | (2)                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                       | 11                                                                                                                                                                                                                                                                                                                                                                | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Submergence             | N/A                                                                                                                                                                              | N/A                                                                                                                                                                                                                                               | (4)                                                                                                                                                                                                                                                                                                                                                        | NIM                                                                                                                                                                                                                                                                                                                   | NIA                                                                                                                                                                                                                                                                                                                                                               | NÍA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                         | 296<br>Parameter<br>Operating<br>Time<br>Temperature<br>(F)<br>Pressure<br>(PSIA)<br>Relative<br>Humidity(\$)<br>Chemical<br>Spray<br>Radiation<br>(RAD)<br>Aging<br>Submergence | 296ENVIRONMENTParameterSpecifi-<br>cationOperating<br>Time30 daysTemperature<br>(F)Figure<br>B.3(1)<br>B.3(2,3)Pressure<br>(PSIA)Figure<br>B.1(1,2,3)Relative<br>Humidity(%)100Chemical<br>SprayN/ARadiation<br>(RAD)3x107Aging<br>SubmergenceN/A | 296     ENVIRONMENT     Parameter   Specifi-<br>cation   Qualifi-<br>cation     Operating<br>Time   30 days   Interface     Temperature<br>(F)   Figure<br>B.3(1)<br>B.3(2,3)   Interface     Pressure<br>(PSIA)   Figure<br>B.1(1,2,3)   Interface     Relative<br>Humidity(\$)   100   Interface     Chemical<br>Spray   N/A   N/A     Aging   N/A   N/A | 296 ENVIRONMENT DOCUMENTA'   Parameter Specifi-<br>cation Qualifi-<br>cation Specifi-<br>cation   Operating<br>Time 30 days (1)   Temperature<br>(F) Figure<br>B.3(1)<br>B.3(2,3) (4)   Pressure<br>(FSIA) Figure<br>B.1(1,2,3) (4)   Relative<br>Humidity(%) 100 (4)   Chemical<br>Spray N/A N/A (4)   Aging N/A (4) | 296   DOCUMENTATION REF   Specifi-<br>cation Qualifi-<br>cation   Parameter Specifi-<br>cation Qualifi-<br>cation   Operating<br>Time 30 days (1)   Temperature<br>(F) Figure<br>B.3(1)<br>B.3(2,3) (1)   Pressure<br>(FSIA) Figure<br>B.1(1,2,3) (4)   Relative<br>Humidity(%) 100 (4)   Chemical<br>Spray N/A N/A (4)   Aging N/A (4)   Submergence N/A N/A (4) | 296 Date 10/27/4   Documentation Ref QUALIFICATION   Parameter Cation Cation   Parameter Cation Cation   Operating<br>Time 30 days (1)   Parameter Cation Cation   Operating<br>Time 30 days (1)   Parameter Figure<br>B.3(1)<br>B.3(2,3) (1)   Pressure<br>(F) Figure<br>B.3(1)<br>B.3(2,3) "   Pressure<br>(PSIA) Table<br>B.1(1,2,3) "   Pressure<br>(PSIA) 100   Chemical<br>Spray N/A N/A N/A N/A   M/A (4) N/A   M/A Appx 1   Radiation<br>(RAD) N/A N/A N/A   Submergence N/A N/A N/A |

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jurk</u>

QA Acceptance:



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## NEB-71-103, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148 ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300 as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146 ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.



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

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

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

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

Prepared by: <u>Alex Melinkow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:\_



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### NEB-71-104, APPENDIX 1, REVISION 0

- 1. This sheet applies to items PS-71-11(A-D), MPL #13-78, and PS-71-21, MPL #13-67.
- 2. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 3. The radiation dose of 1 X  $10^{\circ}$  rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.

The peak temperature due to a HPCI line break in room 3 is  $297^{\circ}$  F in 30 seconds. The temperature is approximately  $200^{\circ}$  F in only 80 seconds and continues to decrease thereafter. Due to the rapid temperature increase and decrease, it is highly unlikely that the critical elements of the device would be subjected to a temperature greater than  $212^{\circ}$ F, which is the temperature to which the device is qualified. Therefore, based on an engineering judgement, this instrument should not be adversely affected by the stated temperature.

4. The radiation doses given are based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad, which represents the dose at the surface of the RHR pipe. Since this instrument is located several feet from the RHR pipe, the actual dose is estimated to be approximately 7 X 10° rad; therefore, this instrument should qualify for the stated environment. Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or any other parameter) on the functioning of this device.

TVA will commit to further analysis to confirm the actual radiation dose and temperature effects for this instrument, or type tests will be performed to qualify the device. Should the results prove inconclusive, TVA will replace the device with a qualified substitute.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                                     | Plant                           |                               |                    |                    |                    | Sheet No. NEB-71<br>Revision 0 | -105                 |
|-----------------------------------------------------------------------------------|---------------------------------|-------------------------------|--------------------|--------------------|--------------------|--------------------------------|----------------------|
| Docket: 50-259, 50-260, 50-2<br>EQUIPMENT DESCRIPTION                             | 96<br>E                         | NVIRONMENT                    |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD        | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                            | Parameter                       | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. PT-71-12<br>MPL ⊉ 13-70 | Operating<br>Time               | 30 days                       | •                  | (1)                |                    | See Appx 1<br>Note 1           | NCR<br>BFNNEB8012    |
| Component: Pressure<br>transmitter<br>Manufacturer: GEMAC (GE)                    | Temperature<br>(F)              | Figures<br>B.3(1)<br>B.3(2,3) |                    | (4)                |                    |                                | 11<br>-              |
| Model No.: 50-551032EAAE1                                                         | Pressure<br>(PSIA)              | Table<br>B.1(1,2,3)           |                    | (4)                |                    | H<br>                          | n                    |
| Function: Exhaust pressure si                                                     | gnal<br>Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | ,II                            | 11                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                         | Chemical<br>Spray               | N/A                           | ÷<br>N/A .         | (4)                | N/A -              | N/A                            | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>RCIC</sup> turbine -                      | Radiation<br>(RAD)              | 3x10 <sup>7</sup>             | •                  | (4)                | <b>`</b>           | See Appx 1<br>Note 1           | NCR<br>BFNNEB8012    |
| Location: 3                                                                       | Aging                           | N/A                           | 4                  | (2)                |                    |                                |                      |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                         | Submergence                     | N/A                           | N/A                | (4)                | • N/A              | N/A                            | N/A                  |

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

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

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

Prepared by naen and l Charles Tenk Reviewed by:

QA Acceptance:

# • NEB-71-105 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

|   | Temperature '     | <sup>-</sup> - <sup>,</sup> 185 <sup>0</sup> F |
|---|-------------------|------------------------------------------------|
|   | Pressure ·        | - Atmospheric                                  |
| • | Relative Humidity | - Not Specified                                |
| ٠ | Radiation         | Not Specified                                  |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no `effect on the operations.

The above information shows justification for continued use of the devices. However, due to lack of sufficient documentation, TVA will either type-test this device or replace it with a type-tested device. ۰.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-               | r Plant<br>296          | System Compon         | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)            | (3)<br>Sheet No. <u>NEB-71</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -106<br>30            |
|--------------------------------------------------------------------------------------------|-------------------------|-----------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------------|-----------------------|
| FOUTDMENT DESCRIPTION                                                                      | E                       | IVIRONMENT            |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>TTEMS  |
| Contract 90744 & 91750                                                                     | Parameter               | Specifi-<br>cation    | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                            |                       |
| System: Reactor core<br>isolation cooling<br>Plant ID No. PS-71-13(A-B)<br>MPL #13-72(A&B) | Operating<br>Time       | 30 days               |                    | (1)                | z                  | See Appx 1<br>Note 1                                                       | See NCR<br>BFNNEB8021 |
| Component: Pressure<br>Switch                                                              | Temperature<br>(F)      | Figure<br>B.3(1,2,3)  | •                  |                    |                    | n                                                                          | 11 -                  |
| Manufacturer: Mercoid                                                                      |                         |                       |                    | (4)                |                    |                                                                            |                       |
| Model No.: DA-7043-804                                                                     | Pressure<br>(PSIA)      | Table ·<br>B.1(1,2,3) |                    | · · · .<br>(4)     |                    | н<br>~                                                                     | H                     |
| Function: Exhaust<br>pressure monitor                                                      | Relative<br>Humidity(%) | 100                   | - 1<br>- 1         | (4)                |                    | И.<br>х                                                                    | " -                   |
| Accuracy:<br>Req'd:<br>Demon:                                                              | Chemical<br>Spray       | N/A                   | N/A                | (4)                | N/A                | N/A                                                                        | N/A                   |
| Category: <sup>A</sup><br>Service: <sup>RCIC</sup> turbine                                 | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>    |                    | (4)                | •••                | See Appx 1<br>Note 1                                                       | See NCR<br>BFNNEB8021 |
| Location: 3                                                                                | Aging                   | N/A                   | -                  | . (2)              |                    | Appx 1 Note 1                                                              | tt                    |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No                       | Submergence             | N/A                   | N/A                | (4)                | N/A                | N/A                                                                        | N/A                   |

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

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

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

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

Prepared by: <u>alex Melnihou</u> Reviewed by: <u>Charles</u> Junk

QA Acceptance:\_\_\_\_

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NEB-71-106

Appendix 1, Rev 0

 To date, qualification information is unavailable. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. This instrument has adequately functioned in the past, and TVA has no indications that this instrument would not properly function in the near future. In addition, Mercoid instruments are installed at several other nuclear plants with no indications of generic failures.





SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

(3) Sheet No. NEB-71-107 Revision 0 10/27/80 Date

Docket .

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| EQUIPMENT DESCRIPTION                                                              | ENVIRONMENT             |                              |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. FCV-71-17<br>MPL # 71-17 | Operating<br>Time       | 30 days                      | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                       | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) | 250 F              | (4)                | 12                   | See Appx 1<br>Note 2    | 11                   |
| Model No.: SMB-00                                                                  | Pressure                | Table<br>B.1(1,2,3)          | 40                 | (1)                | ".                   | Type test               | None                 |
| Function: Inbd suction<br>valve                                                    | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   |                         | n .                  |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                  | Chemical<br>Spray       | N/A                          | · N/A :            | (4)                | N/A                  | -<br>N/A                | N/A                  |
| Category: A<br>Service: RCIC supp                                                  | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None                 |
| Pool<br>Location: 3                                                                | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3           | None                 |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                          | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

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

alex Meliikow Prepared by: Reviewed by:

QA Acceptance:

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## NEB-71-107, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 25 seconds and is 162° F at 120 in unit 1 and 160° F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.
| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-        | ar Plant<br>-296        | System Compo<br>,            | NENT EVALUATIO       | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-71</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -108                 |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|----------------------|--------------------|----------------------|----------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                              | E                       | NVIRONMENT                   |                      | DOCUMENTA          | FION REF             | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation   | Specifi-<br>cation | Qualifi-<br>cation   |                                                                            |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. FCV-71-18<br>MPL # 13-39 | Operating<br>Time       | 30 days                      | 2 <sup>4</sup> hours | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                                       | ncr<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:                                      | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) | 250 F                | (4)                | 11                   | See Appx 1<br>Note 2                                                       | 11                   |
| Model No.: SMB-00                                                                  | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                   | • • • •            | <sup>11</sup> .      | Type test                                                                  | None                 |
| Function: Outbd suction<br>valve                                                   | Relative<br>Humidity(%) | 100                          | 100<br>:             | (4)                | 11                   | 11                                                                         | 13                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                  | Chemical<br>Spray       | NZA                          | :<br>N/A .           | (4)                | N/A                  | N/A                                                                        | N/A                  |
| Category: A<br>Service: RCIC supp                                                  | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | 2x.10 <sup>8</sup>   | (4)                | See Appx 1<br>Note 1 | Type Test                                                                  | None                 |
| Location: 3                                                                        | Aging                   | N/Å                          |                      | (2)                |                      | Appx 1 Note 3                                                              | None -               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                          | Submergence             | N/A                          | N/A Î                | ,<br>(4)           | N/A                  | N/A .                                                                      | N/A`                 |

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

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

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

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

| Prepared by: | alex Melnihow |
|--------------|---------------|
| Reviewed by: | Charles Jurk  |

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 25 seconds and is 162°F at 120 in unit 1 and 160°F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Declet: 50,250, 50,260, 50,206 (3) Sheet No. NEB- 71-109 Revision 0

|                                                                                    |                         |                     | •                  |                   |                      |                         | -                    |
|------------------------------------------------------------------------------------|-------------------------|---------------------|--------------------|-------------------|----------------------|-------------------------|----------------------|
| Docket: 50-259, 50-260, 50-                                                        | 296                     | •                   |                    |                   | ]                    | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                                              | E                       | NVIRONMENT          |                    | DOCUMENTATION REF |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                             |                         | Specifi-            | Qualifi-           | Specifi-          | Qualifi-             |                         |                      |
|                                                                                    | Parameter               | cation              | cation             | cation            | cation               |                         |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. FCV-71-19<br>MPL # 71-19 | Operating<br>Time       | 30 day              | 3 24 hours         | (1)               | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                       | Temperature<br>(F)      | Figure<br>B.3(1)    | 250 F              |                   | tt                   | See Appx 1<br>Note 2    | 12 -                 |
| Manufacturer: Limitorque                                                           |                         | B.3(2,3)            |                    | (4)               |                      |                         |                      |
| Model No.: SMB-00                                                                  | Pressure<br>(PSTA)      | Table<br>B.1(1,2,3) | 40                 | · · ·             | "                    | . Type test<br>~        | None                 |
| Function: Suction<br>valve                                                         | Relative<br>Humidity(%) | 100                 | 100                | (4)               | 11                   | If                      | 17                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                  | Chemical<br>Spray       | N/A                 | :<br>N/A .         | (4)               | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: RCIC ends -<br>tank                                        | Radiation<br>(RAD)      | 3x10 <sup>7</sup>   | 2x.10 <sup>8</sup> | (4)               | See Appx 1<br>Note 1 | Type Test               | None                 |
| Location: 3                                                                        | Aging                   | N/A                 |                    | (2)               |                      | Appx 1 Note 3           | None .               |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No               | Submergence             | N/A                 | N/A                | (4)               | N/A                  | N/A State               | N/A                  |

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

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

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

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

alex meliik Prepared by: alles Ju Reviewed by:

1. Limitorque Test Reports B0003, B-0027, #600198

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2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 25 seconds and is 162°F at 120 in unit 1 and 160°F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

| Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2                                       | 96                              |                               | •                                     |                    |                    | Revision 0<br>Date 10/27/ | 80                |
|-----------------------------------------------------------------------------------|---------------------------------|-------------------------------|---------------------------------------|--------------------|--------------------|---------------------------|-------------------|
| EQUITPMENT DESCRIPTION                                                            | E                               | NVIRONMENT                    |                                       | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD   | OUTSTANDING       |
| Contract 90744 & 91750                                                            | Parameter                       | Specifi-<br>cation            | Qualifi-<br>cation                    | Specifi-<br>cation | Qualifi-<br>cation |                           |                   |
| System: Reactor core<br>isolation cooling<br>Plant ID No. PT-71-20<br>MPL # 13-65 | Operating<br>Time               | 30 days                       |                                       | (1)                | •                  | See Appx 1<br>Note 1      | NCR<br>BFNNEB8012 |
| Component: Pressure<br>transmitter<br>Manufacturer: GEMAC (GE)                    | Temperature<br>(F)              | Figures<br>B.3(1)<br>B.3(2,3) | . ·                                   | (4)                | -                  |                           | • 11              |
| fodel No.: 50-551032CAAY1                                                         | Pressure<br>(PSIA)              | Table<br>B.1(1,2,3)           |                                       | (4)                | · .                | 11<br>12                  | 11                |
| function: Suction pressure si                                                     | gnal<br>Relative<br>Humiditv(%) | 100                           | · · · · · · · · · · · · · · · · · · · | (4)                |                    | n                         | • 11              |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                         | Chemical<br>Spray               | N/A                           | N/A                                   | (4)                | N/A                | N/A                       | N/A               |
| Category: A<br>Service: RCIC pump ·                                               | Radiation<br>(RAD)              | 3x10 <sup>7</sup>             | •                                     | (4)                | •••                | See Appx 1<br>Note 1      | NCR<br>BFNNEB8012 |
| ocation: 3                                                                        | Aging                           | N/A                           |                                       | (2)                |                    |                           | •                 |
| lood Level Elev:552' N/A<br>bove Flood Level: Yes<br>No                           | Submergence                     | N/A                           | N/A .                                 | (4)                | N/A                | N/A                       | N/A .             |

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

(3) All notes and other information not on these sheets are on the attached appendix sheets. (4) See Section 3.0 and/or Appendix B in 79-01B report.

| Prepared by: | alex Melnikour |
|--------------|----------------|
| Reviewed by: | Charles Junk   |

# · NEB-71-110 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature <sup>.</sup> | '- '185 <sup>0</sup> F |
|--------------------------|------------------------|
| Pressure ·               | - Atmospheric          |
| Relative Humidity        | - Not Specified        |
| • Radiation              | - Not Specified        |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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





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# SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant

(3) Sheet No. NEB-71-112 Revision 0

Unit: 1,2,3 50-259, 50-260, 50-296

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| Docket: 50-259, 50-260, 50-2                                                          | 296                     |                               |                    |                    | I                    | Date 10/27/8            | 30                   |
|---------------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                                 | E                       | NVIRONMENT                    |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. PS-71-21-1<br>MPL # 13-67-1 | Operating<br>Time       | 30 daya                       | s 6 hours          | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8020    |
| Component: Pressure<br>switch<br>Manufacturer:                                        | Temperature<br>(F)      | Figures<br>B.3(1)<br>B.3(2,3) | 212 F              | (4)                | Π                    | See Appx 1<br>Note 4    | None                 |
| Static-O-Ring<br>Model No.: 6N-AA21 series                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3            | 3) 25              | (4)                | η.                   | Generic test            | None                 |
| Function: Suction pressure<br>Monitor                                                 | Relative<br>Humidity(%) | 100                           | 100                | (4)                | 17                   | 11                      | 11<br>,              |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3 of report                             | Chemical<br>Spray       | N/A                           | N/A :              | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: RCIC pump low <sup>.</sup>                                    | Radiation<br>(RAD)      | 3 10 <sup>7</sup>             | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8020    |
| Location: 3                                                                           | Aging                   | N/A                           |                    | (2)                | -                    | Appx 1 Note 3           | None ·               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                             | Submergence             | N/A                           | N/Å                | (4)                | N/A                  | N/A .                   | N/A                  |

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

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

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

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

| Prepared | by: | alex Melinhow |
|----------|-----|---------------|
| Reviewed | by: | Charles Junk  |
|          |     | •             |

#### NEB-71-112; APPENDIX 1, REVISION 0

- 1. Viking lab report 30203-2 (generic component)
- 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The material in the device which limits the allowable radiation dose are the seals (Buna-N) which, according to several studies including the guidelines fugnished in bulletin 79-01B, are acceptable up to a dose of 1 X 10° rad.
- 3. The radiation dose specified is based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad. This dose is based upon several conservative assumptions and could be reduced by more accurate specific modeling techniques. In TVA's opinion, such modeling analysis should be able to reduce the actual dose to below 1 X 10° rads.

Based on the materials evaluation and the temperature and radiation doses encountered by this device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or other parameters) on the functioning of this device.

TVA will commit to perform the necessary analysis to model the actual dose levels to this device. Should the results prove inconclusive, TVA will type test the device or replace it with a qualified substitute.

4. The Viking report (30203-2) has tested a similar switch to 212° F. The service condition calls for 297° F as a result of RCIC HELB in the compartment, area 3, making the RCIC pump inoperational. Therefore, the pressure switch would not need to function for 297° F, but for 165° F, unit 1, and 154° F, units 2 and 3, as a result of a HPCI HELB. The HPCI break (area 6) would be the next worst condition compartment #3 would see.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

(3) Sheet No. NEB- 71-114 Revision 0

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| Docket: 50-259, 50-260, 50-2                                                        | 296                     |                                  |                    |                    | I                  | Date 10/27/             | 80                   |
|-------------------------------------------------------------------------------------|-------------------------|----------------------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                               | El                      | IVIRONMENT                       |                    | DOCUMENTA          | FION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                              | Parameter               | Specifi-<br>cation               | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: Reactor core isol<br>cooling system<br>Plant ID No. FM-71-36<br>MPL # 13-99 | Operating<br>Time       | 30 days                          | . , .              | (1)                |                    | See Appx 1<br>Note 1    | NCR<br>BFNNEB8005    |
| Component: Square root<br>converter                                                 | Temperature<br>(F)      | Figures<br>B.12(1)<br>B.12(2, 2) | •                  |                    |                    | 11                      | IJ                   |
| General Electri                                                                     | c                       | B. 12(2,3)                       |                    | (4)                | ·                  |                         |                      |
| Model No.: 565100AAAC1                                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)              |                    | (4)                | · .                | · · ·                   | "                    |
| Function: Flow Sq Rt                                                                | Relative<br>Humidity(%) | 100                              | :                  | (4)                |                    | 11                      | 11                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                           | Chemical<br>Spray       | N/A                              | N/A :              | (4)                | N/A                | N/A                     | N/A                  |
| Category: A<br>Service: RCIC systèm                                                 | Radiation<br>(RAD)      | 3.1x10 <sup>4</sup>              | •                  | (4)                | •                  | See Appx 1<br>Note 1    | NCR<br>BFNNEB8005    |
| Location: 12                                                                        | Aging                   | N/A                              |                    | (2)                |                    | 11                      | 11 -                 |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                           | Submergence             | N/A                              | N/A                | (4)                | N/A                | N/A                     | N/A                  |

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

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

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

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

| Prepared b | y: | alex Melnihow |
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| Reviewed b | y: | Charlis Tik   |

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#### NEB-71-114

#### Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. GE Power Supplies are well known to be high quality equipment and have performed well throughout the industry in normal plant service. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment.

The limited information available however does suggest that these devices can probably be qualified to the required environment since that environment is not extremely harsh. For example, the electronic components of this device are known to perform properly after radiation doses of at least  $10^4$  rads. The required dose of  $3 \times 10^4$  is a 40-year normal plus 1-year accident doses while the required operating time is only 30 days.

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(3)SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 71-115 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: Date 10/27/80 50-259, 50-260, 50-296 Docket: QUALIFICATION ENVIRONMENT DOCUMENTATION REF OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualification cation cation cation Parameter System: Reactor core NCR See Appx 1 6 hours See Appx 1 Operating 30 days isolation cooling BFNNEB8010 Note 4 Note 1 Plant ID No. FS-71-36 Time (1)MPL # 13-57 Component: Flow Temperature n See Appx 1 None Figures 212 F Switch (F) Note 2 B.3(1) B.3(2,3) (4) Manufacturer: Barton •• . n, None Table 25 Type test ••• B.1(1,2,3) 289 Model No.: Pressure (PSIA) (4) RCIC flow Function: п . Ħ n 100 100 monitor Relative (4) Humidity(%) Accuracy: See Section Req'd: ÷. N/A N/A N/A 4.1.3 in report Demon: Chemical N/A N/A (4) . Spray Category: A 3x10<sup>6</sup> 3x10<sup>7</sup> See Appx 1 NCR See Appx 1 Radiation Note 3 BFNNEB8010 Note 1 Service: Minimum (RAD) (4) flow Appx 1 Note 4 None 3 (2) Location: N/A . Aging N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes (4) Submergence N/A N/A No

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

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

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

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

Prepared by: alex Melnihour harles Junk Reviewed by: /

## NEB-71-115, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02.
- 2. As a result of a RCIC HELB in compartment #3, the RCIC pump will be inoperable. Therefore, the next worst condition would be a HPCI HELB in the suppression chamber area #6, a maximum temperature of 165 for unit 1 and 154 for units 2 and 3. These temperatures are well within the qualification data.
- 3. For a 30-day operating time, the 3  $\times$  10<sup>7</sup> accident dose can be lowered to 7 X 10°.

These switches are capillary type and will not see the full 7 X  $10^{\circ}$  acident contact dose. Further modeling should reduce the dose as a function of distance. Also, HS-71-34A and HS-71-34C can be manually operated from the control room.

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TVA will commit to further modeling analysis to confirm the acceptable radiation dose or replace the device with a qualified substitute.



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| Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2                                       | 96                      |                               |                    | DOGINICITY         | I<br>I             | Revision 0<br>Date 10/27/0 | 80                |
|-----------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|----------------------------|-------------------|
| EQUIPMENT DESCRIPTION                                                             | EN                      | VIRONMENT                     |                    | DOCOMENTAL         | I I ON REF         | METHOD                     | ITEMS             |
| Contract 90744 & 91750                                                            | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                            |                   |
| System: Reactor core<br>isolation cooling<br>Plant ID No. FT-71-36<br>MPL # 13-58 | Operating<br>Time       | 30 days                       |                    | (1)                | • • .              | See Appx 1<br>Note 1       | NCR<br>BFNNEB8012 |
| Component: Flow<br>transmitter<br>Manufacturer: CEMAC (CE)                        | Temperature<br>(F)      | Figures<br>B.3(1)<br>B.3(2,3) |                    | (4)                |                    | U .                        | n                 |
| Model No.: 50-555111BDAA3AAA                                                      | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           | -                  | · · · ·            | •                  | n<br>`                     | 11                |
| Function: RCIC flow signal                                                        | Relative<br>Humidity(%) | 100                           | ;                  | (4)                | ·                  | 11                         | 13                |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                         | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                | N/A ·                      | N/A               |
| Category: A                                                                       | Radiation               | 3x10 <sup>7</sup>             |                    |                    | ••-                | See Appx 1                 | NCR               |

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(2)

(4)

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

No

N/A

Flow

Flcod Level Elev:552'

Above Flood Level: Yes

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Service:

Location:

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

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

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

Radiation

Submergence

N/A

N/A

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N/A

(RAD)

Aging

| Prepared | by:  | alex   | Mel | ihou | _ر |
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| Reviewed | by:_ | Charle | 1.  | mb   |    |

Note 1

N/A

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BFNNEB8012

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N/A

QA Acceptance:

N/A

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# NEB-71-116 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature <sup>.</sup> | – 185 <sup>0</sup> F |
|--------------------------|----------------------|
| Pressure                 | - Atmospheric        |
| Relative Humidity        | - Not Specified      |
| Radiation                | - Not Specified      |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

| Facility: Browns Ferry Nuclean                                                     | r Plant                 |                              |                    |                    |                      | Sheet No. <u>NEB-71</u>        | -117                 |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|--------------------------------|----------------------|
| Unit: $1,2,3$<br>Docket: $50-259$ $50-260$ $50-3$                                  | 296                     |                              |                    |                    | =]                   | $Date \frac{10/27/8}{10/27/8}$ | 30                   |
| EQUIPMENT DESCRIPTION                                                              | ENVIRONMENT             |                              |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD        | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. FCV-71-37<br>MPL # 13-20 | Operating<br>Time       | 30 days                      | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3           | ncr<br>Bfnneb8034    |
| Component: Motor<br>operator<br>Manufacturer:                                      | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) | 250 F              | (4)                | n                    | See Appx 1<br>Note 2           | 11                   |
| Model No.: SMB-1                                                                   | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | • • • •            | Ņ.                   | Type test                      | None                 |
| Function: Outbd disch<br>valve                                                     | Relative<br>Humidity(%) | 100                          | 100                | (4)                | n                    | 11                             |                      |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                  | Chemical<br>Spray       | N/A                          | N/A _              | (4)                | N/A                  | N/A                            | N/A<br>-             |
| Category: A<br>Service: RCIC system                                                | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                      | None                 |
| Location: 3                                                                        | Aging                   | N/A                          | لا                 | (2)                | u<br>b               | Appx 1 Note 3                  | None                 |
| Flood Level Elev:552' N/A<br>Above-Flood Level: Yes<br>No                          | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                            | N/A                  |

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

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

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

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

lex Meln Prepared by: Reviewed by:

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#### NEB-71-117, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 25 seconds and is 162°F at 120 in unit 1 and 160°F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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(3)SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-71-118 Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: Date - 10/27/80 50-259, 50-260, 50-296 Docket: QUALIFICATION DOCUMENTATION REF OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Qualifi-Specifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Reactor core NCR 24 hours See Appx 1 See Appx 1 30 davb isolation cooling Operating BFNNEB8034 Note 1 Note<sup>3</sup> (1) Plant ID No. FCV-71-38 Time MPL # 13-30 Temperature Component: Motor 11 250 F n See Appx 1 (F) Figure operator Note 2 B.3(1) B.3(2,3) (4) Manufacturer: Limitorque ••••• 40 n, Type test None Table B.1(1,2,3) Model No.: SMB-1 Pressure (4) (PSIA) Function: Cnds test **u** . tt u 100 100 valve . Relative (4) Humidity(%) Accuracy: . Reg'd: N/A ĉ . A. N/A ·N/A N/A Demon: Chemical N/A N/A (4) • : Spray Category: A 2x10<sup>8</sup> 3x10<sup>7</sup> See Appx 1 Type Test None Radiation Note 1 RCIC system Service: (4) (RAD) Appx 1 Note 3 None 3 Location: Aging (2) N/A Flood Level Elev:552' N/A Ń/A N/A N/A (4)<sup>\*</sup> Above Flood Level: Yes Submergence N/A N/A No

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

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

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

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

Prepared by: <u>Alex Mehnikow</u> Reviewed by: <u>Charles Juck</u>



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1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 297° F at 30 seconds and is 162°F at 120 in unit 1 and 160 F at 120 seconds for units 2 and 3. seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(3) Sheet No. NEB- 71-119 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF OUTSTANDING OUALIFICATION ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Reactor core isolation cooling 30 davb 24 hours See Appx 1 Operating See Appx 1 NCR Plant ID No. FCV-71-39 (1)Note 1 Note R BFNNEB8034 Time MPL # 13-21 Component: Motor Temperature operator (F) 250 F 11 11 Figure See App 1 B.3(1) Note 2 Manufacturer: Limitorque B.3(2.3) (4) •••• 40 Table <u>n</u> . Type test None B.1(1.2,3) SMB-1 Model No.: Pressure (4) (PSIA) Inbd disch Function: 11 valve 100 100 Ħ n Relative (4) Humidity(%) Accuracy: N/A Req'd: N/A N/A N/A (4) Demon: Chemical N/A N/A : : Spray Category: A 2x10<sup>8</sup> 3x10<sup>7</sup> ..... See Appx 1 Type Test None Radiation RCIC system Note 1 Service: (4) (RAD) 3 . Appx 1 Note 3 None Location: N/A (2)Aging N/A Flood Level Elev:552 N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence No

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

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

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

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

Prepared by: alex Mehinhow Charles ~ Reviewed by: (

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1. Limitorque Test Reports B0003, B-0027, #600198

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2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 297°F in 25 seconds and is 160°F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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|------------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|---------------------------------------------------------------------|----------------------|
| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-        | er Plant                | SISIEM COMPO         | VENI EANDAILO      | -                  | (NEV 2)            | Sheet No. <u>NEB-71</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -120                 |
| FOULDWENT DESCRIPTION                                                              | ENVIRONMENT             |                      |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                             | OUTSTANDING<br>TTEMS |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation | 11041100                                                            |                      |
| System: Reactor core<br>isolation cooling<br>Plant ID No. TE-71-41A<br>MPL #13-77A | Operating<br>Time       | 1 hour               |                    | (1)                |                    | Appx 1<br>Note 1                                                    | NCR<br>BFNNEB8022    |
| Component: Temperature<br>Element                                                  | Temperature<br>(F)      | Figure<br>B.8(1,2,3) | ·                  | <u>.</u>           |                    | II.                                                                 | n                    |
| Manufacturer: Scam                                                                 |                         | 3                    |                    | (4)                |                    |                                                                     |                      |
| Model No.: S51-1                                                                   | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | . (4)              |                    | 11<br>  * * ~                                                       | FT                   |
| Function: Leak temp<br>high                                                        | Relative<br>Humidity(%) | 100                  |                    | (4)                |                    | tt                                                                  | 11                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                                    | Chemical<br>Spray       | N/A                  | N/A .              | (4)                | N/A                | N/A                                                                 | N/A                  |
| Category: A<br>Service: RCIC steam -                                               | Radiation<br>(RAD)      | 3x10 <sup>7</sup>    |                    | (4)                |                    | Appx 1<br>Note 1                                                    | ncr<br>BFNNEB8022    |
| Location: 3                                                                        | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 1                                                       | tz                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No               | Submergence             | N/A                  | N/A                | (4)                | N/A .              | N/A                                                                 | N/A                  |

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

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

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

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

Prepared by: <u>alex Melnikon</u> harless Reviewed by:

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# NEB-71-120, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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|----------------------------------------------------------------------------------|-----------------------------------------------------|----------------------|-----------------------------|--------------------|--------------------|-----------------------------|-------------------|--|
|                                                                                  |                                                     | System Compon        | IENT <sup>®</sup> EVALUATIO | n work sheet       | (Rev 2)            | (3)                         |                   |  |
| Facility: Browns Ferry Nuclea                                                    | r Plant                                             |                      |                             |                    | -                  | Sheet No. <u>NEB-71-121</u> |                   |  |
| Unit: 1,2,3                                                                      | 206                                                 |                      | -                           |                    | *                  | $\frac{10/27}{10}$          | 80                |  |
| Docket: 50-259, 50-200, 50-                                                      | E                                                   | NVIRONMENT           | 7                           | DOCUMENTA          | TION REF           | QUALIFICATION               | OUTSTANDING       |  |
| EQUIPMENT DESCRIPTION                                                            |                                                     |                      |                             |                    |                    | METHOD                      | ITEMS             |  |
| Contract 90744 & 91750                                                           | Parameter                                           | Specifi-<br>cation   | Qualifi-'<br>cation         | Specifi-<br>cation | Qualifi-<br>cation |                             |                   |  |
| System: Reactor core                                                             |                                                     |                      | ۶<br>Z                      |                    |                    |                             |                   |  |
| isolation cooling<br>Plant ID No. TE-71-41C&D<br>MPL #13-77C&D                   | Operating<br>Time                                   | 1 hour               |                             | (1)                |                    | Appx 1<br>Note 1            | NCR<br>BFNNEB8022 |  |
| Component: Temperature<br>Element                                                | Temperature<br>(F)                                  | Figure<br>B.6(1,2,3) |                             |                    |                    | ,<br>11                     | tt                |  |
| Manufacturer: Scam                                                               |                                                     |                      |                             | (4)                |                    |                             |                   |  |
| Model No.: S51-1                                                                 | Pressure                                            | Table<br>B.1(1,2,3)  | ×                           | ••••               |                    | н<br>                       |                   |  |
|                                                                                  | (PSIA)                                              |                      |                             | (4)                |                    |                             |                   |  |
| Function: Leak temp<br>high                                                      | Relative<br>Humidity(%)                             | 100                  | :                           | (4)                |                    | 17                          |                   |  |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                                  | Chemical                                            | N/A                  | N/A :                       | (4)                | Ņ/Ą                | N/A                         | N/A               |  |
| Category: A<br>Service: RCIC steam                                               | Radiation                                           | 3.1x10 <sup>7</sup>  |                             | (4)                | • •••              | Appx 1<br>Note 1            | NCR<br>BENNEB8022 |  |
| line                                                                             | (IIAD)                                              |                      | я.                          |                    |                    |                             |                   |  |
| Location: 6                                                                      | Aging                                               | N/A                  |                             | (2)                |                    | Appx 1 Note 1               | 11                |  |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No             | Submergence                                         | N/A                  | N/A                         | (4)                | N/A                | N/A                         | N/A               |  |
| Notes: (1) See Section 2.4 in<br>(2) See Section 4.1.2<br>(3) All notes and othe | n 79-01B report<br>in 79-01B repo<br>er information | rt.<br>not on these  |                             |                    | Prepared by        | : alex M                    | Lelinkow          |  |

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

| Prepared | by: | alex Melwhow |
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| Reviewed | by: | Charles Turk |
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## NEB-71-121, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.
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|----------|--------------------|------------|--------------|-------|-----------|--------------------|--------------------|----------------------|--------------------|-----------|--------------|-------|
|          |                    |            |              |       |           | SYSTEM COMPO       | HENT EVALUATI      | on work sheet        | (Rev 2)            |           | (3)          |       |
| Facility | : Browns           | Fer        | ry Nu        | clear | Plant     |                    | •                  |                      |                    | Sheet No. | NEB-7        | 1-122 |
| Unit:    | 1,2,3              |            | •            |       |           |                    | 2                  |                      |                    | Revision. | 0            |       |
| Docket:  | 50-259             | , 50       | -260,        | 50-2  | 96        |                    |                    |                      |                    | Date      | 10/27/       | 80    |
| EQUIPMEN | T DESCRI           | PTIO       | N            | -     |           | ENVIRONMENT        |                    | DOCUMENTAT           | CION REF           | QUALIFI   | CATION<br>DD | 00    |
| Contract | 90744 &            | 917        | 50           |       | Parameter | Specifi-<br>cation | Qualifi-<br>cation | Specifi- *<br>cation | Qualifi-<br>cation | · ·       |              |       |
| System:  | Reactor<br>cooling | cor<br>sys | e iso<br>tem | •     | Operating | 30 days            |                    |                      |                    | Appx      |              | s     |

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N/A

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N/A

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N/A Flood Level Elev:552\* Above Flood Level: Yes Submergence N/A N/A No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Time

(F)

Pressure (PSIA)

Relative Humidity(%)

Chemical

Radiation

Spray

(RAD)

Aging

Temperature

Figure

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

Table

B.1(1,2,3)

100

N/A

N/A

3x10<sup>7</sup>

alex Melnikou, Prepared by: Reviewed by: Charles

QA Acceptance:

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N/A

Appx 1

Note 1

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Note 1

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OUTSTANDING

ITEMS

See NCR

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N/A

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N/A

See NCR

BFNNEB8025

BFNNEB8025

SE-71-42A&B

Turbine Cntls

Speed Element

Ferrynes

MPL #13-2

Speed

A

See Section

4.1.3 in rpt

**RCIC Turb** 

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Plant ID No.

Manufacturer:

Model No.: Type GS

Component:

Function:

Accuracy:

Req'd:

Demon:

Category:

Service:

Location:

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### NEB-71-122, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148 ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300° as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146° ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA'is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

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| valifi-            | DOCUMENTAT<br>Specifi-<br>cation<br>(1) | (Rev 2)<br>TION REF<br>Qualifi-<br>cation | (3)<br>Sheet No. <u>NEB-71</u><br>Revision <u>0</u><br>Date <u>10/27/8</u><br>QUALIFICATION<br>METHOD<br>Appx 1 | -123<br>30<br>OUTSTANDING<br>ITEMS                                                                |
|--------------------|-----------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Qualifi-<br>Dation | DOCUMENTAT<br>Specifi-<br>cation<br>(1) | ION REF<br>Qualifi-<br>cation             | QUALIFICATION<br>METHOD<br>Appx 1                                                                               | OUTSTANDING<br>ITEMS                                                                              |
| Qualifi-           | Specifi-<br>cation<br>(1)               | Qualifi-<br>cation                        | Appx 1                                                                                                          |                                                                                                   |
|                    | (1)                                     |                                           | Appx 1                                                                                                          |                                                                                                   |
|                    |                                         |                                           | Note 1                                                                                                          | See NCR<br>BFNNEB8025                                                                             |
|                    | (4)                                     |                                           | 17                                                                                                              | II                                                                                                |
|                    | (4)                                     |                                           | H<br>                                                                                                           | 17                                                                                                |
|                    | (4)                                     |                                           | 17                                                                                                              | 11                                                                                                |
| N/A .              | (4)                                     | N/A                                       | N/A                                                                                                             | N/A                                                                                               |
| •                  | (4)                                     | P.1 2                                     | Appx 1<br>Note 1                                                                                                | See NCR<br>BFNNEB8025                                                                             |
|                    | (2)                                     |                                           | -<br>tt                                                                                                         | 89 .                                                                                              |
| N/A                | (4)                                     | N/A                                       | N/A                                                                                                             | N/H                                                                                               |
| -                  | N/A .<br>N/A                            | N/A . (4)<br>                             | N/A (4) N/A<br>(4)<br>(2)<br>N/A (4) N/A                                                                        | N/A     (4)     N/A     N/A       (4)      Appx 1<br>Note 1       (2)         N/A     (4)     N/A |

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(2) See Section 4.1.2 in 79-01B report.(3) All notes and other information not on these sheets are on the attached appendix sheets. (4) See Section 3.0 and/or Appendix B in 79-01B report.

| Prepared | by: <u>Alex Melnihow</u> | _ |
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| Reviewed | by: Charlos Turk         |   |

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# NEB-70-123, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 30° as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146° ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                                      | Plant                   | SYSTEM COMPON                | NENT EVALUATIO     | on work sheet      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-77</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | I-124                 |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|--------------------|---------------------------------------------------------------------------|-----------------------|
| Docket: 50-259, 50-260, 50-2                                                       | E                       | NVIRONMENT                   |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                   | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                           | 9                     |
| System: Reactor core iso.<br>cooling system<br>Plant ID No. TIS-71-45<br>MPL #13-2 | Operating<br>Time       | 30 days                      |                    | (1)                |                    | Appx 1<br>Note 1                                                          | See NCR<br>BFNNEB8025 |
| Component: Turbine<br>Control<br>Manufacturer: Terry                               | Temperature (F)         | Figure<br>B.3(1)<br>B.3(2,3) |                    | (4)                |                    | 11                                                                        | ŧ                     |
| Türbines<br>Model No.: Type GS                                                     | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          |                    | (4)                | •                  | 11<br>~                                                                   | H                     |
| Function: RCIC Governor<br>End                                                     | Relative<br>Humidity(%) | 100                          |                    | (4)                | -                  | 11                                                                        | 11                    |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in rpt                             | Chemical<br>Spray       | N/A                          | N/A :              | (4)                | N/A ···            | N/A                                                                       | N/A                   |
| Category: <sup>A</sup><br>Service: Bearing High -                                  | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | •                  | (4)                | • ••               | Appx 1<br>Note 1                                                          | See NCR<br>BFNNEB8025 |
| Location: 3                                                                        | Aging                   | N/A                          |                    | (2)                |                    | 11                                                                        | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                          | Submergence             | N/A                          | N/A                | (4)                | N/A -              | N/A                                                                       | N/A                   |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> harbos Reviewed by:

QA Acceptance:

Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300° as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146° ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

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|------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|--------------------|-----------------------------------------------------------------------------|-----------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259 50-260 50-2        | Plant                   | System Compo                 | NENT EVALUATIC     | )n work sheet      | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 71</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -125                  |
| EQUIPMENT DESCRIPTION                                                              | E                       | NVIRONMENT                   |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                     | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                             |                       |
| System: Reactor core iso.<br>cooling system<br>Plant ID No. TIS-71-46<br>MPL #13-2 | Operating<br>Time       | 30 days                      | -                  | (1)                | •                  | Appx 1 .<br>Note 1                                                          | See NCR<br>BFNNEB8025 |
| Component: Turbine Cntls<br>Temp Switch<br>Manufacturer:                           | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) |                    | (4)                |                    | 38                                                                          | 11                    |
| Türbines<br>Model No.: Type GS                                                     | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          |                    | (4)                |                    | 11                                                                          | "-                    |
| Function: RCLC Coupl<br>End                                                        | Relative<br>Humidity(%) | 100                          | 2                  | (4)                |                    | tt                                                                          | n ,                   |
| Accuracy:<br>Regid: See Section<br>Demon: 4.1.3 in rpt                             | Chemical<br>Spray       | N/A                          | :<br>N/A .         | (4)                | N/A                | N/A                                                                         | N/A                   |
| Category: <sup>A</sup><br>Service: Bearing Temp                                    | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            |                    | (4)                | ••••<br>·          | Appx 1<br>Note 1                                                            | See NCR<br>BFNNEB8025 |
| Location: 3                                                                        | Aging                   | N/A                          | •                  | (2)                |                    | 33                                                                          | 11                    |
| Flood Level Elev:552: <sup>N/A</sup><br>Above Flood Level: Yes<br>No               | Submergence             | N/A                          | N/A                | (4)                | N/A                | ŅИ                                                                          | N/A                   |

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

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

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

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

| Prepared by: | alex Melinhow | - |
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| Reviewed by: | Charles Junk  |   |

QA Acceptance:

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# NEB-71-125, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The RCIC compartment (area No. 3) will only be exposed to the specified 300° as a result of an RCIC HELB in that compartment. Therefore, the RCIC pump will be inoperable. The next worst environment is caused by a HPCI HELB in area No. 6 resulting in a 146° ambient after 2 minutes in the RCIC compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 71-126 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1 Date 10/27/80 50-259, 50-260, 50-296 Docket: QUALIFICATION ENVIRONMENT DOCUMENTATION REF OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Qualifi-Specifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Reactor core NCR 24 hours See Appx 1 See Appx 1 isolation cooling Operating 30 davs Note 2 BFNNEB8034 Note 1 (1)Plant ID No. FCV-71-59 Time MPL # 14-68 Component: Motor Temperature Ħ None 250 F Type test Figure operator (F) B.6(1) B.6(2,3) (4) Manufacturer: Limitorque ••• n . 40 None Table Type test B.1(1,2,3) Model No.: SMB-00 Pressure (PSIA) (4) . Vacuum Function: п -11 11 100 100 relief Relative (4) Humidity(%) Accuracy: Req'd: N/A ς. . . . N/A N/A N/A Demon: N/A (4) Chemical N/A Spray Category: A 2x10<sup>8</sup> 3.1x10<sup>7</sup> See Appx 1 Type Test None Radiation Note 1 RCIC/HPCI turb Service: (RAD) (4) exhaust Appx 1 Note 2 None 6 Location: Aging N/A (2) Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) .

