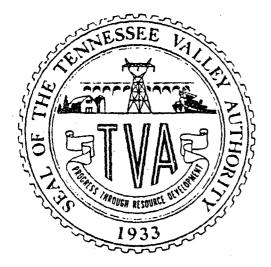
BAR NUCLEAR PLANT UNIT 1

ENNESSEE VALLEY AUTHORITY



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-NOTICE-

SUPPLEMENTAL INFORMATION-TVA'S COMPLIANCE TO 10 CFR50.49-ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANTS

SUPPLEMENTAL INFORMATION TVA'S COMPLIANCE TO 10CFR50.49 - ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANTS VOLUME 4

TABLE OF CONTENTS

BINDER NUMBER	REVISION	EQUIPMENT TYPE	VENDOR
WBNEQ-MOT-001	2	Large Electric Induction Motors - Outside Containment	Westinghouse
WBNEQ-MOT-002	3	Electric Induction Motors with Type RH Insulation - Inside Containment	Joy Fan/ Reliance Electric
WBNEQ-MOT-003	3	Electric Induction Motors with Type RH Insulation - Outside Containment	Reliance
WBNEQ-MOT-004	2	Electric Squirrel Cage Induction Motor - Outside Containment	Louis Allis
WBNEQ-MOV-001	4	Motorized Valve Actuators with Type RH Insulation	Limitorque
WBNEQ-MOV-003	5	Motorized Valve Actuators with Class B Insulation	Limitorque
WBNEQ-PENT-002	3	Primary Containment Electrical Penetration, Low Voltage Power and Control	Conax Corp.
WBNEQ-PENT-003	2	Primary Containment Electrical Penetrations, Instrumentation and Indication	Conax Corp.

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BINDER NO. : WBNEQ-MOT -001 MANUFACTURER : WESTINGHOUS PAGE 1 OF 2

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WATTS BAR NUC AR PLANT TAB A - EQUIPMENT IDENTIFICATION MATRIX

				LOCATION		·		
EQIS_NUMBER		UNII_DEVICE_ID_NO MODEL	AZMIIH	ELEV(1) RM/RAD	CA I (2)	OPER_TIME	EYENI	SAEEIY_EUNCIION
WBN-1-MTR -062-0104 CVCS PUMP MOTOR	- B	1-HTR -062-0104 HSDP	-в	692" A10 71 C6 2-54 11 4-1	A A A A	100D 1H0 1M0 1M0 1M0 1M0	L RH/A CV/A AF AB	THE CCP'S MTRS ARE ESSENTIAL FOR PROPER OPERATION OF THE PMPS WHICH ARE REQUIRED FOR THE MITIGATION OF THESE EVENTS
WBN-1-MTR -062-0108 CVCS PUMP HOTOR	- A	1-HTR -062-0108 HSDP	-A	69 2' AO 9 71 C6 2-54 11 4-1	A A A A	1000 1m0 1m0 1m0 1m0 1m0	L RH/A CV/A AF AB	THE CCPIS MTRS ARE ESSENTIAL FOR PROPER OPERATION OF THE PMPS WHICH ARE REQUIRED FOR THE MITIGATION OF THESE EVENTS
WBN-1-MTR -063-0010 SIS PUMP MOTOR	- A	1-HTR-063-0010 HSDP	-A .	692" &13 71C62-54114-1	A C C C C	1000	RH/A CV/A AF AB	THE SIS PMPS MUST FUNCTION FOR THE DURATION OF THE LOCA TO ASSURE ADEQUATE CORE COOLING. THEY ARE NOT REQOD TO MITIGATE ANY EVENTS IN THE AUX BLDG.
WBN-1-MTR -063-0015 SIS PUMP MOTOR	-8	1-MTR -063-0015 HSDP	-B	692• A12 71 C62- 54 114-1	A C C C C		L RH/A CV/A AF	THE SIS PMPS HUST FUNCTION FOR THE DURATION OF THE LOCA TO ASSURE ADEQUATE CORE COOLING. THEY ARE NOT REQ'D TO HITIGATE ANY EVENTS IN THE AUX BLDG.
WBN-1-MTR -072-0010 CS PUMP Motor		1-MTR-072-0010 HSW2	-8	676" A08 71C62-54114-1	••	• · · ·	RH/A CV/A Ab '	THE CSS PMPS ARE REQUIRED AND MUST OPERATE DURING THE MITIGATION OF A LOCA. THE CSS IS NOT REQUIRED TO MITIGATE ANY EVENTS IN THE AUX BLDG.
Page								· · · · · · · · · · · · · · · · · · ·
A-1 R1				PREPARER/DATE_		C Foust	7/3	$R_1 R_2 R_3$