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

No

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

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

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

| Prepared by:  | alex Melnikow |
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| Reviewed by:_ | Charles Turk  |

QA Acceptance:\_

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# NEB-71-126; APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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|-------------------------------------------------------------------------------------------|--------------------------|----------------------|--------------------|--------------------|-----------------------|-------------------------|-----------------------|
| Facility: Browns Ferry Nuclear                                                            | Plant                    |                      |                    |                    |                       | Sheet No. NEB-73        | -128                  |
| Unit: 1,2,3                                                                               |                          |                      |                    |                    |                       | Revision U              | <u>00</u>             |
| Docket: 50-259, 50-260, 50-2                                                              | .96                      |                      |                    |                    |                       | Date 10/27/             | 80                    |
| EQUIPMENT DESCRIPTION                                                                     | E                        | NVIRONMENT           |                    | DOCUMENTATION REF  |                       | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                                    | Parameter                | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation    |                         | 3                     |
| System: High pressure<br>coolant injection sys<br>Plant ID No. PS-73-1(A-D)<br>MPL #23-68 | Operating<br>Time        | 30 days              | 1 hour .           | (1)                | See Appx 1<br>Note 1- | See Appx 1<br>Note 3    | None                  |
| Component: Pressure<br>Switch                                                             | Temperature<br>(F)       | Figure<br>B.2(1,2,3) | 212 F              | ()))               | 11                    | 17                      | NCR<br>BFNNEB8011     |
| Barksdale                                                                                 |                          |                      |                    | (9)                |                       | ·/                      |                       |
| Model No.: B2T-A12SS                                                                      | Pressuře<br>(PSIA)       | Table<br>B.1(1,2,3)  | 15                 | (4)                | n<br>-                | It                      | None                  |
| Function: Press                                                                           | Relative<br>Humidity(\$) | 100                  | 100                | (4)                | 11                    | 11                      | 11                    |
| Accuracy:<br>Req'd:<br>Demon:                                                             | Chemical<br>Spray        | N/A                  | N/A                | (4)                | N/A                   | N/A                     | N/A                   |
| Category:<br>HPCI steam<br>Service: supply                                                | Radiation<br>(RAD)       | 3x10 <sup>7</sup>    | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 2  | See Appx 1<br>Note 3    | See NCR<br>BFNNEB8011 |
| Location:                                                                                 | Aging                    | N/A -                |                    | ,<br>(2)           |                       | Appx 1 Note 3           | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                 | Submergence              | N/A                  | NZA                | (4)                | N/A                   | N/A                     | N/A                   |

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

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

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

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

| Prepared | by: | alex Mel | hillow |  |
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| Reviewed | by: | Charles  | Jule   |  |
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QA Acceptance:

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# NEB-73-128, APPENDIX 1, REVISION O

- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of  $1 \times 10^6$  rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furnished in bulletin 79-01B, are acceptable up to a dose of  $1 \times 10^6$  rad.
- 3. The radiation doses given are based upon a total accident dose plus normal dose. Since this device is required to operate for only 30 days, the actual dose was calculated to be approximately 7 X 10° rad, which represents the dose at the surface of the RHR pipe. Since this device is located approximately 5 feet from the pipe, the actual dose is calculated to be 7 X 10° rad; therefore, this device should qualify for the stated environment.

Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects should not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered and TVA has identified no adverse effects from temperature or any other parameter on the functioning of this device.

For temperature, the service conditions presently on the worksheets are based on a temperature profile for a HPCI break. PDIS-73-1A and B would detect such a break and isolate the HPCI turbine. Therefore, instruments PS-73-1A, B, C, D, will no longer be needed to monitor the pressure since the HPCI turbine has been isolated and is out of service. The next worse environment would be from a RCIC line break in compartment 6which could possibly lower the steam pressure to 100 lbs/in<sup>2</sup>. Instruments PS-73-1A-D would then be needed to isolate the HPCI turbine to prevent equipment damage when the pressure drops to this level. The temperature profile for unit 1 indicates a maximum temperature of 145° F at 26 seconds. For units 2 and 3, it is 140° F at 27 seconds. The instruments are qualified to these temperatures.

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|--------------------------------|-------------|-------------------|--------------------|--------------|------------|-----------------|---------------------------------------|
| -,                             | S           | SYSTEM COMPO      | NENT EVALUATIO     | N WORK SHEET | (Rev 2)    | (3)             |                                       |
| Facility: Browns Ferry Nuclear | Plant       |                   | _                  |              | 2          | heet No. NEB-73 | -129                                  |
| Unit: 1,2,3                    | - 4         |                   | •                  |              | ł          | $\frac{10}{10}$ | 0                                     |
| Docket: 50-259, 50-260, 50-2   | 96          |                   |                    | 200111010000 |            |                 | U<br>OUTOTANDING                      |
| POUTDURUS DECODIONTOU          | EN          | IVIRONMENT.       |                    | DOCUMENTA    | I ION REP  | METHOD          | UUISTANDING<br>TTEMS                  |
| Contract 007111 t 01750        |             | Specifi           | Qualifi            | Specifi      | Qualifi-   | HEIHOD          |                                       |
| concract goran a grad          | Parameter   | cation            | cation             | cation       | cation     |                 | -                                     |
| System: High pressure coolant  | rai anceer  | caulton           |                    | 0401011      |            |                 | ······                                |
| injection system               | Operating   | 1 hour            | 6 hours            | i            | See Appx 1 | .Type test      | None                                  |
| Plant ID No. PDIS-73-1A,B      | Time        |                   |                    | (1)          | Note 1     |                 |                                       |
| MPL # 23-76,77                 | p-          |                   |                    |              |            |                 |                                       |
| Component: Pressure diff       | Temperature |                   |                    |              |            |                 |                                       |
| indicator switch               | (F)         | Figures           | 212 F              |              |            | See Appx I      |                                       |
|                                | •           | B.2(1)            |                    | (11)         |            | Noce 3          |                                       |
| Barton                         |             | D.2(2,5)          |                    | (4)          |            |                 |                                       |
|                                | м.          | Table             | 15                 | * •• ".      | ti -       | Test            | None                                  |
| Model No. 288A. 289            | Prassure    | B.1(1.2.3)        | .5                 |              | •          | •               |                                       |
|                                | (PSIA)      |                   |                    | (4)          |            |                 |                                       |
| Function: Excessive            |             |                   |                    | ·            |            |                 |                                       |
|                                | Relative    | 100               | 100                |              | n          | 11              | 11                                    |
| •                              | Humidity(%) |                   | •<br>•             | (4)          |            |                 |                                       |
| Accuracy:                      | * -         |                   |                    |              | •          | •               | · · · · · · · · · · · · · · · · · · · |
| Req'd: See Section             |             |                   | ÷ .                | "            | NI/A       | N/A             | N/A                                   |
| Demon: 4.1.3 In report         | Chemical    | N/A               | N/A :              | (4)          | N/A        | II/ A           | W/ R                                  |
| A A                            | Spray       |                   |                    |              | **         |                 |                                       |
| category: "                    | Doddatiday  | 3x10 <sup>7</sup> | 3x.10 <sup>6</sup> |              | See Appx 1 | See Appx 1      |                                       |
| Service. HPCI steam ·          |             |                   | -                  |              | Note 1     | Note 2          |                                       |
| flow                           |             |                   |                    | (4)          |            |                 |                                       |
| Location: <sup>2</sup>         | Aging       | N/A               |                    | (2)          |            | Appx 1 Note 4   | None ·                                |
|                                |             |                   |                    |              |            |                 |                                       |
| Flood Level Elev:552' """      |             |                   |                    | (11)         | N/A        | N/A             | N/A -                                 |
| RDOVE F100d Level: Yes         | Submergence | N/A               | N/A                | (4)          |            |                 |                                       |
| NO                             |             | L                 |                    |              |            | L               | L                                     |

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

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

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

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

Prepared by: <u>Alex Mehnihow</u> Reviewed by: <u>Charles Junh</u>

QA Acceptance:

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### NEB-73-129, APPENDIX 1, REVISION O

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. The radiation dose of 3 X 10<sup>7</sup> rad is based upon a total accident dose plus normal dose. Since this device is needed for only one hour, the actual dose was calculated to be approximately 6 X 10<sup>°</sup>. Therefore, this device qualifies for radiation dose.
- 3. A HPCI HELB in compartment #2 is the worst condition this area will see. However, if this does occur, a break in the RCIC line need not be considered. The next worst condition would be an RCIC line break in the torus (area #6). The maximum temperature area #2 will see as a result of the RCIC break is 145° F (unit 1) and 140° F (units 2 and 3). Therefore, the switches will meet the temperature requirements.
- 4. Based on a study of materials used in this device, it is not expected that aging considerations will adversely affect this equipment (in TVA's engineering judgement). This is based on the low temperature and radiation levels encountered for this instrument.

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

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(3) Sheet No. NEB-73-130 Revision 0

50-259, 50-260, 50-296

| Docket: 50-259, 50-260, 50-                                                         | 296                |                      |                     |                    | I                    | Date 10/27/             | 80                   |
|-------------------------------------------------------------------------------------|--------------------|----------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                               | E                  | NVIRONMENT           |                     | DOCUMENTAT         | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                              | Parameter          | Specifi-<br>cation   | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-2<br>MPL # 23-15 | Operating<br>Time  | A - 30 d<br>B - 1 ye | ays 24 hours<br>ar  | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                        | Temperature<br>(F) | Figure<br>B.0(1,2,3) | 250 F               |                    | 11                   | See Appx 1<br>Note 2    | 11                   |
| Manufacturer:<br>Limitorque                                                         |                    |                      |                     | (4)                | 11                   | 11                      | 11                   |
| Model No.: SMB-2                                                                    | Pressure<br>(PSIA) | B.0(1,2,3)           | 40                  | (4)                |                      | *                       |                      |
| Function: HPCI stm ln<br>inbd isol                                                  | Relative           | 100                  | 100                 | (4)                | 39                   | Type test               | None                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                   | Chemical<br>Spray  | N/A                  | i<br>N/A .          | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A                                                                         | Radiation          | 2x10 <sup>8</sup> ¥  | 2x10 <sup>8</sup> ¥ | (1)                | See Appx 1           | See Appx 1              | None                 |
| Steam                                                                               | (NAD)              | 4x10 /s              |                     |                    | Note-1               | Note-4                  |                      |
| Location:                                                                           | Aging              | N/A                  |                     | (2)                |                      | -Appx-1-Note-3          | None                 |
| Flood Level Elev:552'<br>Above Flood Level: Yes N/A<br>No                           | Submergence        | N/A                  | N/A                 | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

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

| Prepared | bу:_ | alex Mehipow | • |
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| Reviewed | bv:  | Charles Jusk |   |
|          |      | 52/1110/22   |   |

QA Acceptance:

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## NEB-73-130, APPENDIX 1, REVISION 0

1. Limitorque Test Reports #600198, B-0027, and B-0003

2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement, the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-73-131 Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Revision 0 Docket: 50-259, 50-260, 50-296 Date 10/27/80 DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: High pressure Operating coolant injection 1 hour 2 hours See Appx 1 Type test None Plant ID No. Appendix 1 Time (1)Note 2 Note 1 Component: Temperature Temperature (F) Switch Figure 305 F 11 Ħ 11 B.1(1,2,3) Manufacturer: (4) Fenwal • • . 25 Table Ħ., 11 11 Model No.: 17023-6 Pressure B.1(1,2,3) (PSIA) (4) Function: Steam leak

detector Relative 100 100 11 11 11 Humidity(%) (4) Accuracy: Req'd: ÷ ه شر . Demon: Chemical N/A (4). N/A N/A N/A N/A Spray Category: A • • • 5x10<sup>4</sup> 1.7x10<sup>5</sup> Radiation See Appx 1 Type Test None Service: HPCI logic (RAD) - (4) Note 2 Bus A cont. Location: 1 Aging N/A (2) Appx 1 Note 3 None Flood Level Elev:552' N/A

N/A

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

Above Flood Level: Yes

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

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

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

Submergence

N/A

alex Melnihow Prepared by: Reviewed by: Charles

N/A

N/A

QA Acceptance:

N/A

(4)

1. This sheet applies to items:

TS-73-2A MPL No. 23-101 TS-73-2C MPL No. 23-103

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- 2. Fenwal engineering report 6350 and Wyle report 43854-1.
- 3. Aging The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259,50-260,50-     | r Plant<br>296          | -                    |                     | •                  | ]                    | Sheet No. <u>NEB-73</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | <u>-132</u><br>30    |
|-------------------------------------------------------------------------------|-------------------------|----------------------|---------------------|--------------------|----------------------|---------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                               | ENVIRONMENT             |                      |                     | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                                             | OUTSTANDING<br>ITEMS |
|                                                                               | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                                                                     |                      |
| System: High pressure<br>coolant injection<br>Plant ID No. Appendix 1<br>Note | Operating<br>Time       | 1 hour               | 2 hours             | (1)                | See Appx 1<br>Note 2 | Type test                                                           | - None               |
| Component: Temperature<br>Switch                                              | Temperature<br>(F)      | Figure<br>B.1(1,2,3) | 305 F               | (1)                | 11<br>,              | H<br>-                                                              | 11                   |
| Model No.: 17023-6                                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  | 25                  | · · · · ·          | n .                  | 11<br>                                                              | 11                   |
| Function: Steam leak<br>detector                                              | Relative<br>Humidity(%) | 100                  | 100                 | (4)                | 11                   | n -                                                                 | 11                   |
| Accuracy:<br>Req'd:<br>Demon:                                                 | Chemical<br>Spray       | N/A                  | :<br>-N/A           | (4)                | N/A "`               | N/A                                                                 | N/A                  |
| Category: A<br>Service: HPCI logic                                            | Radiation<br>(RAD)      | 5x10 <sup>4</sup>    | 1.7x10 <sup>5</sup> | (4)                | See Appx 1<br>Note 2 | Type Test                                                           | None                 |
| Bus 11 cont.<br>Location: 1                                                   | Aging                   | N/A                  |                     | (2)                |                      | Appx 1 Note 3                                                       | None ·               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence             | N/A                  | H/A                 | (4)                | N/A ·                | N/A .                                                               | N/A                  |

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

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

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

Prepared by: all melupow Reviewed by: Charles 5

QA Acceptance:

1. This sheet applies to items:

TS 73-2B MPL No. 23-102 TS 73-2D MPL No. 23-104

- 2. Fenwal engineering report 6350 and Wyle report 43854-1.
- 3. Aging The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-73-135 Facility: Browns Ferry Nuclear Plant Revision 0 2,3 Unit: 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF QUALIFICATION OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Contract 90744 & 91750 Qualifi-Specifi-Specification Parameter cation cation cation System: High pressure Type test None 1 hour 2 hours See Appx 1 coolant injection Operating Note 2 Plant ID No. Appx 1 (1) Time Note 1B Component: Temperature Temperature н ... 11 Figure 305 F Switch (F) B.6(2,3) (4) Manufacturer: Fenwal · · · tt 11 Table 25 Model No.: 17023-6 B.1(1,2,3) Pressure (4) (PSIA) Steam leak Function: 11 11 11 detector 100 100 Relative (4) Humidity(%) Accuracy: Reg'd: ¢ N/A N/A . . . N/A Demon: N/A (4) Chemical N/A Spray A Category: 1.7x10<sup>5</sup>  $3.1 \times 10^{7}$ See Appx 1 See NCR See Appx 1 Radiation Note 2 Note 3 BFNNEB8009 HPCI logic Service: (4) (RAD) Bus A cont. Appx 1 Note 3 None 6 Location: N/A (2)Aging N/A Flood Level Elev:552' Above Flood Level: Yes (4) N/A N/A Submergence. No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Prepared by: <u>Alex Mehihow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:\_

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1. This sheet applies to items:

 TS 73-2E
 MPL No. 23-101

 TS 73-2F
 MPL No. 23-102

 TS 73-2G
 MPL No. 23-103

 TS 73-2H
 MPL No. 23-104

2. Fenwal Engineering Report 6350.

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3. These switches were subjected to a radiation dose of 1.7x10<sup>5</sup>rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10 rad which is well above the postulated accident dose of 3.1x10 rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

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| Facility: Browns Ferry Nuclean<br>Unit: 1                                           | r Plant                 | System Compon       | IENT EVALUATIO       | on work sheet      | (Rev 2)               | (3)<br>Sheet No. <u>NEB-73</u><br>Revision <u>0</u> | -136                 |
|-------------------------------------------------------------------------------------|-------------------------|---------------------|----------------------|--------------------|-----------------------|-----------------------------------------------------|----------------------|
| Docket: 50-259, 50-260, 50-2                                                        | 296                     |                     |                      |                    |                       | Date 10/27/8                                        | 30                   |
| EQUIPMENT DESCRIPTION                                                               | E                       | NVIRONMENT          |                      | DOCUMENTAT         | FION REF              | QUALIFICATION<br>METHOD                             | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                              | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation . | Specifi-<br>cation | Qualifi-<br>cation    |                                                     |                      |
| System: High pressure<br>coolant injection<br>Plant ID No. TS-73-2F<br>MPL #23-102B | Operating<br>Time       | 1 hour              | 2 hours              | (1)                | See Appx 1.<br>Note 2 | Type test                                           | None                 |
| Component: Temperature<br>Switch                                                    | Temperature<br>(F)      | • Figure<br>B.1(1)  | 305 F                | (11)               | 11                    | 11                                                  | 11                   |
| Manufacturer:<br>Fenwal<br>Model No.: 17023-6                                       | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3) | 25                   | (4)<br>· · · ·     | u .                   | и<br>~                                              | 11                   |
| Function: Steam leak<br>detector                                                    | Relative<br>Humidity(%) | 100                 | 100                  | (4)                | 11                    | ų                                                   | 11                   |
| Accuracy:<br>Req'd:<br>Demon:                                                       | Chemical<br>Spray       | N/A                 | :<br>N/A .           | (4)                | N/A                   | N/A                                                 | N/A                  |
| Category: A<br>Service: HPCI logic                                                  | Radiation<br>(RAD)      | 5x10 <sup>4</sup>   | 1.7x10 <sup>5</sup>  | (4)                | See Appx 1<br>Note 2  | Type Test                                           | None                 |
| Bus II cont.<br>Location: 1                                                         | Aging                   | N/A                 |                      | (2)                |                       | Appx 1 Note 3                                       | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                           | Submergence             | N/A                 | N/A                  | (4)                | Ň/A                   | N/A                                                 | N/A                  |

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

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

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

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

| Prepared by: | alex Meluikow |
|--------------|---------------|
| Reviewed by: | Charles Turk  |

QA Acceptance:

1. This sheet applies to items:

TS-73-2F MPL No. 23-102 TS-73-2H MPL No. 23-104

2. Fenwal engineering report 6350 and Wyle report 43854-1.

3. Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-72\_101 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: QUALIFICATION OUTSTANDING-ENVIRONMENT DOCUMENTATION REF METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Specifi-Specifi-Qualifi-Qualification Parameter cation cation cation System: High pressure Plant ID No. Appx 1 Operating See Appx 1 Type test None 1 hour 2 hours Time (1)Note 2 Note 1 Component: Temperature Temperature (F) н , 11 11 Switch Figure 305 F ÷ B.6(1,2,3) × (4) Manufacturer: Fenwal • • . 11 . Ħ 11 25 Table Model No.: 17023-6 Pressure B.1(1,2,3) (PSIA) (4) Function: Steam leak Relative 11 11 11 100 detector 100 (4) Humidity(%) Accuracy: Req<sup>1</sup>d: ÷ N/A (4) Ń/A N/A Demon: Chemical N/A N/A Spray Category: A • • • 3.1x10<sup>7</sup> 1.7x10<sup>5</sup> See NCR See Appx 1 See. Appx 1 Radiation BFNNEB8009 Service: HPCI logic (4) Note 2 Note 3 (RAD) bus A cont. (2)None Location: 6 Aging N/A Appx 1 Note 3 Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

| Prepared by:_ | alex Meliihow |
|---------------|---------------|
| Reviewed by:  | Charles Turk  |
|               |               |

QA Acceptance:\_

1. This sheet aplies to items:

TS-73-2J MPL No. 23-102 TS-73-2L " TS-73-2N " TS-73-2R "

- 2. Fenwal engineering report 6350 and Wyle report 43854-1.
- 3. These switches were subjected to a radiation dose of 1.7x10<sup>2</sup> rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10 rad which is well above the postulated accident dose of 3.1x10 rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

## SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

(3) Sheet No. NEB-73-142 Revision 0 10/27/80

Date

Docket: 50-259, 50-260, 50-296

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QUALIFICATION ENVIRONMENT DOCUMENTATION REF OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Qualifi-Specifi-Qualifi-Specification cation cation Parameter cation System: High pressure 1 hour 2 hours See Appx 1 Type test None coolant injection Operating Plant ID No. Appx 1 Note 2 (1)Time Note 1 Component: Temperature Temperature n п = Switch Figure 305 F (F) B.6(1,2,3) Manufacturer: Fenwal (4) • • 11 11 Table 25 11 Model No.: 17023-6 B.1(1,2,3) Pressure (PSIA) (4) Steam leak Function: 81 11 11 detector 100 100 Relative (4) Humidity(%) Accuracy: Reg'd: ¢ N/A N/A N/A N/A (4) Demon: N/A Chemical Spray A Category: 1.7x10<sup>5</sup> 3.1x10<sup>7</sup> See Appx 1 See Appx 1 See NCR Radiation Note 2 Note 3 BFNNEB8009 HPCI logic Service: (RAD) (4) Bus II cont. Appx 1 Note 3 None б Location: N/A (2)Aging N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence No

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

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

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

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

| Prepared | by: <u>alex Melnikow</u> |
|----------|--------------------------|
| Reviewed | by: Charles Junk         |

QA Acceptance:

1. This sheet applies to items:

 TS-73-2K
 MPL
 23-102

 TS-73-2M
 MPL
 23-104

 TS-73-1P
 MPL
 23-102

 TS-73-2S
 MPL
 23-104

- 2. Fenwal Engineering Report 6350 and Wyle report 43854-1.
- 3. These switches were subjected to a radiation dose of 1.7x10<sup>2</sup>rad without failure. Based on a materials analysis, however, it is expected that the switches could withstand a much greater dose. The only material in these switches that may be subject to significant radiation damage is the "flamenol" insulation. It has been asserted that this material will lose 25 percent of its heat and electrical insulation properties following a dose of 1.3x 10<sup>0</sup> rad which is well above the postulated accident dose of 3.1x10<sup>1</sup> rad. TVA's engineering judgement is that these switches will perform satisfactorily under all postulated environmental conditions; however, TVA will commit to either a type testing program to confirm the radiation tolerance of the switches or institute a replacement program.

Aging - The effects of aging due to the normal environmental conditions are considered negligible based upon a materials analysis. No materials are used in these devices which are known to be susceptible to significant aging (thermal or radiation) degradation over the range of valves encountered.

| Facility: Browns Ferry Nuclea                                                       | Plant                   | SYSTEM COMPO                 | DNENT EVALUATIO    | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-73</u> | -14?                 |
|-------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|--------------------------------|----------------------|
| Unit: 1,2,3                                                                         |                         |                              |                    |                    | 1                    | Revision 0                     | 80                   |
| Docket: 50-259, 50-260, 50-2                                                        | E                       | NVIRONMENT                   |                    | DOCUMENTAT         | FION REF             | QUALIFICATION<br>METHOD        | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                              | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                |                      |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-3<br>MPL # 23-16 | Operating<br>Time       | A - 30 da<br>B - 1 yea       | ays 24 hours<br>ar | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2           | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                                        | Temperature<br>(F)      | Figure<br>B.6(1)<br>B.6(2,3) | 250 F              | (h)                | 17                   | <br>Type `test                 | None                 |
| Model No.: SMB-2                                                                    | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | Ħ                    | Type test                      | None .               |
| Function: HPCI steam<br>line                                                        | Relative<br>Humidity(%) | 100                          | 100                | (4)                | n                    | n                              | **                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                   | Chemical<br>Spray       | N/A"                         | N/A :              | (4)                | N/A                  | N/A                            | N/A                  |
| Category: A<br>Service: Steam                                                       | Radiation<br>(RAD)      | 3.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                      | None                 |
| Location: 6                                                                         | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 2                  | None                 |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No                | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                            | N/A                  |

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See Section 2.4 in 79-01B report.
 See Section 4.1.2 in 79-01B report.

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

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

| Prepared | by: alex Melnikow |
|----------|-------------------|
| Reviewed | by: Charles Junk  |

QA Acceptance:

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1. Limitorque Test Reports B0003, B-0027, #600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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4 SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 73-148 \_Facility: Browns Ferry Nuclear Plant Revision 0 э 1.2.3 Unit: 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Qualifi-Contract 90744 & 91750 Specifi-, Qualifi-Specifi-Parameter cation cation cation cation System: HPCI Operating See NCR Appx 1 30 davs Plant ID No. SE-73-5 (1)Time Note 1 BFNNEB8025 MPL #23-2 Component: Turbine Cntls Temperature (F) 11 n Speed Element Figure B.1(1) Manufacturer: B.1(2,3) (4) Turbines •• . 11 Ħ Table . Model No.: Type CCS Pressure B.1(1,2,3) (4) (PSIA) Function: Control Valve 11 н Relative 100 -(4) Humidity(\$) Accuracy: Req'd: See Sect. N/A N/A N/A Demon: 4.1.3 in rpt N/A N/A (4) Chemical Spray ٠. Category: A 5x10<sup>4</sup> \*\*\* • Appx 1 See NCR Radiation Service: HPCI Turb BFNNEB8025 Note 1 (4) (RAD) . u -11 Location: 1 Aging N/A (2) Flood Level Elev:552' N/A Above Flood Level: Yes NA N/A N/A N/A (4) Submergence No

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

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

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

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

Prepared by: alex Mehillow Reviewed by: Charles Junk

QA Acceptance:



# NEB-73-148, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 300° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.







SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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(3) Sheet No. <u>NEB-</u>73-149-Revision 0

| UNIC: 1,2,3                                                                        |                         |                              |                    |                    |                      | $\frac{10/27}{10}$      | 80                |
|------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|-------------------|
| Docket: 50-259, 50-260, 50-                                                        | 296<br>E                | NVIRONMENT                   |                    | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING       |
| Contract 90744 & 91750                                                             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                   |
| System: High pressure<br>coolant injection<br>Plant ID No. FCV-73-16<br>MPL #23-14 | Operating<br>Time       | 30 days                      | 24 hours           | (1)                | See Appx 1<br>Note 1 | Appx 1<br>Note 3        | NCR<br>BFNNEB8034 |
| Component: Motor Operator<br>Manufacturer:                                         | Temperature<br>(F)      | Figure<br>B.1(1)<br>B.1(2,3) | 250 F              | (4)                | 11                   | "<br>Note 2             | II                |
| Model No.: SMB-2                                                                   | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | ·<br>(4)           | 11 .                 | Type Test,              | None .            |
| Function: Steam Supply<br>Valve                                                    | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   | 11                      | "                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                  | Chemical<br>Spray       | N/A                          | N/A .              | (4)                | N/A                  | N/A                     | N/A               |
| Category: A<br>Service: HPCI Turbine                                               | Radiation<br>(RAD)      | 5x10 <sup>4</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None .            |
| Location: 1                                                                        | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3           | None              |

N/A

No

Flood Level Elev:552' N/A

Above Flood Level: Yes

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

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

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

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

Submergence

N/A

Prepared by: alex Melnikow Reviewed by:

N/A

N/A

QA Acceptance:

N/A

(4)



## NEB-73-149, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$ F for 24 hours. The peak temperature is  $300^{\circ}$ F in 30 seconds after a HELB in compartment 1 and is  $231^{\circ}$ F in 120 seconds and continues to decrease. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than  $250^{\circ}$ F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-73-151 Facility: Browns Ferry Nuclear Plant . Unit: 1,2,3 Revision 0 50-259, 50-260, 50-296 10/27/80 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: HPCI Operating 30 days See NCR Appx 1 Plant ID No. FCV-73-18 Time (1)Note 1 BFNNEB8025 MPL #23-2 Component: ' Turbine Stop Temperature (F) . tt Valve Figure B.1(1) Manufacturer: B.1(2,3) (4) Turbines •••• . 11 \*\* Table Model No.: Type CCS B.1(1,2,3) Pressure (PSIA) (4) Function: Stop Valve и -11 Relative 100 Humidity(%) (4) Accuracy: \* Req'd: N/A ŝ, . . . Demon: 'N/A N/A N/A Chemical N/A N/A (4) . Spray Category: A 5x10<sup>4</sup> •••• See NCR Appx 1 Radiation HPCI Turb Note 1 Service: BFNNEB8025 · (RAD) (4) n 11 Location: 1 Aging N/A (2)N/A Flood Level Elev:552'

N/A

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

No

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

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

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

Submergence

N/A

| Prepared by: alex Melnihow |  |
|----------------------------|--|
| Reviewed by: Charles Junk  |  |

N/A

NA

QA Acceptance:

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Above Flood Level: Yes

### NEB-73-151, APPENDIX 1, REVISION 0

- 1. To date, only limited test data is available for this equipment. . TVA will pursue through several sources the location of the appropriate documentation or will either commit to type testing or replacement.
- 1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 300° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

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t SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-73-154 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF **OUALIFICATION** -OUTSTANDING ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Contract 90744 & 91750 Specifi-Qualifi-Specification cation cation cation Parameter System: HPCI See NCR Appx 1 Operating 30 davs BFNNEB8025 Note 1 Plant ID No. SC-73-19 (1)Tíme MPL #23-2 Component: Turbine Cntls Temperature 11 11 Figure Speed Cntl (F) B.1(1) Υ. B.1(2,3) (4) Manufacturer: Turbines .... 11 11 Table B.1(1,2,3) Model No.: Type CCS Pressure (4) (PSIA) Function: Control Valve 11 11 100 Relative Humidity(%) (4) Accuracy: Rea'd: See Sect. Demon: 4.1.3 in rpt N/A N/A N/A N/A N/A (4) Chemical • •. Spray Category: A . .... 5x10<sup>4</sup> See NCR Appx 1 Radiation Service: HPCI Turb BFNNEB8025 Note 1 . (4) (RAD) 'n 11 . 1 Location: (2)NZA Aging Flood Level Elev:552' N/A NA NIA N/A Above Flood Level: Yes (4) Submergence N/A N/A No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jurk</u>

QA Acceptance:

# NEB-73-154 APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148 ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 300 as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106 ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                        | Plant                   |                              |                     |                    |                    | Sheet No. <u>NEB-73</u><br>Revision 0<br>Date 10/27/8 | -155                   |
|----------------------------------------------------------------------|-------------------------|------------------------------|---------------------|--------------------|--------------------|-------------------------------------------------------|------------------------|
| EQUIPMENT DESCRIPTION                                                | E E                     | NVIRONMENT                   |                     | DOCUMENTAT         | TION REF           | QUALIFICATION<br>METHOD                               | OUTSTANDING<br>ITEMS   |
| Contract 90744 & 91750                                               | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation |                                                       |                        |
| System: HPCI<br>Plant ID No. FCV-73-19<br>MPL 423-2                  | Operating<br>Time       | 30 day                       |                     | (1)                |                    | See Appx 1<br>Note 1                                  | See NCR<br>BFNNEB-8025 |
| Component: Turbine<br>control valve<br>Manufacturer:                 | Temperature<br>(F)      | Figure<br>B.1(1)<br>B.1(2,3) |                     | (4)                |                    | H                                                     | 17                     |
| Model No.: Type CCS                                                  | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          |                     | • • • •            |                    | н                                                     | 11                     |
| Function: Control valve                                              | Relative<br>Humidity(%) | 100                          | :                   | (4)                |                    | 11                                                    | 18                     |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 of report            | Chemical<br>Spray       | N/A                          | N/A .               | (4)                | N/A                | · N/A                                                 | N/A                    |
| Category: A<br>Service: HPCI turb ·                                  | Radiation<br>(RAD)      | 5x10 <sup>4</sup>            | 1.7x10 <sup>5</sup> | (4)                |                    | See Appx 1<br>Note 1                                  | See NCR<br>BFNNEB8025  |
| Location: 1                                                          | Aging                   | N/A                          |                     | (2)                |                    | 11                                                    | 11 -                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No | Submergence             | N/A                          | N/A                 | (4)                | N/A                | N/A                                                   | N/A                    |

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

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

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

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

Prepared by: <u>alex Melnihous</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

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## NEB 73-155 Appendix 1, Revision 0

 Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100 percent RH. The HPCI compartment (area No. 1) will only be exposed to the specified 300° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by a RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (Common Item List, Revision 5, dated September 24, 1980). Their report is expected by November 30, 1980.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                                            | Plant                   | System Compon        | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-73</u><br>Revision <u>0</u> | -156                  |
|------------------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|----------------------|-----------------------------------------------------|-----------------------|
| Docket: 50-259, 50-260, 50-2                                                             | 96<br>E                 | NVIRONMENT           |                    | DOCUMENTAT         | FION REF             | QUALIFICATION<br>METHOD                             | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                                   | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                     |                       |
| System: High pressure<br>coolant injection sys<br>Plant ID No. PS-73-20A-D<br>MPL #23-86 | Operating<br>Time       | 30 days              | 1 hour             | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                | None                  |
| Component: Pressure<br>Switch                                                            | Temperature<br>(F)      | Figure<br>B.1(1,2,3) | 212 F              |                    | 11                   | 11                                                  | NCR NEB<br>BFNNEB8011 |
| Manufacturer: Barksdale                                                                  |                         |                      |                    | (4)                |                      |                                                     |                       |
| Model No.: D2H-M150SS                                                                    | Pressure<br>(PSTA)      | Table<br>B.1(1,2,3)  | 15 .               | · · · .            | 11                   |                                                     | None                  |
| Function: Disc<br>ruptured                                                               | Relative<br>Humidity(%) | 100                  | 100                | (4)                | 17                   | n                                                   | 11 *                  |
| Accuracy:<br>Reg'd:<br>Demon:                                                            | Chemical<br>Spray       | N/A                  | N/A .              | (4)                | N/A                  | N/A                                                 | N/A                   |
| Category: A<br>Bervice: HPCI turbine                                                     | Radiation<br>(RAD)      | 5x10 <sup>4</sup>    | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 3                                | None                  |
| Location:                                                                                | Aging                   | N/A                  |                    | (2)                |                      | Appx 1 Note 3                                       | None                  |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                | Submergence             | N/A                  | N/A                | (4)                | N/A                  | N/A                                                 | N/A<br>-              |

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

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

(3) All notes and other information not on these sheets are on the attached appendix sheets. (4) See Section 3.0 and/or Appendix B in 79-01B report.

| Prepared | by: alex Melnihow |
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| Reviewed | by: Charlis Junk  |

QA Acceptance:

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- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of 1 X 10<sup>6</sup> rad.

The peak temperature due to a HPCI line break in room 1 is 292° F in 30 seconds. The temperature is approximately 200° F in only 80 seconds and continues to decrease thereafter. Due to the rapid temperature increase and decrease, it is highly unlikely that the critical elements of the device would be subjected to a temperature greater than 212°F, which is the temperature to which the device is qualified. Therefore, based on an engineering judgement, this instrument should not be adversely affected by the stated temperature.

3. Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or any other parameter) on the functioning of this device.

TVA will commit to further analysis to confirm the actual temperature effects on this instrument, or type tests will be performed to qualify the device. Should the results prove inconclusive, TVA will replace the device with a qualified substitute.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB-73-157 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: OUALIFICATION OUTSTANDING DOCUMENTATION REF ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Contract 90744 & 91750 Specifi-Qualifi-Specification cation cation cation Parameter System: High pressure coolant See Appx 1 NCR injection system Operating 30 days Note 1 BFNNEB8012 Plant ID No. PT-73-21 (1)Time MPL # 23-95 Component: Pressure Temperature 11 11 transmitter (F) Figures B.2(1) B.2(2,3) (4) Manufacturer: GEMAC (GE) ÷., •••• 11 11 Table B.1(1,2,3) Model No.: 50-551032EAAE1 Pressure (4) (PSIA) Function: Exhaust press n ' - 11 100 Relative Humidity(%) (4) Accuracy: See Section Rea'd: . N/A N/A N/A . . . 4.1.3 in report (4) Demon: Chemical N/A N/A Spray ٠, A Category: 3x10<sup>7</sup> wr, See Appx 1' NCR Radiation BFNNEB8012 Note 1 HPCI turbine Service: (RAD) (4) а 11 2 Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A (4) Above Flood Level: Yes Submergence N/A N/A No

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

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

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

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

alex Mehichow Prepared by: Reviewed by: Charles Lule

QA Acceptance:\_

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## NEB-73-157 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

|   | Temperature <sup>.</sup> | - 185 <sup>0</sup> F |  |  |  |
|---|--------------------------|----------------------|--|--|--|
| • | Pressure ·               | - Atmospheric        |  |  |  |
| • | Relative Humidity        | - Not Specified      |  |  |  |
|   | Radiation                | - Not Specified      |  |  |  |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

The above information shows justification for continued use of the devices. However, due to lack of sufficient documentation, TVA will either type-test this device or replace it with a type-tested device.
SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB-73-158 1,2,3 Unit: Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: High pressure coolant injection sys Operating 30 davs See Appx 1 See NCR Plant ID No. PS-73-22(A&B) Time Note 1 (1)BFNNEB8021 MPL #23-97(A&B) Component: Pressure Temperature Switch Figure (F) 11 11 B.1(1,2,3) Manufacturer: Mercoid (4) tt " Table Ħ Model No.: DA-23-804 B.1(1,2,3) Pressure (PSIA) (4) Exhaust press Function: high 100 11 11 Relative Humidity(%) (4) Accuracy: Reg'd: NZA N/A N/A Demon: Chemical N/A N/A (4) Spray Category: A 5x10<sup>4</sup> • See Appx 1 See NCR Radiation HPCI Note 1 Service: BFNNEB8021 (RAD) (4) turbine 1 Appx 1 Note 1 11 Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

| Prepared by:_ | alex Melnikow |
|---------------|---------------|
| Reviewed by:_ | Charles Turk  |

NEB-73-158

Appendix 1, Rev 0

 To date, qualification information is unavailable. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. This instrument has adequately functioned in the past, and TVA has no indications that this instrument would not properly function in the near future. In addition, Mercoid instruments are installed at several other nuclear plants with no indications of generic failures.

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|--------------------------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
|                                                                                      | :                        | System Compo                 | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                     |                      |
| Facility: Browns Ferry Nuclear                                                       | • Plant                  |                              |                    |                    |                      | Sheet No. NEB-73        | 3-160                |
| Unit: 1,2 :                                                                          |                          |                              |                    |                    | ÷                    | Revision <u>0</u>       | ~                    |
| Docket: 50-259, 50-260, 50-2                                                         |                          |                              |                    |                    |                      | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                                                | E                        | NVIRONMENT                   |                    | DOCUMENTAT         | CION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                               | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi<br>cation    |                         |                      |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-26<br>MPL # 23-58 | Operating<br>Time        | A - 30 d<br>B - 1 ye         | ays 24 hours<br>ar | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | * NCR<br>BFNNEB8034  |
| Component: Motor<br>operator<br>Manufacturer:                                        | Temperature<br>(F)       | Figure<br>B.2(1)<br>B.2(2,3) | 250 F              | (4)                | 11                   | See Appx<br>Note 2      | n                    |
| Limitorque                                                                           |                          |                              |                    |                    |                      | <b>7</b>                |                      |
| Model No.; SMB-0                                                                     | Pressure<br>(PSIA)       | Table<br>B.1(1,2,3)          | 40                 | - (4)              | ".                   | Type test               | None                 |
| Function: Inbd suction<br>valve                                                      | Relative<br>Humidity(\$) | 100                          | 100                | (4)                | 18                   | 11                      | n                    |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray        | N/A                          | ÷<br>N/A ,         | (4)                | N/A ·                | N/A                     | N/A .                |
| Category: A<br>Service: HPCI Supp                                                    | Radiation<br>(RAD)       | 3x 10 <sup>7</sup>           | 2x.10 <sup>8</sup> | (4)                | Sée Appx 1<br>Note 1 | Type Test               | None<br>:            |
| Pool<br>Location: 2                                                                  | Aging                    | N/A                          |                    | · (2)              |                      | Appx 1 Note 3           | None                 |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                            | Submergence              | N/A                          | N/A                | (4)                | N/A                  | N/A                     | N/A                  |

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

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- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

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#### NEB-73-160, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. Although the peak temperature in units 1 and 3 exceeds the tested condition, the temperature are 174° F for unit 1 and 138°F for unit 3 at 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator. The Limitorque operator is qualified to the unit 2 temperature profile.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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| Facility: Browns Ferry Nuclea                                                        | r Plant                 | System Compo                 | DNENT EVALUATIO    | N WORK SHEET       | (Rev 2)                               | (3)<br>Sheet No. <u>NEB-73</u><br>Revision 0 | -160A                |
|--------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|---------------------------------------|----------------------------------------------|----------------------|
| Docket: 50-259, 50-260, 50-                                                          | 296                     |                              |                    |                    | · · · · · · · · · · · · · · · · · · · | Date 10/27/8                                 | 30                   |
| EQUIPMENT DESCRIPTION                                                                | EI                      | IVIRONMENT                   |                    | DOCUMENTAT         | CION REF                              | QUALIFICATION<br>METHOD                      | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                               | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation                    |                                              | ,                    |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-26<br>MPL # 23-58 | Operating<br>Time       | A – 30 d<br>B – 1 ye         | ays 24 hours<br>ar | (1)                | See Appx 1<br>Note 1 j -              | See Appx 1<br>Note 3                         | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:                                        | Temperature<br>(F)      | Figure<br>B.5(1)<br>B.5(2,3) | 250 F              | (4)                | H                                     | See Appx<br>Note 2                           | ti                   |
| Limitorque<br>Model No.: SMB-0                                                       | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 10                 | (4)                | 11                                    | Type test                                    | None                 |
| Function: Inbd suction<br>valve                                                      | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 88                                    | . 11                                         | 1 <b>1</b>           |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray       | N/A                          | :<br>N/A .         | (4)                | N/A                                   | NŻA                                          | N/A                  |
| Category: A<br>Service: HPCI Supp                                                    | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>           | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1                  | Type Test                                    | None                 |
| Pool<br>Location: 5                                                                  | Aging                   | N/A                          |                    | (2)                |                                       | Appx 1 Note 3                                | None                 |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                            | Submergence             | N/A                          | N/A                | (4)                | N/A                                   | N/A                                          | R/#                  |

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

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- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnikow Reviewed by: Charles Turk

#### NEB-73-160A, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. Although the peak temperature in units 1 and 3 exceeds the tested condition, the temperature are 174°F for unit 1 and 138°F for unit 3 at 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator. The Limitorque operator is qualified to the unit 2 temperature profile.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 73-161 Facility: Browns Ferry Nuclear Plant Revision 1,2,3 Unit: 0 50-259, 50-260, 50-296 10/27/80 Date Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: High pressure coolant injections Operating A = 30 dayb24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-73-27 B - 1 vear Note 1 Time (1)Note 3 BFNNEB8034 MPL # 23-57 Component: Motor Temperature 250 F 11 n operator (F) Figure See App 1 B.1(1) Note 2 Manufacturer: B.1(2,3)(4) Limitorque • . 40 Table п. Type test None B.1(1,2,3) SMB-0 Model No.: Pressure (PSIA) (4) Function: Suction valve 100 100 11 = 11 Relative Humidity(%) (4) Acouracy: Reg'd: N/A N/A Demon: N/A N/A Chemical N/A N/A (4) Spray . Category: A 2x10<sup>8</sup> 5x 10<sup>4</sup> See Appx 1 Type Test None Radiation HPCI Supp Note 1 Service: (RAD) (4) Pool 1 Appx 1 Note 3 None Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

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Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Junk</u>

- 1. Limitorque Test Reports, B0003, B-0027, \$600198
- 2. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. The peak temperature is 300° F in 30 seconds after a HELB in compartment 1 and is 231° F in 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see note 2 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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|---------------------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|-------------------------------------------------------|----------------------|
|                                                                                             |                         | SYSTEM COMPON                 | ENT EVALUATIO      | ON WORK SHEET      | (Rev 2)              | (3)                                                   |                      |
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2               | Plant<br>96             | *                             |                    |                    | •                    | Sheet No. <u>NEB-73</u><br>Revision 0<br>Date 10/27/8 | -162                 |
| EQUIPMENT DESCRIPTION                                                                       | E                       | NVIRONMENT                    |                    | DOCUMENTAT         | FION REF             | QUALIFICATION<br>METHOD                               | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                      | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | -                                                     |                      |
| System: High pressure coolant<br>injection system<br>Plant ID No. PS-73-29-1<br>MPL # 23-85 | Operating<br>Time       | 30 daya                       | 6 hours            | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                  | NCR<br>BFNNEB8020    |
| Component: Pressure<br>switch                                                               | Temperature<br>(F)      | Figures<br>B.1(1)<br>B.1(2,3) | 212 F              |                    | <b>11</b>            | See Appx 1<br>Note 4                                  | None                 |
| Manufacturer: Static-O-Ring                                                                 |                         | Table<br>B.1(1.2.8)           | ) 15               | (4)<br>÷           | 11                   | Generic test                                          | None                 |
| Model No.: 6N-AA-21-V                                                                       | Pressure<br>(PSIA)      |                               |                    | (4)                | •                    |                                                       |                      |
| Function: Suction press<br>high                                                             | Relative<br>Humidity(%) | 100                           | 100                | (4)                | i<br>U               | - 11                                                  | n                    |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3 of report                                   | Chemical<br>Spray       | N/A                           | N/A _              | (4)                | N/A                  | N/A                                                   | N/A .                |
| Category: A<br>Service: HPCI Bstr                                                           | Radiation<br>(RAD)      | 5x10 <sup>4</sup>             | 1x.10 <sup>6</sup> | (4)                | See Appx 1<br>Note 2 | Materials<br>and Analysis                             | None                 |
| Location: 1                                                                                 | Aging                   | N/A ·                         | ,                  | (2)                |                      | U .                                                   | None .               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                   | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                                                   | N/A                  |

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

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

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

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

Prepared by: <u>Alex Melnihan</u> Reviewed by: <u>Charles Junk</u>

- 1. Viking lab report 30203-2 (generic component)
- 2. The radiation dose of  $1 \times 10^6$  rad is based upon a materials analysis of the pressure switch. The material in the device which limits the allowable radiation dose are the seals (Buna-N) which, according to several studies including the guidelines fugnished in bulletin 79-01B, are acceptable up to a dose of  $1 \times 10^6$  rad.

Based on the materials evaluation and the temperature and radiation doses encountered by this device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of 30 days has been considered, and TVA has identified no adverse effects from temperature (or other parameters) on the functioning of this device.

4. The Viking report (30203-2) has tested a similar switch to 212° F. The service condition calls for 297° F as a result of RCIC HELB in the compartment, area 3, making the RCIC pump inoperational. Therefore, the pressure switch would not need to function for 297° F, but for 165° F, unit 1, and 154° F, units 2 and 3, as a result of a HPCI HELB. The HPCI break (area 6) would be the next worst condition compartment #3 would see.