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BINDER NO. : WBNEQ-MOT -001 MANUFACTURER : WESTINGHOU: PAGE 2 OF 2

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Page

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WATTS BAR NUCLER PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EGIS_NUNBER DESCRIPTION		UNII_DEVICE_ID_NO AIMIIH_ MODEL_NUMBER MODEL_NUMBER	LOCATION ELEY(1) BM/BAD CONIBACI	<u>CA</u> I (2)	<u>QPER_IIME</u>	EYENT	SAFETY_EUNCTION
WBN-1-NTR -072-0027 CS PUMP Hotor	- A	1-HTR-072-0027 -A HSH2	676' A09 71662-54114-1	A C C C C	300	L RH/A CV/A AB AF	THE CSS PMPS ARE REQUIRED AND MUST OPERATE DURING THE MITIGATION OF A LOCA. THE CSS IS NOT REQUIRED TO MITIGATE ANY EVENTS IN THE AUX BLDG.
WBN-1-HTR -074-0010 RHR PUNP MOTOR	- A	1-NTR -074-0010 -A VSW1	676° A11 79P64-160412	A C C C C C	1000	L RH/A CV/A Af Ab	THESE PMPS FUNCTION AS PART OF THE ECCS TO ENSURE ADEQUATE CORE COOLING DURING A LOCA. ACTUATION OF THE ECCS IS NOT REQD FOR RH/A, CV/A, AF, OR AB
WBN-1-HTR -074-0020 RHR PUMP HOTOR	- 8	1-MTR -074-0020 -B VSW1	676" A10 71 c62-54114-1	A C C C C	1000	L RH/A CV/A Af Ab	THESE PMPS FUNCTION AS PART OF THE ECCS TO ENSURE ADEQUATE Core cooling during a loca. Actuation of the ECCS is not REQD FOR RH/A, CV/A, AF, OR AB

			R_1_	R_(R
PREPARER/DATE_	R C Foust	7/30/86	JOH		
CHECKED/DATE	W B Kim	7/30/86	1-7-89 KAN		
			Z/E/AG		•

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BINDER NO. <u>WBNEQ-MOT-00</u> 1 PLANT_	URN	INTT(S) 1	SHEFT 1 OF 1
		_ 0011(0)	
BINDER TITLE WESTINGHOUSE	COMPUTED_/R	1 JOH DATE 2.7.	.89
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MOTORS ON RHR. CVCS. CS, AND SIS	CHECKED_/R	<u>1 KBN</u> DATE <u>2/8</u>	189
		· · · · ·	

TAB A

NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- 2. See Page B-1A R1 for source of Category and Operating Time assignments.

PAGE A-3 R1

3	R_1_R RITLE_WESTINGHOUSE COMPUTED_RCFDATE 7/10/86 JDH 2-7-84	
MOTORS	DN RHR.CVCS.CS, AND SIS CHECKED WBK DATE 7/21/86KBA	
A. DOCI	MENTATION (see note)	
Equ	ipment Description <u>CS, RHR, SIS, and CVCS pump motors</u>	-
Veno	lor/Manufacturer Westinghouse	-
Equi	ipment Model No.(s) See TAB A for complete listing of	-
	the equipment covered by this report.	-
	LIFICATION REPORTS (see note) WCAP-8687	-
*(1)	Title/Number/Revision <u>EOTR-A02A, Rev. 2</u> RIMS <u>B43</u> 85041304 "Equipment Qualification Test Report <u>Westinghouse LMD Motor Ins."</u> DATE <u>March 1983</u> NEB	•
(2)	Title/Number/RevisionWCAP-8754,RIMS_801215300"Environmental Qualification of Class 1EMotor for Nuclear Out-of-Containment Use".DATE June 1976	
(3)	WCAP-8587 Title/Number/Revision <u>EQDP AE-2, Rev. 5</u> RIMS <u>B43 850401 303</u> "Environmental Qualification Data Package Large Pump Motors (outside containment)." DATE <u>March 1983</u>	
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)	
(4)	3170 Application Data.	i
(5)	NP-1447 EPRI Report Project 893-1 dated July 1980, pages 3-14 through 3-20.	
(6)	NP-4172SP dated August 1985 (see "Lubricants" - TAB C).	
(7)	NP-3887 dated February 1985 (TAB G).	
(8)	47E235-74 R1 Environmental drawing.	
(9)	47E235-79 R1 Environmental drawing.	
(10)	47E235-81 R1 Environmental drawing.	
(11)	EQ&T-EQT-3592 Rev O Westinghouse Report	