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| Facility Browns Ferry Nuclea                              | r Plant                 | SYSTEM COMPO        | NENT EVALUATIO       | )n work sheet      | (Rev 2)            | (3)<br>Sheet No. NEB- 7 |                      |
|-----------------------------------------------------------|-------------------------|---------------------|----------------------|--------------------|--------------------|-------------------------|----------------------|
| Unit: 1,2,3                                               | 1 1 1 1 1 1 1 1 1       | •-                  |                      |                    |                    | Revision 0              | 3-103                |
| Docket: 50-259, 50-260, 50-                               | 296                     |                     |                      |                    |                    | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                     | . E                     | NVIRONMENT          |                      | DOCUMENTA          | FION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                    | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation . | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: HPCI                                              |                         |                     |                      |                    |                    |                         |                      |
| Plant ID No. PT-73-31<br>MPL # 23-83                      | Operating<br>Time       | 30 days             | -                    | (1)                | -                  | See Appx 1<br>Note 1    | NCR<br>BFNNEB8012    |
| Component: Pressure<br>transmitter                        | Temperature<br>(F)      | Figures             |                      |                    |                    | "                       | 11                   |
| Manufacturer: GEMAC (GE)                                  |                         | B.1(1)<br>B.1(2,3)  |                      | (4)                |                    |                         |                      |
| Model No.: -551032GAAK1                                   | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3) | ÷                    | (4)                |                    | 11                      | *1                   |
| Function: Disch press                                     | Relative<br>Humidity(%) | 100 .               | •                    | (4)                | 4944               | 11                      | н                    |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report | Chemical<br>Spray       | N/A                 | N/A .                | (4)                | N/A                | N/A                     | N/A                  |
| Category: <sup>A</sup><br>Service: HPCI main pump         | Radiation<br>(RAD)      | 5x10 <sup>4</sup>   |                      | (4)                | • **               | See Appx 1<br>Note 1    | NCR<br>BFNNEB8012    |
| Location: 1                                               | Aging                   | N/A                 |                      | (2)                |                    | 11                      | در<br>_              |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No | Submergence             | N/A                 | N/A                  | (4)                | N/A                | N/A                     | N/A                  |

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

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

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

| Prepared b | y: alex Melnihow |
|------------|------------------|
| Reviewed b | y: Charles Turk  |

# NEB-73-163 Appendix 1 Revision O

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature .     | - 185 <sup>0</sup> F |
|-------------------|----------------------|
| Pressure          | - Atmospheric        |
| Relative Humidity | - Not Specified      |
| Radiation         | - Not Specified      |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1x10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $3\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of useful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



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| •                                                                                         |                         | SYSTEM COMPON                 | IENT EVALUATIO     | ON WORK SHEET      | (Rev 2)              | (3)                     |                      |
|-------------------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclear                                                            | • Plant                 |                               |                    |                    |                      | Sheet No. NEB- 73       | 3 <b>-</b> 164 ·     |
| Unit: 1.2.3                                                                               | •                       |                               |                    |                    |                      | Revision 0              |                      |
| Docket: 50-259, 50-260, 50-2                                                              | 296                     |                               |                    | Υ.                 |                      | Date 10/27/2            | 30                   |
| EQUIPMENT DESCRIPTION                                                                     | E                       | NVIRONMENT                    | -                  | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                                    | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: High pressure coolant<br>injection system<br>Plant ID No. FS-73-33<br>MPL # 23-78 | Operating<br>Time       | 30 days                       | 6 hours            | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8010    |
| Component: Flow<br>Switch<br>Manufacturer: Barton                                         | Temperature<br>(F)      | Figures<br>B.1(1)<br>B.1(2,3) | 212 F `            | (4)                | 11                   | See Appx 1<br>Note 3    | n -                  |
| Model No.: 289                                                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           | 15                 | <br>(4)            | ".                   | Type test               | None .               |
| Function: Minimum<br>flow .                                                               | Relative<br>Humidity(%) | 100                           | 100                | (4)                | II                   | 13                      | H ^                  |
| Accuracy:<br>Req*d: See Section<br>Demon: 4.1.3 in report                                 | Chemical<br>Spray       | N/A                           | N/A                | (4)                | N/A                  | N/A                     | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>HPCI system</sup>                                 | Radiation<br>(RAD)      | 5x10 <sup>4</sup>             | 3x10 <sup>6</sup>  | (4)                | Sèe Appx 1<br>Note 1 | Type test               | None                 |
| Location: 1                                                                               | Aging                   | N/A                           | •                  | (2)                |                      | Appx 1 Note 2           | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                                 | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                     | N/A .                |

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

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

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

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

alex Mehrikow Prepared by: harles 7 Reviewed by:

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- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that operating time of one year will adversely affect the instrument. Similarly, due to the relatively low temperature and radiation levels encountered, aging is not expected to significantly affect this device (based on TVA's engineering judgement).
- 3. The HPCI compartment, #1, will only see 300° as a result of a HPCI HELB in that area. Therefore, the HPCI system would be inoperational and making the switch is not required.

The next worst HELB to affect the HPCI compartment would be a RCIC HELB in the torus area (#6). The maximum temperature would be 106°; therefore, the 212° qualification will be satisfactory.

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|-------------------------------------------------------------------------------------------|---------------------------------|-------------------------------|--------------------|--------------------|--------------------|--------------------------------------------------------------------------|--------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2             | Plant                           | SYSTEM COMPO                  | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-7</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | <u>3–165</u><br>80 |
| EQUIPMENT DESCRIPTION                                                                     | E                               | NVIRONMENT                    |                    | DOCUMENTA          | TION REF           | QUALIFICATION                                                            | OUTSTANDING        |
| Contract 90744 & 91750                                                                    | Parameter                       | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                          |                    |
| System: High pressure coolant<br>injection system<br>Plant ID No. FT-73-33<br>MPL # 23-82 | Operating<br>Time               | 30 days                       | Ŧ                  | (1)                |                    | See Appx 1<br>Note 1                                                     | NCR<br>BFNNEB8012  |
| Component: Flow<br>transmitter                                                            | Temperature<br>(F)              | Figures<br>B.1(1)<br>B.1(2,2) | • -                |                    |                    |                                                                          | 11                 |
| Manufacturer: GEMAC (GE)                                                                  |                                 | 5.1(2,5)                      |                    | (4)                |                    |                                                                          |                    |
| Model No.: 555111BDAA3AAA                                                                 | Pressure<br>(PSIA)              | B.1(1,2,3)                    |                    | (4)                |                    | "                                                                        | 11                 |
| Function: Flow                                                                            | Relative<br>Humidity(≴)         | 100                           | ````               | (4)                |                    | 11                                                                       | 11                 |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                                 | Chemical<br>Spray               | N/A                           | N/A                | (4)                | N/A                | N/A                                                                      | N/A ·              |
| Category: <sup>A</sup><br>Service: <sup>HPCI sys</sup> .                                  | Radiation <sup>•</sup><br>(RAD) | 5x10 <sup>4</sup>             |                    | (4)                |                    | See Appx 1<br>Note 1                                                     | NCR<br>BFNNEB8012  |
| Location: 1                                                                               | Aging                           | N/A                           |                    | (2)                |                    | tı, *                                                                    | 21 _               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                                       | Submergence                     | N/A                           | N/A                | (4)                | N/A                | N/A                                                                      | N/A                |

No Notes: (1) See Section 2.4 in 79-01B report.

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Turk</u>

# NEB-73-165 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature       | °– 185 <sup>0</sup> F ∘ |
|-------------------|-------------------------|
| Pressure -        | - Atmospheric           |
| Relative Humidity | - Not Specified         |
| Radiation .       | - Not Specified         |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $3\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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





|                                                                                      |                                         | System Compon                | ENT EVALUATIO     | IN WORK SHEET | (Rev 2)              | (3)                  |                     |
|--------------------------------------------------------------------------------------|-----------------------------------------|------------------------------|-------------------|---------------|----------------------|----------------------|---------------------|
| Facility: Browns Ferry Nuclear                                                       | r Plant                                 |                              |                   |               |                      | Sheet No. NEB- 73    | 3-166               |
| Unit: 1.2.3                                                                          | • • • • • • • • • • • • • • • • • • • • |                              |                   |               |                      | Revision 0           |                     |
| Docket: $50-259$ , $50-260$ , $50-30$                                                | 296                                     |                              |                   |               |                      | Date 10/27/          | 80                  |
|                                                                                      | E                                       | NVIRONMENT                   | ,                 | DOCUMENTA     | TION REF             | QUALIFICATION        | OUTSTANDING         |
| EQUIPMENT DESCRIPTION                                                                |                                         |                              |                   |               |                      | METHOD               | ITEMS               |
| Contract 90744 & 91750                                                               |                                         | Specifi-                     | Qualifi-          | Specifi-      | Qualifi-             | P                    |                     |
|                                                                                      | Parameter                               | cation                       | cation            | cation        | cation               |                      |                     |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-34<br>MPL # 23-20 | Operating<br>Time                       | 30 dayв                      | 24 hours          | (1)           | See Appx 1<br>Note 1 | See Appx 1<br>Note 2 | - NCR<br>BFNNEB8034 |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                             | Temperature<br>(F).                     | Figure<br>B.1(1)<br>B.1(2,3) | 250 F             | (4)           | 11                   | IJ                   | 11                  |
| Model No.: SMR-4T                                                                    | Pressure<br>(PSIA)                      | Table<br>B.1(1,2,3)          | 40                | -<br>(4)      | <sup>11</sup>        | Type test            | None                |
| Function: Outbd disch<br>valve                                                       | Relative<br>Humidity(%)                 | 100                          | 100               | (4)           | IT                   | 11                   |                     |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray                       | N/A                          | N/A .             | (4)           | N/A ·                | N/A                  | N/A                 |
| Category: A<br>Service: HPCI system                                                  | Radiation<br>(RAD)                      | 5x10 <sup>4</sup>            | 2x10 <sup>8</sup> | (4)           | See Appx 1<br>Note 1 | Type Test            | None                |
| Location: 1                                                                          | Aging                                   | N/A                          | :                 | (2)           |                      | Appx 1 Note 3        | None                |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                            | Submergence                             | N/A                          | N/A               | . (4)         | N/A                  | N/A                  | N/A                 |

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

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

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

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

alex Melnikow Prepared by: harly - Turk Reviewed by:



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1. Limitorque Test Reports B0003, B-0027, #600198

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2. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$ F for 24 hours. The peak temperature is  $300^{\circ}$ F in 30 seconds after a HELB in compartment 1 and is  $231^{\circ}$ F in 120 seconds and continues to decrease. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than  $250^{\circ}$ F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3                                         | r Plant                 | SYSTEM COMPO                 | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB- 7</u><br>Revision <u>0</u> | 3-167             |
|--------------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-----------------------------------------------------|-------------------|
| Docket: 50-259, 50-260, 50-                                                          | 296                     | NUTDONNENT                   |                    | DOCUMENTA          | TTON DEE             | Date 10/27/                                         |                   |
| EQUIPMENT DESCRIPTION                                                                |                         | MATUONHENI                   |                    | DOCOMENTA          | IION REF             | METHOD                                              | ITEMS             |
| Contract 90744 & 91750                                                               | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                     |                   |
| System: High pressure<br>coolant injections<br>Plant ID No. FCV-73-35<br>MPL # 23-21 | Operating<br>Time       | 30 days                      | 3 _ 24 hours       | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3                                | NCR<br>BFNNEP8034 |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                             | Temperature<br>(F)      | Figure<br>B.1(1)<br>B.1(2,3) | 250 F              | (4)                | 11                   | See Appx 1<br>Note 2                                | 11                |
| Model No.: SMB-4T                                                                    | Pressure<br>(PSIA) -    | Table<br>B.1(1,2,3)          | 40 ·               | <br>(4)            | n                    | Type test                                           | <sup>^</sup> None |
| Function: Cnds test<br>valve                                                         | Relative<br>Humidity(%) | 100                          | 100                | (4)                | H                    | 11                                                  | 11                |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray       | N/A                          | :<br>N/A _         | (4)                | N/A                  | N/A                                                 | N/A               |
| Category: <sup>A</sup><br>Service: <sup>HPCI system .</sup>                          | Radiation<br>(RAD)      | 5x10 <sup>4</sup>            | 2x,10 <sup>8</sup> | (4)                | Sèe Appx 1<br>Note 1 | Type Test                                           | None              |
| Location: 1                                                                          | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3                                       | None              |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                                  | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                                                 | N/A               |

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

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

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

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

Prepared by: <u>alex Melnihow</u> Reviewed by: <u>Charles Fluck</u>



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#### NEB-73-167, APPENDIX 1, REVISION 0...

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. The peak temperature is  $300^{\circ}$  F in

30 seconds after a HELB in compartment 1 and is 231 F in 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------|--------------------|--------------------|----------------------|-------------------------|-------------------------------------|--|--|
| Facility: Browns Ferry Nuclear                                                       | SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)<br>3 Ferry Nuclear Plant - |                               |                    |                    |                      |                         | (3)<br>Sheet No. <u>NEB- 73-168</u> |  |  |
| Unit: 1                                                                              |                                                                           |                               |                    |                    |                      | Revision 0              |                                     |  |  |
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                                      | ENVIRONMENT                                                               |                               |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS                |  |  |
|                                                                                      | Parameter                                                                 | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                                     |  |  |
| System: High pressure<br>coolant injection<br>Plant ID No. FCV-73-36<br>MPL #23-241B | Operating<br>Time                                                         | 30 days                       | s 24 hours         | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8034                   |  |  |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                             | Temperature<br>(F)                                                        | Figure<br>B.6(1)2<br>B.6(2,3) | 250 F              | (4)                | ti<br>*              | Type test               | None                                |  |  |
| Model No.: SMB-2                                                                     | Pressure<br>(PSIA)                                                        | Table<br>B.1(1,2,3)           | 40                 | (4)                | ".                   | Type test               | None                                |  |  |
| Function: Test return<br>valve                                                       | Relative<br>Humidity(%)                                                   | 100                           | 100                | (4)                | n                    | U                       | п _                                 |  |  |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray                                                         | N/A                           | _ N/A              | (4)                | N/A                  | N/A                     | N/A                                 |  |  |
| Category: A<br>Service: HPCI/RCIC                                                    | Radiation<br>(RAD)                                                        | 3.1x10 <sup>7</sup>           | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None                                |  |  |
| Location: 6                                                                          | Aging                                                                     | .N/A                          |                    | (2)                |                      | Appx 1 Note 2           | None                                |  |  |
| Flood Level Elev:552 N/A                                                             |                                                                           |                               |                    |                    | NT / A               |                         |                                     |  |  |

N/A

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

No

Above Flood Level: Yes

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

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

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

Submergence

N/A

Prepared by: alex Melnihow arles Turk Reviewed by:

N/A

N/A

QA Acceptance:

N/A

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# NEB-73-168, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, \$600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Unit: 2 Docket: 50-259, 50-260, 50-296 (3) Sheet No. <u>NEB-73-168A</u> Revision 0

| Docket: 50-259, 50-260, 50-                                                          |                         | Date 10/27/80                   |                    |                    |                      |                         |                      |
|--------------------------------------------------------------------------------------|-------------------------|---------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                                      | ENVIRONMENT             |                                 |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|                                                                                      | Parameter               | Specifi-<br>cation              | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: High pressure<br>coolant injection<br>Plant ID No. FCV-73-36<br>MPL #23-241B | Operating<br>Time       | 30 days                         | ,<br>24 hours      | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                             | Temperature<br>(F)      | Figure<br>B.4(1)2<br>B.4(1,2,3) | 250 F              | (4)                | 11                   | Type test               | None                 |
| Model No.: SMB-2                                                                     | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)             | 40                 | (4)                | ".                   | Type test               | None                 |
| Function: Test return<br>valve                                                       | Relative<br>Humidity(%) | 100                             | 100                | (4)                | 11                   | 17                      | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                    | Chemical<br>Spray       | N/A .                           | N/A                | <b>(</b> 4)        | N/A .                | N/A                     | N/A                  |
| Category: A<br>Service: HPCI/RCIC                                                    | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>              | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None                 |
| Location: 4                                                                          | Aging                   | N/A                             |                    | (2)                |                      | Appx 1 Note 2           | None                 |
| Flood Level Elev:5521 N/A                                                            |                         |                                 |                    |                    |                      |                         |                      |

N/A

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

No

Above Flood Level: Yes

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Submergence

N/A

alex Melinhow Prepared by: Reviewed by:

N/A

N/A

QA Acceptance:

N/A ·

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### NEB-73-168A, APPENDIX 1, REVISION 0

# 1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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### (3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-73-168B Facility: Browns Ferry Nuclear Plant Revision 0 Unit: Date 10/27/80 Docket: 50-259, 50-260, 50-296 ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Qualifi-Specifi-Specifi-Qualifi-Parameter cation cation cation cation System: High pressure Operating coolant injection 30 days 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-73-36 Time (1)Note 1 Note 2 BFNNEB8034 MPL, #23-241B Component: Motor Temperature operator (F) Figure 250 F H Type test None B.2(1)2Manufacturer: Limitorque B.2(1.2.3) (4) Table 40 н. Type test None Model No.: SMB-2 B.1(1,2,3) Pressure (PSIA) (4) Function: Test return valve Relative 100 100 11 11 H. Humidity(\$) (4) Accuracy: Reg'd: N/A N/A N/A Demon: N/A Chemical N/A N/A (4) Spray Category: A 2x10<sup>8</sup> 3x 10<sup>7</sup> See Appx 1 Type Test None Radiation

N/A

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

No

Service: HPCI/RCIC

Location:

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Flood Level Elev:552' N/A

Above Flood Level: Yes

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

(RAD)

Submergence

N/A

N/A

Aging

Prepared by: alex Melnihow Reviewed by: Charles Turk.

Appx 1 Note 2

N/A

None

N/A

QA Acceptance:

Note 1

N/A

(4)

(2)

(4)

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## NEB-73-168B, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, \$600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 73-169 Facility: Browns Ferry Nuclear Plant 1,2,3 Revision 0 Unit: 50-259, 50-260, 50-296 10/27/80 Docket: Date DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD **ITEMS** Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation High pressure System: A - 30 days coolant injections 24 hours See Appx 1 See Appx 1 Operating NCR Plant ID No. FCV-73-40 BFNNEB8034 Time Note 1 Note 3 (1)MPL # 23-17 Component: Motor Temperature Figure 250 F 11 18 operator (F) See App 1 B.1(1)Note 2 B.1(2,3) Manufacturer: (4) Limitorque Table • • 40 . Type test None B.1(1,2,3)SMB-0 Model No.: Pressure (PSIA) (4) Function: Suction valve 100 100 11 н 11 Relative Humidity(\$) (4) Accuracy: N/A Req'd: N/A N/A Demon: N/A Chemical N/A N/A (4) Spray A Category: 5x 10<sup>4</sup> 2x10<sup>8</sup> See Appx 1 Type Test None Radiation HPCI Cnds Note 1 Service: (RAD) (4) Tank Location: 1 Appx 1 Note 2 None Aging N/A (2) N/A Flood Level Elev:552' N/A N/A N/A

H/A

(4)

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

No

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Above Flood Level: Yes

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

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

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

Submergence

N/A

alex Melnihow Prepared by: Reviewed by:

1. Limitorque Test Reports B0003, B-0027, #600198

1.1.1

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2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 300°F in 30 seconds after a HELB in compartment 1 and is 231°F in ,120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-73-170 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Contract 90744 & 91750 Specifi-Parameter cation cation cation cation System: High pressure A - 30 days24 hours See Appx 1 See Appx 1 NCR coolant injections Operating BFNNEB8034 Note 1 Note 3 Plant ID No. FCV-73-44 (1) Time MPL # 23-19 Component: Motor Temperature Figure 11 11 250 F See App 1 operator (F) B.1(1) Note 2 Manufacturer: Limitorque B.1(2,3)(4) Table 40 н Type test None B.1(1,2,3) Model No.: SMB-4T Pressure (PSIA) (4) Function: Inbd. Disch. 11 11 11 100 100 Valve Relative Humidity(%) (4) Accuracy: N/A Req'd: N/A Č N/A N/A " Demon: N/A N/A (4) Chemical Spray A Category: 2x10<sup>8</sup> 5x10<sup>4</sup> See Appx 1 Type Test None Radiation Note 1 HPCI Supp Service: (4) (RAD) System Appx 1 Note 3 None 1 (2) Location: Aging N/A N/A Flood Level Elev:552' N/A N/A N/A (4) Above Flood Level: Yes N/A N/A Submergence No

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

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

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

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Prepared by: alex Melnikour Reviewed by: Charles Turk

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### NEB-73-170, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 300°F in 30 seconds after a HELB in compartment 1 and is 231°F in 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.





|                                      |              | System compo      | NENT EVALUATIO | ON WORK SHEET | (Rev 2)  | • (3)            |             |
|--------------------------------------|--------------|-------------------|----------------|---------------|----------|------------------|-------------|
| Facility: Browns Ferry Nuclear       | • Plant      |                   |                |               |          | Sheet No. NEB-73 | 3-171       |
| Unit: $1.2.3$                        | -            |                   |                |               |          | Revision 0       |             |
| Docket: $50-259$ , $50-260$ , $50-2$ | 296          |                   |                |               |          | Date 10/27/      | 80          |
|                                      | E            | NVIRONMENT        | VIRONMENT DO   |               | TION REF | QUALIFICATION    | OUTSTANDING |
| EQUIPMENT DESCRIPTION                | }            | 10                | 0              | Secolet       | 0001464  |                  |             |
| Contract 90744 & 91750               | Parameter    | cation            | cation         | cation        | cation   |                  |             |
| System: HPCI                         |              |                   |                |               |          |                  |             |
|                                      | Operating    | 30 days           |                |               |          | Appx 1           | See NCR     |
| Plant ID No. PS-73-47A               | Time         |                   |                | (1)           |          | Note 1           | PFNNEB8025  |
| MPL #23-2                            |              | 1 1               |                |               |          | 1                |             |
| Component: Aux Oil Pump Mtr          | Temperature  |                   |                |               |          |                  |             |
| Press Sw TB Cntls                    | (F)          | Figure            |                |               |          | n                | n           |
|                                      |              | B.1(1)            |                |               | }        |                  |             |
| Manufacturer:                        |              | B.1(2.3)          |                | (4)           | 1        |                  |             |
| Turbines                             |              |                   |                |               |          |                  |             |
|                                      | 1            | Table             | •              | ••            |          |                  | n           |
| Model No.: Type CCS                  | Pressure     | B.1(1.2.3)        |                |               |          |                  | -           |
|                                      | (PSIA)       |                   |                | (4)           |          |                  |             |
| Function: Initiation                 |              |                   | 7              |               |          |                  |             |
|                                      | Relative     | 100               |                |               |          |                  | u           |
|                                      | Humidity(%)  |                   |                | (4)           |          |                  |             |
| Acouracy                             |              |                   |                |               |          |                  |             |
| Reald: See Sect.                     |              |                   |                |               | τ.       |                  | 1           |
| Demon: 4.1.3 in rpt                  | Chemical     | N/A               | N/A .          | (4)           | N/A      | N/A              | N/A         |
|                                      | Spray        |                   |                |               |          |                  |             |
| Category: A                          | - <u> </u>   | ·                 |                |               |          |                  |             |
| category.                            | Radiation    | 5x10 <sup>4</sup> |                |               |          | Appx 1           | See NCR     |
| Service HPCT Aux                     | (RAD)        | 24.1              |                | <u>(4</u> )   |          | Note 1           | BFNNEB8025  |
| Oil Pump                             |              |                   |                | (1)           |          |                  |             |
| Leastions 1                          | Aging        | N/A               |                | (2)           |          |                  |             |
| Location.                            | ABING        | 17 h              |                | (2)           |          |                  |             |
| Flood Loval Flow 5521 N/A            | 1            |                   |                |               |          | · ·              |             |
| About Elevisor Was                   | Submongonoo  | N/A               | NZA            |               | NIA      | nhu              | - ula       |
| NOOVE LTOOD FEAST LES                | Promet.Reuge | 17.8              | N/ A           | (4)           | 17/17    | 1 11 11          |             |
| 10                                   | 1            | 1                 |                | ł             |          |                  | 1           |

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

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

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

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

alex Melnikow Prepared by: harles I ... Reviewed by:



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## NEB-73-171, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 300° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.



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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant<br>196             | SYSTEM COMPO                 | NENT EVALUATI      | ON WORK SHEFT      | ' (Rev 2)          | (3)<br>Sheet No. <u>NEB- 7</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | 3 <del>-</del> 172    |
|-------------------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|--------------------|---------------------------------------------------------------------------|-----------------------|
| EQUIPMENT DESCRIPTION                                                         | E                        | NVIRONMENT                   | -                  | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                   | OUTSTANDING           |
| Contract 90744 & 91750                                                        | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                           |                       |
| System: HPCI<br>Plant ID No. PS-73-47B<br>MPL #23-2                           | Operating<br>Time        | 30 days                      |                    | (1)                |                    | Appx 1<br>Note 1                                                          | See NCR<br>BFNNEB8025 |
| Component: Aux Oil Pump Motor<br>Press Sw TB Cntls<br>Manufacturer:           | Temperature<br>(F)       | Figure<br>B.1(1)<br>B.1(2,3) | -                  | (4)                |                    | "                                                                         | n                     |
| Model No.: Type CCS                                                           | Pressure<br>(PSIA)       | Table<br>B.1(1,2,3)          |                    | (4)                |                    | n .                                                                       | и .                   |
| Function: Press., Low                                                         | Relative<br>Humidity(\$) | 100                          |                    | (4)                |                    | -11                                                                       | 11                    |
| Accuracy:<br>Req'd: See Sect.<br>Demon: 4.1.3 in rpt.                         | Chemical<br>Spray        | N/A                          | N/A .              | (4)                | N/A <sup>*</sup>   | N/A                                                                       | N/A                   |
| Category: A<br>Service: HPCI Turb<br>Bear Oil                                 | Radiation<br>(RAD)       | 5x10 <sup>4</sup>            |                    | (4)                | *1.                | Appx 1<br>Note 1                                                          | See NCR<br>BFNNEB8025 |
| Location: 1                                                                   | Aging                    | N/A                          |                    | <sup>*</sup> (2)   |                    | 17                                                                        | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence              | N/A                          | N/A                | (4)                | Nla                | N/A                                                                       | N(A                   |

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

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

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

alex Melnihow Prepared by: Charles Turk Reviewed by:

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### NEB-73-172, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 30° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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Sheet No. NEB- 73-173 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 50-259, 50-260, 50-296 10/27/80 Date Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Qualifi-Specifi-Specifi-Qualifi-Parameter cation cation cation · cation System: HPCI Operating 30 days Appx 1 See NCR Plant ID No. TIS-73-52 (i)Note 1 BFNNEB8025 Time MPL #23-2 Component: Turbine Cntls Temperature 12 11 Figure (F) B.1(1) B.1(2,3) (4) Manufacturer: Ferfynes ••• 11 ... Table Model No.: Type CCS B.1(1,2,3) Pressure (PSIA) (4) Function: Disch Temp High н . 11 100 Relative Humidity(\$) (4) Accuracy: Regid: N/A N/A N/A NZA Demon: N/A Chemical N/A (4) Spray A Category: 5x10<sup>4</sup> · • See NCR Appx 1 Radiation HPCI Oil Note 1 BFNNEB8025 Service: (RAD) (4) \*\* 11 1 Location: Aging N/A (2)N/A Flood Level Elev:552' Above Flood Level: Yes NA NA Submergence N/A N/A (4). NA No

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Mehikow Prepared by: Reviewed by: Charles Junk

QA Acceptance:

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### NEB-73-173, APPENDIX 1, REVISION O

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 30° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.

# SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Facility: Browns Ferry Nuclear Plant

Sheet No. <u>NEB-73-173A</u> Revision O

(3)

Unit: 1,2,3 Docket: 50-259, 50-260, 50-296

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| Docket: 50-259, 50-260, 50-296                             |                          |                              |                    |                    |                    | Date - 10/27/80         |                       |  |
|------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|--------------------|-------------------------|-----------------------|--|
| EQUIPMENT DESCRIPTION                                      | E                        | ENVIRONMENT                  |                    |                    | TION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS  |  |
| Contract 90744 & 91750                                     | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                       |  |
| System: HPCI<br>Plant ID No. PDS-73-53<br>MPL #23-2        | Operating<br>Time        | 1 year                       |                    | . (1)              |                    | Appx 1<br>Note 1        | See NCR<br>BFNNEB8025 |  |
| Component: Turbine Cntls<br>Diff Press Sw<br>Manufacturer: | Temperature<br>(F)       | Figure<br>B.1(1)<br>B.1(2,3) |                    | (4)                |                    | n                       | 11                    |  |
| Ferfynes<br>Model No.: Type CCS                            | Pressure<br>(PSTA)       | Table<br>B.1(1,2,3)          |                    | (4)                | •                  |                         | 11                    |  |
| Function: Disch Temp High                                  | Relative<br>Humidity(\$) | 100                          | :                  | (4)                |                    |                         | 11                    |  |
| Accuracy:<br>Req'd: See Sect.<br>Demon: 4.1.3 in rpt       | Chemical<br>Spray        | N/A                          | N/A .              | (4)                | N/A                | N/A                     | N/A                   |  |
| Category: A<br>Service: HPCI Oil                           | Radiation<br>(RAD)       | 3.1x10 <sup>7</sup>          | •                  | (4)                | •                  | Appx 1<br>Note 1        | See NCR<br>BFNNEB8025 |  |
| Location: 1                                                | Aging                    | N/A                          |                    | (2)                |                    | 11                      | 11 -                  |  |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No  | Submergence              | N/A                          | N/A                | (4)                | N/H                | N/A                     | N/A                   |  |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles</u> Jush



### NEB-73-173A, APPENDIX 1, REVISION 0

1. Qualification information for the specified environmental conditions cannot be documented at this time. However, the BFN FSAR and the Terry Turbine manual specify a 148° ambient and 100% RH. The HPCI compartment (area No. 1) will only be exposed to the specified 30° as a result of a HPCI HELB in that compartment. Therefore, the HPCI pump will be inoperable. The next worst environment is caused by an RCIC HELB in area No. 6 resulting in a 106° ambient in the HPCI compartment. It is TVA's engineering evaluation that interim operation can be justified. However, TVA is committed to pursue further documentation or type testing. Furthermore, qualification of this component is presently being pursued by the BWR Utility Equipment Environmental Qualification Group (common item list, revision 5, dated 9-24-80). Their report is expected by November 30, 1980.



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| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3                                    | r Plant            | System Compo         | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. NEB-73<br>Revision 0 | -174              |
|----------------------------------------------------------------------------------|--------------------|----------------------|--------------------|--------------------|--------------------|---------------------------------------|-------------------|
| Docket: 50-259, 50-260, 50-2                                                     | 296<br>I E         | NVIRONMENT           |                    | DOCUMENTA          | TION REF           | QUALIFICATION                         | OUTSTANDING       |
| EQUIPMENT DESCRIPTION                                                            |                    |                      |                    |                    |                    | METHOD                                | ITEMS             |
| Contract 90744 & 91750                                                           | Parameter          | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                       |                   |
| System: High pressure<br>coolant injections<br>Plant ID No. See Appx 1<br>Note 1 | Operating<br>Time  | 1 day                |                    | (1)                |                    | Appx 1<br>Note 1                      | NCR<br>BFNNEB8022 |
| Component: Temperature<br>Element                                                | Temperature<br>(F) | Figure<br>B.1(1,2,3) | ,                  |                    | · · · · · ·        | "                                     | 11                |
| lanufacturer: <sub>Scam</sub>                                                    |                    |                      |                    | (4)                |                    |                                       |                   |
| fodel No.: S51-1                                                                 | Pressure           | Table<br>B.1(1,2,3)  |                    | x<br>              |                    | n                                     | 11                |
| Function: Steam leak<br>detector                                                 | Relative           | 100                  | r                  | (4)                |                    |                                       | 11                |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                                  | Chemical Spray     | N/A                  | N/A                | (4)                | N/A                | N/A                                   | N/A               |
| Category: A<br>Service: HPCI Steam                                               | Radiation<br>(RAD) | 5x 10 <sup>4</sup>   |                    | (4)                |                    | Appx 1<br>Note 1                      | NCR<br>BFNNEB8022 |
| Leak detection<br>1<br>Location:                                                 | Aging              | N/A                  |                    | (2)                |                    | Appx 1 Note 1                         | 11                |
| Flood Level Elev:552' N/A ·<br>Above Flood Level: Yes                            | Submergence        | N/A                  | N/A                | (4)                | N/A                | N/A                                   | N/A               |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Mehikow Reviewed by: Charles Link Reviewed by:

QA Acceptance:

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1. This sheet applies to the following items:

TE-73-55A, MPL #23-105A TE-73-55B, MPL #23-105A

2. Test data has not been obtained to date; however, the manufacturer rates these resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test these resistive thermal detector and/or replace if required.



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| Facility: Browns Perry Nuclear PlantSheet No. NEB-73-175DateSheet No. NEB-73-175DateOutst No. Neb No. Neb No. Neb No. See App 1<br>Note 1Specifi- Qualifi-<br>cationSpecifi- Qualifi-<br>cationComponent: Temperature<br>ElementComponent: Temperature<br>ElementSpecifi-<br>QualificationSpecifi-<br>QualificationSpecification<br>cationSpecification<br>QualificationModel No.: S51-1Pressure<br>(F)Specification<br>Pressure<br>(F)Specification<br>Prigure<br>D.(1)Sheet No. Neb Note 1Model No.: S51-1Pressure<br>(F)Specification<br>(A)Model No.: S51-1Pressure<br>(F)N/AComponent: Steam leak<br>detectorMaintity (S)N/AAccuracy:<br>Req'd: Sce section<br>Demon: 4,1.3Appx 1<br>N/AN/AComponent: HPCI steam<br>Leak detectionAppx 1<br>N/AN/AComponent: HPCI steam<br>Leak detectionN/AAccuracy:<br>Req'd: Sce section<br>Demon: 4,1.3Appx 1<br>N/AN/AComponent: HPCI steam<br>Leak detectionAppx 1<br>Appx 1N/AComponent: HPCI steam<br>Leak detectionAppx 1N/A <th>-</th> <th></th> <th>STSTELL COMPO</th> <th>NEWI CANFONIT</th> <th>ON HORK SHEET</th> <th>(nev 2)</th> <th>(3)</th> <th></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                             |             | STSTELL COMPO | NEWI CANFONIT | ON HORK SHEET                                 | (nev 2)  | (3)              |             |
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| Unit:1,2,3<br>Docket:Revision $0$<br>DateDocket:50-259, 50-260, 50-296ENVIRONMENTDOCUMENTATION REFQUALIFICATION<br>METHODOUTSTANDING<br>UTENSEQUIPHENT DESCRIPTION<br>Contract 90744 & 91750ENVIRONMENTDOCUMENTATION REFQUALIFICATION<br>METHODOUTSTANDING<br>UTENSContract 90744 & 91750Parameter<br>collant injections<br>Plant ID No. See Appx 1<br>Note 1Operating<br>Time1 day<br>Time1 day<br>(1)Appx 1<br>Note 1NCR<br>BFNNEB8022Component:Temperature<br>ElementFigure<br>B.6(1,2,3)(4)""""Manufacturer:Scam<br>detectorFigure<br>B.6(1,2,3)(4)""""Accuracy:<br>Req'd:See section<br>Demo:Heltive<br>Humidity(\$)100(4)N/AN/AN/ACategory:A<br>SprayChemical<br>RADIN/AN/A(4)N/AN/AService:<br>HPCI steam<br>Leak detectionAging<br>Aliation $3.1x10^7$<br>(4)(4)N/AN/AN/AFlood Level Elev:552'N/AN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Facility: Browns Ferry Nuclea | ar Plant    |               |               |                                               |          | Sheet No. NEB-73 | 175         |
| Dacket: $50-259$ , $50-260$ , $50-296$ Date $10/27/80$ Dack $10/27/80$ EQUIPMENT DESCRIPTION<br>Contract $90744$ & $91750$ Date $10/27/80$ Contract $90744$ & $91750$ OULIFICATION<br>METHODOULIFICATION<br>METHODSpecifi-<br>coolant injectionsQualifi-<br>cationDate $10/27/80$ OULIFICATION<br>Contract $90744$ & $91750$ OULIFICATION<br>METHODOULIFICATION<br>METHODSpecifi-<br>cationQualifi-<br>cationCationOperating<br>Time1 day<br>TimeTemperature<br>(F)Figure<br>B.6(1,2,3)Component: Scam""Manufacturer:<br>ScamSoamModel No.: $551-1$ Pressure<br>(F)Figure<br>B.1(1,2,3)"Function: Steam leak<br>detectorMatitive<br>Indity(\$)N/AN/AN/AN/AN/AN/AN/ANote 1"ParameterSpecifi-<br>CationQualifi-<br>CationColspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Unit: 1,2,3                   | *           | · · · •       |               |                                               |          | Revision 0       |             |
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750  ENVIRONMENT  DOCUMENTATION REF  QUALTFICATION<br>METHOD  OUTSTANDING<br>ITEMS    System: High pressure<br>coolant injections<br>Plant ID No. See Appx 1<br>Note 1  Operating<br>Time  1 day<br>Time  1 day<br>Time  Qualifi-<br>cation  Qualifi-<br>cation  Qualifi-<br>cation  Outstanding    Component: Temperature<br>Element  Operating<br>Time  1 day<br>Time  1 day<br>Time  (1)  Appx 1  NCR<br>BFNNEB8022    Manufacturer: Scam  Description<br>(F)  Figure<br>B.6(1,2,3)  (4)  "  "  "    Model No.: S51-1  Pressure<br>(FSIA)  Pressure<br>B.1(1,2,3)  (4)  "  "  "    Accuracy:<br>Reg'd: See section<br>Demo: 4.1.3  Chemical<br>Spray  N/A  N/A  N/A  (4)  N/A  N/A  N/A    Service: HPCI steam<br>Leak detection  Radiation<br>(RAD)  3.1x10 <sup>7</sup> (4)  N/A  Appx 1 Note 1  "    Flood Level Elev:552'  N/A  N/A  (2)  Appx 1 Note 1  "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Docket: 50-259, 50-260, 50-   | -296        |               | · · ·         |                                               | <u>ф</u> | Date 10/27/      | 80          |
| COUTPRENT DESCRIPTION    Contract 90744 & 91750    System: High pressure<br>coolant injections<br>Plant ID No. See Appx 1<br>Note 1  METHOD  ITEMS    System: High pressure<br>coolant injections<br>Note 1  Operating<br>Time  1 day<br>Time  NCR<br>BFNNEB8022    Component: Temperature<br>Element  Operating<br>Time  1 day<br>Time  1 day<br>(1)  (1)  Appx 1<br>Note 1  NCR<br>BFNNEB8022    Manufacturer: Scam  Secifi-<br>Element  Signer<br>(F)  Figure<br>B.6(1,2,3)  (4)  "  "    Model No.: S51-1<br>Function: Steam leak<br>detector  Pressure<br>(PSIA)  N/A  N/A  (4)  "  "    Accuracy:<br>Req'd: See section<br>Demon: <sup>11</sup> -1.3  Chemical<br>Spray  N/A  N/A  N/A  N/A  N/A    Service: HPCI steam<br>leak detection  Spray  N/A  N/A  (4)  N/A  N/A    Service: 6  HPCI steam<br>leak detection  3. 1x10 <sup>7</sup> Appx 1<br>Note 1  NCR<br>BFNNEB8022    Radiation<br>(RAD)  N/A  (2)  Appx 1 Note 1  "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | *                             | E           | NVIRONMENT    |               | DOCUMENTATION REF                             |          | QUALIFICATION    | OUTSTANDING |
| Contract 90744 & 91750  Specifi-<br>cation  Qualifi-<br>cation  Qualifi-<br>cation    System: High pressure<br>coolant injections<br>Note 1  Operating<br>Time  1 day<br>Time  1 day<br>(1)  Appx 1<br>Note 1  NCR<br>BFNNEB8022    Component: Temperature<br>Element  Temperature<br>(F)  Figure<br>B.6(1,2,3)  ************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EQUIPMENT DESCRIPTION         |             |               | •             |                                               |          | METHOD           | ITEMS       |
| System: High pressure<br>coolant injections<br>Plant ID No. See Appx 1<br>Note 1Operating<br>Time1 day<br>1 daycation<br>cationcation<br>cationAppx 1<br>Note 1NCR<br>BFNNEB8022Parameter<br>coolant injections<br>Note 1Operating<br>Time1 day<br>Time1 day<br>(1)(1)Appx 1<br>Note 1NCR<br>BFNNEB8022Component:<br>Hanufacturer:<br>ScamTemperature<br>(F)Figure<br>B.6(1,2,3)"""Model No.:<br>Stora<br>Hotel No.:<br>StoraStora<br>(PSIA)Table<br>B.1(1,2,3)"""Model No.:<br>Stora<br>Req'd:<br>Demon:<br>Leak detection<br>Location:Pressure<br>(PSIA)100"""Mathematical<br>Model No.:<br>StoraChemical<br>N/AN/AN/AN/AN/AN/ANote 1Pressure<br>(PSIA)100""""Relative<br>Humidity(S)100(4)N/AN/AN/ARelative<br>Humidity(S)N/AN/A(4)N/AN/AService:<br>HPCI steam<br>leak detection<br>Location:Malation<br>Aging3.1x107"Appx 1<br>(4)NCR<br>BFNNEB8022Flood Level Elev:<br>Flood Level Elev:<br>SprintN/AN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Contract 90744 & 91750        |             | Specifi-      | Qualifi-      | Specifi-                                      | Qualifi- |                  |             |
| System: High pressure<br>coolant injections<br>Plant ID No. See Appx 1<br>Note 1    Operating<br>Time    1 day    (1)    Appx 1<br>Note 1    NCR<br>BFNNEB8022      Component: Temperature<br>Element    Temperature<br>(F)    Figure<br>B.6(1,2,3)    (1)    NCR<br>Note 1    BFNNEB8022      Manufacturer: Scam    Temperature<br>(F)    Figure<br>B.6(1,2,3)    (4)    "    "    "      Model No.: S51-1    Pressure<br>(PSIA)    Figure<br>B.1(1,2,3)    (4)    "    "    "      Function: Steam leak<br>detector    Relative<br>Humidity(\$)    100    (4)    "    "    "      Req/d: See section<br>Demon: 4,1.3    Chemical<br>Spray    N/A    N/A    N/A    N/A    N/A    N/A      Service: HPCI steam<br>leak detection    Aging    N/A    (2)    Appx 1 Note 1    "      Flood Level Elev:552'    N/A    N/A    (2)    Appx 1 Note 1    "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               | Parameter   | cation        | cation        | cation                                        | cation   |                  |             |
| coolant injections    Operating Time    1 day Time    Appx 1    NCR      Plant ID No. See Appx 1    Note 1    BFNNEB8022    Note 1    BFNNEB8022      Component: Temperature Element    Temperature (F)    Figure B.6(1,2,3)    "    "    "      Manufacturer: Scam    Model No.: S51-1    Pressure (PSIA)    Figure B.6(1,2,3)    (4)    "    "    "      Model No.: Stean leak detector    Relative No.1(1,2,3)    (4)    "    "    "    "    "      Accuracy: Req'd: See section Demon: 4.1.3    Chemical Spray    N/A    N/A    N/A    N/A    N/A    N/A    N/A      Service: HPCI steam leak detection    Radiation (RAD)    3.1x10 <sup>7</sup> (4)    N/A    N/A    N/A    BFNNEB8022      Flood Level Elev:552' N/A    N/A    (2)    Appx 1 Note 1    "    "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | System: High pressure         |             |               |               |                                               |          |                  |             |
| Plant ID No. See Appx 1<br>Note 1    Time    (1)    Note 1    BFNNEB8022      Component: Temperature<br>Element    Temperature<br>(F)    Figure<br>b.6(1,2,3)    (1)    Note 1    BFNNEB8022      Manufacturer: Scam    Temperature<br>(F)    Figure<br>b.6(1,2,3)    (4)    "    "      Model No.: S51-1    Pressure<br>(PSIA)    Table<br>B.1(1,2,3)    (4)    "    "    "      Function: Steam leak<br>detector    Relative<br>Humidity(f)    100    (4)    "    "    "      Accuracy:<br>Req'd: See section<br>Demon: 4.1.3    Relative<br>Isak detection    100    (4)    N/A    N/A    N/A      Category: A<br>Service: HPCI steam<br>leak detection    3.1x10 <sup>7</sup> (4)    N/A    N/A    NCR<br>BFNNEB8022      Location: 6    Aging    N/A    (2)    Appx 1 Note 1    "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | coolant injections            | Operating   | 1 day         |               |                                               |          | Appx 1           | NCR         |
| Note 1<br>Component: Temperature<br>ElementTemperature<br>(F)Figure<br>$0.6(1,2,3)$ Temperature<br>ElementTemperature<br>(F)Figure<br>$0.6(1,2,3)$ Manufacturer:<br>SeamSeamPressure<br>(PSIA)Figure<br>$0.6(1,2,3)$ Model No.:S51-1Pressure<br>(PSIA)Relative<br>$0.6(1,2,3)$ Function:Steam leak<br>detectorRelative<br>Humidity(\$)100Accuracy:<br>Req'd:See section<br>Demon: 4.1.3N/AN/AN/AN/AN/ACategory:AService:HPCI steam<br>leak detection<br>Location: $3.1 \times 10^7$ Appx 1<br>Note 1NCR<br>BFNNEB8022Flood Level Elev: 552'N/AN/AAppx 1 Note 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Plant ID No. See Appx 1       | Time        |               |               | (1)                                           |          | Note 1           | BFNNEB8022  |
| Component: Temperature<br>ElementTemperature<br>(F)Figure<br>B.6(1,2,3)Image: second sec | Note 1                        |             |               |               |                                               |          | ļ                |             |
| Element(F)Figure<br>Definition""Manufacturer:<br>ScamScam $(F)$ Figure<br>Definition $(H)$ ""Model No.:S51-1Pressure<br>(PSIA)Table<br>B.1(1,2,3)"""Function:Steam leak<br>detectorRelative<br>Humidity(\$)100(4)""Accuracy:<br>Req'd:See section<br>Demon:Image: N/A100(4)""Accuracy:<br>Demon:Relative<br>Humidity(\$)100(4)N/AN/AAccuracy:<br>Demon:Relation<br>(Handle)N/AN/AN/ACategory:<br>Location:A<br>Baiation<br>(RAD)3.1x10 <sup>7</sup><br>(4)Appx 1<br>Note 1NCR<br>BENNEB8022Flood Level Elev:552'N/AN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Component: Temperature        | Temperature |               |               |                                               |          |                  |             |
| Manufacturer:<br>ScamScamB. $6(1,2,3)$ (4)Model No.:S51-1Pressure<br>(PSIA)Table<br>B. $1(1,2,3)$ ""Function:Steam leak<br>detectorRelative<br>Humidity(\$)100(4)""Accuracy:<br>Req'd:<br>Demon:4.1.3Chemical<br>SprayN/AN/A(4)N/AN/ACategory:A<br>SprayChemical<br>(RAD)N/AN/AN/AN/AN/AService:HPCI steam<br>leak detection3.1x107(4)N/AN/CR<br>BFNNEB8022Location:6AgingN/A(2)Appx 1<br>Note 1NCR<br>BFNNEB8022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Element                       | (F)         | Figure        |               |                                               |          | 11               | <b>n</b>    |
| Manufacturer:  Scam  (4)  "    Model No.:  S51-1  Pressure  Table  "    Function:  Steam leak<br>detector  Relative  100  (4)    Accuracy:<br>Req'd:  See section<br>Demon:  100  (4)    Category:  A    Service:  HPCI steam<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                             |             | B.6(1,2,3)    |               |                                               |          |                  |             |
| Model No.:S51-1Table<br>Pressure<br>(PSIA)Table<br>B.1(1,2,3)""Function:Steam leak<br>detectorRelative<br>Humidity(\$)100(4)""Accuracy:<br>Req'd:See section<br>Demon:100(4)"""Accuracy:<br>Req'd:See section<br>Demon:N/AN/AN/AN/AN/ACategory:AChemical<br>SprayN/AN/AN/AN/AN/ACategory:ARadiation<br>(RAD)3.1x107<br>(4)Appx 1<br>Note 1NCR<br>BFNNEB8022Flood Level Elev:S52'N/AN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Manufacturer: Scam            | 5.          |               |               | (4)                                           |          |                  |             |
| Model No.:S51-1Table<br>B.1(1,2,3)""Function:Steam leak<br>detectorPressure<br>(PSIA)B.1(1,2,3)(4)""Accuracy:<br>Req'd:See section<br>Demon:Helative<br>Humidity(\$)100(4)""Accuracy:<br>Demon:Get section<br>Location:Chemical<br>SprayN/AN/AN/AN/AN/AService:HPCI steam<br>leak detection<br>Location:Sittin3.1x107Appx 1<br>Note 1NCR<br>BFNNEB8022Flood Level Elev:Signal<br>N/AN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Scali                         |             |               |               |                                               |          |                  |             |
| Model No.:  S51-1    Function:  Steam leak<br>detector    Accuracy:<br>Req'd:  See section<br>Demon:    Model No.:  Steam leak<br>detector    Accuracy:<br>Req'd:  See section<br>Demon:    Munidity(1)    N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |             | Table         |               | ,                                             |          | · 11             | n           |
| Function: Steam leak detector    (PSIA)    (4)    "    "      Accuracy: Req'd: See section Demon: 4.1.3    Relative Spray    100    (4)    "    "      Category: A    Chemical Spray    N/A    N/A    (4)    N/A    N/A    N/A      Service: HPCI steam leak detection    Radiation (RAD)    3.1x10 <sup>7</sup> (4)    N/A    N/A    N/A      Flood Level Elev:552'    N/A    N/A    (2)    Appx 1 Note 1    "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Model No.: S51-1              | Pressure    | B.1(1,2,3)    |               |                                               |          | •                |             |
| Function:Steam leak<br>detectorRelative<br>Humidity(\$)100(4)""Accuracy:<br>Req'd:See section<br>Demon:4.1.3Relative<br>Humidity(\$)N/AN/AN/AN/AN/ACategory:AChemical<br>SprayN/AN/AN/A(4)N/AN/AN/ACategory:AAAppx 1<br>Note 1NCR<br>BFNNEB8022Location:6AgingN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ( · ·                         | (PSIA)      |               |               | (4)                                           |          |                  |             |
| detectorRelative<br>Humidity(\$)100""Accuracy:<br>Req'd: See section<br>Demon: 4.1.3Relative<br>Humidity(\$)100(4)""Category: AChemical<br>SprayN/AN/AN/AN/AN/ACategory: ARadiation<br>(RAD)3.1x107Appx 1<br>Note 1NCR<br>BFNNEB8022Location: 6AgingN/A(2)Appx 1 Note 1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Function: Steam leak          | *           |               |               |                                               |          |                  |             |
| Accuracy:<br>Req'd:<br>Demon:<br>4.1.3Humidity(\$)(4)N/ACategory:<br>A<br>Category:<br>A<br>Service:<br>HPCI steam<br>leak detection<br>Location:N/AN/AN/AN/AMadiation<br>(RAD)3.1x107Appx 1<br>Note 1NCR<br>BFNNEB8022Flood Level Elev:552;N/AN/A(2)Appx 1 Note 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detector                      | Relative    | 100           | _             |                                               |          | 1 11             | n           |
| Accuracy:<br>Req'd:<br>Demon:<br>4.1.3See section<br>Period:<br>4.1.3N/AN/AN/AN/AN/ACategory:<br>Category:<br>AAAAAAAACategory:<br>Category:<br>AABrayAAAAAService:<br>HPCI steam<br>leak detection<br>Location:BBAAAAAAgingN/AAAAAAAAFlood Level Elev:52'N/AAAAAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               | Humidity(%) |               | · •           | (4)                                           |          |                  | İ           |
| Req'd:See section<br>Demon:N/AN/AN/AN/AN/ACategory:ACategory:AService:HPCI steam<br>leak detectionLocation:6AgingN/AFlood Level Elev:552'N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Accuracy:                     |             |               | ····          |                                               |          |                  | [           |
| Demon:4.1.3Chemical<br>SprayN/AN/AN/AN/AN/ACategory:ACategory:AService:HPCI steam<br>leak detection3.1x107Appx 1<br>(4)NCR<br>BFNNEB8022Location:6AgingN/A(2)Appx 1 Note 1"Flood Level Elev:552*N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Requir See section            |             |               | · .           |                                               |          |                  |             |
| Category:AService:HPCI steam<br>leak detection3.1x107Location:63.1x107AgingN/A(4)Flood Level Elev:52'N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Demon: 4.1.3                  | Chemical    | N/A           | N/A           | (4)                                           | N/A      | N/A              | N/A         |
| Category:AService:HPCI steam<br>leak detectionLocation:6AgingN/AFlood Level Elev:N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               | Spray       |               | -             |                                               |          |                  |             |
| Service:HPCI steam<br>leak detectionRadiation<br>(RAD)3.1x10'(4)Appx 1<br>Note 1NCR<br>BFNNEB8022Location:6AgingN/A(2)Appx 1 Note 1"Flood Level Elev:552'N/A6N/A000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Category: A                   |             | 7             |               |                                               | •••      |                  |             |
| Service:  HPCI steam<br>leak detection  (RAD)  (4)  Note 1  BFNNEB8022    Location:  6  Aging  N/A  (2)  Appx 1 Note 1  "    Flood Level Elev:552*  N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               | Radiation   | 3.1x10'       |               | -                                             |          | Appx 1           | NCR         |
| leak detection  Aging  N/A  (2)  Appx 1 Note 1    Location:  6  Aging  N/A  (2)  Appx 1 Note 1    Flood Level Elev:552*  N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Service: HPCI steam           | (RAD)       |               |               | (4)                                           |          | Note 1           | BFNNEB8022  |
| Location: <sup>6</sup> Aging N/A (2) Appx 1 Note 1 "<br>Flood Level Elev:552' N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | leak detection                |             |               |               |                                               |          | ·····            |             |
| Flood Level Elev:552' N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Location: 6                   | Aging       | N/A ·         |               | (2)                                           |          | Appx 1 Note 1    | 11          |
| Flood Level Elev:552' N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |             | -             |               | <u>, , , , , , , , , , , , , , , , , , , </u> |          |                  |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Flood Level Elev:552' N/A     | -           | j             | -             |                                               |          |                  |             |
| Above Flood Level: Yes Submergence N/A N/A (4) N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Above Flood Level: Yes        | Submergence | N/A           | N/A           | (4)                                           | N/A      | N/A              | N/A         |

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

No

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

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

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

alex Mehibou Prepared by: Charles: Reviewed by:

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1. This sheet applies to the following items:

TE-73-55C, MPL #23-105C TE-73-55D, MPL #23-105C

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2. Test data has not been obtained to date; however, the manufacturer rates these resistive thermal detector at 100 psi and 500°F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test these resistive thermal detector and/or replace if required.