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BINDER M	NO. <u>WBNEO-MOT-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1a</u> OF <u>2</u>
BINDER 1	R_2_R TITLE_WESTINGHOUSECOMPUTED_/R1_JDH_DATE 2/7/89
MOTORS (ON RHR, CVCS, CS, AND SIS CHECKED /R1 KBN DATE 2/8/89
A. DOCL	UMENTATION
OTHE	ER (ANALYSIS, VENDOR DATA, ETC.) (Continued)
(12)	EQ&T-EQT-2026 Rev 0 (B71 860530 004) Westinghouse Report
[^] (13)	EQ&T-EQT-3827 Rev O Westinghouse Report
(14)	WBNOSG4-013 R12 (826 900321200) ⁴⁴⁵ System 62, Category and Operating Times Calculation
(15)	WBNOSG4-014 R11 (B26 900309 227) System 63, Category and Operating Times Calculation
(16)	WBNOSG4-019 R7 (B26 900309 234) System 72, Category and Operating Times Calculation
(17)	WBNOSG4-020 R8 (B26 900309 232) System 74, Category and Operating Times Calculation
(18)	GENNAL6-002 R2 (B45 860812 236) Areas with High Potential for Condensate Formation
(19)	WBP EVAR 8602001 R0 (B43 860227 901) Degraded Voltage for Environmental Qualification Project
How	AP-8687 is the only test report used for qualification purposes. wever, WCAP-8754 and -8587 were included because they contain eful information on Westinghouse motors.
Note -	e: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.
	PAGE B-1A R2

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	BINDER TITLE WESTINGHOUSE MOTORS COMPUTED R DATE 9/18/16 R
	ON RHR, CVCS, CS, and SIS CHECKED WBK/AWT DATE 9/19/86
	B. <u>CONCLUSION OF REVIEW</u> (Check only one block)
	X Equipment Qualified Pending Resolution of All Open Items.
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation
	Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES See Open Items in front
	of binder.
	<u>1 - SCR EEB8618 must be resolved (see Open Item No. 6).</u>
	<u>2 - Watts Bar must supply termination data (see Open Item No. 1).</u>
	<u>3 - Watts Bar must supply documentation on installed motors</u>
	S.O. No. 78F35296 and 79F55979 (see Open Item No. 5).
	COMMENTS / RECOMMENDATIONS
arrive	
	PAGE 8-1

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	ER TITLE <u>WESTINGHOUSE MOTORS</u> COMPUTED <u>I</u> DATE <u>7/10/36</u> <u>R</u> R RHR, CVCS, CS, and SIS CHECKED <u>Mark</u> DATE <u>7/10/36</u>
	CHECKED DATE //2//00
C.	QUALIFICATION CRITERIA
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
	Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	X Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>
	<u>NEMA Standard MG1-1972, IEEE 275-1966, IEEE 112A-1964, IEEE 344-1975,</u>

TVA 19537. (06-3-86)

	BINDER NO. WBNEQ-M	0T-001 PLANT_WBN UNIT(S) 1 SHEET 4 OF 27
	BINDER TITLE WEST	INGHOUSE MOTORS COMPUTED RATE 7/30/86 R R
	ON RHR, CVCS, CS	, and SIS CHECKED AM DATE 7/30/86
	D. <u>QUALIFICATIO</u>	N METHODOLOGY (Check only one block)
	Test Con	of Identical Item Under Identical Conditions or Under Similar nditions with Supporting Analysis
	Test	of Similar Items with Supporting Analysis
	<u>X</u> Analy Suj	ysis in Combination with Partial Type Test Data that pports the Analytical Assumptions and Conclusions
	Experies Con	rience with Identical or Similar Equipment Under Similar nditions with Supporting Analysis
	JUSTIFICATION	N/COMMENTS <u>The qualification of these motors is based</u>
	<u>on a Westingl</u>	house test in which only a stator was subjected to
	<u>environmental</u>	l testing. Westinghouse denotes that only the
	thermalastic	epoxy insulation system is the limiting material in
	these motors.	. The effects of accident conditions on lubricants,
	bearings, and	d interfaces are discussed in TAB C and are
	qualified by	analysis. Westinghouse has provided a materials
	<u>comparison</u> or	n the tested stator versus the TVA motors. This com-
	<u>parison is di</u>	iscussed in TAB C, "Similarity."
	-	
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	BINDER NO. WBNEQ-MOT-001			
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	ON RHR, CVCS, CS, and SI			1/86

### E. EQUIPMENT DESCRIPTION

••

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? No See Section A and C.