(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-73-176 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF OUTSTANDING QUALIFICATION ENVIRONMENT METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 Parameter cation cation cation cation System: High pressure Operating See Appx 1 coolant injection 30 days See NCR Plant ID No. LS-73-57(A&B) Time (1)BFNNEB8004 Note 1 MPL #23-91(A&B) Component: Level Temperature (F) 11 11 Switch Figure B.6(1,2,3) (4) Manufacturer: Robertshaw It 11 Table Model No.: SL-202-A2X Pressure B.1(1,2,3) (PSIA) (4) Function: Suppression pool high level Relative 100 Ħ 11 (4) Humidity(%) Accuracy: Req'd: N/A N/A N/A N/A N/A Demon: Chemical (4) Spray Category: A 3.1x10<sup>?</sup> . See Appx 1 See NCR Radiation Service: HPCI logic (4) Note 1 BFNNEP8004 (RAD) Bus II cont. 6 Appx 1 Note 1 n N/A (2) Location: Aging Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence No

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Mehnihow</u> Reviewed by: <u>Charles Turk</u>

NEB-73-176

Appendix 1, Rev 0

 To date, test data has not been obtained. Vendor drawings and materials information is expected in the near future; thus analysis of this item will continue. Depending on the results of this analysis, TVA will commit to type testing in order to verify material analysis results or commit to replacement of the equipment.

Based on limited information available on materials, it is expected that this device could be qualified to the applicable environmental conditions. These high quality swithces have demonstrated good performance in normal plant service for some time and are required to function in the postulated accident environment for a relatively short period.

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|                                                                      |                         | SYSTEM COMPON                | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                         |                      |
|----------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-----------------------------|----------------------|
| Facility: Browns Ferry Nuclea                                        | r Plant                 |                              |                    |                    | -                    | Sheet No. NEB-71            | 1-179                |
| Unit: 1,2 3                                                          | 00C                     |                              |                    |                    |                      | Revision 0                  |                      |
| Docket: 50-259, 50-260, 50-                                          | -296                    |                              | ·                  |                    |                      | Date 10/27/                 | 80                   |
| EQUIPMENT DESCRIPTION                                                | E                       | NVIRONMENT                   |                    | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD     | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                               | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                             |                      |
| System: Residual heat<br>removal<br>Plant ID No. Appx 1<br>Note 4    | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note <b>3</b> | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitoroue             | Temperature<br>(F)      | Figure<br>B.2(1)<br>B.2(2,3) | 250 F              | (4)                | 11                   | See App 1<br>Note 2         | n                    |
| Model No.: SMB-1                                                     | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | n .                  | Type test                   | None                 |
| Function: RHR Pump<br>"A" supp pool                                  | Relative<br>Humidity(%) | 100                          | 100                | (4)                | rt                   | 11                          | It                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                    | Chemical<br>Spray       | N/A                          | N/A                | (4)                | N/A                  | N/A                         | N/A                  |
| Category: <sup>A</sup><br>Service: Suction                           | Radiation<br>(RAD)      | 3×10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | Sée Appx 1<br>Note 1 | Type Test                   | None                 |
| Location: 2                                                          | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3               | None                 |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No | Submergence             | N/A                          | N/A                | <b>(</b> 4)        | N/A                  | N/A                         | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:

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- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2 This particular type operator (class B insulation) was successfully tested to 250° F for 24 hours. Although the peak temperature in unit 1 exceeds the tested condition, the temperature is 174° F at 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250° F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging. considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. This sheet applies to items:

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FCV-74-1, -12, -24, -35 (units 1 and 2) (All MPL #10-13)

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

(3) NEB- 74-179A Sheet No. Revision 0

| Docket: 50-259, 50-260, 50-                                               | 50-259, 50-260, 50-296  |                              |                    |                    |                      |                         | Date 10/27/80        |  |  |
|---------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|--|--|
| EQUIPMENT DESCRIPTION                                                     | E                       | NVIRONMENT                   |                    | DOCUMENTAT         | FION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |  |  |
| Contract 90744 & 91750                                                    | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |  |  |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-35<br>MPL # 10-13 | Operating<br>Time       | 1 year                       | 24 hours           | 、 (1)              | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |  |  |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                  | Temperature<br>(F)      | Figure<br>B.2(1)<br>B.2(2,3) | 250 F              | (4)                | 11                   | See Appx 1<br>Note 2    | 11                   |  |  |
| Model No.: SMB-0                                                          | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | 11                   | Type test               | None                 |  |  |
| Function: "A" supp pool                                                   | Relative<br>Humidity(%) | 100                          | 100                | (4)                | n                    | n                       | 17                   |  |  |
| Accuracy: N/A<br>Req'd:<br>Demon:                                         | Chemical<br>Spray       | N/A                          | N/A                | (4)                | N/A                  | N/A                     | N/A                  |  |  |
| Category:<br>Suction valve<br>Service:                                    | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>           | 2x.10 <sup>8</sup> | (4)                | See Appx 1<br>Note 1 | Type Test               | None                 |  |  |
| 2<br>Location:                                                            | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3           | None                 |  |  |
| N/A<br>Flood Level Elev:552'<br>Above Flood Level: Yes<br>No              | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                     | N/A                  |  |  |

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

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

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

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

Prepared by: <u>alex Mehikow</u> Reviewed by: <u>Charles Junk</u>
· · · 1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 292°F at 30 seconds after a HELB in compartment 1 and is 174°F at 120 seconds. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The opérating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnihow Reviewed by: Charles Junk

QA Acceptance:



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NEB-74-180

Appendix 1, Rev 0

## 1. This sheet applies to PS-74-8A, MPL # 10-120. PS-74-19A, MPL # 10-120.

- 2. Viking lab report 30203-2 (generic component).
- 3. The radiation dose of  $1 \times 10^6$  rads is based upon a materials analysis of the pressure switch. The material in the device limits the allowable radiation dose are the seals (buna N) which according to several studies including the guidelines furnished in bulletin 79-01B are acceptable up to a dose of  $1 \times 10^6$  rads.
- Peak temperature conditions of compartment (292<sup>o</sup>C) exceeds the Viking lab report 30203-2 (212<sup>o</sup>) qualification. This condition would only exist as a result of a HELB in the HPCI compartment.

These two pressure switches fail temperature conditions because of their location adjacent (area 2) to the HPCI compartment. However, if these two switches fail, area 5 contains pressure switches PS-74-31A and PS-74-42A which in conjunction with the core spray pump switches would provide sufficient redundancy to initiate ADS.

In TVA's engineering judgment the device could pass a type test designed to confirm that the temperature of the switch would not reach an unacceptable temperature. The switch, due to inertia, is not expected to heat up to unacceptable levels.

5. Radiation: Susceptible materials in the pressure switch will not meet the present radiation dose. The accident condition is  $2 \times 10^7$ , but the material will withstand  $1 \times 10^6/7 \times 10^6$ . However, the operating time given as 1 year may be reduced. The switches are required for initiation of the ADS. A normal blowdown of the ADS should take  $\approx 17$  minutes, after which time the ADS would not be required. At 24 hours, the radiation dose would be  $8 \times 10^5$ . At 30 days, it would be  $7 \times 10^6$  which would be within the susceptible materials tolerance.

Notwithstanding these arguments, TVA will either type test or replace with qualified equipment.



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| Facility: Browns Ferry Nuclear   Unit: 1,2,3   Docket: 50-259, 50-260, 50-2 | 296                      |                               |                    |                    |                      | Revision 0<br>Date 10/27/8 | 30                   |
|-----------------------------------------------------------------------------|--------------------------|-------------------------------|--------------------|--------------------|----------------------|----------------------------|----------------------|
| FOULTPMENT DESCRIPTION                                                      | ENVIRONMENT              |                               |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                      | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                            |                      |
| System: Residual heat<br>removal<br>Plant ID No. Appx 1<br>Note 1           | Operating<br>Time        | 1 year                        | 6 hours            | (1)                | See Appx 1<br>Note 2 |                            | ncr<br>Pfnneb8020    |
| Component: Pressure<br>switch                                               | Temperature<br>(F)       | Figures<br>B.2(1)<br>B.2(2,3) | 212 F              | (4)                | 1)                   | See Appx 1<br>Note 4       | E1                   |
| Static-O-Ring                                                               |                          | Table<br>B.1(1,2,             | 3) 25              |                    | tt "                 | Generic test               | None                 |
| Model No.: 5A-AA3                                                           | (PSIA)                   |                               |                    | (4)                |                      | •                          |                      |
| Function: Disch press                                                       | Relative<br>Humidity(\$) | 100                           | 100                | (4)                | 11                   | See Appx 1<br>Note 5       | NCR<br>BFNNEB8020    |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3 of report                   | Chemical<br>Spray        | NZA                           | N/A _              | (4)                | N/A                  | N/A                        | N/A                  |
| Category: A<br>Service: RHR pump A                                          | Radiation<br>(RAD)       | 3.10 <sup>7</sup>             | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 3 | See Appx 1<br>Note 6       | NCR<br>BFNNEB8020    |
| Location: 2                                                                 | Aging                    | N/A                           |                    | (2)                |                      |                            | 11                   |
| Flood Level Elev:5521 N/A<br>Above Flood Level: Yes<br>No                   | Submergence              | N/A                           | N/A                | (4)                | N/A                  | N/A                        | N/A                  |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:\_

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NEB-74-180A '

Appendix 1, Rev 0

- 1. This sheet applies to PS-74-8B, MPL # 10-123. PS-74-19B, MPL # 10-123.
- 2. Viking lab report 30203-2 (generic component).
- 3. The radiation dose of  $1 \times 10^6$  rads is based upon a materials analysis of the pressure switch. The material in the device limits the allowable radiation dose are the seals (buna N) which according to several studies including the guidelines furnished in bulletin 79-01B are acceptable up to a dose of  $1 \times 10^6$  rads.
- 4. Accident temperature conditions for compartment #2 (292<sup>0</sup>) exceeds the Viking lab report 30203-2 qualification (212<sup>0</sup>). This condition would exist as a result of a HELB in the HPCI compartment. The two pressure switches in this area have not been tested to meet the 292<sup>0</sup> in the compartment; however, in TVA's engineering judgment the switch would never reach levels that would adversely affect the device. This is due to the short time device. In TVA's opinion, the switch is qualifiable by type testing. Area 5 has pressure switches PS-74-31B and PS-74-42B for RHR pumps B and D discharge along with core spray pumps, in less harsh areas, that will provide sufficient redundancy to initiate ADS.
- 5. The Viking report (30203-2) addresses humidity for a static-O-ring model #12N-AA4. Vendor data describes the N as a weathertight housing. The type <u>A</u> housing is an explosion proof plain type. Further evaluation of humidity is needed.
- 6. No radiation qualification information is available at this time. A material breakdown, from vendor data, identified buna N diaphragm and O rings. This material will not meet the accident condition of  $3 \times 10^7$  rads (1 year). However, the operating time given as 1 year should be reduced. A normal blowdown of the ADS should last 17 minutes, after which time the ADS would not be required. With an operating time of 24 hours, the radiation dose would be 8 x 10<sup>5</sup> and for 30 days it would be 7 x 10<sup>6</sup>. This would be within the susceptible materials tolerance.

The accident dose of  $3 \times 10^7$  is a worst case. The pumps will not see this radiation level until the condensate tank supply has been depleted and the RHR's are on recirc from the torus. Another consideration is that the 1/4-inch Ø instrument is "dead-ended" and some distance away from the pipe. The instrument tubing is a stagnant leg and should not see the fluid radiation dose of  $3 \times 10^7$ . At 5 feet from the pipe, the radiation dose could be lowered  $\approx 7 \times 10^5$  rads. Additional modeling or analysis is required for the piping the area.

Notwithstanding these arguments, TVA will commit to a type testing or replacement program.



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|                                                                       |                         | SYSTEM COMPO         | NENT EVALUATI      | ON WORK SHEET      | '(Rev 2)           | (3)                     |                      |
|-----------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nucle                                          | ear Plant               |                      | •                  |                    |                    | Sheet No. NEB-7         | 4-181                |
| Unit: 1,2,3                                                           |                         |                      |                    |                    |                    | Revision O              |                      |
| Docket: 50-259, 50-260, 50                                            | 0-296                   |                      |                    | ·                  |                    | Date 10/27/             | /80                  |
| EQUIPMENT DESCRIPTION                                                 | E                       | NVIRONMENT           |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. See Appx 1<br>Note 1 | Operating<br>Time       | 1 year               |                    | (1)                |                    | Appx 1<br>Note 2        | NCR<br>PFNNEB8022    |
| Component: Temperature<br>Element<br>Manufacturer:                    | Temperature<br>(F)      | Figure<br>B.8(1,2,3) |                    | (11)               |                    | 11                      | 11                   |
| Scam                                                                  |                         | Table                |                    | (4)                |                    |                         |                      |
| Model No.: S51-1                                                      | Pressure<br>(PSIA)      | B.1(1,2,3)           |                    | (4)                |                    |                         |                      |
| Function: Inlet temp<br>measure                                       | Relative<br>Humidity(%) | 100                  | •                  | (4)                |                    | Π                       | 1F                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                       | Chemical<br>Spray       | N/A                  | :<br>N/A ,         | (4)                | N/A                | N/A ·                   | N/A                  |
| Category: A<br>Service: <sup>RHR</sup> Htx A ·                        | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>   | ۰ ،                |                    |                    | Appx 1<br>Note 2        | NCR<br>BFNNEB8022    |
| Location: 8                                                           | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 2           | 11 v                 |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No  | Submergence             | N/A                  | N/A                | (4)                | N/A                | N/A                     | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnibou</u> Reviewed by: Charles Turk

QA Acceptance:

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. . , , 1. This sheet applies to the following items:

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TE-74-9, -21, -32, -43 (All MPL #10-93)

2. Test data has not been obtained to date; however, the manufacturer rates these resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test these resistive thermal detector and/or replace if required.

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| Facility: Browns Ferry Nuclea                                     | r Plant                 | SYSTEM COMPO                  | NENT EVALUATIO     | on work sheet      | (Rev 2)              | (3)<br>Sheet No. <u>· NEB- 7</u> 1<br>Revision 0 | -184                 |
|-------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|--------------------------------------------------|----------------------|
| Docket: $50-259$ , $50-260$ , $50-$                               | 296                     |                               | •                  |                    | ,                    | Date 10/27/                                      | 80                   |
| EQUIPMENT DESCRIPTION                                             | ENVIRONMENT             |                               |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                          | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                            | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                  |                      |
| System: Residual heat<br>removal<br>Plant ID No. Appx 1<br>Note 1 | Operating<br>Time       | 1 year                        | 6 hours            | (1)                | See Appx 1<br>Note 2 |                                                  | NCR<br>BFNNEB8020    |
| Component: Pressure<br>switch                                     | Temperature<br>(F)      | Figures<br>B.5(1)<br>B.5(2,3) | 212 F              | •                  | 11                   | See appx 1<br>Note 4                             | 11                   |
| Manufacturer: Static-O-Ring                                       |                         | Table<br>B.1(1.2.             | 3) 25              | (4)                |                      | Generic test                                     | None                 |
| Model No.: 5N-AA3 series                                          | Pressure<br>(PSIA)      |                               |                    | (4)                | ·                    |                                                  | none                 |
| Function: Disch press<br>monitor                                  | Relative<br>Humidity(%) | 100                           | 100                | (4)                | 11                   | 11                                               | 11                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3 of report         | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                  | N/A                                              | N/A                  |
| Category: A<br>Service: RHR pump B                                | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>            | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 3 | See Appx 1<br>.Note 5                            | NCR<br>BNFNEB8020    |
| Location: 5                                                       | Aging                   | N/A                           |                    | (2)                |                      |                                                  | 11                   |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No         | Submergence             | N/A                           | N/A ·              | (4)                | N/A                  | N/A                                              | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnihou Prepared by: Phase Reviewed by:

QA Acceptance:

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NEB-74-184

Appendix 1, Rev 0

### 1. This sheet applies to PS-74-31A, MPL # 10-120. PS-74-42A, MPL # 10-120.

2. Viking lab report 30203-2 (generic component).

- 3. The radiation dose of  $1 \times 10^6$  rads is based upon a materials analysis of the pressure switch. The material in the device limits the allowable radiation dose are the seals (buna N) which according to several studies including the guidelines furnished in bulletin 79-01B are acceptable up to a dose of  $1 \times 10^6$  rads.
- 4. Peak temperature conditions of compartment (294°) exceeds the Viking lab report 30203-2 (212°) qualification. This condition would only exist as a result of a HELB in the HPCI compartment; however, in TVA's engineering judgment, the switch would never reach levels that would adversely affect the device. This is due to the short time at 292° F and the thermal inertia of the device. In TVA's opinion, the switch is qualifiable by type testing.

These two pressure switches fail temperature conditions because of their location adjacent (area 5) to the HPCI compartment. However, if these two switches fail, area 2 contains pressure switches PS-74-8A and PS-74-19A which in conjunction with the core spray pump switches would provide sufficient redundancy to initiate ADS.

5. Susceptible materials in the pressure switch will not meet the present radiation dose. The accident condition is  $3 \times 10^7$ , but the material will withstand  $1 \times 10^6/7 \times 10^6$ . However, the operating time given as 1 year may be reduced. The switches are required for initiation of the ADS. A normal blowdown of the ADS should take  $\approx 17$  minutes, after which time the ADS would not be required. At 24 hours, the radiation dose would be  $8 \times 10^5$ . At 30 days, it would be  $7 \times 10^6$  which would be within the susceptible materials tolerance.

Notwithstanding these arguments, TVA will either type test or replace with qualified equipment.



| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant                   | SISTEM COMPO                  | WENI EVALUATIO     | JA WORK SHEET      | (Rev 2)              | Sheet No. NEB-71<br>Revision $0$ | I-184A               |
|-------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|----------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                         | E                       | NVIRONMENT                    |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD          | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                        | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                  |                      |
| System: Residual heat removal<br>Plant ID No. Appx 1<br>Note 1                | Operating<br>Time       | 1 year                        | 6 hours            | (1)                | See Appx 1<br>Note 2 |                                  | NCR<br>BFNNEB8020    |
| Component: Pressure<br>switch<br>Manufacturer: Static-O-Bing                  | Temperature<br>(F)      | Figures<br>B.5(1)<br>B.5(2,3) | 212 F              | (4)                | 11                   | See Appx 1<br>Note 4             | 11                   |
| Model No.: 5A-AA3 series                                                      | Pressure<br>(PSIA)      | Table<br>B.1(1,2,             | 3) 25              | (4)                | Π.                   | Generic test                     | None                 |
| Function: Disch press<br>monitor                                              | Relative<br>Humidity(%) | 100                           | 100                | (4)                | 11                   | 17                               | łł                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3 of report                     | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A -                | N/A                              | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> pump B                      | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>            | 1x10 <sup>6</sup>  | (4)                | See Appx 1<br>Note 3 | See Appx 1<br>Note 6             | NCR<br>BFNNEB8020    |
| Location: 5                                                                   | Aging                   | N/A                           |                    | (2)                |                      | Υ                                | 11                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No          | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                              | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnilow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:

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NEB-74-184A

Appendix 1, Rev 0

1. This sheet applies to PS-74-31B, MPL # 10-123. PS-74-42B, MPL # 10-123.

- 2. Viking lab report 30203-2 (generic component).
- 3. The radiation dose of  $1 \times 10^6$  rads is based upon a materials analysis of the pressure switch. The material in the device limits the allowable radiation dose are the seals (buna N) which according to several studies including the guidelines furnished in bulletin 79-01B are acceptable up to a dose of  $1 \times 10^6$  rads.
- 4. Accident temperature conditions for compartment #5  $(294^{\circ})$  exceeds the Viking lab report 30203-2 qualification  $(212^{\circ})$ . This condition would exist as a result of a HELB in the HPCI compartment. The two pressure switches in this area have not been tested to meet the 294° in the compartment; however, in TVA's engineering judgment the switch would never reach levels that would adversely affect the device. This is due to the short at 292° F and the thermal inertia of the device. In TVA's opinion, the switch is qualifiable by type testing. Area 2 has pressure switches PS-74-8B and PS-74-19B for RHR pumps A and C discharge along with core spray pumps, in less harsh areas, that will provide sufficient redundancy to initiate ADS.
- 5. The Viking report (30203-2)addresses humidity for a static-O-ring model #12NAA4. Vendor data describes the <u>N</u> as a weathertight housing. The type <u>A</u> housing is an explosion proof plain type. Further evaluation of humidity is needed.
- 6. No radiation qualification information is available at this time. A material breakdown, from vendor data, identified buna N diaphragm and O rings. This material will not meet the accident condition of  $3 \times 10'$  rads (1 year). However, the operating time given as 1 year should be reduced. A normal blowdown of the ADS should last 17 minutes, after which time the ADS would not be required. With an operating time of 24 hours, the radiation dose would be  $8 \times 10^{5}$  and for 30 days it would be 7 x 10<sup>5</sup>. This would be within the susceptible materials tolerance.

The accident dose of  $3 \times 10^7$  is a worst case. The pumps will not see this radiation level until the condensate tank supply has been depleted and the RHR's are on recirc from the torus. Another consideration is that the 1/4-inch Ø instrument is "dead-ended" and some distance away from the pipe. The instrument tubing is a stagnant leg and should not see the fluid radiation dose of  $3 \times 10^7$ . At 5 feet from the pipe, the radiation dose could be lowered  $7 \times 10^5$  rads. Additional modeling or analysis is required for the piping in this area.

Notwithstanding these arguments, TVA will commit to a type testing or replacement program.





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### SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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| DOCKEL: 50-259, 50-200, 50                                                | -290                     |                                            |                     |                    |                      | Date 10/27/             | 780                  |
|---------------------------------------------------------------------------|--------------------------|--------------------------------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                     | , E                      | ENVIRONMENT                                |                     | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                    | Parameter                | Specifi-<br>cation                         | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-47<br>MPL # 10-17 | Operating<br>Time        | 1 year                                     | 24 hours            | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                  | Temperature<br>(F)       | Figure<br>B.0(1,2,3)                       | 250 F               | (4)                | 11                   | See Appx 1<br>Note 2    | 11                   |
| Model No.: SMB-3                                                          | Pressure<br>(PSIA)       | Figure<br>B.0(1,2,3)                       | 40                  | . (4)              |                      | Ħ                       | II .                 |
| Function: Outbd valve<br>cont                                             | Relative<br>Humidity(\$) | 100                                        | 100                 | (4)                | 11                   | Type test               | None                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                         | Chemical<br>Spray        | N/A                                        | N/A                 | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: RHR shut<br>line cooling                          | Radiation<br>(RAD)       | 2x10 <sup>8</sup> ¥<br>4x10 <sup>8</sup> β | 2x10 <sup>8</sup> Y | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 4    | None                 |
| Location: 0                                                               | Aging                    | N/A                                        | ,                   | (2)                |                      | Appx 1 Note 3           | None                 |
| Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                     | Submergence              | N/A                                        | N/A                 | (4)                | N/A                  | N/A                     | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Mehrikow . Reviewed by: Charles Junk

(3)

Sheet No. NEB-74-186

Revision 0

QA Acceptance:

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- 1. Limitorque Test Reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement, the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.



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| Unit: 1,2,3                                                              | 206                     |                                            |                    |                    |                      | Revision $0$            | -107                 |
|--------------------------------------------------------------------------|-------------------------|--------------------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                    | ENVIRONMENT             |                                            |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                   | Parameter               | Specifi-<br>cation                         | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-48<br>MPL #10-18 | Operating<br>Time       | 1 year                                     | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                             | Temperature<br>(F)      | Figures<br>B.1(1,2,3                       | :) 250 F           | -                  | 11                   | See Appx 1<br>Note 2    | 11                   |
| Manufacturer: Limitorque                                                 |                         | Table                                      |                    | (4)                |                      |                         |                      |
| Model No.: SMR-2                                                         | Pressure<br>(PSTA)      | B.1(1,2,8                                  | ) 40               | ··<br>(4)          | ۳.                   | 11                      | Ħ .                  |
| Function: RHR shutdn<br>cool inbd                                        | Relative<br>Humidity(%) | 100                                        | 100                | (4)                | 11                   | Type test               | None                 |
| Accuracy: NA<br>Reg'd:<br>Demon:                                         | Chemical<br>Spray       | N/A                                        | N/A .              | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: <sup>Water</sup>                                 | Radiation<br>(RAD)      | Г 2x10 <sup>8</sup><br>В 4x10 <sup>9</sup> | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 4    | None                 |
| Location: 0                                                              | Aging                   | N/A                                        |                    | (2)                | ·                    | Appx 1 Note 3           | 1[                   |

N/A

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

No

Above Flood Level: Yes

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

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

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

x 579'3' Submergence

N/A

alex Melniho Prepared by: Charlos I Reviewed by:

N/A

N/A

QA Acceptance:

N/A

(4)

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- 1. Limitorque test reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.

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ç SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB- 74-188 1,2,3 Unit: Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Residual heat Operating removal system 1 year 6 hours See Appx 1 See Appx 1 NCR Plant ID No. FIS-74-50 Time (1) Note 1 BFNNEB8010 Note 2 MPL # 10-124 Component: Differential Temperature pressure indicator 212 F 15 (F) Figures See Appx 1 11 B.1(1) Note 3 Manufacturer: B.1(2,3) (4) Barton

Π. Table 15 Type test None Model No.: 289 Pressure B.1(1,2,3) (PSIA) (4) Function: Total flow 100 11 Relative 100 11 18 Humidity(\$) (4) Accuracy: Req'd: See Section Demon: 4.1.3 in report N/A N/A N/A Chemical N/A N/A (4) Spray A Category: 5x10<sup>4</sup> 3x.10<sup>6</sup> See Appx 1 Type test, Radiation RHR system I -Service: Note 1 (RAD) (4) 1 Appx 1 Note 2 Aging None Location: N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnihow Prepared by: Reviewed by: Charles Junk

QA Acceptance:



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# NEB-74-188, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that an operating time of one year would create problems with the proper functioning of this device. Similarly, aging is not expected to adversely affect the proper functioning of this instrument; however, the available data is inconclusive.
- 3. The type test for this device does not meet the accident requirements; however, it is expected from a materials analysis that the device could pass tests at these temperatures; therefore, TVA will commit to a type testing or replacement program.

Please note, however, that these switches, which open valves FCV-74-30 and FCV 74-7, can also be operated by handswitches located in the control room.

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|                                                                           |                         | SYSTEM COMPON                 | IENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)                  |                   |
|---------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|----------------------|-------------------|
| Facility: Browns Ferry Nuclear                                            | Plant                   |                               |                    |                    |                    | Sheet No. NEB-71     | 1-189             |
| Unit: 1,2,3<br>Docket: 50-259 50-260 50-2                                 | 996                     |                               |                    |                    |                    | $\frac{10/27}{2}$    | 80                |
| EQUIPMENT DESCRIPTION                                                     | ENVIRONMENT             |                               |                    | DOCUMENTATION REF  |                    | QUALIFICATION        | OUTSTANDING       |
| Contract 90744 & 91750                                                    | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                      |                   |
| System: Residual heat<br>removal<br>Plant ID No. FT-74-50<br>MPL # 10-109 | Operating<br>Time       | 1 year                        |                    | (1)                |                    | See Appx 1<br>Note 1 | NCR<br>BFNNEB8012 |
| Component: Flow<br>transmitter<br>Manufacturer: GEMAC (GE)                | Temperature<br>(F)      | Figures<br>B.2(1)<br>B.2(2,3) |                    | (4)                | <u> </u>           | IC                   | 11                |
| Model No.: 50-5551118DAA3AAA                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           |                    | ··<br>(4)          | •                  | 11                   | 11                |
| Function: flow signal                                                     | Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | It                   | tf                |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                 | Chemical<br>Spray       | N/A                           | N/A                | (4)                | N/A                | N/A                  | N/A               |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> system I ·              | Radiation<br>(RAD)      | 3x10 <sup>7</sup>             | × ,                | (4)                | ₽-g                | See Appx 1<br>Note 1 | NCR<br>BFNNEB8012 |
| Location: 2                                                               | Aging                   | N/A                           |                    | (2)                |                    | ţı.                  | 11                |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes            | Submergence             | N/A                           | N/A ·              | (4)                | N/A                | N/A                  | N/A               |

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

No

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

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

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

Prepared by: <u>alex Melnihan</u> Reviewed by: <u>Charles</u> Juk

QA Acceptance:

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### NEB-74-189 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature :     | '- 185 <sup>0</sup> F |
|-------------------|-----------------------|
| Pressure          | - Atmospheric         |
| Relative Humidity | - Not Specified       |
| Radiation         | - Not Specified       |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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


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SYSTEM COMPONENT EVALUATION WORK SHEET ( Por 2)

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| •                                                         |                                 | SYSTEM COMPO        | NENT EVALUATI        | ON WORK SHEET      | (Rev 2)            | (3)                     |                                        |
|-----------------------------------------------------------|---------------------------------|---------------------|----------------------|--------------------|--------------------|-------------------------|----------------------------------------|
| Facility: Browns Ferry Nuclear                            | • Plant                         |                     |                      |                    |                    | Sheet No. NEB- 7        | 4-190                                  |
| Unit: 1,2,3                                               |                                 |                     |                      |                    |                    | Revision 0              | ······································ |
| Docket: 50-259, 50-260, 50-2                              | 296                             |                     |                      |                    |                    | Date 10/27/             | 80                                     |
| EQUIPMENT DESCRIPTION                                     | ENVIRONMENT                     |                     |                      | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS                   |
| Contract 90744 & 91750                                    | Parameter                       | Specifi-<br>cation  | Qualifi-<br>• cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                                        |
| System: Residual heat<br>removal<br>Plant ID No. PT-74-51 | Operating<br>Time               | 1 year              |                      | (1)                |                    | See Appx 1<br>Note 1    | NCR<br>BFNNEB8012                      |
| Component: Pressure<br>transmitter                        | Temperature<br>(F)              | Figures<br>B.2(1)   |                      | - 2                |                    | 11                      | 11                                     |
| Manufacturer: GEMAC (GE)                                  |                                 | B.2(2,3)            |                      | (4)                |                    |                         |                                        |
| Model No.: 50-551032EAAK1                                 | Pressure<br>(PSIA)              | Table<br>B.1(1,2,3) | ·3                   |                    | •                  | n<br>-                  | Ħ                                      |
| Function: Pressure level sign                             | al<br>Relative<br>Humidity(%)   | 100                 |                      | (4)                |                    | 11                      | If                                     |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report | Chemical<br>Spray               | N/A                 | N/A .                | (4)                | N/A ·              | N/A                     | N/A                                    |
| Category: A<br>Service: <sup>RHR</sup> system I pressur   | Radiation<br><sup>e</sup> (RAD) | 3x10 <sup>7</sup>   |                      | - (4)              | • •                | See Appx 1<br>Note 1    | NCR<br>BFNNEB8012                      |
| Location: 2                                               | Aging                           | N/A                 |                      | (2)                |                    | ŧ.                      | 11 <u>,</u>                            |
| Flood Level Elev:552, N/A<br>Above Flood Level: Yes<br>No | Submergence .                   | N/A                 | N/A                  | (4)                | N/A                | N/A                     | N/A                                    |

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

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

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

Prepared by: <u>Alex Melinhow</u> Reviewed by: <u>Charles Juk</u>



### NEB-74-190 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature ·     | '- 185 <sup>0</sup> F |
|-------------------|-----------------------|
| Pressure · ·      | - Atmospheric         |
| Relative Humidity | - Not Specified       |
| Radiation         | - Not Specified       |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-74-190A Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Specifi-Contract 90744 & 91750 Qualifi-Qualifi-Parameter cation cation cation cation System: RHR NCR 1 year See Appx 1 Operating BFNNEB8012 Plant ID No. FT-74-56 Note 1 Time (1)MPL # 10-111A Component: Flow Temperature N Figures 11 transmitter (F) B.2(1) Manufacturer: GEMAC (GE) B.2(2.3) (4) 11 Ħ Table Model No.: 50-555111BDAA-3AA B.1(1,2,3) Pressure (PSIA) (4) Function: Flow signal n Ħ 100 Relative (4) Humidity(%) Accuracy: See Section Rea'd: N/A N/A N/A 4.1.3 in report Demon: Chemical N/A N/A (4) Spray Category: A • •  $3 \times 10^{7}$ See Appx 1 NCR Radiation RHR Sys I containment Note 1 BFNNEB8012 Service: (RAD) (4) 11 ti 2 Location: Aging N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence No

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

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

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

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

Prepared by: <u>alex Melnihow</u> Reviewed by: <u>Charles Junh</u>

# NEB-74-190A Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature ·       | '- 185 <sup>0</sup> F             |
|---------------------|-----------------------------------|
| . Pressure          | - Atmospheric                     |
| · Relative Humidity | <ul> <li>Not Specified</li> </ul> |
| Radiation           | - Not Specified                   |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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|                               |             | SYSTEM COMPON | IENT EVALUATIO | IN WORK SHEET  | (Rev 2)        | (3)               |             |
|-------------------------------|-------------|---------------|----------------|----------------|----------------|-------------------|-------------|
| Facility: Browns Ferry Nuclea | ar Plant    |               |                |                |                | Sheet No. NEB- 71 | -191        |
| Unit: 1.2.3                   |             |               |                | *              |                | Revision 0        |             |
| Docket: 50-259, 50-260, 50-   | -296        |               | -              |                |                | Date 10/27/       | 80          |
|                               | E           | NVIRONMENT    | I              | DOCUMENTA      | TION REF       | QUALIFICATION     | OUTSTANDING |
| EQUIPMENT DESCRIPTION         | -           |               |                | •              |                | METHOD            | ITEMS       |
| Contract 90744 & 91750        |             | Specifi-      | Qualifi-       | Specifi-       | Qualifi-       | **                |             |
|                               | Parameter   | cation        | cation         | cation         | cation         |                   |             |
| System: Residual heat         |             |               |                |                |                |                   |             |
| removal                       | Operating   | 1 year        | 24 hours       |                | See Appx 1     | See Appx 1        | NCR         |
| Plant ID No. Appx 1           | Time        |               |                | (1)            | Note 1         | Note 3            | BFNNEB8034  |
| Note 5                        |             |               |                |                |                |                   |             |
| Component: Motor              | Temperature |               |                |                |                |                   |             |
| operator                      | (F)         | Figure        | 250 F          |                | 11             | See Appx 1        | n           |
|                               |             | B.0(1,2,3)    |                |                |                | Note 2            |             |
| Manufacturer:                 |             |               |                | (4)            | -              |                   |             |
| is imit corque                |             |               |                |                |                |                   |             |
| -                             |             | Figure        | 40             | · ·            | ".             | See Appx 1        | 11          |
| Model No.: SMB-5T             | Pressure    | B.0(1,2,3)    |                |                |                | Note 2            |             |
|                               | (PSIA)      |               |                | (4)            |                |                   |             |
| Function: Outbd recirc        |             |               |                |                |                |                   |             |
| - loop cont                   | Relative    | 100           | 100            |                | n              | Type Test         | None        |
|                               | Humidity(%) |               |                | (4)            |                |                   |             |
| Accuracy:                     |             |               | - 1            |                |                |                   |             |
| Reg'd: N/A                    |             |               |                |                |                |                   |             |
| Demon:                        | Chemical    | N/A           | N/A            | (4)            | N/A            | N/A               | N/A         |
|                               | Spray       |               |                | , . <i>,</i> , |                |                   |             |
| Category: A                   |             | 8             | 8              |                | а              |                   |             |
|                               | Radiation   | 2x10° Y       | 2x10 8         |                | See Appx 1     | See Appx 1        | None        |
| Service: RHR Sys I            | (RAD)       | 4x10° ß       |                | (4)            | Note 1         | Note 4            |             |
|                               |             |               |                |                |                |                   |             |
| Location: 0                   | Aging       | N/A           |                | (2)            |                | Appx 1 Note 3     | None        |
|                               |             | <u> </u>      |                |                | <del>~~~</del> |                   | <u> </u>    |
| Flood Level Elev:552' N/A     |             |               |                | -              |                |                   |             |
| Above Flood Level: Yes        | Submergence | N/A           | N/A            | (4)            | N/A            | N/A               | N/A         |
| No                            |             |               |                | 117            |                |                   |             |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnikow Charles Tink Prepared by: Reviewed by:\_\_\_

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### NEB-74-191, APPENDIX 1, REVISION 0

1. Limitorque Test Reports #600198, B-0027, and B-0003

2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement, the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand  $325^{\circ}$  F for five minutes followed by a gradual decline to  $250^{\circ}$  F after one hour without allowing the motor temperature and internals to exceed  $280^{\circ}$  F. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to  $280^{\circ}$  F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.

5. This sheet applies to the following:

FCV-74-52, MPL #10-154 FCV-74-66, MPL #10-154









|                                                                           |                          | SYSTEM COMPON                | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)                | · (3)                   |                      |
|---------------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|------------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclea                                             | r Plant                  |                              |                    |                    |                        | Sheet No. NEB- 74       | I-192                |
| llnit: 1.2.3                                                              |                          |                              |                    |                    |                        | Revision 0              |                      |
| Docket: $50-259$ , $50-260$ , $50-$                                       | -296                     |                              |                    | *                  | •                      | Date 10/27/             | 80                   |
| FOUTPHENT DESCRIPTION                                                     | ENVIRONMENT              |                              |                    | DOCUMENTATION REF  |                        | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                    | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation     |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-53<br>MPL # 10-25 | Operating<br>Time        | 1 years<br>,                 | 24 hours           | (1)                | See Appx 1<br>Note 1 . | See Appx 1<br>Note 2    | NCR<br>BFNNE88034    |
| Component: Motor<br>operator                                              | Temperature<br>(F)       | Figure<br>B.7(1)<br>B.7(2 3) | 250 F              | (4)                | 11                     | Type test               | None                 |
| Handracturer: Limitorque                                                  |                          | Table                        | 40                 |                    | 11                     | Type 'test              | None                 |
| Model No.: SMB-4                                                          | Pressure<br>(PSIA)       | B.1(1,2,3)                   |                    | (4)                |                        |                         |                      |
| Function: Inbd recic<br>loop cont                                         | Relative<br>Humidity(\$) | 100                          | 100                | (4)                | 31                     | n                       | n                    |
| Accuracy:<br>Reg'd: N/A<br>Demon:                                         | Chemical<br>Spray        | N/A                          | N/A                | (4)                | N/A ·                  | N/A                     | N/A                  |
| Category: A<br>Service: <sup>RHR</sup> sys I                              | Radiation<br>(RAD)       | 2x 10 <sup>6</sup>           | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1   | Type Test               | None                 |
| Location: 9                                                               | Aging                    | N/A                          |                    | (2)                |                        | Appx 1 Note 2           | None -               |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No      | Submergence              | N/A                          | N/A                | (4)                | N/A                    | N/A                     | N/A                  |

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

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

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

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

alex Melnihou Prepared by: 9 Reviewed by:



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- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

TVA will perform additional analyses or type tests to confirm that the operating time is acceptable.