See Dection A and 0.		Qualification	
	<u>Plant Device</u>	Document	<u>Reference</u> WCAP-8687
(1) Equipment Type	Motor(s)	Stator	page 2
(2) Manufacturer	Westinghouse	Same	WCAP-8687 page 2
<pre>(3) Model Number(s)</pre>			WCAP-8687
() Model Number(s)	<u>See TAB C</u>	<u>S.O.# 76F60185</u>	page 2
		·····	
			······································
(4) Serial Number(s)	See TAP C	10.70	
(+) Serial Number(s)	<u>See TAB C</u>	<u>15-78</u>	<del></del>
(5) Identify Component- Unique checksheet attached:	Supplement 1,	pages 26 and 27 o	f this tab.
JUSTIFICATION/COMMENTS	TAB C provides a		
-		comparison betwee	
the W test stator and the	TVA motors. A	<u>discussion is pro</u>	vided
for all items which are n	ot the same.		
	PAGE B-5	•	
		•	

TVA 19537 (OE-3-86)

MOTORS	ON RHR, CVCS, C	S, AND SIS CHECKED	WBK DATE 7/2	2-7-89 1/86 <u>KBN</u>
<u> </u>	•		·	
F. <u>I</u>	ISTALLATION INT	<u>IERFACES</u>		
do in	ocumentation an Iterface a requ	aces pertinent to EQ ad/or evaluation and airement for our appl equirement in QMDS, is	reference the sour ication (Yes/No)?	rce. Is the (Note below.
	<u>Interface</u>	Identify Interface	Plant Requirement? (Yes/No)	Reference Test Report
Мо	ounting Bolts	*None	N/A	
P	ternal Process Connections	*None	N/A	
	ectrical connections	*None	<u> </u>	
Co	nduit Seals	None	N/A	
	nnector eals	None	N/A	
0r	ientation	*None	<u>N/A</u>	
	ysical onfiguration	None	N/A	
Ot	her	None		- <u></u>
JU	STIFICATION/CO	MMENTS <u>*The W test w</u>	as performed only	on a
st	ator not the m	otor assembly as a wh	ole. The interfa	ces listed
<u>ab</u>	<u>ove have been</u>	analyzed and are note	ed in TAB C.	<u></u>
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BINDER NO.WBNEQ-MOT-001	PLANT_WBNUNIT(S) _1SHEET _7_OF 27_	<u> </u>
BINDER TITLE WESTINGHOUSE	MOTORS COMPUTED ALF DATE 1/18/86	
ON RHR, CVCS, CS, and SI	<u>s</u> CHECKED	-

### G. <u>TEST_SEQUENCE</u>

(1) Test Sequence: Was the test sequence established to simulate the accident environment in accordance with IEEE-323 (74), paragraph 6.3.2 (yes/no/NA)? (note below)
Var(Na/Na)

			Yes/No/NA	Reference
	(a)	Equipment inspected for damage	Yes	<u>Pg. 7 of WCAP-8687</u> Table 4 of
	(Ъ)	Baseline performance measurements taken	Yes	WCAP-8687
	(c)	Equipment aged:		
		Thermal	Yes	Pg. 7 of WCAP-8687
		Radiation	Yes	Pg. 8 of WCAP-8687
		Wear	No	
	(ð)	Vibration/seismic testing conducted	Yes	Pg. 6&8 of WCAP-8687
	(e)	Design basis event (DBE) exposure (radiation and humidity)	Yes	Pg. 8&9 of WCAP-8687
	(f)	Post-DBE exposure	<u> </u>	
	(g)	Final inspection and disassembly	<u>No</u>	
(2)	Was desc	the same piece of equipment used ribed in item (1) above (yes/no/)	throughout the NA)? <u>Yes</u>	test sequence
(3)	been	the test equipment, test equipment, test equipment, test equipment, appropriately documented (yes/no erence <u>Table 1 and 2 of WCAP-868</u>	o/NA)? <u>No</u>	nd calibration data
JUST	IFICA	TION/COMMENTS (1)Wear aging was	not_defined_as_	a_pretest
requ	ireme	nt. Following completion of the	test, the stato	r_was
<u>sub j</u>	ected	to a series of electrical tests	which proved th	<u>e_reliability</u>
<u>of t</u>	<u>he in</u>	sulation system. (2)Complete ca	<u>libration data w</u>	as not PAGE

included within the text of the qualification report. However, this

information is on file at Westinghouse and is available for audit.