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| Facility: Browns Ferry Nucle<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50  | ear Plant<br>1-296      | SYSTEM COMPO                 | NENT EVALUATI(     | ON WORK SHEET      | '(Rev 2)             | (3)<br>Sheet No. NEB- $\frac{7}{10}$<br>Revision 0 | u <u>_193</u>     |
|----------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|----------------------------------------------------|-------------------|
| EQUIPMENT DESCRIPTION                                                      | ENVIRONMENT             |                              |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                            | OUTSTANDING       |
| Contract 90744 & 91750                                                     | Parameter .             | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                    |                   |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-57<br>MPL # 10-39A | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                               | NCR<br>BFNNEB8034 |
| Component: Motor<br>operator<br>Manufacturer:                              | Temperature<br>(F)      | Figure<br>B.6(1)<br>B.6(2,3) | 250 F              | (4)                | 12                   | Type test                                          | None              |
| Limitorque<br>Model No.: SMB-2                                             | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | - (4)              | 11 .                 | Type test,                                         | None _            |
| Function: RHR sys I                                                        | Relative<br>Humidity(%) | 100                          | 100                | (4)                | Ħ                    | 11<br>L                                            | 11                |
| Accuracy:<br>Req'd: N/A<br>Demon:                                          | Chemical<br>Spray       | N/A                          | N/A                | . (4)              | N/A                  | N/A                                                | N/A               |
| Category: A<br>Service: <sup>Water</sup>                                   | Radiation<br>(RAD)      | 2.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                                          | None              |
| Location: 6                                                                | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 2                                      | None              |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                  | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                                                | N/A               |

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

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

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

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

Prepared by: alex Melnihow Reviewed by: Charles Link

## NEB-74-193, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



|                                                                   | •                        | System Compon                | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                     | •                    |
|-------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclea                                     | r Plant                  |                              | <b>`</b>           |                    |                      | Sheet No. NEB- 74       | -194                 |
| Unit: 1.2.3                                                       |                          | ,                            |                    |                    |                      | Revision 0              |                      |
| Docket: 50-259, 50-260, 50-                                       | 296                      |                              |                    |                    |                      | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                             | ENVIRONMENT              |                              |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                            | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         | 1                    |
| System: Residual heat<br>removal<br>Plant ID No. Appx 1<br>Note 4 | Operating<br>Time        | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:                     | Temperature<br>(F)       | Figure<br>B.6(1)<br>B.6(2,3) | 250 F              | . (4)              | 11                   | Type test .             | None                 |
| Model No.: SMB-00                                                 | Pressure<br>(PSTA)       | Table<br>B.1(1,2,3)          | 40                 | (4)                |                      | Type test,              | None                 |
| Function: RHR sys<br>supp pool                                    | Relative<br>Humidity(\$) | 100                          | 100                | (4)                | n                    | n                       | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                 | Chemical<br>Spray        | N/A                          | :<br>N/A _         | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: Water                                     | Radiation<br>(RAD)       | 3.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test               | None                 |
| Location: 6                                                       | Aging                    | N/A                          |                    | (2)                | -                    | Appx 1 Note 2           | None                 |
| Flood Level Elev:552' .N/A<br>Above Flood Level: Yes<br>No        | Submergence              | N/A                          | N/A .              | (4)                | -<br>N/A             | N/A                     | N/A                  |

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

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

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

Prepared by: alex Melnihous Reviewed by: Charles The

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### NEB-74-194, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, \$600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

3. This sheet applies to the following:

FCV 74-58 and -72 (MPL #10-38)

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-74-195 Facility: Browns Ferry Nuclear Plant Unit: 1,2,3 Revision 0 50-259, 50-260, 50-296 -10/27/80 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD **1TEMS** Specifi-Contract 90744 & 91750 Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Residual Heat Operating 1 year Removal 24 hours See Appx 1 NCR See Appx 1 Plant ID No. Appendix 1 Time (1)Note 1 Note 2 BFNNEB8034 Note 3 Component: Motor Temperature Figure operator (F) 250 F # Type Test None B.6(1) B.6(2,3) Manufacturer: (4) Limitorque Table 40 н\_ 11 11 B.1(1,2,3) Model No.: SMR-2 Pressure . (PSIA) (4) Function: RHR Sys I Test Valve 100 100 11 Relative Ħ ů. Humidity(\$) (4) Accuracy: Req'd: N/A Demon: N/A N/A N/A Chemical N/A (4) N/A Spray Category: A 2x10<sup>8</sup>  $3.1 \times 10^{7}$ See Appx 1 Radiation Type Test None Water Note 1 Service: (RAD) (4) 6 Appx 1 Note 2 Location: Aging N/A (2)None Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A N/A Submergence N/A (4)

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

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

(3) All notes and other information not on these

sheets are on the attached appendix sheets.

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

Melnihow alex Prepared by: Reviewed by: Charles Junk

1. Limitorque Test Reports B0003, B-0027, #600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

3. This sheet applies to the following:

FCV-74-59 and -73 (MPL #10-34)



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-74-196 Facility: Browns Ferry Nuclear Plant Revision 0 1, .3 10/27/80 Docket: 50-259, 50-260, 50-296 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Residual heat removal Operating 1 years 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-74-60 Time (1)Note 1 Note 2 BFNNEB8034 MPL # 10-26 Component: Motor Temperature 11 operator (F) Figure 250 F Type test None B.9(1) B.9(2,3) Manufacturer: (4) Limitorque 40 11 Table Type test None

Model No.: SMB-2 Pressure B.1(1,2,3) <u>(4)</u> <sup>^</sup> (PSIA) Function: Spray inbd n 11 11 valve 100 100 Relative (4) Humidity(%) Accuracy: Req'd: N/A N/A N/A N/A Demon: Chemical N/A N/A (4) Spray Category: A 2.1x10<sup>7</sup> 2x10<sup>8</sup> See Appx 1 Type Test None Radiation RHR sys I Note 1 Service: (RAD) (4) contmt 9 Appx 1 Note 2 None Location: Aging N/A (2) ~ Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4)

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

No

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these
  - sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnikow Reviewed by: Charles Turk

QA Acceptance:

Unit:

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# NEB-74-196, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 71 Facility: Browns Ferry Nuclear Plant -196A Revision 0 Unit: 50-259, 50-260, 50-296 Date 10/27/80 Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Qualifi-Specifi-Specifi-Qualification cation cation cation Parameter System: Residual heat Operating removal 1 years 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-74-60 Time (1)Note 1 Note 2 BFNNEB8034 MPL # 10-26 Component: Motor Temperature (F) operator Figure 250 F 11 Type test None B.8(1) Manufacturer: B.8(2.3) (4) Limitorque • • Table 40 11 . Type test None Model No.: SMB-2 Pressure B.1(1,2,3) (PSIA) (4) Function: Spray inbd valve 100 Relative 100 Ħ 11 11 Humidity(\$) (4) Accuracy: Reg'd: N/A Demon: Chemical N/A N/A (4) N/A N/A N/A Spray Category: A ... 2x10<sup>8</sup> 2.1x10<sup>7</sup> Radiation See Appx 1 Type Test None Service: RHR sys I (RAD) (4) Note 1 contmt 8 N/A Location: Aging (2)Appx 1 Note 2 None Flood Level Elev:552' N/A Above Flood Level: Yes N/A N/A Submergence N/A N/A (4) N/A No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Junk</u>



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# NEB-74-196A, APPENDIX 1, REVISION O

1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) . (3) Sheet No. NEB- 74-197 Facility: Browns Ferry Nuclear Plant , Revision 0 Unit: 2 10/27/80 50-259, 50-260, 50-296 Date Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION . Specifi-Specifi-Qualifi-Qualifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Residual heat See Appx 1 Operating 24 hours See Appx 1 1 year NCR removal Plant ID No. FCV-74-61 Time (1)Note 1 Note 2 BFNNEP8034 MPL #10-31A Figures Component: Motor Temperature (F) B.8(2,3) 250 F 11 Type test operator None (4). Manufacturer: Limitorque Table n . n  $B.1(1,2,\beta)$ 40 Ħ Model No.: SMB-2 Pressure (PSIA) (4) Function: Spray inbd 11 cont 100 100 Type test None Relative (4) Humidity(\$) Accuracy: NA Req'd: N/A N/A N/A Demon: Chemical N/A N/A (4) Spray Category: A 2x10<sup>8</sup> 2.1x10<sup>7</sup> ... See Appx 1 Type test None Radiation Note 1 RHR sys T Service: (RAD) (4) containment 11 8 Appx 1 note 2 (2) Location: Aging N/A N/A Flood Level Elev:552' N/A N/A N/A ·(4) N/A N/A Above Flood Level: Yes Submergence No Notes: (1) See Section 2.4 in 79-01B report. .

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

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

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

alex Mehribour Prepared by: Reviewed by:

QA Acceptance:

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# NEB-74-197, APPENDIX 1, REVISION 0

1. Limitorque test reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 71 1071 Facility: Browns Ferry Nuclear Plant Revision Unit: 1, 3 Date 10/27/80 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Contract 90744 & 91750 Qualifi-Qualifi-Specifi-Specification cation cation Parameter cation System: Residual heat Operating removal 1 year 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-74-61 (1)Time Note 1 Note 2 BFNNEB8034 MPL 10-31A -Component: Motor Temperature Figures (F) operator B.9(1) 250 F 11 Type test None B.9(2,3) (4) Manufacturer: Limitorque Table B.1(1,2,1) н. 40 11 11 Model No.: SMB-2 Pressure (4) (PSIA) Function: Spray inbd Relative 11 cont 100 100 Type test None (4) Humidity(\$) Accuracy: NA Req'd: Demon: Chemical N/A N/A (4) N/A N/A N/A Spray Category: A 2x10<sup>8</sup> 2.1x10<sup>7</sup> Radiation See Appx 1 Type test None Service: RHR sys I (RAD) (4) Note 1 containment 9 N/A (2)n Location: Aging Appx 1 note 2 Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence No

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>



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1. Limitorque test reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of 30 days is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, TVA's judgement, the Limitorque operation will adequately meet the operating time requirements.

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|----------------------------------------------------------------------------|-----------------------------------|-------------------------------|--------------------|--------------------|----------------------|---------------------------------------|----------------------|
| *                                                                          | :                                 | SYSTEM COMPON                 | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                                   |                      |
| Facility: Browns Ferry Nuclear                                             | • Plant                           | 1                             |                    |                    | . '                  | Sheet No. <u>NEB-71</u><br>Revision 0 | 1-198                |
| Docket: $50-259$ , $50-260$ , $50-2$                                       | 296                               |                               |                    |                    |                      | Date 10/27/0                          | 80                   |
| EQUIPMENT DESCRIPTION                                                      | E                                 | NVIRONMENT                    |                    | DOCUMENTAT         | TION REF             | QUALIFICATION<br>METHOD               | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                     | Parameter                         | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                       |                      |
| System: Residual heat<br>removal<br>Plant ID No. FIS-74-67<br>MPL # 10-12A | Operating<br>Time                 | 1 year                        | 6 hours.           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                  | NCR<br>BFNNEB8010    |
| Component: Diff pressure<br>indicating switch                              | Temperature<br>(F)                | Figures<br>B.4(1)<br>B.4(2,3) | 212 F              | (11)               | 37                   | See Appx 1<br>Note 3                  | 11                   |
| Barton                                                                     | _                                 | Table                         | 15                 | ·                  | n.                   | Type test                             | None                 |
| Model No.: 289A                                                            | Pressure<br>(PSIA)                | B.1(1,2,3)                    | A                  | (4)                |                      |                                       |                      |
| Function: Flow indication                                                  | Relative<br>Humidity( <b>\$</b> ) | 100                           | 100 .              | · (4)              | tt                   | 11                                    | 11                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                  | Chemical<br>Spray                 | Ń/A                           | :<br>N/A .         | (4)                | N/A                  | N/A                                   | N/A                  |
| Category: A<br>Service: RHR sys II                                         | Radiation<br>(RAD)                | 3x10 <sup>7</sup>             | 3x 10 <sup>6</sup> | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 4                  | NCR<br>BFNNEB8010    |
| Location: 4                                                                | Aging                             | N/A                           |                    | (2)                | -                    | Appx 1 Note 2                         | 'None                |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No       | Submergence                       | N/A                           | N/A                | (4)                | N/A                  | N/A                                   | N/A                  |

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

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

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

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

Prepared by: <u>Alex Mehichow</u> Reviewed by: <u>Charles</u> Juck



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- Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that an operating time of one year would create problems with the proper functioning of this device. Similarly, aging is not expected to adversely affect this device; however, the available information is inconclusive.
- 3. FIS-74-64 (unit 3) As a result of a HPCI HELB in compartment #1, the maximum temperature in compartment #5 will be 294° F for 30 seconds. The temperature will remain above 200° for only 60 seconds. Based on consideration of materials and heat transfer properties, it is reasonable to assume that the temperature spike will not adversely affect the switch.
- 4. In TVA's opinion, further modeling of the target area could reduce the radiation dose. The switches have capillary or "dead-ended" type instrument sensing lines which will not see the

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 $3 \times 10$  dose from the fluid but rather see a dose as a function of the distance from the radiation source. Also, the bypass valves FCV-74-30 and 7 can be manually operated by handswitches in the control room.

TVA will commit to a type testing or replacement program for this switch in order to ensure utilization of qualified equipment.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                             | Plant                   | System Compon                 | IENT EVALUATI(     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-74</u><br>Revision <u>0</u><br>Date <u>10/27/4</u> | - <u>199</u>         |
|---------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------------|----------------------|
| FOULTPMENT DESCRIPTION                                                    | E                       | NVIRONMENT                    |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                    | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                    | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                            |                      |
| System: Residual heat<br>removal<br>Plant ID No. FT-74-64<br>MPL # 10-109 | Operating<br>Time       | 1 year                        |                    | (1)                |                    | See Appx 1<br>Note 1                                                       | NCR<br>BFNNEB8012    |
| Component: Flow<br>transmitter<br>Manufacturer: CEMAG (CE)                | Temperature<br>(F)      | Figures<br>B.5(1)<br>B.5(2,3) |                    | (4)                |                    | į 1                                                                        | 11                   |
| Model No.: 50-555111BDAA3AAA                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           |                    | (4)                | •                  | n ,                                                                        | 11<br>,              |
| Function: Flow signal                                                     | Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | 11                                                                         | "                    |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                 | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                | N/A                                                                        | N/A                  |
| Category: A<br>Service: RHR sys II                                        | Radiation<br>(RAD)      | 3x10 <sup>7</sup>             |                    | (4)                | •                  | See Appx 1<br>Note 1                                                       | NCR<br>BFNNEB8012    |
| Location: 5                                                               | Aging                   | N/A                           |                    | (2)                |                    | 14                                                                         | 11                   |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                 | Submergence             | N/A                           | N/A                | (4)                | N/A                | N/A                                                                        | N/A                  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnikow Reviewed by: Charles Jurk

### NEB-74-199 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature ·     | <b>'</b> | - 185 <sup>0</sup> F              |
|-------------------|----------|-----------------------------------|
| Pressure ·        | -        | <ul> <li>Atmospheric</li> </ul>   |
| Relative Humidity | -        | Not Specified                     |
| Radiation         | _        | <ul> <li>Not Specified</li> </ul> |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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| Facility: Browns Ferry Nuclear                                         | • Plant                          | System Compoi                 | ENT EVALUATIO      | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 7</u> 1 |                      |
|------------------------------------------------------------------------|----------------------------------|-------------------------------|--------------------|--------------------|--------------------|----------------------------------|----------------------|
| Unit: 1,2,3                                                            | 2                                | -                             |                    |                    |                    | Revision 0                       | 80                   |
| EQUIPMENT DESCRIPTION                                                  | E                                | NVIRONMENT                    |                    | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD          | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                 | Parameter                        | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                  |                      |
| System: Residual heat removal<br>Plant ID No. PT-74-65<br>MPL # 10-105 | Operating<br>Time                | 1 year                        |                    | (1)                |                    | See Appx 1<br>lote 1             | NCR<br>BFNNEB8012    |
| Component: Pressure<br>transmitter<br>Manufacturer: GEMAC (GE)         | Temperature<br>(F)               | Figures<br>B.5(1)<br>B.5(2,3) |                    | (4)                |                    | u                                | × 11                 |
| Model No.: 50-551032EAAK1                                              | Pressure<br>(PSIA)               | Table<br>B.1(1,2,3)           | •                  | (4)                |                    | n .                              | 11                   |
| Function: Press level signal                                           | Relative<br>Humidity( <b>%</b> ) | 100                           |                    | · (4)              |                    | H                                | 11                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report              | Chemical<br>Spray                | N/A                           | N/A .              | (4)                | N/A                | N/A                              | N/A                  |
| Category: A<br>Service: RHR Sys II pressure                            | Radiation<br>(RAD)               | 3x 10 <sup>7</sup>            |                    | (4)                | •                  | See Appx 1<br>Note 1             | NCR<br>BFNNEB8012    |
| Location: 5                                                            | Aging                            | N/A                           |                    | (2)                |                    | ц                                | 11                   |
| Flood Level Elev:552' N/A<br>Above Flood'Level: Yes                    | Submergence                      | N/A                           | N/A                | (4)                | N/A                | N/A                              | N/A                  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnihow Prepared by: Reviewed by:

### NEB-74-200 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well'within the manufacturer's standard operating conditions in all areas except radiation.

- The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature       | - '-' 185 <sup>0</sup> F |  |
|-------------------|--------------------------|--|
| Pressure          | - Atmospheric            |  |
| Relative Humidity | - Not Specified          |  |
| Radiation         | - Not Specified          |  |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1\times10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Sheet No. NEB- 74-202 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 10/27/80 Docket: 50-259, 50-260, 50-296 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD **TTEMS** Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-. Parameter cation cation cation cation System: Residual heat Operating removal 1 year 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-74-67 (1)Time Note 1 Note 3 BFNNEB8034 MPL # 10-25 Component: Motor Temperature (F) operator Figure 250 F 11 See Appx 1 Ħ B.0(1,2,3)Note 2 Manufacturer: (4) Limitorque ... Figure 40 18 11 11 Model No.: SMB-4 Pressure B.0(1,2,3) (PSIA) (4) Function: Inbd recic loop cont. Relative 100 100 11 Type test None Humidity(\$) (4) Accuracy: Req'd: N/A Demon: Chemical N/A N/A N/A (4) N/A N/A Spray Category: A 2x10<sup>8</sup> ¥ 4x10<sup>9</sup> \$ 2x10<sup>8</sup> Y See Appx 1 Radiation See Appx 1 None Service: RHR sys (RAD) Note 1 Note 4 (4) II 0 Location: Aging N/A (2)Appx 1 Note 3 None ' Flood Level Elev:552' N/A N/A х N/A Above Flood Level: Yes N/A · N/A Submergence N/A (4) 565 No

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

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

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

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

alex Mehrikow Prepared by: harles V Reviewed by:

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#### NEB-74-202, APPENDIX 1, REVISION 0

- 1. Limitorque test reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand 325° F for five minutes followed by a gradual decline to 250° F after one hour without allowing the motor temperature and internals to exceed 280° F. This particular type operator (Class B insulation) was successfully tested to 250° F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to 280° F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.

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|-------------------------------------------------------------------------------|----------------------------------|---------------------------------------------|--------------------|--------------------|--------------------|------------------------------------------------------------------------------------------|---------------------------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant<br>96                      | SYSTEM COMPON                               | IENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-</u> 7 <sup>1</sup><br>Revision <u>0</u><br>Date <u>10/27</u> /3 | 4–203<br>                             |
| EQUIPMENT DESCRIPTION                                                         | E                                | NVIRONMENT                                  |                    | DOCUMENTAT         | TION REF           | QUALIFICATION                                                                            | OUTSTANDING                           |
| Contract 90744 & 91750                                                        | Parameter                        | Specifi-<br>cation                          | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                                          | , , , , , , , , , , , , , , , , , , , |
| System: Residual heat<br>removal<br>Plant ID No. FT-74-70<br>MPL # 10-111     | Operating<br>Time                | 1 year                                      | -                  | (1)                |                    | See Appx 1<br>Note 1                                                                     | NCR<br>BFNNEB8012                     |
| Component: Flow<br>transmitter                                                | Temperature<br>(F)               | Figures<br>B.5(1)<br>B.5(2 3)               |                    | (11)               |                    | li ,                                                                                     | tt                                    |
| GEMAC (GE)                                                                    |                                  | <i>m</i> . <i>y</i> ( <i>z</i> , <i>y</i> ) |                    | (4)                |                    |                                                                                          |                                       |
| Model No.: 50-555111BDAA3AAA                                                  | Pressure<br>(PSIA)               | B.1(1,2,3)                                  |                    | (4)                | •                  |                                                                                          |                                       |
| Function: Flow signal                                                         | Relative<br>Humidity(\$)         | 100                                         |                    | (4)                |                    | 11                                                                                       | 11                                    |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                     | Chemical<br>Spray                | N/A                                         | N/A                | (4)                | N/A                | N/A                                                                                      | N/A                                   |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> sys II containme            | Radiation<br><sup>nt</sup> (RAD) | 3x 10 <sup>7</sup>                          |                    | (4)                | •                  | See Appx 1<br>Note 1                                                                     | NCR<br>BFNNEB8012                     |
| Location: 5                                                                   | Aging                            | N/A                                         |                    | (2)                |                    | u                                                                                        | <i>L</i> (                            |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence                      | - N/A                                       | N/A                | (4)                | N/A                | N/A                                                                                      | N/A                                   |

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

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- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melmikow Reviewed by: Charles Junk



# NEB-74-203 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
  - 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature · · · | '- <sup></sup> 185 <sup>0</sup> F |
|-------------------|-----------------------------------|
| Pressure          | - Atmospheric                     |
| Relative Humidity | - Not Specified                   |
| Radiation .       | - Not Specified                   |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-1 of the DOR Guidelines - 79-018.

These devices are located in a low radiation zone (less than  $2x10^4$ ), with an accident dose of only  $6x10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 74-204 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 10/27/80 Date 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING . METHOD \* ITEMS EQUIPMENT DESCRIPTION Qualifi-Qualifi-Specifi-Contract 90744 & 91750 Specification cation cation Parameter cation Residual Heat System: Removal Operating 1 year 24 hours See Appx 1 See Appx 1 NCR Plant ID No. FCV-74-71 (1)Time Note 1 Note 2 BFNNEB8034 MPL # 10-39B Component: Motor Temperature .... Figure operator 250 F (F) 11 Type Test None  $B_{0}(1)$ B.6(2,3) Manufacturer: Limitorque (4) . . Table 40 н. 11 Ħ B.1(1,2,3) Model No.: SMB-2 Pressure (4) (PSIA) Function: RHR Supp. Pool 100 100 8 11 Relative 11 Humidity(\$) (4) Accuracy: Req'd: N/A Demon: Chemical N/A N/A (4) N/A N/A N/A Spray · Category: A 2x10<sup>8</sup> 3.1x10<sup>7</sup> See Appx 1 Type Test Radiation None Service: Water (4) Note 1 (RAD) 6 (2) Appx 1 Note 2 Location: Aging -N/A None Flood Level Elev:552' N/A N/A . N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

| Prepared by: | alex Melnikow |
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| Reviewed by: | Charles Turk  |

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# NEB-74-204, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, \$600198

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2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | r Plant<br>296          | System Compoi                | VENT EVALUATIO     | on work sheet      | (Rev 2)              | (3)<br>Sheet No. <u>NEB-74</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | - <u>205</u><br>80 |
|-------------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|---------------------------------------------------------------------------|--------------------|
| FOULTPMENT DESCRIPTION                                                        | E                       | NVIRONMENT                   |                    | DOCUMENTA          | TION REF             | QUALIFICATION                                                             | OUTSTANDING        |
| Contract 90744 & 91750                                                        | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | HEIHOD                                                                    |                    |
| System: Residual heat<br>removal<br>Plant ID No. FCY-74-74<br>MPL # 10-26     | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                      | NCR<br>BFNNEB8034  |
| Component: Motor<br>operator<br>Manufacturer:                                 | Temperature<br>(F)      | Figure<br>B.9(1)<br>B.9(2,3) | 250 F              | (4)                | 11                   | Type test                                                                 | None .             |
| Model No.: SMB-2                                                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | - (4)              | н _                  | Type test                                                                 | None               |
| Function: Spray outbd<br>cont.                                                | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   | 11                                                                        | H<br>,             |
| Accuracy:<br>Req'd: N/A<br>Demon:                                             | Chemical<br>Spray       | N/A                          | N/A .              | (4)                | N/A                  | N/A                                                                       | N/A ·              |
| Category: A<br>Service: RHR Sys                                               | Radiation<br>(RAD)      | 2.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                                                                 | None               |
| Location: 9                                                                   | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 2                                                             | None               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                                                                       | N/A                |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: abex Melinhow Reviewed by: Charles - Turk



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### NEB-74-205, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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|-------------------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|----------------------|---------------------------------------------------------------------------|---------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant                    | System Compo                 | NENT EVALUATIC     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-71</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | 1- <u>206</u><br>80 |
| FOULTPMENT DESCHIPTION                                                        | E                        | NVIRONMENT                   |                    | DOCUMENTAT         | TION REF             | QUALIFICATION                                                             | OUTSTANDING         |
| Contract 90744 & 91750                                                        | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                           |                     |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-75<br>MPL # 10-31B    | Operating<br>Time        | 1 years                      | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                      | NCR<br>BFNNEB8034   |
| Component: Motor<br>operator<br>Manufacturer:                                 | Temperature<br>(F)       | Figure<br>B.9(1)<br>B.9(2,3) | - 250 F            | (4)                | 11                   | Type test                                                                 | None                |
| Model No.: SMB-2                                                              | Pressure<br>(PSIA)       | Table<br>B.1(1,2,3)          | 40                 | (4)                | Π,                   | Type test                                                                 | None                |
| Function: Spray inbd<br>cont                                                  | Relative<br>Humidity(\$) | 100                          | 100                | (4)                | 11                   | 11                                                                        | 11                  |
| Accuracy:<br>Req*d: N/A<br>Demon:                                             | Chemical<br>Spray        | N/A                          | N/A                | ( <u>4</u> )       | N/A -                | N/A                                                                       | N/A                 |
| Category: A<br>Service: RHR SyS II                                            | Radiation<br>(RAD)       | 2.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | Šee Appx 1<br>Note 1 | Type Test                                                                 | None                |
| Location: 9                                                                   | Aging                    | N/A                          |                    | (2)                | -                    | Appx 1 Note 2                                                             | None ·              |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence              | N/A                          | ,<br>N/A           | (4)                | N/A                  | N/A                                                                       | ` N/A               |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnihow Reviewed by: Charles 7 us

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1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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|---------------------------------------------------------------------------|-------------------------|--------------------------------|--------------------|--------------------|----------------------|----------------------------------------------------------------------------------------|----------------------|
| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259 50-260 50- | r Plant                 | System Compon                  | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB- 7<sup>1</sup></u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | I-207<br>30          |
| FOULTPMENT DESCRIPTION                                                    | E                       | NVIRONMENT                     |                    | DOCUMENTATION REF  |                      | QUALIFICATION                                                                          | OUTSTANDING<br>TTEMS |
| Contract 90744 & 91750                                                    | Parameter               | Specifi-<br>cation             | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                                        | ,                    |
| System: Residual heat<br>removal<br>Plant ID No. FCV-74-77<br>MPL # 10-33 | Operating<br>Time       | 1 year                         | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                                   | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                  | Temperature<br>(F)      | Figure<br>B.12(1)<br>B.12(2,3) | 250 F              | (4)                | Η.                   | Type test                                                                              | None                 |
| Model No.: SMB-00                                                         | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)            | 40                 | (4)                | H .                  | Type test                                                                              | None                 |
| Function: Outbd isol<br>valve                                             | Relative<br>Humidity(%) | 100                            | 100 .              | (4)                | 11                   | 11                                                                                     | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                         | Chemical<br>Spray       | N/A                            | NZA .              | (4)                | N/A                  | N/A                                                                                    | N/A                  |
| Category: <sup>A</sup><br>Service: Reactor head                           | Radiation<br>(RAD)      | 3.1x10 <sup>4</sup>            | 2x <u>10</u> 8     | (4)                | Sée Appx 1<br>Note 1 | Type Test                                                                              | None                 |
| Location: 12                                                              | Aging                   | N/A                            |                    | (2)                |                      | Appx 1 Note 2                                                                          | None                 |

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

No

Flood Level Elev:552'

Above Flood Level: Yes

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

N/A

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

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

Submergence

N/A

ł/A

Prepared by: <u>Alex Melnikou</u> Reviewed by: <u>C. harles</u> - Junk

N/A

NŻA

QA Acceptance:

N/A

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## NEB-74-207, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 74-208 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF ENVIRONMENT QUAL IFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Qualifi-Specifi-Specifi-Contract 90744 & 91750 cation cation Parameter cation cation System: Residual heat Operating See Appx 1 NCR 1 vear 24 hours Sec Appx 1 removal (1)Time Plant ID No. FCV-74-78 Note 1 Note 3 BFNNEB8034 MPL #10-32 Component: Motor Temperature Figures (F) B.0(1,2,8) 11 11 250 F See Appx 1 operator Note 2 (4) Manufacturer: Limitorque Table B.1(1,2,8)н , ... 11 40 Model No.: SMB-09 Pressure (4) (PSIA) Function: Inbd isol 11 100 100 valve Relative Type test None (4)Humidity(\$) Accuracy: NA Reg'd: < N/A N/A Demon: N/A N/A (4) N/A Chemical Spray Category: A 2x10<sup>8</sup> ¥ 2x10<sup>8</sup> В 4x10<sup>9</sup> See Appx 1 See Appx 1 None Radiation Service: Reactor head • Note 4 Note 1 '(RAD) (4) sprav 11 · Appx 1 Note 3 0 (2) Aging N/A Location: Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes х N/A N/A (4) Submergence 6211 No

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

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

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

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

Prepared by: <u>Aulos</u> - Jule



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#### NEB-74-208, APPENDIX 1, REVISION O

- 1. Limitorque test reports #600198, B-0027, and B-0003
- 2. Although this specific type operator (with Class B insulation) was not tested to the postulated pressure for the accident environment, in TVA's engineering judgement the operator would not be adversely affected by such pressure. Other Limitorque operators with identical housing designs (hermetically sealed, with double O-rings) have been tested successfully to pressures in excess of 80 psia.

Likewise, this particular model operator was not tested to the postulated temperature for the accident environment; however, as shown in Limitorque report B-0027, Limitorque motor housings have sufficient thermal inertia to withstand  $325^{\circ}$  F for five minutes followed by a gradual decline to  $250^{\circ}$  F after one hour without allowing the motor temperature and internals to exceed  $280^{\circ}$  F. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$  F for 24 hours. In TVA's engineering judgement, the operators with Class B insulation could tolerate this period of overheating to  $280^{\circ}$  F (about 50 minutes) without adverse effects on the proper functioning of the motor operator. Otherwise, the tests for Limitorques with Class B insulation exceed the accident temperature profile.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). In TVA's engineering judgement, this Limitorque operator is not adversely affected by aging considerations.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. The effects of beta radiation is insignificant; see 4.1.4 of the report.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259 50-260 50- | r Plant<br>296           | System Compo                  | NENT EVALUATI      | ON WORK SHEFT      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-7</u><br>Revision <u>0</u><br>Date <u>10/27</u> / | 1 <b>-2</b> 09    |
|---------------------------------------------------------------------------|--------------------------|-------------------------------|--------------------|--------------------|--------------------|---------------------------------------------------------------------------|-------------------|
| CONTRACT DESCRIPTION                                                      | E                        | NVIRONMENT                    |                    | DOCUMENTA          | TION REF           | QUALIFICATION                                                             | OUTSTANDING       |
| Contract 90744 & 91750                                                    | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                           |                   |
| System: Residual Heat<br>Removal<br>Plant ID No. Appendix 1<br>Note 1B    | Operating<br>Time        | 1 year                        |                    | (1)                |                    | Appendix 1<br>Note 2                                                      | NCR<br>BFNNEB8015 |
| Component: Temperature<br>Element<br>Manufacturer: Colimetic              | Temperature<br>(F)       | Figures<br>B.8(1)<br>B.8(2,3) |                    | (4)                |                    | 11                                                                        | 11                |
| Model No.: 158B7061P016<br>(GE Part No.)                                  | Pressure<br>(PSIA)       | Table<br>B.8(1,2,3)           |                    | <br>(4)            |                    | 11                                                                        | 11                |
| Function: Outlet Temp.<br>Meas.                                           | Relative<br>Humidity(\$) | 100                           | 1                  | (4)                |                    | 21                                                                        | 11                |
| Accuracy:<br>Req'd:<br>Demon:                                             | Chemical<br>Spray        | N/A                           | N/A .              | (4)                | ,N/A               | N/A .                                                                     | N/A               |
| Category: A<br>Service: RHR HTX A                                         | Radiation<br>(RAD)       | 3x10 <sup>7</sup>             |                    | (4)                |                    | Appendix 1<br>Note 2                                                      | NCR<br>BFNNEB8015 |
| Location: 8.                                                              | Aging                    | N/A                           |                    | (2)                |                    | Appx 1 Note 2                                                             | 11                |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No      | Submergence              | N/A                           | N/A                | (4)                | N/A                | N/A                                                                       | N/A               |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:

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## NEB-74-209, APPENDIX 1, REVISION 0

- This sheet applies to items TE-74-81, MPL #10-116A 1. TE-74-82, MPL #10-116B TE-74-83, MPL #10-116C TE-74-84, MPL #10-116D
- 2. To date TVA has yet to receive any information on these items. Vendor drawings and materials information are still being actively sought through several sources, thus analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.



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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant                   | SYSTEM COMPO                  | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 71</u><br>Revision <u>0</u><br>Date <u>10/27/</u> 4 | 1-210<br>80          |
|-------------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|------------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                         | E                       | NVIRONMENT                    |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                      | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                        | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                              |                      |
| System: Residual heat<br>removal<br>Plant ID No. PT-74-94<br>MPL # 10-113     | Operating<br>Time       | 1 year                        |                    | (1)                |                    | See Appx 1<br>Note 1                                                         | NCR<br>BFNNEB8012    |
| Component: Pressure<br>transmitter                                            | Temperature<br>(F)      | Figures<br>B.6(1)<br>B.6(2,3) |                    | (4)                |                    | 11                                                                           | 11                   |
| GEMAC (GE)<br>Model No.: 551032GAAN1                                          | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           |                    | ·<br>(4)           |                    | n                                                                            | 11                   |
| Function: Low press signal                                                    | Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | 11                                                                           | 11                   |
| Accuracý:<br>Req'd: See Section<br>Demon: 4.1.3 in report                     | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                | N/A                                                                          | N/A                  |
| Category: A<br>Service: Supp pool disch head                                  | Radiation<br>er(RAD)    | 3.1x10 <sup>7</sup>           |                    | (4)                |                    | See Appx 1<br>Note 1                                                         | NCR<br>BFNNEB8012    |
| Location: 6                                                                   | Aging                   | N/A                           |                    | (2)                |                    |                                                                              |                      |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence             | N/A .                         | N/A                | (4)                | N/A                | N/A                                                                          | N/A                  |

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

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

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

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

Prepared by: <u>Alex Melnikoce</u> Reviewed by: Charles -

## NEB-74-210 Appendix 1 Revision 0

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature <sup>.</sup> | - 185 <sup>0</sup> F |
|--------------------------|----------------------|
| Pressure ·               | - Atmospheric        |
| Relative Humidity        | Not.Specified        |
| Radiation                | - Not Specified      |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-l of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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| <u>.</u>                                                  |                         |                     | *                  |                    |                      |                                       |                   |
|-----------------------------------------------------------|-------------------------|---------------------|--------------------|--------------------|----------------------|---------------------------------------|-------------------|
|                                                           | 2                       | System Compon       | IENT EVALUATIO     | ON WORK SHEET      | (Rev 2)              | (3)                                   |                   |
| Facility: Browns Ferry Nuclear                            | • Plant                 |                     |                    |                    |                      | Sheet No. NEB- 74                     | -211              |
| Unit: 1,2,3                                               | 206                     | łr                  |                    |                    |                      | Revision $0$                          | 0                 |
| Docket: 50-259, 50-260, 50-2                              | 290<br>F                | NVTRONMENT          |                    | DOCUMENTA          | TION REF             | QUALIFICATION                         | OUTSTANDING       |
| EQUIPMENT DESCRIPTION                                     |                         |                     |                    |                    |                      | METHOD                                | 1 TEMS            |
| Contract 90744 & 91750                                    | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                       |                   |
| System: RHR                                               |                         |                     |                    |                    |                      |                                       |                   |
| Plant ID No. See Appx 1<br>Note 1                         | Operating<br>Time       | 1 year              |                    | (1)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 5                  | NCR<br>BFNNEB8008 |
| Component: RHR pump<br>motor                              | Temperature<br>(F)      | Figures<br>B.5(1)   | 292 F              |                    | 11                   | Generic test                          | None              |
| Manufacturer: General Electri                             | c                       | B.5(2,3)            |                    | (4)                |                      | · · · · · · · · · · · · · · · · · · · |                   |
| Model No.: 5K6348XC23A                                    | Pressure                | Table<br>B.1(1,2,3) | 14.7               | ••                 | Π,                   | See Appx 1<br>Note 3                  | 19                |
| B                                                         | (PSIA)                  |                     |                    | (4)                |                      |                                       |                   |
| Function: Pump motor                                      | Relative<br>Humidity(%) | 100                 | 100                | (4)                | 11                   | Experience &<br>Humidity testin       | "<br>g            |
| Accuracy:<br>Req'd: See Section<br>Demon:                 | Chemical<br>Sprav       | N/A                 | N/A _              | 、 (4)              | N/A                  | N/A                                   | 'N/A              |
| Category: A<br>Sorvice: RHR                               | Radiation               | 3x10 <sup>7</sup>   | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 2 | Generic test                          | None              |
| Pumps                                                     |                         | ·    ·              | ·····              | (1)                |                      |                                       |                   |
| Location: 5                                               | Aging                   | N/A                 |                    | (2)                |                      | Appx 1 Note 4                         |                   |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No | Submergence             | N/A                 | N/A                | (4)                | N/A                  | N/A                                   | N/A               |
|                                                           | 040                     |                     |                    |                    |                      |                                       | A                 |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Junk</u>

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1. This sheet applies to the following items:

RHR Pump 1B, -1D, -2B, -2D, -3B, -3D (All MPL #10-3)

- Topical Report of GE Vertical Induction Motors for Class IE Intake Cooling Pumps for St. Lucie Nuclear Power Plant Unit 2, revision 2, 8/31/79 (FF #103). This test is applicable to generic GE model 5K6 series.
- 3. Based on a factory production test. It is TVA's opinion that the 0.3 psia difference between the required and tested conditions is insignificant and will not adversely affect the proper functioning of the motor.
- 4. In TVA's engineering judgement, this motor is not adversely affected by aging considerations.
- 5. Although further evaluation is necessary to determine the qualified operating times, it is TVA's opinion that the GE motor will adequately meet the operating time requirements.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3       | Plant                    | SYSTEM COMPON                 | NENT EVALUATIO     | ON WORK SHEFT      | (Rev 2)              | (3)<br>Sheet No. <u>NEB- 74</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> | -212                 |
|-----------------------------------------------------|--------------------------|-------------------------------|--------------------|--------------------|----------------------|-----------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                               | Ē                        | NVIRONMENT                    | ٩                  | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                                                     | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                              | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                             | ä                    |
| System: RHR<br>Plant ID No. See Appx 1<br>Note 1    | Operating<br>Time        | 1 year                        |                    | (1)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 5                                                        | NCR<br>BFNNEB8008    |
| Component: RHR pump<br>motor<br>Manufacturer:       | Temperature<br>(F)       | Figures<br>B.2(1)<br>B.2(2,3) | 292 F              | (4)                | 12 -                 | Generic test                                                                | None                 |
| General Flectri<br>Model No.: 5K6348XC23A           | Pressure<br>(PSIA)       | Table<br>B.1(1,2,3)           | 14.7               | (4)                | ".                   | See Appx 1<br>Note 3                                                        | łt                   |
| Function: Pump motor                                | Relative<br>Humidity(\$) | 100                           | 100                | (4)                | 11                   | Experience &<br>Humidity testin                                             |                      |
| Accuracy:<br>Req'd: See Section<br>Demon:           | Chemical<br>Spray        | N/A                           | N/A                | - (4)              | - N/A                | N/A                                                                         | N/A                  |
| Category: A<br>Service: RHR                         | Radiation (RAD)          | 3x 10 <sup>7</sup>            | 2x 10 <sup>8</sup> | (4)                | See Appx 1<br>Note 2 | Generic test                                                                | None                 |
| Pumps<br>Location: <sup>2</sup>                     | Aging                    | N/A                           |                    | (2)                |                      | Appx 1 Note 4                                                               |                      |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes | Submergence              | N/A                           | N/A                | (4)                | N/A                  | N/A                                                                         | N/A                  |

No Notes: (1) See Section 2.4 in 79-01B report.

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melnihow - Railes -Reviewed by: (

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.1. This sheet applies to the following items:

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RHR Pump 1A, 1C, 2A, 2C, 3A, 3C (all MPL #10-3)

- Topical Report of GE Vertical Induction Motors for Class IE Intake Cooling Pumps for St. Lucie Nuclear Power Plant Unit 2, revision 2, 8/31/79 (FF #103). This test is applicable to generic GE model 5K6 series.
- 3. Based on a factory production test. It is TVA's opinion that the 0.3 psia difference between the required and tested conditions is insignificant and will not adversely affect the proper functioning of the motor.
- 4. In TVA's engineering judgement, this motor is not adversely affected by aging considerations.
- 5. Although further evaluation is necessary to determine the qualified operating times, it is TVA's opinion that the GE motor will adequately meet the operating time requirements.

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ţ SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-74-213 Facility: Browns Ferry Nuclear Plant Revision 0 1.2.3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF QUALIFICATION ENVIRONMENT OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 cation Parameter cation cation cation System: Residual heat removal Operating 1 year Appx 1 NCR (1) Plant ID No. TE-74-95A Time Note 1 BFNNEB8022 MPL #10-98 Component: Temperature Temperature Figure Element (F) 11 -18 B.2(1,2,3) . Manufacturer: Scam (4) 11 Table 11 Model No.: S51-1 B.1(1,2,3) Pressure (PŠIA) (4) Function: Line s 100 11 11 leakage Relative (4) Humidity(%) Accuracy: Req'd: See section 4.1.3 N/A N/A Demon: Chemical N/A N/A (4) N/A Spray Category: A 3x 10<sup>7</sup> . Appx 1 NCR Radiation Service: RHR steam Note 1 BFNNEB8022 (RAD) (4) 2 ` Appx 1 Note 1 н (2) N/A Location: Aging N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) llo

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

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

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

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

Prepared by: alex Melnibour Reviewed by: Charles Junk

QA Acceptance:\_\_\_\_\_

## NEB-74-213, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the magufacturer rates this resistive thermal detector at 100 psi and 500 F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-74-213A Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: QUALIFICATION OUTSTANDING DOCUMENTATION REF . ENVIRONMENT METHOD **TTEMS** EQUIPMENT DESCRIPTION Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Residual heat Operating Appx 1 NCR removal 1 year (1)Note 1 BFNNEB8022 Plant ID No. TE-74-95B Time MPL #10-98 Component: Temperature Temperature 11 IT Element Figure (F) B.5(1,2,3) Manufacturer: Scam (4) • .. 11 11 Table Model No.: S51-1 B.1(1,2,3) Pressure (4) (PSIA) Function: Line 11 100 11 leakage Relative (4) Humidity(\$) Accuracy: See section Req.'d: Demon: 4.1.3 N/A N/A N/A (4) Chemical N/A N/A Spray А Category: 3×10<sup>7</sup> Appx 1 NCR Radiation RHR steam Note 1 BFNNEE8022 (4) Service: (RAD) n 5 Appx 1 Note 1 Location: N/A (2) Aging Flood Level Elev:552' N/A

N/A

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

No

Above Flood Level: Yes

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

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

Submergence

N/A

Prepared by: alex Melnihow hailos -Reviewed by: (

N/A

N/A

QA Acceptance:

N/A

(4)

## NEB-74-213A, APPENDIX 1, REVISION O

Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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| · .                                                                          |                         | System Compon        | IENT EVALUATIO                         | ON WORK SHEFT      | (Rev 2)            | (J)<br>Sheat No NER 71  | _213R                |
|------------------------------------------------------------------------------|-------------------------|----------------------|----------------------------------------|--------------------|--------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclean                                               | r Plant                 |                      |                                        |                    |                    | Revision 0              |                      |
| 50-259 $50-260$ $50-260$                                                     | 296                     |                      | ч.                                     |                    | 2                  | Date 10/27/8            | 10                   |
| FOUTPMENT DESCRIPTION                                                        | E                       | NVERONMENT           | ×                                      | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                       | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation                     | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. TE-74-95(C,D)<br>MPL #10-98 | Operating<br>Time       | 1 year               |                                        | (1)                |                    | Appx 1<br>Note 1        | NCR<br>BFNNER8022    |
| Component: Temperature<br>Element                                            | Temperature<br>(F)      | Figure<br>B.8(1,2,3) | ~                                      |                    |                    | H                       | n                    |
| Manufacturer: <sub>Scam</sub>                                                |                         |                      | ,<br>,                                 | (4)                |                    |                         |                      |
| Model No.: S51-1                                                             | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                                        | (4)                |                    | n                       | 11                   |
| Function: Line<br>leakage                                                    | Relative<br>Humidity(%) | 100                  | •                                      | (4)                |                    | 11                      | 11                   |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                              | Chemical<br>Spray       | N/A .                | N/A                                    | (4)                | N/A                | . N/A                   | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> steam                      | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>   |                                        | (4)                | ,                  | Appx 1<br>Note 1        | NCR<br>BFNNEB8022    |
| Location: 8                                                                  | Aging                   | N/A                  | ······································ | (2)                |                    | Apox 1 Note 1           | 11                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No         | Submergence             | NZA                  | N/A                                    | (4)                | N/A                | N/A                     | N/A                  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melinbow Prepared by: Reviewed by: Charles Jun



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## NEB-74-213B, APPENDIX 1, REVISION O

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.



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| Facility: Browns Ferry Nuclea<br>Unit: 1.2.3                                 | r Plant                 | SYSTEM COMPON         | ENT EVALUATI       | on work sheft      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-7<sup>1</sup></u><br>Revision <u>0</u> | 1-2130            |
|------------------------------------------------------------------------------|-------------------------|-----------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------|-------------------|
| Docket: 50-259, 50-260, 50-                                                  | 296<br>E                | NVIRONMENT            |                    | DOCUMENTA          | TION REF           | Date 10/27/<br>QUALIFICATION                                   | 80<br>OUTSTANDING |
| Contract 90744 & 91750                                                       | Parameter               | Specifi-<br>cation    | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                | 111.05            |
| System: Residual heat<br>removal<br>Plant ID No. TE-74-95(E,F)<br>MPL #10-98 | Operating<br>Time       | 1 vear                |                    | (1)                |                    | Appx 1<br>Note 1                                               | NCR<br>BFNNER8022 |
| Component: Temperature<br>Element                                            | Temperature<br>(F)      | Figure<br>B.12(1,2,3) |                    |                    |                    | 11                                                             | IT                |
| Manufacturer: Scam                                                           | -                       | ,                     |                    | (4)                |                    |                                                                |                   |
| Model No.: S51-1                                                             | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)   |                    | (4)                | -                  | n<br>-                                                         | 11                |
| Function: Line<br>leakage                                                    | Relative<br>Humidity(%) | 100                   | r                  | (4)                |                    | 11                                                             | " .               |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                              | Chemical<br>Spray       | N/A                   | N/A                | (4)                | N/A                | N/A                                                            | N/A               |
| Category: <sup>A</sup><br>Service: <sup>RHR</sup> steam                      | Radiation<br>(RAD)      | 3.1x10 <sup>4</sup>   |                    | (4)                |                    | Appx 1<br>Note 1                                               | NCR<br>BFNNEB8022 |
| Location: <sup>12</sup>                                                      | Aging                   | N/A                   |                    | (2)                |                    | Appx 1 Note 1                                                  | 11                |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                    | Submergence             | N/A                   | N/A                | (4)                | N/A                | N/A                                                            | N/A               |

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

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

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

| Prepared by: | alex Melnihow |   |
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| Reviewed by: | Charles Junk  | , |

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## NEB-74-213C, APPENDIX 1, REVISION 0

1. Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3                                  | r Plant                 | System Compon        | IENT EVALUATIO     | DN WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-74</u><br>Revision <u>0</u> | -213D             |
|--------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|-----------------------------------------------------|-------------------|
| Docket: 50-259, 50-260, 50-2                                                   | 296<br>T F              | NVTRONMENT           |                    | DOCUMENTAT         | TON REF            |                                                     | OUTSTANDING       |
| EQUIPMENT DESCRIPTION                                                          |                         |                      |                    |                    |                    | METHOD                                              | ITEMS             |
| Contract 90744 & 91750                                                         | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                     |                   |
| System: Residual heat<br>removal<br>Plant ID No. TE-74-95(G,H)<br>* MPL #10-98 | Operating<br>Time       | 1 year               |                    | (1)                | -                  | Appx 1<br>Note 1                                    | NCR<br>BFNNEB8022 |
| Component: Temperature<br>. Element                                            | Temperature<br>(F)      | Figure<br>B.6(1,2,3) |                    |                    |                    | ŧŧ                                                  | 11                |
| Manufacturer: Scam                                                             |                         | -                    |                    | (4)                |                    |                                                     | <i>x</i>          |
| ار<br>•                                                                        |                         | Table                |                    |                    | -                  | 11                                                  | 11                |
| Model No.: S51-1                                                               | Pressure<br>(PSIA)      | B.1(1,2,3)           |                    | (4)                |                    |                                                     |                   |
| Function: Line<br>leakage                                                      | Relative<br>Humidity(%) | 100                  |                    | (4)                |                    | n                                                   | 11 -              |
| Accuracy:<br>Req'd: See section<br>Demon: 4.1.3                                | Chemical<br>Spray       | N/A                  | N/A                | (4)                | N/A                | N/A                                                 | N/A               |
| Category: A<br>Service: RHR steam .                                            | Radiation<br>(RAD)      | 3.1×10 <sup>7</sup>  |                    | (4)                |                    | Appx 1<br>Note 1                                    | NCR<br>BFNNEB8022 |
| Location: 6                                                                    | Aging -                 | N/A                  |                    | (2)                |                    | Appx 1 Note 1                                       | 11                |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No           | Submergence             | N/A                  | N/A                | ,<br>(4)           | N/A                | N/A .                                               | N/A               |

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles July</u>



## NEB-74-213D, APPENDIX 1, REVISION 0

 Test data has not been obtained to date; however, the manufacturer rates this resistive thermal detector at 100 psi and 500° F without a thermowell. The device is installed with a weatherproof head, so humidity should not be a problem. A materials consideration does not reveal any parts likely to fail under radiation exposure.

This equipment is believed to be qualified, thus TVA will type test this resistive thermal detector and/or replace if required.

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|                                                           | *                       | System Compoi                | NENT EVALUATIO     | N WORK SHEET        | (Rev 2)              | (3)                                          | •                    |
|-----------------------------------------------------------|-------------------------|------------------------------|--------------------|---------------------|----------------------|----------------------------------------------|----------------------|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3             | Plant                   |                              | ·                  |                     | •                    | Sheet No. <u>NEB-75</u><br>Revision <u>0</u> |                      |
| Docket: 50-259, 50-260, 50-2                              | 296                     |                              |                    |                     |                      | Date 10/27/                                  | 80                   |
| EQUIPMENT DESCRIPTION                                     | , E                     | NVIRONMENT                   |                    | DOCUMENTATION . REF |                      | QUALIFICATION<br>METHOD                      | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                    | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation  | Qualifi-<br>cation   |                                              | ·····                |
| System: Core spray<br>Plant ID No. Appx 1<br>Note 4       | Operating<br>Tíme       | 1 year                       | 24 hours           | (1)                 | See Appx 1<br>Note 1 | See Appx 1<br>Note 3 ·                       | ncr<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer:             | Temperature<br>(F)      | Figure<br>B.3(1)<br>B.3(2,3) | 250 F              | (4)                 | U                    | See Appx 1<br>Note 2                         | 11                   |
| Model No.: SMB-0                                          | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40 .               | (4)                 | , I <b>I</b>         | Type test                                    | None                 |
| Function: CS pump "A"<br>Suction Valve                    | Relative<br>Humidity(%) | 100                          | 100                | (4)                 | 11                   | 11 -                                         | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                         | Chemical<br>Spray       | N/A                          | N/A                | (4)                 | N/A                  | N/A .                                        | N/A                  |
| Category: A<br>Service: Water                             | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>           | -2x10 <sup>8</sup> | (4)                 | See Appx 1<br>Note 1 | Type Test                                    | None ·               |
| ocation: 3                                                | Aging                   | N/A                          |                    | . (2)               |                      | Appx 1 Note 3                                | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No | Submergence             | N/A                          | N/A                | (4)                 | N∕A                  | N/A                                          | N/A                  |

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

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

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

Prepared by: alex Melnikow Reviewed by: Charles Flerk

### NEB-75-214, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 297°F in 25 seconds 1 and is 162°F in 120 seconds for unit 1 and 160 F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

4. This sheet applies to the following FCV-75-Z MPL # 14-7 FCV-75-11 "

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| ,                                                               |                         | SYSTEM COMPO         | NENT EVALUATI                 | on work sheet      | (Rev 2)            | · (3)                   |                       |
|-----------------------------------------------------------------|-------------------------|----------------------|-------------------------------|--------------------|--------------------|-------------------------|-----------------------|
| Facility: Browns Ferry Nuclea                                   | ar Plant                |                      |                               |                    |                    | Sheet No. NEB           |                       |
| Unit: 1,2,3                                                     | r                       |                      |                               |                    |                    | Revision 0              | •                     |
| Docket: 50-259, 50-260, 50-                                     | -296 -                  |                      |                               |                    |                    | Date 10/27/             | 80                    |
| EQUIPMENT DESCRIPTION                                           | E                       | NVIRONMENT           |                               | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>TTEMS  |
| Contract 90744 & 91750                                          | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation            | Specifi-<br>cation | Qualifi-<br>cation |                         |                       |
| System: Core spray<br>Plant ID No. PS-75-7 ,-16<br>MPL #14-442B | Operating<br>Time       | 1 year               |                               | (1)                |                    | See Appx 1<br>Note 1    | See NCR<br>5FNNEB8021 |
| Component: Pressure<br>Switch                                   | Temperature<br>(F)      | Figure<br>B.3(1,2,3) | ·····                         |                    |                    | 11                      |                       |
| Manulaccurer:<br>Mercoid                                        |                         |                      | ***··· <u>·</u> · <u>-··-</u> | (4)                |                    |                         |                       |
| Model No.: DA-7043-804                                          | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                               | (4)                |                    | 91                      | 11                    |
| Function: Pump "A" det                                          | Relative<br>Humidity(%) | 100                  | <u> </u>                      | . (4)              |                    | 13                      | -                     |
| Accuracy:<br>Req'd:<br>Demon:                                   | Chemical                | N/A                  | N/A .                         | (4)                | N/A                | N/A                     | N/A                   |
| Category: A                                                     | Badiation               | 3x10 <sup>7</sup>    |                               |                    |                    |                         | 8 NOD                 |
| Service: Disch press                                            | (RAD)                   |                      |                               | (4)                | 4,                 | Note 1                  | BFNNEB8021            |
| Location: 3                                                     | Aging                   | N/A                  |                               | (2)                |                    | Appx 1 Note 1           | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes             | Submergence             | N/A                  | N/A                           | (4)                | N/A                | N/A                     | N/A                   |

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

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: Charles Jun

QA Acceptance:

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NEB-75-216

## Appendix 1, Rev 0

 To date, qualification information is unavailable. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. This instrument has adequately functioned in the past, and TVA has no indications that this instrument would not properly function in the near future. In addition, Mercoid instruments are installed at several other nuclear plants with no indications of generic failures.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

(3) NEB- 75-217 Sheet No. 0 Revision

Date

10/27/80

50-259, 50-260, 50-296

| EQUIPMENT DESCRIPTION                                                    | E                        | NVIRONMENT                   |                    | DOCUMENTA          | TLON REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|--------------------------------------------------------------------------|--------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Contract 90744 & 91750                                                   | Parameter                | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Residual heat<br>removal<br>Plant ID No. FCV-75-9<br>MPL # 14-68 | Operating<br>Time        | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitoroue                 | Temperature<br>(F)       | Figure<br>B.3(1)<br>B.3(2,3) | 250 F              | (4)                | 11 -                 | See Appx 1<br>Note 2    | 11                   |
| Model No.: SMB-2                                                         | Pressure.<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | U<br>v               | Type test               | None                 |
| Function: CS Sys I<br>flow isol                                          | Relative<br>Humidity(\$) | 100                          | 100                | (4)                | 11 5                 | 11                      | 19                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                        | Chemical<br>Spray        | N/A                          | N/A                | (4)                | N/A                  | N/A                     | - N/A                |
| Category: <sup>A</sup><br>Service: <sup>Water</sup> ·                    | Radiation<br>(RAD)       | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | . (4)              | See Appx 1<br>Note 1 | Type Test               | None                 |
| Location: 3                                                              | Aging                    | N/A                          |                    | (2)                |                      | Appx 1 Note 3           | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                | Submergence              | N/A                          | N/A                | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

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

alex Melnikow Prepared by: Reviewed by:
- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. This particular type operator (Class B insulation) was successfully tested to 250°F for 24 hours. The peak temperature is 297°F in 30 seconds 1 and is 162°F in 120 seconds for unit 1 and 160°F at 120 seconds for units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 75-210 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF QUALIFICATION ENVIRONMENT OUTSTANDING METHOD **TTEMS** EQUIPMENT DESCRIPTION Specifi-Specifi-Qualifi-Contract 90744 & 91750 Qualification cation cation cation Parameter System: Core spray 6 hours Operating See Appx 1 See Appx 1 NCR 1 year Plant ID No. FIS-75-21 BENNEB8010 Time (1)Note 1 Note 2 MPL # 14-45B Component: Flow Temperature 212 F 11 .. See Appx 1 Figures Switch (F) Note 3 B.3(1) (4) B.3(2,3) Manufacturer: Barton Type 11 15 Test None Table Model No.: B.1(1,2,3) 289 Pressure (4) (PSIA) Function: Flow detection 11 H. 100 100 11 & ann Relative Humidity(%) (4) Accuracy: Req'd: See Section \* N/A -N/A N/A 4.1.3 in report Demon: Chemical N/A N/A (4) Spray Category: A 3x10<sup>6</sup> 3x 10<sup>7</sup> See Appx 1 See Appx 1 NCR Radiation Note 3 Note 1 BFNNEB8010 Sys I low (4) Service: (RAD) flow Appx 1 Note 2 None 3 (2)Location: NZA Aging Flood Level Elev:552' N/A N/A N/A N/A N/A (4) Above Flood Level: Yes Submergence N/A No

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnihow Prepared by: Reviewed by: (

QA Acceptance:

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#### NEB-75-219, APPENDIX 1, REVISION 0

- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that an operating time of one year would create problems with the proper functioning of this device. Similarly, aging is not expected to adversely affect the proper functioning of this instrument; however, the available data is inconclusive.
- 3. The test for this device does not meet the accident requirements for temperature or radiation; however, it is expected, based on further modeling for radiation and a materials analysis, that this device could pass a test at this temperature and radiation. TVA will type test this device to confirm the above or replace it with qualified equipment.

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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB- 75-220 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 50-259, 50-260, 50-296 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Core spray Operating 1 year See Appx 1 NCR Plant ID No. FT-75-21 Time (1)Note 1 BFNNEB8012 MPL # 14-40 Component: Flow Temperature 11 transmitter Figures Ħ (F) B.3(1) Manufacturer: GEMAC (GE) B.3(2,3) (4) " 、 Table ... 50-555111BDAA3AAA B.1(1,2,3) Model No.: Pressure (PSIA) (4) Flow signal Function: 100 11 11 Relative (4) Humidity(\$) Accuracy: See Section Reg'd: 4.1.3 in report N/A N/A Demon: N/A Chemical N/A N/A (4) Spray Α Category: 3x10<sup>7</sup> • • • See Appx 1 NCR Radiation Sys I flowch press Note 1 BFNNEB8012 Service: (RAD) (4) 3 11 11 Aging Location: N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A

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

No

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

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

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

N/A

alex Melnikow Prepared by: harles Jul Reviewed by:

QA Acceptance:

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### NEB-75-220 Appendix 1 Revision O

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

| Temperature       | - 185 <sup>0</sup> F |
|-------------------|----------------------|
| Pressure · ·      | - Atmospheric        |
| Relative Humidity | - Not Specified      |
| Radiation         | - Not Specified      |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-1 of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

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| Docket: 50-259, 50-260, 50                                  | <u>-296</u><br>E        | ENVIRONMENT                  |                    | DOCUMENTATION REF  |                      | Date 10/27/8<br>QUALIFICATION | OUTSTANDING       |
|-------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|-------------------------------|-------------------|
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750             | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | METHOD                        | ITEMS             |
| System: Core Spray<br>Plant ID No. FCV-75-22<br>MPL # 14-26 | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3          | NCR<br>BFNNEB8034 |
| Component: Motor<br>operator                                | Temperature<br>(F)      | Figure<br>B.3(1)<br>B 3(2 3) | 250 F              | . (1)              | 11                   | See App 1<br>Note 2           | 11                |
| Manufacturer: Limitorque                                    |                         | Table                        | 40                 | (4)                | ".                   | Type test                     | -<br>None         |
| Model No.: SMB-1                                            | Pressure<br>(PSIA)      | B.1(1,2,3)                   | -                  | (4)                | <b>,</b>             |                               |                   |
| Function: CS Sys I Test<br>Bypass Valve                     | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   | 11                            | u                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                           | Chemical<br>Spray       | N/A                          | N/A .              | (4)                | N/A                  | N/A                           | N/A .             |
| Category: A<br>Service: Water ·                             | Radiation<br>(RAD)      | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                     | None              |
| Location: 3                                                 | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 3                 | None              |
| Flood Level Elev:552: N/A                                   | Submongonac             | NZA                          | 21/0               |                    | N/A                  | N/A                           | N/A               |

N/A

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

No

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

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

Submergence

N/A

| Prepared by: | alex Melnihow |  |
|--------------|---------------|--|
| Reviewed by: | Charles Junk  |  |

QA Acceptance:

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Above Flood Level: Yes

# NEB-75-221, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

2. This particular type operator (Class B insulation) was successfully tested to  $250^{\circ}$ F for 24 hours. The peak temperature is  $297^{\circ}$ F at 25 seconds and is  $162^{\circ}$ F at 120 seconds in unit 1 and  $160^{\circ}$ F at 120 seconds in units 2 and 3. It is TVA's opinion that this rapid rise and decrease in temperature is unlikely to subject the critical elements of the operator to a temperature greater than 250°F and, therefore, would not affect the proper functioning of the operator.

TVA will commit to a testing program to verify the conclusions drawn on temperature-related behavior of the Limitorque operators with Class B insulation.

3. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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|                                                             |                         | SYSTEM COMPON       | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)                     |                      |
|-------------------------------------------------------------|-------------------------|---------------------|--------------------|--------------------|----------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclea                               | ar Plant                |                     |                    |                    | •                    | Sheet No. NEB-70        | 5 <u>-222</u>        |
| Unit: 1,2,3                                                 | τ.                      |                     |                    |                    |                      | Revision 0              |                      |
| Docket: 50-259, 50-260, 50-                                 | -296                    |                     |                    |                    |                      | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                       | ENVIRONMENT             |                     |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                      | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Core spray<br>Plant ID No. FCV-75-23<br>MPL # 14-11 | Operating<br>Time       | 1 yeara             | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator                                | Temperature<br>(F)      | Figure<br>B.9(1)    | 250 F              | •                  | 11                   | Type test               | None                 |
| Manufacturer:<br>Limitorque                                 |                         | B.9(2,3)            |                    | (4)                |                      |                         |                      |
| Model No.: SMB-2                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3) | 40                 | -<br>-<br>- (4)    | υ.                   | Type test.              | None                 |
| Function: Disch<br>control                                  | Relative<br>Humidity(%) | 100                 | -100<br>-100       | (4)                | 17                   | 11                      |                      |
| Accuracy:<br>Req'd: N/A<br>Demon:                           | Chemical<br>Spray       | N/A                 | N/A                | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: Sys I outbd                         | Radiation<br>(RAD)      | 2.1x10 <sup>7</sup> | 2x10 <sup>8</sup>  | · (4)              | See Appx 1<br>Note 1 | Type Test               | None                 |
| disch .<br>Location: 9                                      | Aging                   | N/A                 | ×                  | (2)                |                      | Appx 1 Note 2           | ' None               |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No   | Submergence             | N/A                 | N/A                | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

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

Prepared by: <u>alex Melnihow</u> Reviewed by: <u>Charles</u> Jul

QA Acceptance:

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# NEB-75-222, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50- | r Plant<br>296          | SYSTEM COMPO                 | NENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB-75</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | 5-224<br>            |
|-----------------------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|---------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                       | E                       | ENVIRONMENT                  |                    |                    | DOCUMENTATION REF    |                                                                           | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                      | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                           |                      |
| System: Core spray<br>Plant ID No. FCV-75-25<br>MPL #14-12                  | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                                                      | NCR<br>BFNNEB8034    |
| Component: Motor<br>operator<br>Manufacturer: Limitorque                    | Temperature<br>(F)      | Figure<br>B.9(1)<br>B.9(2,3) | 250 F              | (4)                | 11                   | Type test                                                                 | None                 |
| Model No.: SMB-2                                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | W _                  | Type test                                                                 | None<br>-            |
| Function: Sys I<br>control                                                  | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   | n                                                                         | 11 *                 |
| Accuracy:<br>Req'd: N/A<br>Demon:                                           | Chemical<br>Spray       | N/A                          | N/A .              | (4)                | N/A                  | N/A                                                                       | N/A                  |
| Category: <sup>A</sup><br>Service: Inbd disch                               | Radiation<br>(RAD)      | 2.1x10 <sup>7</sup>          | 2x 10 <sup>8</sup> | (4)                | Sëe Appx 1<br>Note 1 | Type Test                                                                 | None                 |
| Location: 9                                                                 | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 2                                                             | None                 |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                   | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                                                                       | N/A                  |

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

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

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

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

Prepared by: <u>Alex Melniboa</u> harles -Reviewed by: (

QA Acceptance:

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# NEB 75-224, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                         | Plant                   | SYSTEM COMPON                 | IENT EVALUATIO     | N WORK SHEET       | (Rev 2)              | (3)<br>Sheet No. <u>NEB- 75</u><br>Revision <u>0</u> | 5-226                |
|-----------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|------------------------------------------------------|----------------------|
| Docket: 50-259, 50-260, 50-2                                          | 96                      |                               |                    |                    |                      | Date 10/27/8                                         | 30                   |
| EQUIPMENT DESCRIPTION                                                 | ENVIRONMENT             |                               |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                              | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                      |                      |
| System: Core spray<br>Plant ID No. Appx 1<br>Note 1                   | Operating<br>Time       | 1 year                        | 6 hours            | (1)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 3,                                | NCR<br>BFNNEB8010    |
| Component: Diff pressure<br>indicating switch<br>Manufacturer: Boston | Temperature<br>(F)      | Figures<br>B.8(1)<br>B.8(2,3) | 212 F              | . (4)              | 11                   | Type test                                            | None                 |
| Model No.: 288 series                                                 | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           | 15                 | (4)                | 11                   | 11                                                   | None                 |
| Function: Press diff<br>detection ·                                   | Relative<br>Humidity(%) | 100                           | 100                | (4)                | 11                   | n .                                                  | 29                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report             | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                  | N/A                                                  | N/A                  |
| Category: A<br>Service: Sys I_core -                                  | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>            | 3x 10 <sup>6</sup> | (4)                | See Appx 1<br>Note 2 | Type test<br>-                                       | NCR<br>BFNNEB8010    |
| dift<br>Location: 8                                                   | Aging                   | N/A                           |                    | (2)                |                      | Appx 1 Note 3                                        | None                 |
| Flood Level Elev:552* <sup>N/A</sup><br>Above Flood Level: Yes<br>No  | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                                                  | N/A *                |

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

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

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

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

Prepared by: <u>alex Melnikow</u> Reviewed by: Charles -

QA Acceptance:

#### NEB-75-226, APPENDIX 1, REVISION 0

1. This sheet applies to the following:

PDIS-75-28, -56 (MPL #14-43)

2. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02.

3. To date, test data has not been obtained which addresses a one-year operating time or thermal aging. A materials analysis does not reveal any parts likely to fail due to thermal or radiation aging. In TVA's engineering judgement, the one-year operating time is not expected to be a problem. Analysis is presently underway to support the above.

|                                                          | •                       | OVOTEN COMDO                 |                    | M LODK SHEET       | (Roy 2)              | (2)                                  |                   |
|----------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|--------------------------------------|-------------------|
| Facility: Browns Ferry Nuclea                            | r Plant                 | SISTEM COMPO                 | NENI EVALUATIO     | M NORK BREF        | (1164 2)             | Sheet No. <u>NEB-7</u><br>Revision 0 | 5-227             |
| 0 $1,2,30 $ $0 $ $0 $ $-259, 50 $ $-260, 50$             | 296                     |                              |                    |                    | βη.                  | Date 10/27/                          | 80                |
| CONTRACT DESCRIPTION                                     | ENVIRONMENT             |                              |                    | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD              | OUTSTANDING       |
| Contract 90744 & 91750                                   | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | ×                                    |                   |
| System: Core Spray<br>Plant ID No. Appendix 1<br>Note 4  | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                 | NCR<br>BFNNEB8034 |
| Component: Motor<br>operator<br>Manufacturer: Limitorque | Temperature<br>(F)      | Figure<br>B.4(1)<br>B.4(2,3) | 250 F              | (4)                | n                    | Type Test                            | 11                |
| fodel No.: SMB-0                                         | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | n ,                  | 11                                   | 11                |
| Function: Pump "B"<br>Suction Valve                      | Relative<br>Humidity(%) | 100                          | 100                | 、<br>(4)           | 11                   | п                                    | - 11              |
| Accuracy:<br>Req'd: N/A<br>Demon:                        | Chemical<br>Spray       | N/A                          | N/A _              | (4)                | N/A                  | N/A                                  | N/A               |
| Category: A                                              | Radiation               | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | ,                  | See Appx 1           | Type Test                            | None              |

N/A

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

No

N/A

Water

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Flood Level Elev:552'

Above Flood Level: Yes

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Service:

Location:

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

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

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

Radiation

Submergence

N/A

N/A

(RAD)

Aging

alex Melnikow Prepared by: harles Reviewed by:

Appx 1 Note 2

N/A

None

· N/A

QA Acceptance:

Note 1

N/A

(4)

(2)

(4)

## NEB-75-227, APPENDIX 1, REVISION 0

- 1. Limitorque Test Reports B0003, B-0027, #600198
- 2. Various aging-related tests have been performed on Limitorque operators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

3. This sheet applies to the following:

FCV 75-30 and -39 (MPL #14-7)



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1 SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB-75-220-Facility: Browns Ferry Nuclear Plant Revision 0 1,2,3 Unit: Date 10/27/80 50-259, 50-260, 50-296 Docket: ENVIRONMENT DOCUMENTATION REF OUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Contract 90744 & 91750 Specifi-Parameter cation cation cation cation System: Core spray Operating See NCR See Appx 1 1 vear Plant ID No. PS\_75\_35,\_44 Time (1)Note 1 BENNEB8021 MPL #14-44 Component: Pressure Temperature (F) n 11 Switch Figure B.4(1,2,3) (4) Manufacturer: Mercoid ... 11 Table Pressure Model No.: DA-7043-804 B.1(1,2,3) (PSIA) (4) Function: Pump "B" det . Relative n 100 Humidity(%) (4) Accuracy: Req'd: N/A N/A (4) N/A N/A N/A Demon: Chemical Spray Category: A 3x 10<sup>7</sup> See Appx 1 See NCR Radiation Service: Disch press Note 1 (4) BFNNEB8021 (RAD) ..... 4-Appx 1 Note 1 N/A (2) Location: Aging Flood Level Elev:552' N/A N/A NZA N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles</u> July

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QA Acceptance:\_\_\_

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#### NEB-75-229

# Appendix 1, Rev 0

 To date, qualification information is unavailable. TVA will continue to pursue, through several sources, the location of the necessary information, and if unsuccessful, commit to type testing or replacement. This instrument has adequately functioned in the past, and TVA has no indications that this instrument would not properly function in the near future. In addition, Mercoid instruments are installed at several other nuclear plants with no indications of generic failures. , 

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 75-230 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 10/27/80 Date 50-259, 50-260, 50-296 Docket: OUTSTANDING DOCUMENTATION REF QUALIFICATION ENVIRONMENT METHOD ITEMS EOUIPMENT DESCRIPTION Qualifi-Specifi-Qualifi-Contract\_90744.& 91750 Specification cation cation . Parameter cation System: Core Spray See Appx 1 NCR 1 year 24 hours See Appx 1 Operating Note 1 Note 2 BFNNEB8034 Plant ID No. FCV-75-37 (1)Time MPL # 14-68 Motor Temperature Component: Figure 11 NONE 250 F Type Test operator (F) B.4(1)B.4(2,3) (4) Manufacturer: Limitorque ۳. n Table 40 11 B.1(1,2,3)Model No.: SMB-00-5 Pressure (4)(PSIA) Sys II Flow Function: 11 11 11 **Isol Valve** 100 100 Relative (4) Humidity(%) Accuracy: N/A Req'd: N/A N/A N/A (4) Chemical N/A N/A Demon: Spray Ţ A 2x10<sup>8</sup> Category: 3x 10<sup>7</sup> See Appx 1 Type Test None Radiation Water Note (4) Service: (RAD) ~ Appx 1 Note 2 llone ų N/A (2)Aging Location: N/A Flood Level Elev:552'

N/A

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

No

Above Flood Level: Yes

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

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

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

Submergence

N/A

Prepared by: <u>Alex Meluiboco</u> Reviewed by: (

N/A

N/A

QA Acceptance:

N/A

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#### NEB-75-230, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements. . .

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MPL # 14-45

Switch

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flow -

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Flood Level Elev:552'

Above Flood Level: Yes

See Section

CS Sys II low

Barton

EQUIPMENT DESCRIPTION

System: Core spray

Component: Flow

Manufacturer:

Model No.:

Function:

Accuracy:

Reg<sup>1</sup>d:

Demon:

Category:

Service:

Location:

Contract 90744 & 91750

Unit:

Docket:



(4)

(2)

(4)

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

No

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

N/A-

- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Radiation

Submergence

N/A

N/A

N/A

(RAD)

Aging

alex Melinhow Prepared by: hailes. Reviewed by:

Note 3

N/A

Appx 1 Note 2

BENNEFECT

None

N/A

QA Acceptance:

Note 2

N/A

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- 1. Barton Engineering report R3-288A-1, page 7, paragraph 5.3.3, and Wyle summary report QSR-027-A-02
- 2. Based on a study of materials used in this device, it is not expected that an operating time of one year would create problems with the proper functioning of this device. Similarly, aging is not expected to adversely affect the proper functioning of this instrument; however, the available data is inconclusive.
- 3. The test for this device does not meet the accident requirements for radiation; however, it is expected, based on a materials analysis, that this device could pass a test for this radiation. TVA will type test this device to confirm the above or replace it with qualified equipment.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 75\_233 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Date Docket: 50-259, 50-260, 50-296 DOCUMENTATION REF ENVIRONMENT QUALIFICATION OUTSTANDING METHOD ITEMS EQUIPMENT DESCRIPTION Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 Parameter cation cation cation cation System: Core spray Operating 1 year See Appx 1 NCR Plant ID No. FT-75-49 (1) Time BFNNEB8012 Note 1 MPL # 14-40 Temperature Component: Flow transmitter (F) Figures 11 B.4(1) Manufacturer: GEMAC (GE) (4) B.4(2.3) Table 11 11 Model No.: 50-5551118DAA3AAA Pressure B.1(1,2,3) (PSIA) (4) Function: Flow det signal Relative 100 11 11 Humidity(\$) (4) Accuracy: Regid: See Section Demon: 4.1.3 in report N/A N/A N/A Chemical N/A (4) N/A Spray Category: A · • Radiation (1 3)3x10<sup>7</sup> See Appx 1 NCR Service: CS Sys II low flow BFNNEB8012 (RAD) Note 1 (4) 4 (units 1&3) 11 11 Location: Aging N/A (2) Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A N/A (4) Submergence N/A

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

No

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Melinkow Reviewed by: Charles Junk

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## NEB-75-233 Appendix 1 Revision O

The operating conditions to which the pressure transmitters will be subjected are well within the manufacturer's standard operating conditions in all areas except radiation.

- 1. The pressure transmitters are required to operate in the environment as specified on the system component evaluation work sheet.
- 2. The manufacturer's specifications for the pressure transmitters are as follows:

|   | Temperature <sup>.</sup> | – 185 <sup>0</sup> F | ٠    |
|---|--------------------------|----------------------|------|
|   | Pressure                 | - Atmospher          | ic   |
| • | Relative Humidity        | - Not Speci          | fied |
|   | Radiation .              | - Not Speci          | fied |

Material breakdown analysis reveals the presence of electronic gear such as diodes and transistors. The specifications for these components are not available. The components are susceptible to a threshold gamma radiation of  $1 \times 10^4$  per Table C-l of the DOR Guidelines - 79-01B.

These devices are located in a low radiation zone (less than  $2\times10^4$ ), with an accident dose of only  $6\times10^4$ , which is within an order of magnitude above the threshold. Also, the threshold is not a point of failure or end of use-ful life.

The devices will function in the environment to which they are exposed due to a LOCA or HELB for at least one hour. FSAR analyses for the design basis accidents assume that the reactor is placed in a stable hot shutdown condition within one hour. Thus the devices are qualified to perform their safety function assumed for a stable hot shutdown condition.

Therefore, in our engineering judgement based on available information, it is concluded that this evaluation provides justification for continued operation. Also, since the devices have a NEMA 4 case, relative humidity should have no effect on the operations.

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

| ł                                                                            | 4                                                         |                              | •                  |                    |                      | ų                                                                                 |                   |  |
|------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------|--------------------|--------------------|----------------------|-----------------------------------------------------------------------------------|-------------------|--|
| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50- | SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)<br>r Plant |                              |                    |                    |                      | ) (3)<br>Sheet No. <u>NEB-75-234</u><br>Revision <u>0</u><br>Date <u>10/27/80</u> |                   |  |
| FOUL PMENT DESCRIPTION                                                       | •                                                         | DOCUMENTATION REF            |                    | QUALIFICATION      | OUTSTANDING          |                                                                                   |                   |  |
| Contract 90744 & 91750                                                       | Parameter                                                 | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                                   | 11110             |  |
| System: Core Spray<br>Plant ID No. FCV-75-50<br>MPL # 14-26                  | Operating<br>Time                                         | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1 ·<br>Note 2                                                            | NCR<br>BFNNEB8034 |  |
| Component: Motor<br>operator<br>Manufacturer: Limitonguo                     | Temperature<br>(F)                                        | Figure<br>B.4(1)<br>B.4(2,3) | 250 F              | (4)                | tt                   | Type Test                                                                         | None              |  |
| Model No.: SMB-2                                                             | Pressure<br>(PSIA)                                        | Table<br>B.1(1,2,3)          | 40                 | (4)                | H _                  | 11                                                                                | 11                |  |
| Function: CS Sys. II Test<br>Bypass Valve                                    | Relative<br>Humidity(%)                                   | 100                          | 100 <u>-</u>       | (4)                | 11                   | tı                                                                                | 11                |  |
| Accuracy:<br>Req'd: N/A<br>Demon:                                            | Chemical<br>Spray                                         | N/A                          | N/A                | (4)                | N/A                  | N/A                                                                               | N/A               |  |
| Category: <sup>A</sup><br>Service: <sup>Water</sup>                          | Radiation<br>(RAD)                                        | 3x10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | Šee Appx 1<br>Note   | Type Test                                                                         | None              |  |
| Location: 4                                                                  | Aging                                                     | N/A                          |                    | (2)                |                      | Appx 1 Note 2                                                                     | None              |  |
| Flood Level Elev:552; N/A<br>Above Flood Level: Yes<br>No                    | Submergence                                               | N/A                          | N/A                | - (4)              | N/A                  | N/A                                                                               | N/A               |  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Mehnikow</u> Reviewed by: <u>Charles Turk</u>

QA Acceptance:



## • NEB-75-234, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

ł SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 75-235 ŧ Facility: Browns Ferry Nuclear Plant 1,2,3 Revision 0 i Unit: 50-259, 50-260, 50-296 10/27/80 Docket: Date . DOCUMENTATION REF OUTSTANDING ENVIRONMENT QUALIFICATION a saw EQUIPMENT DESCRIPTION METHOD ITEMS Specifi-Contract 90744 & 91750 Qualifi-Specifi-Qualification Parameter cation cation cation Ì System: Core spray 24 hours 1 year See Appx 1 See Appx 1 NCR Operating Note 1 Note 2 BFNNEB8034 Plant ID No. FCV-75-51 Time (1)MPL # 14-11 £ Component: Motor Temperature 250 F Ħ - Figure operator Type test None (F) B.9(1) B.9(2,3) Manufacturer: (4) Limitorque Table 40 tt Type test None ŧ B.1(1,2,3) SMB-2 Model No.: Pressure (PSIA) (4) 2 Disch Function: : 100 100 Ħ 11 - 11 control Relative Humidity(%) (4) Accuracy: N/A Req'd: N/A N/A N/A Demon: N/A (4) Chemical N/A Spray A Category: 2x.10<sup>8</sup> 2.1x10<sup>7</sup> See Appx 1 Type Test None Radiation Sys II Outbd . Note 1 Service: (RAD) (4) disch 9 Appx 1 Note 2 None Location: N/A Aging (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A -(4) No

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

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

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

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

alex Melnikow Prepared by: Reviewed by: Charles July

QA Acceptance:



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## NEB-75-235, APPENDIX 1, REVISION 0

1. Limitorque Test Reports #B-0003, -0027, #600198

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2. Various aging-related tests have been performed on Limitorque operators (see note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.



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| Jnit: 1,2,3<br>Docket: 50-259, 50-260, 50                   | )-296                   |                              | ,                  |                    |                      | Revision 0<br>Date 10/27/ | 80                   |
|-------------------------------------------------------------|-------------------------|------------------------------|--------------------|--------------------|----------------------|---------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                       | E                       | NVIRONMENT                   |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD   | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                      | Parameter               | Specifi-<br>cation           | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                           |                      |
| System: Core spray<br>Plant ID No. FCV-75-53<br>MPL # 14-12 | Operating<br>Time       | 1 year                       | 24 hours           | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2      | NCR<br>BFNNE88034    |
| Component: Motor<br>operator<br>Manufacturer:               | Temperature<br>(F)      | Figure<br>B.9(1)<br>B.9(2,3) | 250 F              | (4)                | 11                   | Type test                 | None                 |
| Limitorque<br>Model No.: SMB-2                              | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)          | 40                 | (4)                | ".                   | Type test                 | None                 |
| Function: Disch<br>control                                  | Relative<br>Humidity(%) | 100                          | 100                | (4)                | 11                   | 22                        | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                           | Chemical<br>Spray       | N/A                          | NZA _              | (4)                | N/A                  | N/A                       | N/A                  |
| Category: A<br>Service: Sys II inbd ·                       | Radiation<br>(RAD)      | 2.1x10 <sup>7</sup>          | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Type Test                 | None                 |
| .ocation: 9                                                 | Aging                   | N/A                          |                    | (2)                |                      | Appx 1 Note 2             | None                 |
| Plood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No   | Submergence             | N/A                          | N/A                | (4)                | N/A                  | N/A                       | N/A                  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnikow</u> Reviewed by: Charles Jule

#### NEB-75-237, APPENDIX 1, REVISION 0

1. Limitorque Test Reports B0003, B-0027, #600198

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2. Various aging-related tests have been performed on Limitorque oeprators (see Note 1 above). It is TVA's engineering judgement that this Limitorque operator is not adversely affected by aging considerations.

The operating time of one year is longer than the test duration of 24 hours; however, based on the temperature level of the test compared to the accident temperature profile, in TVA's judgement, the Limitorque operator will adequately meet the operating time requirements.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Desket: 50-250 50-260 50-2 | Plant .                 |                               |                    |                    |                      | Sheet No. <u>NEB-75-</u><br>Revision <u>0</u><br>Date <u>10/27/8</u> 0 | -238                 |
|-----------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|----------------------|------------------------------------------------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                                       | ENVIRONMENT             |                               |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                                                | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                      | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                                                        |                      |
| System: Core spray<br>Plant ID No.<br>MPL #14-1                             | Operating<br>Time       | 1 year                        |                    | (1)                | See Appx 1<br>Note I | See Appx 1<br>Note 4                                                   | NCR<br>BFNNEB8008    |
| Component: Core spray<br>pumps - motors<br>Manufacturer: core a point i     | Temperature<br>(F)      | Figures<br>B.4(1)<br>B.4(2,3) | 292 F              | (4)                | LT                   | Generic test                                                           | None ,               |
| Model No.: 5K6336XC198A                                                     | r<br>Pressure<br>(PSIA) | Table<br>B.1(1,2,3)           | 14.7               | . (4)              | ".                   | See Appx_1<br>Note 2                                                   | 11                   |
| Function: Pump motor                                                        | Relative<br>Humidity(%) | 100                           | 100                | (4)                | . 11                 | Experience &<br>Humidity testing                                       | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                           | Chemical<br>Spray       | N/A                           | N/A                | (4)                | N/A                  | N/A                                                                    | N/A                  |
| Category: <sup>A</sup><br>Service: Core spray                               | Radiation '<br>(RAD) '  | 3x 10 <sup>7</sup>            | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note   | Generic test                                                           | None                 |
| Location: <sup>4</sup> båd pumps                                            | Aging                   | N/A                           |                    | (2)                |                      | Appx 1 Note 3                                                          |                      |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No        | Submergence             | N/A                           | N/A                | (4)                | N/A                  | N/A                                                                    | N/A                  |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Jule</u>

QA Acceptance:

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## NEB-75-238, APPENDIX 1, REVISION O

- Topical Report of GE Vertical Induction Motors for Class IE Intake Cooling Pumps for St. Lucie Nuclear Power Plant Unit 2, revision 2, 8/31/79 (FF \$103). This test is applicable to generic GE model 5K6 series.
- 2. Based on a factory production test. It is TVA's opinion that the 0.3 psia difference between the required and tested conditions is insignificant and will not adversely affect the proper functioning of the motor.
- 3. In TVA's engineering judgement, this motor is not adversely affected by aging considerations.

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4. Although further evaluation is necessary to determine the qualified operating times, it is TVA's opinion that the GE motor will adequately meet the operating time requirements.



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| Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2                | 96                       |                               |                    |                    |                      | Date <u>0/27/80</u>              | )                    |
|------------------------------------------------------------|--------------------------|-------------------------------|--------------------|--------------------|----------------------|----------------------------------|----------------------|
| EQUIPMENT DESCRIPTION                                      | E                        | NVIRONMENT                    |                    | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD          | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                     | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |                                  |                      |
| System: Core spray<br>Plant ID No.<br>MPL #14-1            | Operating<br>Time        | 1 year                        |                    | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 4             | NCR<br>BFNNEB8008    |
| Component: Core spray<br>pumps - motors                    | Temperature<br>* (F)     | Figures<br>B.3(1)<br>B.3(2,3) | 292 F              | (11)               | n                    | Generic test                     | None                 |
| Model No.: 5K6336XC198A                                    | Pressure                 | Table<br>B.1(1,2,3)           | 14.7               | (1)                | n .                  | See Appx 1<br>Note 2             | 11                   |
| Function: Pump motor                                       | Relative<br>Humidity(\$) | 100                           | 100                | (4)                | 37                   | Experience &<br>Humidity testing | 11<br>5              |
| Accuracy:<br>Regid: See Section<br>Demon:                  | Chemical<br>Spray        | N/A                           | N/A ,              | (4)                | N/A                  | N/A                              | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Core</sup> spray - | Radiation<br>(RAD)       | (A3C)07                       | 2x10 <sup>8</sup>  | (4)                | See Appx 1<br>Note 1 | Generic test                     | None                 |
| Location: 3 A&C pumps                                      | Aging                    | N/A                           |                    | (2)                |                      | Appx 1 Note 3                    | None                 |
| Flood Level Elev:552; N/A<br>Above Flood Level: Yes<br>No  | Submergence              | N/A                           | N/A                | (4)                | N/A                  | N/A                              | N/A                  |

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

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

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

Prepared by: <u>alex Melnikow</u> Reviewed by: <u>Charles</u> Jule



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### NEB-75-238A, APPENDIX 1, REVISION 0

- Topical Report of GE Vertical Induction Motors for Class IE Intake Cooling Pumps for St. Lucie Nuclear Power Plant Unit 2, revision 2, 8/31/79 (FF \$103). This test is applicable to generic GE model 5K6 series.
- 2. Based on a factory production test. It is TVA's opinion that the 0.3 psia difference between the required and tested conditions is insignificant and will not adversely affect the proper functioning of the motor.
- 3. In TVA's engineering judgement, this motor is not adversely affected by aging considerations.
- 4. Although further evaluation is necessary to determine the qualified operating times, it is TVA's opinion that the GE motor will adequately meet the operating time requirements.



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|-----------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| Facility · Browns Ferry Nuclea                                                    | r Plant ·               | Sistem compo         | NENT EVALUATI      | ON WORK SHEET      | (Rev 2)            | Sheet No. NEB-76        | 5-239                |
| Unit: 1.2.3                                                                       |                         |                      | -                  | Revision 0         |                    |                         |                      |
| Docket: 50-259, 50-260, 50-                                                       | 296                     |                      |                    | ,                  | •                  | Date 10/27/             | 80                   |
| EQUIPMENT DESCRIPTION                                                             | ENVIRONMENT             |                      |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                            | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: Containment<br>inerting system<br>Plant ID No. FCV-76-17<br>MPL #16-20-20 | Operating<br>Time       | 1 year               |                    | (1)                |                    | Appx 1<br>Note 1        | NCR<br>BFNNEB8019    |
| Component: Limit<br>Switch                                                        | Temperature<br>(F)      | Figure<br>B.8(1,2,3) |                    |                    |                    | 11                      | II                   |
| Manufacturer: Nameo                                                               |                         |                      |                    | (4)                |                    |                         |                      |
| Model No.: D1200G                                                                 | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | (4)                |                    | "                       | 11                   |
| Function: Makeup outbo<br>isln vlv J                                              | Relative<br>Humidity(%) | 100                  | •                  | ₅<br>(4)           |                    | 11                      | 11                   |
| Accuracy:<br>Req'd: N/A<br>Demon:                                                 | Chemical<br>Spray       | N/A                  | N/A .              | (4)                | N/A                | • N/A .                 | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Pri contmt</sup> .                        | Radiation<br>(RAD)      | 5.1x10 <sup>5</sup>  |                    | (4)                | у<br>-             | Appx 1<br>Note 1        | NCR<br>BFNNEB8019    |
| "2 <sub>8</sub><br>Location:                                                      | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 1           | 11                   |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                         | Submergence             | N/A                  | N/A                | (4)                | N/A                | N/A                     | N/A                  |

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

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

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

| Prepared | by: | alex Melnikow |
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| Reviewed | by: | Charles Tinke |

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To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90°C (194°F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.

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| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3                               | Plant                   | System Compon        | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-</u> 76<br>Revision <u>0</u> | 5-239A -          |
|-----------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|------------------------------------------------------|-------------------|
| EOUIPMENT DESCRIPTION                                                       | ENVIRONMENT             |                      |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                              | OUTSTANDING       |
| Contract 90744 & 91750                                                      | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                      |                   |
| System: Containment<br>inerting<br>Plant ID No. FCV-76-18<br>MPL #16-20-22B | Operating<br>Time       | 1 year               |                    | (1)                |                    | Appx 1<br>Note 1                                     | NCR<br>BFNNEB8019 |
| Component: Limit<br>Switch                                                  | Temperature<br>(F)      | Figure<br>B.8(1,2,3) |                    |                    | <u> </u>           | с П                                                  | tt                |
| Manufacturer: Namco                                                         |                         |                      |                    | (4)                |                    |                                                      |                   |
| Model No.: D1200G                                                           | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | (4)                | •                  | •                                                    | ÷                 |
| Function: Inbd isln<br>valve                                                | Relative<br>Humidity(%) | 100                  |                    | (4)                |                    | H ,                                                  | tt -              |
| Accuracy:<br>Req'd: N/A<br>Demon:                                           | Chemical<br>Spray       | N/A                  | N/A                | (4)                | N/A                | N/A                                                  | N/A               |
| Category: A<br>Service: Drywell N <sub>2</sub>                              | Radiation<br>(RAD)      | 5.1x10 <sup>5</sup>  | γ.                 | (4)                | b.,                | Appx 1<br>Note 1                                     | NCR<br>BFNNEB8019 |
| makeup <sup>2</sup><br>Location: <sup>8</sup>                               | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 1                                        | 19                |
| Flood Level Elev:552: N/A<br>Above Flood Level: Yes<br>No                   | Submergence             | N/A                  | N/A                | (4)                | N/A                | N/A                                                  | . N/A             |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>



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#### NEB-76-239A, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for  $90^{\circ}$  C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB-76-239B Revision 0 Unit: 1.2.3 50-259, 50-260, 50-296 10/27/80 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation. System: Containment Inerting Operating 1 year Appx 1 NCR Plant ID No. FCV-76-19 BFNNEB8019 (1)Note 1 Time MPL #16-20-22A Component: Limit Temperature Switch Figure 11 11 (F). B.8(1,2,3) Manufacturer: Namco (4) Table Ħ 11 B.1(1,2,3) Model No.: D1200G Pressure (4) (PSIA) Function: Inbd isln valve \* 100 11 11 Relative Humidity(%) (4) Accuracy: Req'd: N/A N/A N/A N/A Demon: N/A Chemical N/A (4) Spray A Category: 5.1x10<sup>5</sup> · . Appx 1 NCR Radiation Suppression Note 1 BFNNEB8019 Service: (RAD) (4) Chamber N<sub>2</sub> н <sup>т</sup> 8 Appx 1 Note 1 Location: Aging N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes N/A Submergence N/A (4) No

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

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

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

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

alex Melinhow Prepared by: Reviewed by: Charles Jule

QA Acceptance:

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# NEB76-239B, APPENDIX 1, REVISION O

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for  $90^{\circ}$  C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.



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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB- 76-239C Revision Unit: 1,2,3 0 50-259, 50-260, 50-296 10/27/80 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Containment Operating Inerting 1 year Appx 1 NCR Plant ID No. FCV-76-24 Time (1) Note 1 BFNNEB8019. MPL #16-20-21 Component: Limit Temperature Switch (F) Figure . 11 B.8(1,2,3) . Manufacturer: (4) Nameo . . Table 11 ... Model No.: D1200G Pressure B.1(1,2,3) (PSIA) (4) Function: Outbd isln valve 100 . Relative 11 Humidity(\$) (4) . Accuracy: Reg'd: N/A Demon: N/A N/A Chemical N/A N/A N/A (4) Spray Category: Α 2.9x10<sup>5</sup> NCR Radiation Appx 1 Containmentl Service: Note 1 BFNNEB8019 (RAD) (4) N28 purge H Appx 1 Note 1 Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

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alex melnihow Prepared by: Reviewed by: Charles 5

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#### NEB-76-239C, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for 90°C (194°F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models.