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	TLE WESTINGHOUSE MOTORS COMPUTED REAL	_ DATE 7/30/86 
H. <u>AGI</u>	NG	
(1)	Was aging considered in the qualification $pr$	Ogram
	(Yes/no/NA)? <u>Yes</u> (Reference Pg. 7&8 of WCA JUSTIFICATION/COMMENTS <u>The test stator was</u>	
	radiation, and vibration aging.	<u>subjected to thermal</u>
(2)	Were the following effects considered in the	aging program:
	Aging Effect	Yes/No/NA Reference
	Thermal aging	Pg. 7 of Yes WCAP-8687
	Radiation exposure	Pg. 8 of Yes WCAP-8687
	Vibration (non-seismic) aging	Pg. 6 & 8 of           Yes         WCAP-8687
	Operational (electrical/mechanical/process) stress aging	No
	JUSTIFICATION/COMMENTS <u>Only a stator was to</u>	ested.
(3)	Were all known synergistic effects which are significant effect on equipment performance of program (yes/no/NA)? <u>N/A</u> (Reference	Considered in the aging
	JUSTIFICATION/COMMENTS <u>Based on available</u>	information, no known
	synergistic effects exist in these motors.	
(4)	Thermal Aging:	
	(a) Was thermal aging considered in the qual (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 7 of W</u>	ification program CAP-8687 ).
	JUSTIFICATION/COMMENTS <u>Only two materi</u>	als were identified
	as being significantly affected by therm	al aging: they are
	the thermalastic epoxy insulation and mo	otor lubricant. Since
	the motor lubricant is sampled and repla	ced periodically,

TVA 19537 (OE-3-86)

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BINDER IIILE	ESTINGHOUSE MOTORS COMPUTED ATE 7/10/56 R R
ON RHR, CVCS,	CS, and SIS CHECKED DATE /2/8/
H. <u>AGING</u> ((	Continued)
с <b>(b)</b>	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>Pg. 7 of WCAP-8687 &amp; TAB C</u> ).
	JUSTIFICATION/COMMENTS <u>Thermalastic Epoxy insulation, see</u>
	"Similarity" in TAB C.
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 2&amp;3 of WCAP-8687</u> ).
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 7 of WCAP-8687</u> ).
	<u>Parameter</u> <u>Plant Maximum Normal</u> <u>Test</u> <u>Equivalent</u> See
	Temperature <u>104°F or 40°C</u> <u>210°C</u> <u>TAB C</u> See
	Time <u>40 Years Normal</u> <u>168hrs</u> <u>TAB C</u>
	JUSTIFICATION/COMMENTS See TAB C
(e)	Was the Arrhenius methodology used for accelerated aging
	(yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 7 of WCAP-8687</u> ).
	JUSTIFICATION/COMMENTS <u>See TAB C</u>
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 7 of WCAP-8687</u> ).
	JUSTIFICATION/COMMENTS <u>Activation energy of 1.11 ev was</u>
	derived from tests performed as required by IEEE-275-1966.
	PAGE B-9

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pa li JU	a regression line was used for determining accelerated agin rameters, are test points or failure modes identified on the ne (yes/no/NA)? <u>No</u> (Reference <u>Pg. 59 of WCAP-8687</u> ).
pa li JU	rameters, are test points or failure modes identified on the
	STIFICATION/COMMENTS <u>Arrhenius Methodology was used. See</u>
<u>TA</u>	B C.
(h) Wa (y	s the equipment operated during the thermal aging es/no/NA)? <u>No</u> (Reference).
របះ	STIFICATION/COMMENTS <u>Stator was meggered before and</u>
af	ter.
(5) Radiatio	on Aging Exposure:
(a) Was pro	s radiaton aging exposure considered in the qualification ogram (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 8 of WCAP-8687</u> ).
JUL	STIFICATION/COMMENTS <u>TID of 5 x 10⁷ rads, gamma following</u>
the	ermal_aging.
ide	re the materials susceptible to radiation degradation entified in the qualification program (yes/no/NA)? <u>Yes</u> eference <u>Pg. 7 of WCAP-8687 and TAB C</u> ).
BUC	STIFICATION/COMMENTS <u>Thermalastic Epoxy</u> .
qua	the basis for radiation aging exposure identified in the lification program (yes/no/NA)? <u>Yes</u> (Reference <u>Pg. 3 of</u> <u>P-8687</u> ).
JUS	TIFICATION/COMMENTS