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|                                                                                   |                         | System Compon                                       | VENT EVALUATIO     | on work sheet      | (Rev 2)              | (3)                  | • •         |
|-----------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------|--------------------|--------------------|----------------------|----------------------|-------------|
| Facility: Browns Ferry Nuclear                                                    | r Plant                 |                                                     |                    |                    |                      | Sheet No. NEB-76     | -240        |
| Unit: 1,2,3                                                                       |                         |                                                     |                    |                    |                      | Revision 0           | 90          |
| Docket: 50-259, 50-260, 50-2                                                      | 295                     |                                                     |                    | DOCUMENTATION REF  |                      | QUALIFICATION        | OUTSTANDING |
| EQUIPMENT DESCRIPTION                                                             |                         |                                                     |                    |                    |                      | METHOD               | ITEMS       |
| Contract 90744 & 91750                                                            | Parameter               | Specifi-<br>cation                                  | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | -                    |             |
| System: Containment<br>inerting system<br>Plant ID No. FSV-76-17<br>MPL #16-20-20 | Operating<br>Time       | A - 1 day<br>B - 1 yeau                             | ' 30 days<br>r     | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 3 | None        |
| Component: Solenoid<br>valve                                                      | Temperature<br>(F)      | Figure<br>B.8(1,2,3)                                | 290 F              |                    | 11                   | Type test            | 11          |
| Manufacturer:<br>Asco,                                                            | -                       |                                                     |                    | (4)                |                      | · · · ·              |             |
| Model No.: X8315                                                                  | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)                                 | 60                 | (4)                | и.                   | ".                   | u           |
| Function: Makeup outbd<br>isln vlv J                                              | Relative<br>Humidity(%) | 100                                                 | 100                | (4)                | LØ-                  | 11                   | 11          |
| Accuracy:<br>Req'd:<br>Demon:                                                     | Chemical<br>Spray       | N/A                                                 | N/A                | (4)                | N/A                  | N/A                  | N/A         |
| Category: A<br>Service: PRI cont N2                                               | Radiation<br>(RAD)      | (1) 3.5x10 <sup>5</sup><br>(2.3)5.1x10 <sup>5</sup> | 1x10 <sup>6</sup>  | . (4)              | See Appx 1<br>Note 2 | See Appx 1<br>Note 3 | None        |
| Location: <sup>8</sup>                                                            | Aging                   | N/A                                                 |                    | (2)                |                      | Appx 1 Note 3        | None        |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                         | Submergence             | N/A                                                 | N/A                | (4)                | N/A                  | N/A                  | N/A         |
| Notes: (1) See Section 2.4 in                                                     | 79-01B report           | ·•                                                  |                    |                    |                      | 0.0                  | 0.1         |

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

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

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

alex Melnikow Charles Tink Prepared by: Reviewed by: (

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#### NEB-76-240, APPENDIX 1, REVISION O

- ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 2. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10<sup>6</sup> rad.
- 3. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259 50-260 50-   | r Plant                 | SYSTEM COMPO                                      | NENT EVALUATIO      | ON WORK SHEET      | (Rev 2)              | (3)<br>Sheet No. <u>NEB-76</u><br>Revision 0<br>Date <u>10/27</u> / | -241        |
|-----------------------------------------------------------------------------|-------------------------|---------------------------------------------------|---------------------|--------------------|----------------------|---------------------------------------------------------------------|-------------|
| EQUIPMENT DESCRIPTION                                                       | · E                     | NVIRONMENT                                        |                     | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                                             | OUTSTANDING |
| Contract 90744 & 91750                                                      | Parameter               | Specifi-<br>cation                                | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                                                                     |             |
| System: Containment<br>inerting system<br>Plant ID No. See Appx 1<br>Note 1 | Operating<br>Time       | A – 1 day<br>B – 1 yea                            | 30 days<br>r        | (1)                | See Appx 1<br>Note 2 | See Appx 1<br>Note 4                                                | None        |
| Component: Solenoid<br>valve                                                | Temperature<br>(F)      | Figure<br>B.8(1,2,3)                              | 290 F               |                    | 11                   | . Type test                                                         | 11          |
| Manufacturer: <sub>Asco</sub>                                               | 40                      |                                                   | •                   | (4)                |                      |                                                                     |             |
| Model No.: X-8315C28                                                        | Pressure                | Table<br>B.1(1,2,3)                               | 60                  | •                  | 11                   | н                                                                   | 11          |
| Function: INBD ISLN<br>valve                                                | Relative<br>Humidity(%) | 100                                               | 100                 |                    | 11                   | 11                                                                  | 11          |
| Accuracy:<br>Req'd:<br>Demon:                                               | Chemical<br>Spray       | N/A                                               | N/A                 | (4)                | N/A                  | N/A                                                                 | N/A         |
| Category: <sup>A</sup><br>Service: Drywell N2<br>makeup                     | Radiation (<br>(RAD)    | (1)3.5x10 <sup>5</sup><br>2,3)5.1x10 <sup>5</sup> | . 1x10 <sup>6</sup> | (4)                | See Appx 1<br>Note 3 | See Appx 1<br>Note 4                                                | None        |
| Location:                                                                   | Aging                   | N/A                                               |                     | (2)                |                      | Appx 1 Note 4                                                       | None        |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                         | Submergence             | N/A                                               | N/A                 | (4)                | N/A                  | N/A                                                                 | N/A .       |

No Notes: (1) See Section 2.4 in 79-01B report.

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: alex Mehikow Reviewed by: Charles \_ T

- 1. This sheet applies to the following items FSV-76-18 and -19 (MPL #16-20-22).
- ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 3. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10<sup>6</sup> rad.
- 4. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-76-242 Facility: Browns Ferry Nuclear Plant 0 Revision 1,2,3 -Unit: 10/27/80 Date 50-259, 50-260, 50-296 Docket: DOCUMENTATION REF QUALIFICATION OUTSTANDING ENVIRONMENT METHOD EQUIPMENT DESCRIPTION **ITEMS** Specifi-Qualifi-Specifi-Qualifi-Contract 90744 & 91750 cation cation cation cation Parameter System: Containment Inerting System Operating A-1 day 30 days See Appx 1 See Appx 1 None Plant ID No. FSV-76-24 (1) B-1 year Note 1 Note 3 Time MPL #16-20-21 Component: Solenoid Temperature 290 F #1 Valve Figure 11 Type Test (F) B.8(1) Manufacturer: ASCO B.8(2,3) (4) • # Table 60 11 11 88 Model No.:WPHTX8300B45R B.1(1,2,3) Pressure (4) (PSIA) Purge Outboard Function: **Isolation Valve** 100 100 11 11 11 Relative (4) Humidity(%) Accuracy: Reg'd: N/A N/A (4) N/A Demon: Chemical N/A N/A Spray Category: 1×10<sup>6</sup> 2.9x10<sup>5</sup> See Appx 1 See Appx 1 None Radiation Service: PRI Containment Note 2 Note 3 (4) (RAD) N2 8 Appx 1 Note 3 None Location: N/A (2)Aging 1 Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A (4) Submergence N/A

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

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

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

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

Prepared by: alex Melnihow Reviewed by: Charles Jul

QA Acceptance:

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#### NEB-76-242, APPENDIX 1, REVISION 0

- ASCO report number AQ5-21678/TR This report covered an 8300 and an 8316 series valve. All valves of a particular series number are of the same basic design. Differences in materials, etc., are noted by differences in prefix or suffix letters.
- 2. Based on a material analysis of this valve, TVA has determined that the only materials limiting the allowable rad dose to the solenoid is the Buna-N diagram material. According to the guidelines of 79-01B, Buna-N is acceptable up to a dose of 1 X 10<sup>6</sup> rad.
- 3. Based on similarities between this valve and the actual valve tested, this valve has been judged to surpass the basic environmental values listed. In addition, even should the valve fail, it has been determined that it would fail safe (based on materials analysis). That is, should the diaphragms fail due to radiation, the valve would close and perform the isolation function required of it.

The only material identified in the valve which is subject to significant aging effects is the Buna-N diaphragms. In TVA's opinion, aging effects over 40 years at normal conditions would be insignificant. Aging effects from higher temperature and rad doses over the one-year accident period have also been judged to pose no serious threat to the proper functioning of this valve.

The operating time of one year pertains to category B. TVA has determined that the environment will not cause the valve to fail in such manner to adversely affect plant safety of accident mitigation.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3                      | Plant                   |                               |                    |                    |                    | Sheet No. <u>NEB-7</u><br>Revision <u>0</u> | 6-243                |
|--------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|---------------------------------------------|----------------------|
| Docket: 50-259, 50-200, 50-2                                       | F                       | NVTRONMENT                    |                    | DOCUMENTA          | TTON REF           | Date 10/27/                                 | 00<br>00<br>00<br>00 |
| EQUIPMENT DESCRIPTION                                              |                         |                               |                    | 2000112111         |                    | METHOD                                      | LTEMS                |
| Contract 90744 & 91750                                             | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                             |                      |
| System: Containment inerting                                       |                         |                               |                    |                    |                    |                                             |                      |
| Plant ID No. Addx 1<br>Note 1                                      | Operating<br>Time       | 1 year                        |                    | (1)                |                    | See Appx 1<br>Note I                        | NCR<br>BFNNEB8005    |
| Component: Hydrogen<br>element                                     | Temperature<br>(F)      | Figures<br>B.0(1.2.3)         |                    |                    |                    | n                                           | 11                   |
| lanufacturer: Geperal Electri                                      | c.                      |                               |                    | (4)                |                    |                                             |                      |
| Model No.: 47E226428G2                                             | Pressure                | Table<br>B.O(1,2,3)           |                    |                    |                    | 11                                          | 11                   |
| Function: H. detection                                             | (PSIA)                  |                               |                    | (4)                |                    |                                             |                      |
| 2                                                                  | Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | • H                                         | n                    |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report          | Chemical<br>Spray       | NZA -                         | N/A                | (4)                | N/A                | N/A 😳                                       | N/ <u>A</u>          |
| Category: A                                                        | opray                   | v 8                           |                    |                    | •                  |                                             |                      |
| Service: Drywell -                                                 | Radiation<br>(RAD)      | 8 2x10<br>A 4x10 <sup>9</sup> | *                  | (4)                |                    | See Appx 1<br>Note 1                        | NCR<br>BFNNEB8005    |
| ocation: 0                                                         | Aging                   | N/A                           |                    | (2)                |                    | 11                                          | u -                  |
| lood Level Elev:552' <sup>N/A</sup><br>bove Flood Level: Yes<br>No | Submergence             | Ń/A                           | N/A                | (4)                | N/A                | N/A                                         | N/A                  |

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

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

| Prepared by: | alex Melnikow |  |
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| Reviewed by: | Charles Junk  |  |

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#### NEB-76-243, APPENDIX 1, REVISION 0

- 1. This item applies to H E-76237, -37A, -38, -38A, -39, -39A, -40 (all MPL #16-20-45)
- 2. Please refer to TVA letter from L. M. Mills to NRC Director Harold R. Denton dated May 21, 1980, regarding the containment atmospheric monitoring system which discusses the continued use of these devices.

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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3<br>Docket: 50-259 50-260, 50- | r Plant                 | System Compo                               | NENT EVALUATI      | ON WORK SHEFT      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-77</u><br>Revision <u>0</u><br>Date <u>10/27/4</u> | -244                  |
| FOULDWENT DESCRIPTION                                                      | E                       | NVIRONMENT                                 |                    | DOCUMENTA          | TION REF           | QUALIFICATION                                                              | OUTSTANDING           |
| Contract 90744 & 91750                                                     | Parameter               | Specifi-<br>cation                         | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                            | ITED                  |
| System: Radwaste<br>Plant ID No. See Appx 1<br>Note 1                      | Operating<br>Time       | lyn                                        |                    | (1)                |                    | See Appx 1<br>Note 2                                                       | Sec NCR<br>BFNNEB8024 |
| Component: Level<br>Switch                                                 | Temperature<br>(F)      | Figure<br>B.0(1,2,3)                       |                    | · · · ·            |                    | 11                                                                         |                       |
| GEMS                                                                       | ÷                       |                                            |                    | (4)                |                    |                                                                            |                       |
| Model No.: XM-36425 type                                                   | Pressure<br>(PSIA)      | Table<br>B.O(1,2,3)                        |                    | (4)                | • •                | 11                                                                         | 11                    |
| Function: Fluid level<br>detection                                         | Relative<br>Humidity(%) | 100                                        |                    | (4)                |                    | 11                                                                         |                       |
| Accuracy:<br>Req'd:<br>Demon:                                              | Chemical<br>Spray       | N/A                                        | N/A .              | (4).               | N/A                | N/A                                                                        | N/A                   |
| Category: A<br>Service: Radwaste - dw <sup>.</sup>                         | Radiation<br>(RAD)      | 2x10 <sup>8</sup> Y<br>4x10 <sup>9</sup> B |                    | (4)                | •                  | See Appx 1<br>Note 2                                                       | See NCR<br>BFNNEB8024 |
| Sump<br>Location: 0                                                        | Aging                   | N/A                                        |                    | (2)                |                    | 11                                                                         | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                        | Submergence             | N/A                                        | N/A                | (4)                | N/A                | N/A .                                                                      | N/A                   |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jule</u>

1. This sheet applies to the following items:

LIS-77-1A MPL #20-351-1 LIS-77-18, MPL #20-352-1 LT-77-1A MPL #20-351 LT-77-1B MPL #20-352 LT-77-14A MPL #20-360 LT-77-14B MPL #20-361 LIS-77-14A MPL #20-360-1 LIS-77-14B MPL #20-361-1

2. These instruments, which service the drywell and equipment drain sumps, are referenced in TVA operations procedures as aids in detecting certain accidents. In actuality, they provide the operator "symptomatic" information which is desirable but not essential in mitigation of accidents. It has been determined that failure of these instruments would not preclude safe shutdown or accident mitigation. TVA will either replace the existing devices with qualified devices or determine if revision of operating procedures to remove inference that these devices are necessary for accident mitigation is acceptable.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB\_77-249 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1.2.3 10/27/80 50-259, 50-260, 50-296 Date Docket: DOCUMENTATION REF . ENVIRONMENT QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Radwaste A - 1 hour See Appx 1 See NCR Operating B - 1 year BFNNEB8026 Note 2 Plant ID No. See Appx 1 Note 1 Time (1)Component: Solenoid Valve Temperature B.6(1,2,3) (F) n .. Manufacturer: VERSA (4) Table VSG-3521 Model No.: B.1(1,2,3) Pressure 11 .. (PSIA) (4)Function: Drywell FD Sump 100 H ... Relative (4)Humidity(\$) Accuracy: Reg'd: Demon: Chemical N/A N/A (4) N/A N/A · N/A Spray Category: A See Appx 1 See NCR Radiation 3.11107 Note 2 BFNNEB8026 Water Service: (RAD) (4) Location: 6 n ... Aging N/A (2) . Flood Level Elev:552'N/A Above Flood Level: Yes Submergence N/A N/A (4) N/A N/A N/A No

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles</u> Julk

QA Acceptance:\_\_\_\_

1. This sheet applies to the following items.

| FSV | 77-2A  | MPL | <b>#20-82</b>   |
|-----|--------|-----|-----------------|
| FSV | 77-2B  | MPL | <i>\$</i> 20-83 |
| FSV | 77–15A | MPL | <i>4</i> 20–94  |
| FSV | 77-15B | MPL | <i>#</i> 20-95  |

2. These solenoid valves which service the drywell floor drain and equipment drain sumps are required only to close for isolation purposes. No credit is taken for reopening the valves. Analysis of actual physical configuration of solenoid valves indicates that all postulated solenoid failures would result in closing of the valves, thus these valves will fail-safe. Ultimate failure of all O-rings due to radiation damage could not result in reopening of the valves. Not withstanding this argument, TVA will commit to either qualification by type testing or replacement with qualified equipment.

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| Facility: Browns Ferry Nuclear PlantSheat No. MEE-77-209ABooket: $j0.259, 50-260, 50-296Sheat No. MEE-77-209ABooket: 50-259, 50-260, 50-296DOCUMENTATION REFSheat No. MEE-77-209ABooket: 50-259, 50-260, 50-296Contract 90744 \pm 91750Specifi-Qualifi-cationQualifi-cationSpecifi-CationQualifi-cationSpecifi-CationQualifi-cationSpecifi-CationQualifi-cationSpecifi-CationQualifi-cationComponent: Limit switchNCRBFNNEB8006Temperature(F)FiguresB.6(1)%Pressure(F)Note 1See Appx 1Note 1Note 2TableB.6(1)%MEL 77.210.4MEE 77.210.4MEE 77.210.4MEE 77.210.4Outs for call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on call on ca$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                               |                                         | SYSTEM COMPO        | NENT EVALUATIO                         | ON WORK SHEET | (Rev 2)    | (3)                        |            |            |  |           |          |               |             |
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| Mail 10, 1, 2, 3<br>Docket: Decket: <thdecket:< th=""> &lt;</thdecket:<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reallity: Browns Ferry Nuclea                                                                                                                                 | r Plant                                 |                     |                                        |               |            | Sheet No. NEB-77           | -249A      |            |  |           |          |               |             |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | init: 123                                                                                                                                                     | ~                                       |                     |                                        |               | 1          | Revision 0                 |            |            |  |           |          |               |             |
| DOUMENT DOULD () DOULS () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () DOUL () <td>50,250</td> <td>296</td> <td></td> <td></td> <td></td> <td></td> <td>Date 10/27/</td> <td>80 ,</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 50,250                                                                                                                                                        | 296                                     |                     |                                        |               |            | Date 10/27/                | 80 ,       |            |  |           |          |               |             |
| Contract 90744 & 91750METHOD ITENS:METHODTENDTENDSpecifi-<br>cationCalionCalionCalionSystem: RadWasteOperating<br>Time1 year<br>cationCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalionCalion <th calion<="" colspan="6" t<="" td=""><td>DOCKEL: 30-233, 30-200, 30</td><td>E</td><td>NVIRONMENT</td><td></td><td>DOCUMENTA</td><td>TION REF</td><td>QUALIFICATION</td><td>OUTSTANDING</td></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <td>DOCKEL: 30-233, 30-200, 30</td> <td>E</td> <td>NVIRONMENT</td> <td></td> <td>DOCUMENTA</td> <td>TION REF</td> <td>QUALIFICATION</td> <td>OUTSTANDING</td> |                                         |                     |                                        |               |            | DOCKEL: 30-233, 30-200, 30 | E          | NVIRONMENT |  | DOCUMENTA | TION REF | QUALIFICATION | OUTSTANDING |
| System: Radwaste Specifi-<br>cation Qualifi-<br>cation Qualifi-<br>cation Qualifi-<br>cation Qualifi-<br>cation   System: Radwaste   Plant ID No. FCV-77-2AAB<br>MPL /20-82,83   Component: Limit switch   Manufacturer: Microswitch   Manufacturer: Microswitch   Model No.: BZE6-2RH<br>floor drain sump   Function: Outlet<br>floor drain sump   Accuracy: Req'd:   Req'd: N/A   Service: Indi isol<br>valve   Category: A<br>Aging   Node Level Elev:552* N/A<br>Above Flood Level:   Yes Submergence   N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FOUL PMENT DESCRIPTION                                                                                                                                        | -                                       |                     |                                        |               |            | METHOD                     | ITEMS      |            |  |           |          |               |             |
| Parameter oation cation cation cation cation   System: Radwaste   Plant ID No. FCV-77-2AAB<br>MPL #20-82,83 Operating<br>Time 1 year (1) See Appx 1<br>Note 1 See Appx 1<br>Note 2 NCR<br>BFNNEB8006   Component: Limit switch Pressure<br>(F) Pigures<br>B.6(1)<br>B.6(2,3) 400 F " " " "   Manufacturer: Microswitch Pressure<br>(PSIA) Pigures<br>B.6(1),2,3) 400 F " " " "   Modél No.: BZE6-28H Pressure<br>(PSIA) Pressure<br>(PSIA) 100 " " " "   Function: Outlet<br>floor drain sump Relative<br>Humidity(S) 100 " " " "   Accuracy:<br>Req'd: N/A N/A N/A N/A N/A N/A N/A   Service: Inbd isol<br>valve Spray 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> See Appx 1<br>(4) N/A N/A   Flood Level Elev:552* N/A<br>Above Flood Level: Yes Submergence N/A N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contract 90744 & 91750                                                                                                                                        | ·                                       | Specifi-            | Qualifi-                               | Specifi-      | Qualifi-   |                            |            |            |  |           |          |               |             |
| System: Radwaste Operating<br>MPL #20-82,83 1 year<br>Time 1 year<br>Time 1 year<br>Time 1 year<br>(1) See Appx 1<br>Note 1 See Appx 1<br>Note 2 NCR<br>BFNNEB8006   Component: Limit switch Temperature<br>(F) Pigures<br>B.6(1)<br>B.6(2,3) 400 F " " " " "   Manufacturer: Microswitch Table<br>B.1(1,2,3) 400 F " " " " "   Model No.: BZE6-2RN Pressure<br>(PSIA) Pressure<br>(PSIA) 100 " " " " "   Function: Outlet<br>floor drain sump Relative<br>Humidity(\$) 100 (4) " " " "   Accuracy:<br>Req'd: N/A N/A N/A (4) N/A N/A % %   See Appx 1<br>Note 2 See Appx 1<br>Note 2 See Appx 1<br>Note 2 % % %   Chemical<br>Decation: N/A N/A N/A (4) N/A N/A   Flood Level Elev:552' N/A<br>Above Flood Level Yes Submergence N/A N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               | Parameter                               | cation              | cation                                 | cation        | cation     |                            |            |            |  |           |          |               |             |
| Plant ID No. FCV-77-2AAB<br>MPL r20-82,83 Operating<br>Time 1 year (1) See Appx 1<br>Note 1 See Appx 1<br>Note 2 Note 2 Description   Component: Limit switch Temperature<br>(F) Figures<br>B.6(1)<br>B.6(2,3) 400 F " " " " "   Manufacturer: Microswitch Table<br>B.1(1,2,3) 400 F " " " " "   Model No.: BZE6-2RN<br>Finction: Pressure<br>(PSIA) Pressure<br>(PSIA) 100 " " " " "   Accuracy:<br>Req'd: N/A 100 (4) " " " "   Accuracy:<br>Req'd: N/A 100 (4) N/A N/A See Appx 1 See Appx 1   Service: Inbd isol<br>valve Ratiation<br>(RAD) 1.1x10 <sup>8</sup> (4) N/A N/A See Appx 1 See Appx 1   Flood Level Elev:552' N/A Aging N/A N/A N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | System: Radwaste                                                                                                                                              |                                         |                     |                                        |               |            |                            |            |            |  |           |          |               |             |
| Plant ID No. FCV-77-2AR<br>MPL r20-82,83<br>Component: Limit switchTimeImage: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                               | Operating                               | 1 year              |                                        |               | See Appx 1 | See Appx 1                 | NCR        |            |  |           |          |               |             |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Plant ID No. FCV-77-2A&B                                                                                                                                      | Time                                    |                     |                                        | . (1)         | Note 1     | Note 2                     | BFNNEB8006 |            |  |           |          |               |             |
| Component: Limit switch<br>Manufacturer: MicroswitchTemperature<br>(F)Figures<br>B.6(1)<br>B.6(2,3)400 F"""""Manufacturer: Microswitch<br>Model No.: BZE6-2RN<br>Function: Outlet<br>floor drain sumpPressure<br>(PSIA)Table<br>B.1(1,2,3)""""""Madel No.: BZE6-2RN<br>Function: Outlet<br>floor drain sumpPressure<br>(PSIA)100(4)"""""Function: Outlet<br>floor drain sumpRelative<br>Humidity(\$)100(4)"""""Accuracy:<br>Req'd: N/A<br>Demon:Relation<br>(RAD)N/AN/AN/A(4)N/AN/AN/AService: Inbd isol<br>valve<br>Location: 6AgingN/AN/A(2)""""Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>NoSubmergenceN/AN/AN/A(4)N/AN/AN/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MPL #20-82,83                                                                                                                                                 |                                         |                     |                                        |               |            | <br>                       |            |            |  |           |          |               |             |
| Manufacturer:<br>Manufacturer:<br>Model No.:B.6(1)<br>B.6(2,3)400 F""""Model No.:BZE6-2RN<br>Function:<br>floor drain sumpPressure<br>(PSIA)Pressure<br>(Humidity(\$)"""""Model No.:BZE6-2RN<br>Floor drain sumpPressure<br>(PSIA)Pressure<br>(Humidity(\$)100"""""Accuracy:<br>Req'd:<br>Demon:Relative<br>Humidity(\$)100(4)"""""Accuracy:<br>Req'd:<br>N/A<br>Demon:Relation<br>(RAD)N/AN/AN/A(4)N/AN/AN/AService:<br>valve<br>Location:Inbd isol<br>valve3.1x1071x108See Appx 1<br>(4)See Appx 1<br>Note 2Scee Appx 1<br>BFNNEB8006Scee Appx 1<br>Mote 2Scee Appx 1<br>Mote 2 <td>Component: Limit switch</td> <td>Temperature</td> <td>Figures</td> <td>had a</td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Component: Limit switch                                                                                                                                       | Temperature                             | Figures             | had a                                  |               |            |                            |            |            |  |           |          |               |             |
| Manufacturer:<br>MicroswitchMicroswitchB. b(2,3)(4)Image: Constraint of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                               | (F)                                     | B.6(1)              | 400 F                                  |               |            |                            |            |            |  |           |          |               |             |
| Manufacturer: Microswitch Table (4) Constraints   Modèl No.: BZE6-2RN Pressure Table """"""""""""""""""""""""""""""""""""                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | · · · ·                                                                                                                                                       |                                         | B.6(2,3)            |                                        |               |            |                            |            |            |  |           |          |               |             |
| Model No.:BZE6-2RNPressure<br>(PSIA)Pressure<br>(B.1(1,2,3))"""""Function:Outlet<br>floor drain sumpRelative<br>Humidity(\$)100(4)""""Accuracy:<br>Req'd:<br>N/A<br>Demon:Relative<br>Humidity(\$)100(4)""""Category:A<br>SprayChemical<br>SprayN/AN/A(4)N/AN/AN/AN/ACategory:A<br>SprayRadiation<br>(RAD)3.1x1071x108See Appx 1<br>Note 1See Appx 1<br>Note 2See Appx 1<br>SFNNEB8006See Appx 1<br>Note 2N/C?<br>SFNNEB8006Flood Level Elev:552:N/A<br>No<br>NoSubmergenceN/AN/A(4)N/AN/AS:/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Manufacturer: Microswitch                                                                                                                                     |                                         |                     |                                        | (4)           |            |                            |            |            |  |           |          |               |             |
| Model No.:BZE6-2RNPressure<br>(PSIA)Pressure<br>(PSIA)B.1(1,2,3)M.4Function:Outlet<br>floor drain sumpRelative<br>Humidity(\$)100(4)""Accuracy:<br>Req'd:<br>Demon:N/AN/AN/A(4)N/AN/A"Category:AChemical<br>SprayN/AN/AN/A(4)N/AN/AN/ACategory:AAAN/AN/A(4)N/AN/AN/AService:Inbd isol<br>valve<br>Location:BaingN/A1x108See Appx 1<br>Note 1See Appx 1<br>Note 2See Appx 1<br>SFNNEB8006Flood Level Elev:552'N/A<br>NoSubmergenceN/AN/A(4)N/AN/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                               |                                         | Table               | · ·                                    |               |            |                            | 11         |            |  |           |          |               |             |
| Model No.: BZED-2BN Pressure<br>(PSIA) Pressure<br>(PSIA) (4) Image: Constraint of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of th                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                               |                                         | 8.1(1,2,            | 5)<br>                                 |               | · · ·      |                            |            |            |  |           |          |               |             |
| Function: Outlet<br>floor drain sump<br>Relative<br>munidity(1) 100 (4) " "   Accuracy:<br>Req'd: N/A<br>Demon: Relative<br>Humidity(1) 100 (4) " " "   Accuracy:<br>Req'd: N/A<br>Demon: Relative<br>Humidity(1) 100 (4) " " "   Accuracy:<br>Req'd: N/A<br>Demon: Relative<br>Humidity(1) N/A N/A (4) N/A N/A   Chemical<br>Spray N/A N/A N/A (4) N/A N/A N/A   Service: Inbd isol<br>valve Radiation<br>(RAD) 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> See Appx 1<br>(4) See Appx 1<br>Note 1 N/C?<br>BFNNEB8006   Flood Level Elev:552' N/A Submergence N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Model No.: BZED-2RN                                                                                                                                           | Pressure                                |                     |                                        |               | [          |                            |            |            |  |           |          |               |             |
| Function:Outlet<br>floor drain sump<br>Relative<br>Humidity(\$)Relative<br>Humidity(\$)100"""""Accuracy:<br>Req'd:<br>Demon:Relative<br>Humidity(\$)N/AN/A(4)N/AN/AN/AN/ACategory:<br>A<br>Demon:AChemical<br>SprayN/AN/A(4)N/AN/AN/ACategory:<br>A<br>Service:Inbd isol<br>valve<br>Location:Radiation<br>(RAD)3.1x1071x108(4)N/AN/AN/AFlood Level Elev:552 *<br>N/A<br>Above Flood Level:<br>YesN/ASubmergenceN/AN/A(4)N/AN/AN/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0                                                                                                                                                             | (PSIA)                                  |                     | ······································ | (4)           |            |                            |            |            |  |           |          |               |             |
| Accuracy:<br>Req'd: N/A<br>Demon:Relative<br>Humidity(x)N/AN/A(4)N/AN/AN/ACategory:<br>A<br>Category:<br>A<br>Service:Inbd isol<br>valve<br>Location:N/AN/AN/AN/AN/AN/AN/AFlood Level Elev:552:N/A<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Function: Outlet                                                                                                                                              |                                         | 100                 | ٠ •                                    |               | , III ,    |                            | n          |            |  |           |          |               |             |
| Accuracy:<br>Req'd: N/A<br>Demon: N/A N/A N/A N/A N/A N/A   Category: A Chemical<br>Spray N/A N/A N/A N/A N/A N/A   Category: A A Spray 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> (4) N/A N/A N/A   Service: Inbd isol<br>valve Aging N/A 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> (4) Note 1 See Appx 1<br>Note 2 Sce<br>BFNNEB8006   Location: 6 Aging N/A (2) " " "   Flood Level Elev:552' N/A Submergence N/A N/A (4) N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1100r orain sump                                                                                                                                              | Relative                                | 100                 |                                        |               |            |                            |            |            |  |           |          |               |             |
| Accuracy:<br>Req'd: N/A<br>Demon: N/A N/A N/A N/A N/A N/A   Category: A<br>Category: A Chemical<br>Spray N/A N/A N/A (4) N/A N/A N/A   Service: Inbd isol<br>valve Radiation<br>(RAD) 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> (4) See Appx 1<br>Note 1 See Appx 1<br>Note 2 N/C?<br>BFNNEB8006   Location: 6 Aging N/A (2) " "   Flood Level Elev:552: N/A<br>No Submergence N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                               | Humidity(\$)                            |                     |                                        | (4)           |            | <u> </u>                   | i<br>      |            |  |           |          |               |             |
| Req'd:N/AN/AN/AN/AN/AN/AN/ADemon:SprayN/AN/AN/AN/AN/AN/AN/ACategory:ARadiation<br>(RAD)3.1x1071x108See Appx 1<br>(4)See Appx 1<br>Note 1See Appx 1<br>Note 2Sc?<br>BFNNEB8006Service:Inbd isol<br>valve<br>Location:AgingN/A(4)N/AN/ASce Appx 1<br>Note 2Sc?<br>BFNNEB8006Location:6AgingN/A(2)"""Flood Level Elev:552:N/A<br>N/ASubmergenceN/AN/A(4)N/AN/ASca                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Accuracy:                                                                                                                                                     |                                         |                     |                                        | ļ             |            |                            |            |            |  |           |          |               |             |
| Demon: Chemical N/A N/A (4) See Appx 1 See Appx 1   Category: A Radiation<br>valve 3.1x10 <sup>7</sup> 1x10 <sup>8</sup> (4) See Appx 1 See Appx 1   Service: Inbd isol<br>valve Aging N/A (2) " "   Flood Level Elev:552: N/A Aging N/A N/A (4) N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Req'd: N/A                                                                                                                                                    |                                         |                     |                                        |               | Ń/A        | N/A                        | N/A        |            |  |           |          |               |             |
| Category: A Spray Sec Appx 1 See Appx 1 Note 2 NCP   Service: Inbd isol valve Aging N/A (4) Note 1 Note 2 BFNNEB8006   Location: 6 Aging N/A (2) " " "   Flood Level Elev:552: N/A Submergence N/A N/A (4) N/A N/A State                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Demon:                                                                                                                                                        | Chemical                                | N/A                 | N/A                                    | (4)           |            |                            |            |            |  |           |          |               |             |
| $\frac{1}{2} \frac{1}{2} \frac{1}$ | A                                                                                                                                                             | Spray                                   |                     | 0                                      |               |            |                            |            |            |  |           |          |               |             |
| Service:   Inbd isol<br>valve   Indiation<br>(RAD)   Image: N/A   N/A   (4)   Note 1   Note 2   BFNNEB8006     Location:   6   Aging   N/A   (2)   "   "   "     Flood Level Elev:552*   N/A<br>Above Flood Level: Yes   Submergence   N/A   N/A   N/A   N/A   N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | category:                                                                                                                                                     | Dediction                               | 3.1x10 <sup>7</sup> | I x 10 <sup>0</sup>                    | 1             | See Appx 1 | See Appx 1                 | NCP        |            |  |           |          |               |             |
| Service: valve (1) (1)   6 Aging N/A (2) "   Flood Level Elev:552: N/A Submergence N/A N/A   Above Flood Level: Yes Submergence N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Inbd isol                                                                                                                                                     |                                         |                     |                                        |               | Note 1     | Note 2                     | BFNNEB8006 |            |  |           |          |               |             |
| Location: 6 Aging N/A (2) " "   Flood Level Elev:552* N/A Above Flood Level: Yes Submergence N/A N/A N/A N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | valve                                                                                                                                                         | ((((((((((((((((((((((((((((((((((((((( |                     |                                        | (4)           |            |                            |            |            |  |           |          |               |             |
| Location: Aging N/A N/A   Flood Level Elev:552: N/A   Above Flood Level: Yes Submergence   N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6                                                                                                                                                             | Aging                                   | N/A                 |                                        | (2)           |            | 11                         | n          |            |  |           |          |               |             |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes Submergence N/A N/A (4) N/A N/A X/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                               | ABIUR                                   | N/ A                | ·                                      |               |            |                            |            |            |  |           |          |               |             |
| Above Flood Level: Yes Submergence N/A N/A (4) N/A N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Flood Level Flev:5521 N/A                                                                                                                                     | •                                       |                     |                                        |               |            |                            |            |            |  |           |          |               |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Above Flood Level · Yes                                                                                                                                       | Submergence                             | N/A                 | N/A                                    | (4)           | N/A        | N/A                        | SZA –      |            |  |           |          |               |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | No .                                                                                                                                                          | Sumer Deneo                             |                     |                                        |               |            |                            |            |            |  |           |          |               |             |

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

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

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

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

Prepared by: <u>Alex Melnibow</u> Reviewed by: <u>Charles Jule</u>

- 1. Microswitch (Honeywell) catalog No. 40 limit and enclosed switches.
- 2. Qualification to the specified environmental conditions cannot be documented at this time. However, the microswitch catalog describes a standard basic switch in a phenolic case with metalic components of silver and beryllium copper.8 It was, therefore, judged to have a radiation tolerance of 10 rads. Other operating features are temperature tolerance (400 F) and a wide range of seals. It was concluded that interim operation can be justified. TVA is committed to pursuit of qualified documentation and type testing or replacement.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB- 77-2498 Facility: Browns Ferry Nuclear Plant 1.2.3 Unit: Revision 0 Docket: 50-259, 50-260, 50-296 10/27/80 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD **TTEMS** Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Radwaste Operating 1 hour See Appx 1 See Appx 1 NCR Plant ID No. FCV-77-15A&B Time (1)Note 1 Note 2 BFNNEB8006 MPL #20-94,95 Component: Limit switch Temperature Figures (F) B.6(1) 400 F 11 11 11 B.6(2,3) Manufacturer: (4) Microswitch Table B.1(1,2,8)11 81 11 Model No.: BZE6-2RN Pressure (PSIA) (4) Function: Drywell floor drain sump Relative 100 11 11 11 Humidity(%) (4)Accuracy: Req'd: N/A Demon: Chemical N/A N/A N/A N/A (4) N/A Spray Category: A l x10<sup>8</sup>

N/A

3.1x10<sup>7</sup>

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N/A

N/A

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

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valve 6

Flood Level Elev:552' N/A

Above Flood Level: Yes

Service:

Location:

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

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

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

Radiation

Submergence

(RAD)

Aging

alex Melnihow Prepared by: Reviewed by: Charles -

See Appx 1

Note 2

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N/A

NCR

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N/A .

BFNNEB8006

QA Acceptance:

See Appx 1

Note 1

N/A

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- 1. Microswitch (Honeywell) catalog No. 40 limit and enclosed switches.
- 2. Qualification to the specified environmental conditions cannot be documented at this time. However, the microswitch catalog describes a standard basic switch in a phenolic case with metalic components of silver and beryllium copper.<sub>8</sub> It was, therefore, judged to have a radiation tolerance of 10 rads. Other operating features are temperature tolerance (400° F) and a wide range of seals. It was concluded that interim operation can be justified. TVA is committed to pursuit of qualified documentation and type testing or replacement.



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| Facility: Browns Ferry <sup>7</sup> Nucles<br>Unit: 1,2,3<br>Deckot: 50,250, 50,260, 50, | nr Plant                | SYSTEM COMPON           | IENT EVALUATIO     | ON WORK SHEET      | (Rev 2)                               | (3)<br>Sheet No. <u>NEG-77</u><br>Revision <u>0</u><br>Date <u>10/27</u> /1 | 7 <u>- 250</u><br>80 |
|------------------------------------------------------------------------------------------|-------------------------|-------------------------|--------------------|--------------------|---------------------------------------|-----------------------------------------------------------------------------|----------------------|
| DOCKEL: 50-259, 50-200, 50-                                                              | E                       | NVIRONMENT <sup>.</sup> | ,,,                | DOCUMENTAT         | TION REF                              | QUALIFICATION                                                               | OUTSTANDING          |
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                                          | Parameter               | Specifi-<br>cation      | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation                    | MSTNOD                                                                      |                      |
| System: Radwaste -                                                                       |                         |                         |                    |                    | -                                     |                                                                             |                      |
| Plant ID No. LS-77-8A<br>MPL #20-355                                                     | Operating<br>Time       | l year .                |                    | (1)                |                                       | Appendix 1<br>Note 1                                                        | NCR<br>BFNNEB8029    |
| Component: Level <sup>•</sup><br>Switch                                                  | Temperature<br>(F)      | Figures<br>B.2(1)       | •                  | •                  | <u></u>                               | 11                                                                          | 11                   |
| Manufacturer: Autocon                                                                    |                         | B.2(2,3)                |                    | (4)                | *                                     |                                                                             |                      |
| Model No.: M-1                                                                           | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)     |                    | (4)                | `.                                    | u                                                                           | 11                   |
| Function: Fluid Level<br>Detection                                                       | Relative<br>Humidity(%) | 100                     | ſ                  | (4)                |                                       | 11                                                                          | 11                   |
| Accuracy:<br>Req'd: Not<br>Demon: Specified                                              | Chemical<br>Spray       | N/A                     | N/A                | (4)                | N/A                                   | N/A                                                                         | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Radwaste</sup>                                   | Radiation<br>(RAD)      | 3x 10 <sup>7</sup>      | ••••               | (4)                | *                                     | Appendix 1<br>Note 1                                                        | NCR<br>BFNNEB8029    |
| Location: 2                                                                              | Aging                   | N/A                     |                    | (2)                | · · · · · · · · · · · · · · · · · · · | Appx 1 Note <sup>3</sup> 1                                                  | 11                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No                     | Submergence             | N/A                     | N/A                | (4)                | N/A                                   | N/A                                                                         | N/A                  |

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Junk</u>

NEB-77-250

Appendix 1, Rev 0

 To date, TVA has received limited infomation on these items. Vendor drawings and additional materials information are still being actively sought through several sources; thus analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Information received to date suggests that these quality switches do not contain parts susceptible to environemntal damage. Complete material information is expected from the vendor in the near future. It appears, at this time, that these devices will pass an environmental type test.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-77-251 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 Docket: 50-259, 50-260, 50-296 Date ENVIRONMENT DOCUMENTATION REF OUTSTANDING QUALIFICATION EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Radwaste Operating 1 year NCR Appendix 1 Plant ID No. LS-77-8B Time (1)Note 1 BFNNEB8029 MPL #20-355 Component: Level Temperature Switch (F) Figures .... 11 B.5(1) Manufacturer: B.5(2,3) (4) Autocon . Table 11 n B.1(1,2,3) Model No.: M-4 Pressure (PSIA) (4) Function: Fluid Level Detection 100 11 ti i Relative (4) Humidity(%) Accuracy: Req'd: Not Demon: Specified N/A ----N/A N/A Chemical N/A N/A (4) Spray Category: A 3x10<sup>7</sup> . . NCR Appendix 1 Radiation Radwaste BFNNEB8029 Note 1 Service: (RAD) (4) Sump 11 5 Appx 1 Note 1 Location: Aging N/A (2) Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

alex Melnikow Prepared by: Reviewed by: ( halles

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NEB-77-251

1. To date, TVA has received limited infomation on these items. Vendor drawings and additional materials information are still being actively sought through several sources; thus analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Information received to date suggests that these quality switches do not contain parts susceptible to environemntal damage. Complete material information is expected from the vendor in the near future. It appears, at this time, that these devices will pass an environmental type test.



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### SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)

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

Sheet No. NEB-77\_252 Revision 0

Date

10/27/80

50-259, 50-260, 50-296 Docket:

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ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING METHOD EQUIPMENT DESCRIPTION ITEMS Specifi-Qualifi-Contract 90744 & 91750 Specifi-Qualifi-Parameter cation cation cation cation System: Radwaste Operating 1 year Appendix 1 NCR Plant ID No. TE-77-14 Time (1)Note 1 BFNNEB8027 MPL #20-362 Temperature Component: Temperature Element (F) Figure 11 11 B.0(1,2,3) -, Manufacturer: (4) Thermo-Elect Table 11 11 Model No.: B7582-1 Pressure **B.1(1,2,3)** (4) , (PSIA) Function: Temp Measure Relative 100 11 Ħ Humidity(\$) (4) Accuracy: Reg'd: See Section Demon: 4.1.3 in report N/A (4) Chemical N/A N/A N/A N/A Spray Category: A • • 2x10<sup>8</sup> γ <sup>μ</sup>x10<sup>9</sup> β Radiation Appendix 1 NCR BFNNEB8027 Service: Radwaste Equip (RAD) (4) Drain Sump Location: 0 11 N/A (2) Appx 1 Note 1 Aging Flood Level Elev:552' N/A N/A N/A (4) N/A Above Flood Level: Yes Submergence N/A N/A No

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

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

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

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

Prepared by: alex Melnikow Reviewed by: Charles Jule

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NEB-77-252

Appendix 1, Rev 0

1. To date, TVA has yet to receive any information on these items. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Based on past operating experience, the temperature elements are expected to perform satisfactorily. Materials of construction are stainless steel, ceramic, and copper constantan. It is in TVA's engineering judgment that the specified environment will not adversely affect the components function. Although qualified documentation is not available at this time, TVA is committed to pursue qualified information, type testing, or replacement with qualified components.

It should be noted that even if TE-77-14 fails to indicate sump temperature, the operator should conservatively operate in the recirculation mode prior to discharging to waste collector tank.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

(3) Sheet No. <u>NEB-77-259</u> Revision <u>O</u>

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

Date 10/27/80

| EQUIPMENT DESCRIPTION                                     | ENVIRONMENT             |                                            |                    | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|-----------------------------------------------------------|-------------------------|--------------------------------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| Contract 90744 & 91750                                    | Parameter               | Specifi-<br>cation                         | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |
| System: Radwaste                                          | Operating               | 1 year                                     |                    |                    |                    | Appendix 1              | NCR                  |
| Plant ID No. TE-77-17<br>MPL #20-366                      | Time                    |                                            |                    | · (1)              |                    | Note 1                  | BFNNEB8027           |
| Component: Temperature<br>Element                         | Temperature<br>(F)      | Figures<br>B.4(1) <sup>,</sup><br>B.4(2,2) |                    | × (h)              |                    | 11                      | 11                   |
| Manufacturer: Thermo-Elect                                |                         | Table                                      |                    |                    |                    | 11                      | 11                   |
| Model No.: B7582-1                                        | Pressure<br>(PSIA)      | R.1(1,2,3)                                 |                    | (4)                |                    |                         |                      |
| Function: RB Equipment<br>Sump - Temp                     | Relative<br>Humidity(%) | 100                                        | ÷                  | (4)                |                    | 11                      | н ,                  |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.2 of report | Chemical<br>Spray       | N/A                                        | N/A                | (4)                | N/A                | N/A                     | N/A                  |
| Category: A<br>Service: <sup>Water</sup> .                | Radiation<br>(RAD)      | 3x10 <sup>7</sup>                          |                    | (4)                |                    | Appendix 1<br>Note 1    | NCR<br>BFNNEB8027    |
| Location: 4                                               | Aging                   | N/A                                        |                    | (2)                |                    | Appx 1 Note 1           | 11                   |
| Flood Level Elev:552; N/A<br>Above Flood Level: Yes<br>No | Submergence             | N/A                                        | N/A                | , (4)              | N/A                | N/A                     | N/A                  |

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

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

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

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

Prepared by: alex Melnik Reviewed by: (

#### NEB-77-259

#### Appendix 1, Rev O

1. To date, TVA has yet to receive any information on these items. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Based on past operating experience, the temperature elements are expected to perform satisfactorily. Materials of construction are stainless steel, ceramic, and copper constantan. It is in TVA's engineering judgment that the specified environment will not adversely affect the components function. Although qualified documentation is not available at this time, TVA is committed to pursue qualified information, type testing, or replacement with qualified components.

It should be noted that even if TE-77-17 fails to indicate sump temperature, the operator should conservatively operate in the recirculation mode prior to discharging to waste collector tank.

| Facility: Browns Ferry Nucle                                         | ar Plant                | System Compoi                 | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 77</u> | -260                 |
|----------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|---------------------------------|----------------------|
| Unit: 1,2,3<br>Dooket: 50-250 50-260 50                              | -206                    |                               |                    |                    |                    | Revision 0                      | 30                   |
| EQUIPMENT DESCRIPTION                                                | Ē                       | NVIRONMENT                    | <u> </u>           | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD         | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750 _                                             | Parameter -             | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                 |                      |
| System: Radwaste<br>Plant ID No. LS-77-17A<br>MPL #20-365            | Operating<br>Time       | 1 year                        | 2 hours            | (1)                |                    | Appendix 1<br>Note 1            | NCR<br>BFNNEB8029    |
| Component: Level<br>Switch<br>Manufacturer: Autocon                  | Temperature<br>(F)      | Figures<br>B.4(1)<br>B.4(2,3) |                    | ,<br>(4)           |                    | "-                              | n<br>-               |
| Model No.: M-5                                                       | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)           |                    | (4)                | -                  | "                               | . u                  |
| Function: RB Equip.<br>Sump Lo-Hi-Hi-Hi                              | Relative<br>Humidity(%) | 100                           |                    | (4)                |                    | <i>∝</i> 11                     | 12                   |
| Accuracy:<br>Req'd:`Not<br>Demon: Specified                          | Chemical<br>Spray       | N/A                           | N/A .              | (4)                | N/A                | N/A<br>-                        | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Water</sup> ·                | Radiation<br>(RAD)      | 3x 10 <sup>?</sup>            |                    | (4)                |                    | Appendix 1<br>Note 1            | NCR<br>BFNNEB8029    |
| Location: 4                                                          | Aging                   | N/A                           |                    | (2)                |                    | Appx <sub>1</sub> Note 1        | п,                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No | Submergence             | N/A                           | N/A `              | (4)                | N/A                | N/A                             | N/A -                |

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

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

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

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

Prepared by: <u>Alex Melnihow</u>. Reviewed by: <u>Charles Jule</u>.