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BINDER	D. WBNEQ-MOT-001 PLANT WBN UNIT(S) 1 SHEET 11 OF 2
	. R <u>1</u> R
BINDER	ITLE WESTINGHOUSE COMPUTED RCF DATE 7/10/86 JOH Z-7-89
MOTORS	NRHR, CVCS, CS, AND SIS CHECKED WBK DATE 7/21/86
	2/5/89
H. <u>A</u>	IG (Continued)
	(d) Is the radiation test exposure dose and dose rate $-$
	acceptable (Yes/No/NA)? <u>Yes</u> (Reference:).
ă.	Plant normal ambient radiation dose (rd) <u>3.6 x 10⁶-40 Yr Norm</u>
	Test exposure dose (rd) $5 \times 10^7$ gamma
	Test exposure dose rate (rd/hr) $9.4 \times 10^5$
	Test exposure source type (e.g., Co-60 gamma) <u>Cobalt-60</u>
	JUSTIFICATION/COMMENTS <u>267 percent greater than plant</u> <u>specific requirement</u> .
()	Vibration (non-seismic) Aging:
	(a) Were the effects of non-seismic vibration induced during
	normal and abnormal operation addressed in the
	qualification program ¹ (YES/NO/NA)? Yes
	(Reference: <u>Pg. 8 of WCAP-8687</u> ).
•••	JUSTIFICATION/COMMENTS The effects of the Vibration
	aging are noted on Table 4, pg 22, of WCAP-8687.
	Vibration aging had no effect on the insulation resistance.
	(b) Was the basis for vibration aging identified and justified
	in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>See below</u> ).
	(xercrence: <u>5ee below</u> ).
	JUSTIFICATION/COMMENTS The basis for vibration aging
	was given in WCAP 8687, page 8.
(7)	Operational Stress Aging:
	(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal
	operation adressed in the qualification program
	(Yes/No/NA)? <u>No</u> (Reference:).
	JUSTIFICATION/COMMENTS Only the stator of the test
	motor was subjected to testing environment. It is not
	possible to define or consider the effects of these
	stresses when only a stator was tested.
¹ Qu	ification program refers to the test report and any supple-
me	al documentation including TVA analyses in TAB C of the Binder.

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BINDER 1	TITLE WESTINGHOUSE COMPUTED RCF DATE 7/10/86 JDH z-7-89
MOTORS (	DN_RHR, CVCS, CS, AND SIS_ CHECKED_WBKDATE 7/21/86 KBNZ/8/89
H. AGIN	IG (Continued)
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? <u>N/A</u> (Reference:
·	JUSTIFICATION/COMMENTS
(8)	Was the qualified life of the equipment and its basis define in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>See TAB C</u>
	Qualified life (Document in QMDS) <u>40 years</u>
	JUSTIFICATION/COMMENTS <u>Westinghouse defines the qualified</u>
	life as 5 years per pg 8 of WCAP-8687. For the TVA
(9)	JUSTIFICATION/COMMENTS Westinghouse defines the qualified life as 5 years per pg 8 of WCAP-8687. For the TVA application, TAB C defines the qualified life. Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes (Reference: Pg. 2 of WCAP-8687
(9)	<pre>life as 5 years per pg 8 of WCAP-8687. For the TVA application. TAB C defines the qualified life. Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes</pre>
(9)	<pre>life as 5 years per_pg 8 of WCAP-8687. For the TVA application. TAB C defines the qualified life. Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes (Reference: Pg. 2 of WCAP-8687</pre>
(9)	<pre>life as 5 years per pg 8 of WCAP-8687. For the TVA application. TAB C defines the qualified life. Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes (Reference: Pg. 2 of WCAP-8687</pre>
(9)	<pre>life as 5 years per_pg 8 of WCAP-8687. For the TVA application. TAB C defines the qualified life. Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes (Reference: Pg. 2 of WCAP-8687 JUSTIFICATION/COMMENTS Westinghouse only requires periodic</pre>
(9)	life as 5 years per pg 8 of WCAP-8687. For the TVA         application. TAB C defines the qualified life.

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BINDER NO. WBNEQ-MOT-001 PLANT	WBN UNIT(S)	
BINDER TITLEWESTINGHOUSE MOTORS		_ DATE 7/10/56 R
ON RHR, CVCS, CS, and SIS		DATE 7/21/86

### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of EQC Binder for Detailed Materials Analysis)

	Material/Property/Function	Radiation <u>Threshold</u>		Activation <u>Energy</u>	<u>Refere</u>
(a)	<u>See TAB C (</u>	<u>Similarity)</u>			
(Ъ)					
502	TIFICATION/COMMENTS <u>Prov</u>	ided in TAB	<u>C.</u>		
-			·		
					<u></u>
-					
				·····	<del></del>
				· · · · · · · · · · · · · · · · · · ·	
					*