QA Acceptance:

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NEB-77-260

#### Appendix 1, Rev 0

 To date, TVA has received limited infomation on these items. Vendor drawings and additional materials information are still being actively sought through several sources; thus analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Information received to date suggests that these quality switches do not contain parts susceptible to environemntal damage. Complete material information is expected from the vendor in the near future. It appears, at this time, that these devices will pass an environmental type test.
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(3) SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) Sheet No. NEB-77-261 Facility: Browns Ferry Nuclear Plant Revision 0 Unit: 1,2,3 10/27/80 50-259, 50-260, 50-296 Date ' Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Qualifi-Contract 90744 & 91750 Specifi-Specifi-Qualification cation cation Parameter cation System: Radwaste Operating 1 year Appendix 1 NCR Plant ID No. LS-77-17B (1)Time Note 1 BFNNEB8029 MPL #20-486 . Component: Level Temperature 11 n Switch (F) Figures B.4(1) (4) Manufacturer: B.4(2,3) Autocon • • Table 11 11 Model No.: M-4 B.1(1,2,3) Pressure (PSIA) (4) Function: RB Equip. 11 ... Sump Lo-Hi-Hi-Hi 100 Relative Humidity(%) (4) Accuracy: Reg'd: Not Specified N/A N/A N/A Demon: Chemical N/A (4) N/A Spray Category: A 3x 10<sup>7</sup> - -Appendix 1 NCR Radiation Service: Water Note 1 BFNNEB8029 (4) (RAD) 11 4 Appx 1 Note 1 Location: Aging N/A (2) Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes (4) Submergence N/A N/A

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

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

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

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

Prepared by: <u>alex Melnihow</u> Reviewed by: <u>Charles Lunk</u>



#### NEB-77-261

#### Appendix 1, Rev O

 To date, TVA has received limited infomation on these items. Vendor drawings and additional materials information are still being actively sought through several sources; thus analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment.

Information received to date suggests that these quality switches do not contain parts susceptible to environemntal damage. Complete material information is expected from the vendor in the near future. It appears, at this time, that these devices will pass an environmental, type test.

|                                                                                   |                         | SYSTEM COMPO        | NENT EVALUATIO     | N WORK SHEET                          | (Rev 2)            | (3)                                          |                               |
|-----------------------------------------------------------------------------------|-------------------------|---------------------|--------------------|---------------------------------------|--------------------|----------------------------------------------|-------------------------------|
| Facility: Browns Ferry Nuclean<br>Unit: 1,2,3                                     | r Plant                 |                     |                    |                                       |                    | Sheet No. <u>NEB-78</u><br>Revision <u>0</u> | -262                          |
| Docket: 50-259, 50-260, 50-2                                                      | 296                     |                     | ·                  |                                       |                    | <u>Date 10/27/</u>                           | 80                            |
| EQUIPMENT DESCRIPTION                                                             | E                       | NVIRONMENT          |                    | DOCUMENTA                             | TION REF           | QUALIFICATION<br>METHOD                      | OUTSTANDING<br>ITEMS          |
| Contract 90744 & 91750                                                            | Parameter               | Specifi-<br>cation  | Qualifi-<br>cation | Specifi-<br>cation                    | Qualifi-<br>cation |                                              |                               |
| System: FP Cooling and<br>Demineralizing<br>Plant ID No. See<br>Appendix 1 Note 1 | Operating<br>Time       | 1 year              |                    | (1)                                   |                    | Appendix 1<br>Note <b>2</b>                  | See NCR<br>BFNNEB802 <b>B</b> |
| Component: Level<br>Switch                                                        | Temperature<br>(F)      | Figures<br>B.13(1)  |                    | · · · · · · · · · · · · · · · · · · · |                    | 11                                           | 11                            |
| Manufacturer:<br>Meletron                                                         |                         | 8,13(2,3)           |                    | (4)                                   |                    |                                              |                               |
| Model No.: 9241-65510A                                                            | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3) |                    | (4)                                   | •                  | n                                            | 11                            |
| Function: Skimmer Surge<br>Tank L-Hi                                              | Relative<br>Humidity(%) | 100                 |                    | (4)                                   |                    | n                                            | - 17                          |
| Accuracy:<br>Req'd: See Paragraph<br>Demon: 4.1.3                                 | Chemical<br>Spray       | N/A                 | N/A .              | (4)                                   | N/A ·              | N/A                                          | N/A                           |
| Category: A<br>Service: Water                                                     | Radiation<br>(RAD)      | 3.1×10 <sup>4</sup> |                    | (4)                                   | -                  | Appendix 1<br>Note 2                         | See NCR<br>BFNNEB8028         |
| Location: 13                                                                      | Aging -                 | N/A                 |                    | (2)                                   | ħ                  | Appx 1 Note 2                                | 19                            |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                         | Submergence             | N/A                 | N/A ,              | (4)                                   | N/A                | N/A                                          | ~ N/A                         |

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

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- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report:

Prepared by: <u>alex Melnibow</u> Reviewed by: <u>Charles</u> Tunk



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NEB-78-262

Appendix 1, Rev 0

- 1. LS-78-1A, MPL# 19-65 LS-78-1B, MPL# 19-66 LS-78-1C, MPL# 19-67 LS-78-1 (D-G), MPL# 19-63
- To date, TVA has yet to receive any information on these items. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending upon the results of this analysis, TVA will commit to type testing of these devices or replacement with qualified equipment. Meletron level switches are fairly simple in nature, and TVA has no reason to believe that the devices could not be qualified. The devices have been used in normal nuclear service for several years and have performed satisfactorily.

#### SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

| FOULTPMENT DESCRIPTION                                                                  | E                       | NVIRONMENT           | DOCUMENTATION REF  |                    |                      |
|-----------------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|----------------------|
| Contract 90744 & 91750                                                                  | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   |
| System: FP cooling and<br>demineralizing<br>Plant ID No. LS-78-1(D,E,F,G)<br>MPL #19-63 | Operating<br>Time       | . 1 vear             | 1 hour             | (1)                | See Appx 1<br>Note 1 |
| Component: Level<br>Switch                                                              | Temperature<br>(F)      | Figure<br>B.13(1,2,3 | 212 F              |                    | 11                   |
| Manufacturer: Barksdale                                                                 |                         |                      |                    | (4)                |                      |
| Model No.: D2H-M18SS                                                                    | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  | 15                 | (4)                | 11<br>               |
| Function: Skimmer surge tank<br>level lo-lo                                             | Relative<br>Humidity(%) | 100                  | 100                | (4)                | 11                   |
| Accuracy:<br>Req'd:<br>- Demon:                                                         | Chemical<br>Spray       | N/A                  | N/A _              | (4)                | N/A                  |
| Category: <sup>A</sup><br>Service: <sup>Water</sup>                                     | Radiation<br>(RAD)      | 3.1x10 <sup>4</sup>  | 1x 10 <sup>6</sup> | (4)                | See Appx 1<br>Note 2 |
| Location: 13                                                                            | Aging                   | N/A                  |                    | (2)                |                      |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                                     | Submergence             | N/A                  | N/A                | (4)                | N/A                  |

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

No

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

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

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

alex Melnikow Prepared by: Roules -Reviewed by:

QA Acceptance:

See Appx 1 Note 3

Appx 1 Note 3

Date 10/27/80 QUALIFICATION METHOD

See Appx 1

Note 3

Generic

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Revision

(3)

Sheet No. NEB-78-265

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Facility: Browns Ferry Nuclear Plant

OUTSTANDING

ITEMS

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N/A

None

None

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### NEB-78-265, APPENDIX 1, REVISION 0

- 1. Barksdale qualification procedure 9993 and Wyle summary report QSR-018-A-012.
- 2. The radiation dose of  $1 \times 10^6$  rad is based upon a materials analysis of the pressure switch. The materials in the device which limit the allowable radiation dose are the seals (Buna-N or Viton) which, according to several studies including the guidelines furgished in bulletin 79-01B, are acceptable up to a dose of  $1 \times 10^6$  rad.

Based on the materials evaluation and the relatively low temperature and radiation doses encountered by the device, aging effects will not adversely affect this device, in TVA's engineering judgement. Similarly, the operating time of one year has been considered and TVA has identified no adverse effects from temperature or any other parameter on the functioning of this device.



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| Facility: Browns Ferry Nuclea<br>Unit: 1,2,3                                          | r Plant                  | System Compo          | NENT EVALUATI                         | on work sheet      | (Rev 2)              | (3) Sheet No. NEB-85<br>Revision 0<br>Date 10/27/ | -267                  |
|---------------------------------------------------------------------------------------|--------------------------|-----------------------|---------------------------------------|--------------------|----------------------|---------------------------------------------------|-----------------------|
| EQUIPMENT DESCRIPTION                                                                 | E                        | NVIRONMENT            | · · · · · · · · · · · · · · · · · · · | DOCUMENTATION REF  |                      | QUALIFICATION<br>METHOD                           | OUTSTANDING<br>ITEMS  |
| Contract 90744 & 91750                                                                | Parameter                | Specifi-<br>cation    | Qualifi-<br>cation                    | Specifi-<br>cation | Qualifi-<br>cation   | ÷                                                 |                       |
| System: Control rod<br>drive system<br>Plant ID No. FSV-85-35(A&B)<br>MPL f3-140(A&B) | Operating<br>Time •      | 1 hour                |                                       | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                              | See NCR<br>BFNNEB8031 |
| Component: Solenoid<br>valve                                                          | Temperature<br>(F)       | Figure<br>B.8(1,2,3)  |                                       |                    | u                    | 11                                                | 11                    |
| Manufacturer: Asco                                                                    |                          |                       |                                       | (4)                |                      |                                                   |                       |
| Model No.: HVA86-030                                                                  | Pressure<br>(PSIA)       | Table .<br>B.1(1,2,3) |                                       | -<br>(4)           | " .                  |                                                   | 11                    |
| Function: Pilot valve B                                                               | Relative<br>Humidity(\$) | 100                   | ÷                                     | (4)                | 11                   | te                                                | 11                    |
| Accuracy:<br>Req'd:<br>Demon:                                                         | Chemical<br>Spray        | N/A                   | N/A .                                 | (4)                | í n/a                | N/A                                               | N/A                   |
| Category: A<br>Service: CRD backup                                                    | Radiation<br>(RAD)       | _ 2.4x10 <sup>6</sup> | •                                     | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2                              | See NCR<br>BFNNEB8031 |
| B<br>Location:                                                                        | Aging                    | N/A                   |                                       | (2)                |                      | Appx 1 Note 2                                     | 11                    |
| Flood Level Elev:552'<br>Above Flood Level: Yes<br>No                                 | Submergence              | N/A                   | N/A                                   | (4)                | N/A                  | N/A .                                             | N/A -                 |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihor</u> harles Reviewed by:\_\_\_



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- The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of Buna-N material which can withstand doses of 1 X 10<sup>°</sup> rad . Since the valve need only operate for one hour, the actual dose seen is approximately 8 X 10<sup>°</sup> rad. Similar ASCO valves (by design and materials) have been tested in excess of the temperature, pressure, and humidity values specified; therefore, it is expected that these valves would pass a type test.
- 2. This solenoid valve is required to open for accident mitigation purposes. No credit is taken for closing the valve. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in opening of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in closure of the valve. Not withstanding this justification, TVA will commit to either a type testing or replacement program for this valve.

(3) Sheet No. NEB-85-268

Revision 0

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

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

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Date 10/27/80 ENVIRONMENT DOCUMENTATION REF . QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-7 Parameter cation cation cation cation System: Control rod drive system A = 1 hour Operating See Appx 1 See Appx 1 See NCP Plant ID No. FCV-85-37(A&B) B = 1 year Note 1 Time (1)Note 2 BFNNEB8031 MPL #3-31(A&B) Component: Solenoid Temperature valve 11 Figure 11 11 (F) B.8(1,2,3) Manufacturer: Asco (4) 11 . Table 11 Model No.: HVA90-405 B.1(1,2,3) Pressure (PSIA) (4) Function: Dr & vent pilot vlv A 100 11 11 11 Relative Humidity(%) (4) Accuracy: Req'd: N/A N/A N/A · Demon: Chemical N/A N/A (4) Spray Category: 2.4x10<sup>6</sup> See Appx 1 See Appx 1 See NCR Radiation CRD scram Note 1 Note 2 BFNNEP8031 Service: (RAD) (4) Disch vol . 8 Appx 1 Note 2 11 Location: Aging N/A (2) N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A N/A (4) No

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Junk</u>

#### NEB-85-268, APPENDIX 1, REVISION O

- 1. The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the solenoid valve. The diaphragm is composed of Buna-N material which can withstand doses of 1 X 10<sup>°</sup> rad Since the valve need only operate for one hour, the actual dose seen is approximately 8 X 10<sup>°</sup> rad. Similar ASCO valves (by design and materials) have been tested in excess of the temperature, pressure, and humidity values specified; therefore, it is expected that these valves would pass a type test to these valves. TVA will either implement such tests or replace the valves.
- 2. This solenoid valve is required to open for accident mitigation purposes. No credit is taken for closing the valve. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in opening of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in closure of the valve. Not withstanding this justification, TVA will commit to either a type testing or replacement program for this valve.

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## Facility: Browns Ferry Nuclear Plant

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

| Rev | 2) |       | (   | (3)  |         |
|-----|----|-------|-----|------|---------|
|     |    | Sheet | No. | NEB- | 85-268A |

Unit: 1,2,3

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| Revision | 0        |
|----------|----------|
| Date     | 10/27/80 |

Docket: 50-259, 50-260, 50-296

| EQUIPMENT DESCRIPTION                                                | ENVIRONMENT             |                      |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
|----------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| Contract 90744 & 91750                                               | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation | ä                       | •                    |
| System: CRD system                                                   |                         |                      |                    |                    |                    |                         |                      |
| Plant ID No. FCV-85-37A,B,C<br>MPL #3-32B                            | Operating<br>Time       | 1 year               |                    | - (1)              |                    | Appx 1<br>Note 1        | NCR<br>BFNNEB8019    |
| Component: Limit<br>Switch                                           | Temperature<br>(F)      | Figure<br>B.8(1,2,3) | <u></u>            |                    |                    | H                       | 13                   |
| Manufacturer: Namco                                                  |                         |                      |                    | (4)                |                    |                         |                      |
| Model No.: D1200G                                                    | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | (4)                | ×                  | n                       | 11                   |
| Function: CRD scram<br>disch vol                                     | Relative<br>Humidity(%) | 100                  |                    | (4)                |                    | 11                      |                      |
| Accuracy:<br>Req'd: N/A<br>Demon:                                    | -<br>Chemical<br>Spray  | N/A                  | N/A _              | (4)                | N/A                | N/A                     | N/A                  |
| Category: <sup>A</sup><br>Service: Vent control ·                    | Radiation<br>(RAD)      | 2.4x10 <sup>6</sup>  | -                  | (4)                | -                  | Appx 1<br>Note 1        | NCR<br>BFNNEB8019    |
| Location:                                                            | Aging                   | N/A                  |                    | (2)                |                    | Appx 1 Note 1           | 11 .                 |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No | Submergence             | N/A                  | N/A                | (4)                | N/A                | N/A                     | N/A                  |

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

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: C

#### NEB-85-268A, APPENDIX 1, REVISION 0

To date test data has not been obtained for the D1200G (EA080); however, test data is available for similar Namco limit switches (EA170, 180, 740). The manufacturer reports that the EA080 is a high quality switch, similar to the tested models, and is rated for  $90^{\circ}$  C (194° F). It has a weatherproof housing. Test results for the similar models show that they would meet the required environmental conditions. Thus, engineering judgement indicates that the Namco D1200G will meet the environmental and operating requirements. TVA will type test these switches to confirm the above or replace them with qualified models. · · ·

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|                                                                                 | 107                      | SYSTEM COMPON                 | NENT EVALUÁTI      | ON WORK SHEET      | (Rev 2)              | (3)                  |                      |
|---------------------------------------------------------------------------------|--------------------------|-------------------------------|--------------------|--------------------|----------------------|----------------------|----------------------|
| Facility: Browns Ferry Nuclear                                                  | • Plant                  |                               |                    |                    |                      | Sheet No. NEB-85     | -272                 |
| Unit: 1,2,3                                                                     | 206                      |                               |                    |                    |                      | Revision 0           |                      |
| Docket: 50-259, 50-260, 50-2                                                    | 290<br>                  | NUTRONMENT                    |                    | DOCUMENTA          |                      | Date 10/27/          | 80                   |
| EQUIPMENT DESCRIPTION                                                           | £                        | NVIRONPENI                    |                    | DUCUMENTA          | IION REP             | METHOD               | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                          | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | -                    |                      |
| System: Control rod<br>drive system<br>Plant ID No. FCV-85-39A<br>MPL #3-13-126 | Operating<br>Time        | 1 hour                        |                    | _ (1)              | See Appx 1<br>Note 1 | See Appx 1<br>Note 2 | NCR<br>BFNNEB8006    |
| Component: Position switch<br>(scram outlet valv)<br>Manufacturer:              | Temperature<br>) (F)     | Figures<br>B.8(1)<br>B.8(2,3) | 400 F              |                    | 18                   | 31                   | n                    |
| Microswitch<br>Model No.: BZE6-2RN                                              | Pressure<br>(PSIA)       | Table<br>B.1(1,2,1)           | • .                | (4)                | н.                   | n .                  | 11                   |
| Function: Inlet valve                                                           | Relative<br>Humidity(\$) | 100                           |                    | (4)                | 17                   | 11                   | -<br>n               |
| Accuracy:<br>Req'd: N/A<br>Demon:                                               | Chemical<br>Spray        | N/A                           | N/A .              | (4)                | N/A                  | N/A                  | N∕A                  |
| Category: A<br>Service: CRD scram                                               | Radiation<br>(RAD)       | 2.4x10 <sup>6</sup>           | I x10 <sup>8</sup> | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2 | NCR<br>BFNNEB8006    |
| Location: 8                                                                     | Aging                    | N/A                           |                    | (2)                |                      | 11                   | n                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                       | Submergence              | N/A                           | N/A                | (4)                | N/A · ·              | N/A                  | N/A                  |

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

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

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

Prepared by: <u>alex Melnihow</u> Reviewed by: <u>Charles July</u>

- 1. Microswitch (Honeywell) catalog No. 40 limit and enclosed switches.
- 2. Qualification to the specified environmental conditions cannot be documented at this time. However, the microswitch catalog describes a standard basic switch in a phenolic case with metalic components of silver and beryllium copper.<sup>8</sup> It was, therefore, judged to have a radiation tolerance of 10 rads. Other operating features are temperature tolerance (400 F) and a wide range of seals. It was concluded that interim operation can be justified. TVA is committed to pursuit of qualified documentation and type testing or replacement.

|                                                                                 |                          | System Compo                  | NENT EVALUATIO      | ON WORK SHEET      | (Rev 2)              | (3)                     | •                    |
|---------------------------------------------------------------------------------|--------------------------|-------------------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclear                                                  | Plant                    |                               |                     |                    |                      | Sheet No. NEB-89        | 5-273                |
| Unit: 1,2,3                                                                     | 006                      |                               |                     |                    |                      | Revision $0$            | 80                   |
| EQUIPMENT DESCRIPTION                                                           | E                        | NVIRONMENT                    |                     | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                          | Parameter                | Specifi-<br>cation            | Qualifi-<br>cation  | Specifi-<br>cation | Qualifi-<br>cation   |                         |                      |
| System: Control rod<br>drive system<br>Plant ID No. FCV-85-39B<br>MPL #3-13-127 | Operating<br>Time        | 1 hour                        |                     | (1)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8006    |
| Component: Position switch<br>(scram outlet valv                                | Temperature<br>e) (F)    | Figures<br>B.8(1)<br>B.8(2,3) | 400 F               |                    | 11                   | TT                      | 11                   |
| Manufacturer: Microswitch                                                       |                          | Table<br>B.1(1.2.8            | )                   | (4)                | u _                  | 11 -                    |                      |
| Model No.: BZE6-2RN                                                             | Pressure<br>(PSIA)       |                               |                     | (4)                | -                    |                         |                      |
| Function: Outlet                                                                | Relative<br>Humidity(\$) | 100                           | ł                   | (4)                | 11                   | 11                      |                      |
| Accuracy:<br>Req'd: N/A<br>Demon:                                               | Chemical<br>Spray        | N/A                           | N/A .               | (4)                | N/A                  | N/A                     | N/A                  |
| Category: A<br>Service: CRD scram                                               | Radiation<br>(RAD)       | 2.4x10 <sup>6</sup>           | 1 x 10 <sup>8</sup> | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | NCR<br>BFNNEB8006    |
| Location: 8                                                                     | Aging                    | N/A                           |                     | (2)                |                      | 11                      | 11                   |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No            | Submergence              | N/A                           | N/A                 | (4)                | N/A                  | N/A                     | N/A                  |

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by:\_\_\_\_

- 1. Microswitch (Honeywell) catalog No. 40 limit and enclosed switches.
- 2. Qualification to the specified environmental conditions cannot be documented at this time. However, the microswitch catalog describes a standard basic switch in a phenolic case with metalic components of silver and beryllium copper.8 It was, therefore, judged to have a radiation tolerance of 10 rads. Other operating features are temperature tolerance (400° F) and a wide range of seals. It was concluded that interim operation can be justified. TVA is committed to pursuit of qualified documentation and type testing or replacement.

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|--------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------------------|----------------------|-------------------------|-----------------------|
| (                                                                        |                         |                      |                    |                    |                      | • .                     |                       |
|                                                                          |                         | SYSTEM COMPON        | JENT EVALUATI      | ON WORK SHEET      | (Rev 2)              | (3)                     |                       |
| Facility: Browns Ferry Nuclea                                            | r Plant                 |                      | "                  |                    |                      | Sheet No. NEB- RE       | - 27/1                |
| Unit: 1,2,3                                                              |                         |                      |                    | -                  |                      | Revision 0              | · · · · · ·           |
| Docket: 50-259, 50-260, 50-                                              | 296                     |                      |                    |                    |                      | Date 10/27/             | 80                    |
| EQUIPMENT DESCRIPTION                                                    | E                       | NVIRONMENT           |                    | DOCUMENTA          | TION REF             | QUALIFICATION<br>METHOD | OUTSTANDING<br>TTEMS  |
| Contract 90744 & 91750                                                   | Parameter               | Specifi-<br>cation   | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation   | <u>د</u>                |                       |
| System: Control rod<br>drive<br>Plant ID No. FSV-85-39A<br>MPL #3-13-117 | Operating<br>Time       | 1 hour               |                    | _ (1)              | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | See NCR<br>BFNNER8031 |
| Component: CRD scram inlet<br>valve (solenoid)                           | Temperature<br>(F)      | Figure<br>B.8(1,2,3) |                    | (4)                | 11                   | 11                      | 11                    |
| Asco<br>Model No.: HVA-90-005-2A                                         | Pressure<br>(PSIA)      | Table<br>B.1(1,2,3)  |                    | (4)                | 11 .                 | tf                      |                       |
| Function: CRD solenoid<br>scram                                          | Relative<br>Humidity(%) | 100                  |                    | ,<br>(4)           |                      | 11                      | 11                    |
| Accuracy:<br>Req'd:<br>Demon:                                            | Chemical<br>Spray       | N/A                  | N/A .              | (4)                | ,<br>N/A             | N/A                     | N/A                   |
| Category: A<br>Service: CRD exb H <sub>2</sub> O                         | Radiation<br>(RAD)      | 2.4x10 <sup>6</sup>  | -                  | (4)                | See Appx 1<br>Note 1 | See Appx 1<br>Note 2    | See NCR<br>BFNNEB8031 |
| Location: 8                                                              | Aging                   | N/A                  |                    | (2)                |                      | Appx 1 Note 2           | 11                    |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes                      | Submergence             | N/A                  | N/A                | (4)                | NZA                  | N/A                     | N/A -                 |

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

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

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

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

Prepared by: <u>alex Melnikow</u> Reviewed by: Charles

- The radiation dose of 1 X 10<sup>6</sup> rad is based upon a materials analysis of the solenoid valve. Tolerance to radiation is limited by the diaphragm which is composed of Buna-N material that can withstand doses of 1 X 10<sup>6</sup> rad . Since the valve need only operate for one hour, the actual dose seen is approximately 8 X 10<sup>6</sup> rad. Similar ASCO valves (by design and materials) have been tested in excess of the temperature, pressure, and humidity values specified; therefore, it is expected that these valves would pass a type test to these valves. TVA will implement such tests or replace the valves.
- 2. This solenoid valve is required to open for accident mitigation purposes. No credit is taken for closing the valve. Analysis of actual physical configuration of the solenoid valve indicates that all postulated solenoid failures would result in opening of the valve, thus the valve will fail-safe. Ultimate failure of the diaphragm due to radiation damage could not result in closure of the valve. Not withstanding this justification, TVA will commit to either a type testing or replacement program for this valve.

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ç SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Sheet No. NEB-85-276 Facility: Browns Ferry Nuclear Plant .1,2,3 Revision Unit: 0 50-259, 50-260, 50-296 10/27/80 Docket: Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION , · OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Qualifi-Specifi-Specifi-Qualifi-Parameter cation cation cation cation System: Control rod drive 1 hour Operating See Appx 1 See NCR Plant ID No. LS-85-45(A-E) Time Note 1 BENNEB8004 (1)MPL /3-231A-E Component: Level Temperature Switch Figure 11 \*\* (F) B.8(1,2,3) Manufacturer: Robertshaw (4) Table н ... Model No.: SL-305-E3-X B.1(1,2,3) Pressure (PSIA) (4) CRD scram Function: disch vol level 100 ú . . . Relative Humidity(%) -(4) Accuracy: Reg'd: N/A N/A N/A Demon: Chemical N/A N/A (4) Spray -A Category: 2.1x10<sup>7</sup> See Appx 1 See NCR Radiation . CRD logic RENNEB8004 Note 1 Service: (RAD) (4) 8 Appx 1 Note 1 Location: Aging N/A (2)N/A Flood Level Elev:552' N/A N/A N/A Above Flood Level: Yes Submergence N/A (4) N/A

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

No

- (2) See Section 4.1.2 in 79-01B report.
- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- · (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Jule</u>

QA Acceptance:

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NEB-85-276

Appendix 1, Rev 0

 To date, test data has not been obtained. Vendor drawings and materials information is expected in the near future; thus, analysis of this item will continue. Depending upon the results of this analysis, TVA will commit to type testing in order to verify material analysis results or commit to replacement of the equipment.

Although test data has not yet been obtain, it is believed that the equipment can be qualified. These are high quality switches and have performed well under normal plant service for some time. It should also be noted that their operation is required for only a short time.



SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB- 90-279 Revision 0 Unit: 1.2.3 50-259, 50-260, 50-296 10/27/80 Date Docket: ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Radiation monitoring Operating 1 year See Appx 1 NCR Plant ID No. RE-90-136 Time (1) Note 1 BFNNEB8005 MPL # 17-230 Component: Ion Temperature 1 = B.8(1)11 11 chamber (F) 2 = B.8(2,3)3 - B.7(2,3)Manufacturer: (4) General Electric Table Ħ Ħ GE part No. . B.1(1,2,3) Model No.: ...essure 237×7316001 (PSIA) (4) Rad detection Function: н 100 11 Relative (4) Humidity(%) Accuracy: See Section Req'd: 4.1.3 in report N/A N/A N/A Demon: Chemical N/A N/A (4) Spray A 11.27 Category: 2x10<sup>6</sup> • (3) See Appx 1 NCR Radiation Main steam • BFNNEB8005 Note 1 Service: (RAD) (4), 11 11 8 - units 1&2 Location: Aging N/A (2) 7 = unit 3Flood Level Elev:552' N/A N/A N/A N/A Above Flood Level: Yes N/A Submergence N/A (4) No

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

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

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

Prepared by: alex Melnihow Reviewed by: Charles

NEB-90-279

#### Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment.

These GE components have been used in normal nuclear plant operation for several years. The ion chambers are simple in construction and are not known to be susceptible to the given environments. In TVA's opinion, the devices could be qualified by type testing.

|                                                                        |                         | System Compo                  | NENT EVALUATIO     | ON WORK SHEET      | (Rev 2)            | (3)                     |                      |
|------------------------------------------------------------------------|-------------------------|-------------------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|
| Facility: Browns Ferry Nuclear                                         | Plant .                 |                               |                    |                    |                    | Sheet No. NEB-90        | -280                 |
| Unit: 1,2,3<br>Desket: 50,250 50,260 50,2                              | 006                     | ж                             | -                  |                    |                    | $\frac{10/27}{10}$      | 80                   |
| EQUIPMENT DESCRIPTION                                                  | E                       | NVIRONMENT                    | ····               | DOCUMENTAT         | TION REF           | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |
| Contract 90744 & 91750                                                 | Parameter               | Specifi-<br>cation            | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation | -                       |                      |
| System: Radiation monitoring<br>Plant ID No. RE-90-137<br>MPL # 17-230 | Operating<br>Time       | 1 vear                        |                    | (1)                |                    | See Appx 1<br>Note 1    | NCR<br>BFNNEP8005    |
| Component: Ion<br>chamber                                              | Temperature<br>(F)      | Figures<br>B.7(1)<br>B.8(2.3) |                    | ,<br>(#)           |                    | 11                      | 11                   |
| Model No.: 237X731G001                                                 | p<br>Pressure<br>(PSIA) | Table<br>B.1(1,2,3)           |                    | (4)                |                    | H                       | 11                   |
| Function: Main steam line<br>chc det                                   | Relative<br>Humidity(%) | 100                           | -                  | (4)                |                    | 11                      | 11 <sup>-</sup>      |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report              | Chemical<br>Spray       | N/A                           | N/A                | (4)                | N/A                | N/A                     | NZA                  |
| Category: <sup>A</sup><br>Service: <sup>Area monitors</sup>            | Radiation<br>(RAD)      | 2x 10 <sup>6</sup>            |                    | (4)                | ۰.                 | See Appx 1<br>Note 1    | NCR<br>BFNNEB8005    |
| Location: 7                                                            | Aging                   | N/A                           |                    | (2)                |                    | 11                      | 10                   |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No              | Submergence             | N/A                           | N/A                | (4)                | N/A                | N/A                     | N/A `                |

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

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles. Jark</u>

NEB-90-280

Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment.

These GE components have been used in normal nuclear plant operation for several years. The ion chambers are simple in construction and are not known to be susceptible to the given environments. In TVA's opinion, the devices could be qualified by type testing.

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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant                              |                                          |                    | -                  |                    | Sheet No. <u>NEB-</u> 90<br>Revision <u>0</u><br>Date <u>10/27/8</u> | 9–281<br>30                           |
|-------------------------------------------------------------------------------|------------------------------------|------------------------------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------|---------------------------------------|
| EQUIPMENT DESCRIPTION                                                         | El                                 | VIRONMENT                                |                    | DOCUMENTA          | TION REF           | QUALIFICATION<br>METHOD                                              | OUTSTANDING<br>ITEMS                  |
| Contract 90744 & 91750                                                        | Parameter                          | Specifi-<br>cation                       | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                      | · · · · · · · · · · · · · · · · · · · |
| System: Radiation monitoring<br>Plant ID No. RE-90-138<br>MPL # 17-230        | Operating<br>Time                  | 1 year                                   | -                  | (1)                |                    | See Appx 1<br>Note 1                                                 | NCR<br>BFNNEB8005                     |
| Component: Ion chamber<br>Manufacturer: General Electri                       | Temperature<br>(F)                 | 1 - B.8(1<br>2 - B.8(2<br>3 - B.7(2      | )<br>,3)<br>,3)    | (4)                |                    |                                                                      | 11                                    |
| Model No.: 237X731G001                                                        | Pressure<br>(PSIA)                 | Table<br>B.1(1,2,3)                      | •                  | (4)                |                    | 11                                                                   | 11                                    |
| Function: Main stm line chn c                                                 | Relative<br>Humidity(%)            | 100                                      |                    | (4)                |                    | 11                                                                   | <b>)1</b> ~~                          |
| Accuracy:<br>Req'd: Sec Section<br>Demon: 4.1.3 in report                     | Chemical<br>Spray                  | N/A                                      | N/A                | (4)                | N/A                | . N/A                                                                | N/A                                   |
| Category: <sup>A</sup><br>Service: <sup>Area monitor</sup>                    | Radiation <sup>(1,2</sup><br>(RAD) | ) $2.1 \times 10^7$<br>) $2 \times 10^6$ |                    | (4)                |                    | <ul> <li>See Appx 1</li> <li>Note 1</li> </ul>                       | NCR<br>BFNNEB8005                     |
| Location: 8 - Units 1&2                                                       | Aging                              | N/A ·                                    |                    | (2)                |                    | 11 *                                                                 | <sup>11</sup> .                       |
| Flood Level Elev:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence                        | N/A                                      | N/A                | (4)                | <sup>2</sup> N/A   | N/A                                                                  | N/A                                   |

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

sheets are on the attached appendix sheets.

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Julk</u>



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NEB-90-281

Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment.

These GE components have been used in normal nuclear plant operation for several years. The ion chambers are simple in construction and are not known to be susceptible to the given environments. In TVA's opinion, the devices could be qualified by type testing.


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| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant<br>96                     | SYSTEM COMPON                   | IENT EVALUATI(     | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB-9</u><br>Revision <u>0</u><br>Date <u>10/27/</u> | 0-282<br>80       |
|-------------------------------------------------------------------------------|---------------------------------|---------------------------------|--------------------|--------------------|--------------------|--------------------------------------------------------------------------|-------------------|
| FOULTPMENT DESCRIPTION                                                        | ENVIRONMENT                     |                                 |                    | DOCUMENTATION REF  |                    | QUALIFICATION                                                            | OUTSTANDING       |
| Contract 90744 & 91750                                                        | Parameter                       | Specifi-<br>cation              | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation | <u>HETHOP</u>                                                            | 1156              |
| System: Radiation<br>monitoring<br>Plant ID No. RE-90-139<br>MPL # 17-230     | Operating<br>Time               | 1 year                          |                    | (1)                |                    | See Appx 1<br>Note 1                                                     | NCR<br>BFNNEB8005 |
| Component: Ion chamber<br>Manufacturer: General Electri                       | Temperature<br>(F)<br>c         | Figures<br>B.7 (1)<br>B.7 (2,3) |                    | <b>(</b> 4)        |                    | 11                                                                       | 11                |
| Model No:: 237X731G001                                                        | Pressure<br>(PSIA)              | Table<br>B.1(1,2,3)             |                    | <br>(4)            | ÷                  | 11 _<br>-                                                                | 11                |
| Function: Main steam line chd                                                 | det<br>Relative<br>Humidity(\$) | 100                             |                    | (4)                |                    | 11                                                                       |                   |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                     | Chemical<br>Spray               | N/A                             | N/A .              | (4)                | N/A                | <br>N/A                                                                  | - N/A             |
| Category: <sup>A</sup><br>Service: <sup>Area monitor</sup>                    | Radiation<br>(RAD)              | 2x 10 <sup>6</sup>              |                    | (4)                | ••                 | See Appx 1<br>Note 1                                                     | NCR<br>BFNNEB8005 |
| Location: 7                                                                   | Aging                           | N/A                             | •                  | (2)                |                    | 11                                                                       | H                 |
| Flood Level Elev:552' <sup>N/A</sup><br>Above Flood Level: Yes<br>No          | Submergence                     | N/A                             | N/A                | (4)                | N/A ·              | N/A                                                                      | N/A               |

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

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- (3) All notes and other information not on these sheets are on the attached appendix sheets.
- (4) See Section 3.0 and/or Appendix B in 79-01B report.

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Chailes Junk</u>

## Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment.

These GE components have been used in normal nuclear plant operation for several years. The ion chambers are simple in construction and are not known to be susceptible to the given environments. In TVA's opinion, the devices could be qualified by type testing.

SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3) Facility: Browns Ferry Nuclear Plant Sheet No. NEB- 90-283 Unit: 1,2,3 Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date ENVIRONMENT DOCUMENTATION REF OUTSTANDING QUALIFICATION EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualif.i-Specifi-Qualifi-Parameter cation cation cation cation System: Radiation monitoring Operating -1 year See Appx 1 NCR Plant ID No. Appx 1 Time (1)Note 1 BFNNEB8005 Note 1 Component: Sensor and Temperature convertor (F) Figures 11 11 B.15(1) Manufacturer: B.15(2,3) (4) General Electric Table \*\* H Model No.: GE part No. **B.1(1,2,3)** Pressure 194X927G014 (PSIA) (4) Function: .Refueling zones ch A det 100 11 Relative 81 Humidity(\$) (4) Accuracy: See Section Reg'd: 4.1.3 in report Demon: N/A N/A N/A Chemical N/A (4) N/A Spray A Category: 3.1x10<sup>4</sup> See Appx 1 NCR Radiation Area monitor - -Service: Note 1 BFNNER8005 (RAD) (4) 15 11 11 Location: Aging N/A (2) N/A Flood Level Elev:552' N/A N/A Above Flood Level: Yes (4) N/A N/A Submergence N/A No

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

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

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

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

Prepared by: <u>Alex Mehnikow</u> Reviewed by: <u>Charles Junk</u>

QA Acceptance:



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Appendix 1, Rev 0

## 1. This sheet applies to NE-90-140, MPL # 17-432. -141, MPL # 17-432.

2. To date, sufficient qualification information is unavailable to make a proper evaluation. TVA will continue to pursue, through several sources, the location of the necessary qualification information, and if unsuccessful, TVA will commit to type testing or replacement. These instruments have functioned properly in the past and TVA has no indications that they would not continue in the future.



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| Docket: 50-259, 50-260, 50-296                                      |                         |                                 |                    |                    |                    | Date $10/27/80$         |                      |  |
|---------------------------------------------------------------------|-------------------------|---------------------------------|--------------------|--------------------|--------------------|-------------------------|----------------------|--|
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                     | ENVIRONMENT             |                                 |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD | OUTSTANDING<br>ITEMS |  |
|                                                                     | Parameter               | Specifi-<br>cation              | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                         |                      |  |
| System: Radiation<br>monitoring<br>Plant ID No. Appx 1<br>Note 1    | Operating<br>Time .     | 1 year                          | -                  | (1)                |                    | See Appx 1<br>Note 1    | NCR<br>BFNNEB8005    |  |
| Component: Sensor and<br>convertor<br>Manufacturer: Coronal Floated | Temperature<br>(F)      | Figures<br>B.15(1)<br>B.15(2,3) |                    | (4)                |                    | 11                      | 11                   |  |
| GE part No.<br>GE part No.<br>Model No.: 194X927G012                | pressure<br>(PSIA)      | Table<br>B.1(1,2,3)             |                    | (4)                | -                  | 11<br>11                | n                    |  |
| Function: Reac zone exh ch<br>A det                                 | Relative<br>Humidity(%) | 100                             |                    | (4)                |                    | H .                     | H                    |  |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report           | Chemical<br>Spray       | N/A                             | N/A .              | (4)                | N/A                | N/A                     | N/A                  |  |
| Category: A<br>Service: Area monitors                               | Radiation<br>(RAD)      | 3.1x10 <sup>4</sup>             |                    | (4)                | ¥ <b>4</b> .       | See Appx 1<br>Note 1    | NCR<br>BFNNEB8005    |  |
| ocation: 15                                                         | Aging                   | N/A                             | •                  | (2)                |                    | H                       | 11                   |  |
| Nod Level Elev:552: N/A<br>Nove Flood Level: Yes<br>No              | Submergence             | N/A                             | N/A                | (4)                | N/A                | N/A                     | N/A                  |  |

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

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

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

alex Melnikow Prepared by: Reviewed by:

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Appendix 1, Rev 0

- 1. This sheet applies to NE-90-142, MPL # 17-430. -143, MPL # 17-430.
- 2. To date, sufficient qualification information is unavailable to make a proper evaluation. TVA will continue to pursue, through several sources, the location of the necessary qualification information, and if unsuccessful, TVA will commit to type testing or replacement. These instruments have functioned properly in the past and TVA has no indications that they would not continue in the future.

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SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2)

Facility: Browns Ferry Nuclear Plant Sheet No. NEB- 90-286 1.2.3 Unit: Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation 🕤 cation cation cation Radiation System: monitoring 1 year Operating See Appx 1 NCR Plant ID No. RE-90-283A Time (1)Note 1 BFNNEB8005 MPL # 16-20-47 Component: Fission Product Temperature monitor Figures 11 (F) 11 B.0(1,2,3) Manufacturer: General Electric (4) Table = 11 B.1(1,2,3) Model No.: Pressure (PSIA) (4) Sensor fission Function: product monitor 100 11 Relative 11 Humidity(%) (4) Accuracy: See Section Req'd: 4.1.3 in report Demon: N/A N/A Chemical N/A . N/A N/A (4) Spray A Category: \$ 2.x1g<sup>8</sup> See Appx 1 NCR Radiation DW radurbine . B 4x10<sup>5</sup> Service: Note 1 BFNNEB8005 (RAD) (4) 0 Ħ 11 Location: 'N/A Aging (2)N/A Flood Level Elev:552\* N/A N/A Above Flood Level: Yes N/A Submergence N/A N/A (4) No

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

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

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

alex Melnikow Prepared by: Reviewed by:



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Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment. These devices are know to be high quality equipment which has performed well for some time under normal plant operating conditions. There is, at this time, no reason to believe that they will not continue to function properly.

| Facility: Browns Ferry Nuclear<br>Unit: 1,2,3<br>Docket: 50-259, 50-260, 50-2 | Plant                          | System Compo                    | NENT EVALUATI      | ON WORK SHEET      | (Rev 2)            | (3)<br>Sheet No. <u>NEB- 9</u><br>Revision <u>0</u><br>Date <u>10/27</u> / | 0-286A              |
|-------------------------------------------------------------------------------|--------------------------------|---------------------------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------------|---------------------|
| EQUIPMENT DESCRIPTION<br>Contract 90744 & 91750                               | ENVIRONMENT                    |                                 |                    | DOCUMENTATION REF  |                    | QUALIFICATION<br>METHOD                                                    | OUTSTANDING         |
|                                                                               | Parameter                      | Specifi-<br>cation              | Qualifi-<br>cation | Specifi-<br>cation | Qualifi-<br>cation |                                                                            |                     |
| System: Radiation monitoring<br>Plant ID No. RE-90-283B<br>MPL # 16-20-47     | Operating<br>Time              | 1 vear                          |                    | (1)                |                    | See Appx 1<br>Note 1                                                       | NCR<br>BFNNEB8005   |
| Component: Fission product<br>monitor<br>Manufacturer: General Electri        | Temperature<br>(F)<br>c        | Figures<br>B.6 (1)<br>B.6 (2,3) |                    | (4)                |                    | 11                                                                         |                     |
| Model No.:                                                                    | Pressure<br>(PSIA)             | Table<br>B.1(1,2,3)             |                    | (4)                | • *                | ".                                                                         |                     |
| Function: Sensor fission proc<br>monitor                                      | uct<br>Relative<br>Humidity(%) | 100                             | ;                  | (4)                |                    | 11                                                                         |                     |
| Accuracy:<br>Req'd: See Section<br>Demon: 4.1.3 in report                     | Chemical<br>Spray              | N/A                             | N/A                | (4)                | N/A                | N/A                                                                        | N/A                 |
| Service: DW rad                                                               | Radiation<br>(RAD)             | ·3.1x10 <sup>7</sup>            |                    | ·<br>(4)           | **•                | See Appx 1<br>Note 1                                                       | NCR .<br>BFNNEB8005 |
| Location: 6                                                                   | Aging                          | N/A                             |                    | (2)                |                    | 11                                                                         | 11                  |
| Flood Level Eley:552' N/A<br>Above Flood Level: Yes<br>No                     | Submergence                    | N/A                             | N/A                | (4)                | N/A ·              | N/A                                                                        | N/A                 |

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

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

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

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

Prepared by: <u>Alex Melnikow</u> Reviewed by: <u>Charles Junk</u>.



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NEB-90-286A

## Appendix 1, Rev 0

To date, TVA has yet to receive enough information on these items to make a proper evaluation. Vendor drawings and materials information are still being actively sought through several sources; thus, analysis of these devices will continue. Depending on the results of this continued analysis, TVA will type test or replace this equipment with qualified equipment. These devices are know to be high quality equipment which has performed well for some time under normal plant operating conditions. There is, at this time, no reason to believe that they will not continue to function properly.

¢. SYSTEM COMPONENT EVALUATION WORK SHEET (Rev 2) (3)Sheet No. NEB-NM-287 Facility: Browns Ferry Nuclear Plant 1,2,3 Unit: Revision 0 50-259, 50-260, 50-296 Docket: 10/27/80 Date ENVIRONMENT DOCUMENTATION REF QUALIFICATION OUTSTANDING EQUIPMENT DESCRIPTION METHOD ITEMS Contract 90744 & 91750 Specifi-Qualifi-Specifi-Qualifi-Parameter cation cation cation cation System: Neutron Monitoring A-1 hour Operating ADDX 1 See NCR Plant ID No. GE - 7- 104 Time (1) B-1 year Note 1 BFNNEB8007 MPL #7-104 Component: Tip System Temperature Valve Assembly (F) Figure 11 . B.8(1) Manufacturer: GE B.8(2.3) (4) Table 11 11 Model No.: 136B1302G2 Pressure B.1(1,2,3) (PSIA) (4) Function: Neutron Monitoring Relative 100 н 11 Humidity(%) (4) Accuracy: -Req'd: N/A Demon: Chemical N/A (4) N/A - N/A N/A N/A Spray Category: A 4.3 x 10<sup>5</sup> Radiation Appx 1 See NCR Service: Tip System Note 1 BFNNEB8007 (RAD) (4) 8 n Location: 11 Aging N/A (2) Flood Level Elev:552 N/A Above Flood Level: Yes Submergence N/A NA N/A (4) NA NA No Notes: (1) See Section 2.4 in 79-01B report.

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

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

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

Prepared by: <u>Alex Melnihow</u> Reviewed by: <u>Charles Juck</u>

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1. To date, qualification information is unavailable for this GE equipment. However, TVA will pursue through GE the appropriate qualification documents.

If a coolant leak develops in a guide tube as a result of a LOCA, the valve assembly is capable of isolating the reactor side of the 3/8" guide tube. Since this device is required to operate only during a LOCA, the actual temperature and pressure are  $140^{\circ}$  F and normal atmosphere. It is TVA's opinion the environment outside the containment due to a LOCA would not adversely affect the redundant isolating subsystems or the assembly.

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