BINDER NO	D. WBNEQ-MOT-001 PLANT_WBN UNIT(S) SHEET 14 OF
BINDER TI	TLE WESTINGHOUSE MOTORS COMPUTED R DATE 7/18/56 R R
ON RHR,	TLE WESTINGHOUSE MOTORS COMPUTED $A = DATE \frac{7/18/86}{124/86}$ B = B = CVCS, CS, and SIS CHECKED $M = DATE \frac{7/18/86}{124/86}$ CHECKED $M = DATE \frac{7/18/86}{124/86}$ CHECKED $M = DATE \frac{7/18/86}{124/86}$ CHECKED $M = DATE \frac{7/18}{124/86}$ CHECKED $M = DATE \frac{7/18}{124/86}$ CHECKED $M = DATE \frac{7/18}{124/86}$ CHECKED $M = DATE \frac{7}{124/86}$ CHECKED CHECKECKECKECKECKECKECKECKECKECKECKECKECKE
	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? <u>Yes</u> (Reference <u>WCAP-8687, pgs. 3 and 12</u> ).
	Identify Acceptance Criteria: <u>The tested stator must measure greater</u> ·
	than 5 megohms when subjected to a 2500 VDC megger and must pass a
	6000 VAC hipot for one minute.
(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Sect. 5.1, pg. 7 of WCAP-8687).
	Identify baseline and functional testing: <u>Before and after each</u>
	major test sequence, the resistance of the stator insulation was
	measured and the ambient temperature recorded. Resistance was
	measured using a 2500 VDC megger where the stator leads were tied
	together. The voltage was applied for 10 minutes and measurements
	taken at 15, 30, 45, 60, 90, and 120 seconds and at 1 minute intervals
	thereafter until test completion. Also see above.
	JUSTIFICATION/COMMENTS
(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>No</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Only a stator was tested; therefore</u> ,
	operational loading conditions could not be addressed. However, the
PAGE 8-14	stator passage of the electrical test described in WCAP-8687
	demonstrates that the insulation system had shown no signs of
	significant wear and verified its integrity.
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	WBNEQ-MOT-001     PLANT     WBN     UNIT(S)     1     SHEET     15     OF       THE     WESTINCHOUSE     COMPUTED     DOE     DATE     7 (10 (2))
	TLE_WESTINGHOUSECOMPUTED_RCFDATE 7/10/86_70+ 2-7-89
MOTORS ON	RHR, CVCS, CS, AND SIS CHECKED WBK DATE 7/21/86 KEN
	• · · · · · · · · · · · · · · · · · · ·
PERF	PMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE - ORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIC tinued)
(4)	Do the applied loads during baseline testing reflect normal operating conditions (Yes/No/NA)? <u>No</u> (Reference:)
	JUSTIFICATION/COMMENTS <u>But the testing assures stator</u>
	reliability
(5)	Identify electrical characteristics necessary to ensure the equipment performance specifications can be satisfied.
	(a) <u>Parameter</u> <u>Plant Normal Conditions</u> <u>Reference</u>
	Voltage
	Load
	Frequency
	Accuracy
	Other(s)
•	JUSTIFICATION/COMMENTS See "Justification/Comments"
	under 5(c) page 16 of this Tab.
	•

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BIND	ER NO	WBNEQ_MOT_00	PLANTU	NIT(S) <u>1</u>	SHEET <u>16</u> 0F R <u>1</u> R	
BIND	ER TI	TLE <u>WESTINGHO</u>	E COMPUTED RCF	DATE <u>7/1</u>		
MOTO	<u>rs on</u>	RHR, CVCS, CS,	ID SIS CHECKED WBK	DATE <u>7/2</u>		
J.	PERF		<u>CHARACTERISTICS NEC</u> CATIONS CAN BE SATISF			.01
	(b)	Parameter	<u>Specific Accident C</u>	onditions	Reference	
		Voltage				_
		Load			· · ·	
		Frequency		<del>-,</del>		_
		Accuracy				
		Other(s)				
						_
		JUSTIFICATION	OMMENTS			_
					•	_
			•			-
	(c)	Parameter	Demonstrated Conc	<u>iitions</u>	Reference	_
		Voltage				_
		Load	. <u></u>			_
	·	Frequency		<u> </u>		_
		Accuracy			·	_
		Other(s)				
						-
		JUSTIFICATION /	MMENTS A discussion		······································	-
		JUSTIFICATION/	OMMENTS <u>A discussion</u>	of these par	ameters is	-

PAGE B-16 R1

BINDER T	0. <u>WBNEQ-MOT-00</u> 1 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>17</u> OF R <u>1</u> R ITLE <u>WESTINGHOUSE</u> COMPUTED <u>RCF</u> DATE <u>7/18/86</u> <u>JDH</u>
-	N RHR, CVCS, CS, AND SIS CHECKED WBK DATE 7/21/86 481
K. <u>Req</u>	UIRED OPERATING ENVIRONMENT -
Ref	erence Environmental Drawing No. <u>47E235-74, -79, and -81</u>
· (1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM(-)</u> (b) Pressure (psig) <u>ATM(-)</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	*(d) Radiation (rd) $3.6 \times 10^6$ (d) Radiation (rd) $3.6 \times 10^6$
· .	*Greatest value for any of the motors qualified in this binder. (See TVA Calculation WBNNAL3-025)
• (3)	Process Interfaces: <u>None</u>
(4)	State anticipated occurrence frequency and duration of abnormation conditions: <u>Temperature and humidity - Up to 8 hours per</u>
	excursion and less than 1 percent of plant life (excluding
	accident conditions).
(5)	parameters including peak, duration, and profile):
(5)	( the
(5)	parameters including peak, duration, and profile): 110 for 30 days
(5)	parameters including peak, duration, and profile):         110 for 30 days         (a) Temperature(°F) 104 for 70 days Accident typeLOCA         (b) Pressure (psig)ATM(-) Accident typeLOCA         (c) Humidity (%)90 Accident typeLOCA
(5)	<pre>parameters including peak, duration, and profile):</pre>

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		TLE <u>WESTINGHOUSE</u> COMPUTED <u>RCF</u> DATE <u>9/17/86</u> 2-7-89
MOTOR		RHR, CVCS, CS, AND SIS CHECKED WBK/AWT DATE 9/17/86
к.	<u>REQU</u>	IRED OPERATING ENVIRONMENT (Continued)
		Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>Under worse conditions of Post-LOCA, the</u>
		CVCS, RHR, and SIS motors are required to operate 100 days.
		The CS motors are required for 30 days.
	(6)	Is the equipment subject to moisture or liquid intrusion whi can affect the performance of the equipment under design bas accident conditions (Yes/No/NA)? <u>No</u> (Reference:
		See TAB C
	(7)	Subject to submergence (Yes/No/NA)? <u>No</u> (Reference:
		See "Submergence" in TAB C
		Identify initiation time and duration of submergence:
	(8)	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>No</u> (Reference:
		If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:
	(9)	Special environmental calculations (temp., rad., etc.)
		Type RIMS No.
		See TAB B Section A

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BINDER NO. <u>WBNEQ-MOT-00</u> 1 PLANT	WBN	UNIT(S) <u>1</u>		
BINDER TITLE WESTINGHOUSE	COMPUTED R	CF DATE 7/		
MOTORS ON RHR, CVCS, CS, AND SIS	CHECKED W	<u>BK</u> DATE <u>7/</u>	2-7-89 21/86 <u>K En/</u> 248/89	
L. <u>SUMMARY COMPARISON OF TEST</u>	CONDITIONS	TO SPECIFIED C	ONDITIONS -	
(1) Comparison of worst-ca			<u>0101110110</u>	-
Parameter	Specified	Demonstrated		
Operating Time	<u>100 Days</u>	***48 Hours	See TAB D Sec. 5.6 of WC <u>AP 8687</u> See TAB D	Rl
Temperature (°F)	110	95	Sec. 5.6 of WC <u>AP 8687</u>	R1
Pressure (psig)	0	0_	See <u>TAB C</u> See TAB C	,
			and TAB D Sec. 5.6	R1
Relative Humidity (%)	90	100	of <u>WCAP 868</u> 7	`
Chemical Spray*	N/A	N/A	<u>N/A</u> See TAB C	,
Radiation (rd)**	1.36x10 ⁷ _gamma	5x10 ⁷ gamma	and TAB D Sec. 5.3 of <u>WCAP 868</u> 7	R1
Submergence	<u>N/A</u>	N/A	N/A •••	
<pre>*Includes spray concent:     pH.</pre>	ration, flow	vrate, density,	duration, and	
**Enter 40-year integrate dose and specify type.	ed normal do	ose plus integr	ated accident	
<pre>***Westinghouse subjected     humidity/environment fo     are not subject to this     subject to DBA radiatio     increase in temperature</pre>	or 48 hours. s condition. on exposure	However, the The TVA moto with no apprec	TVA motors ors are only iable	

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(con	tinued)	<u>CONDITIONS TO SPECIFIE</u>	
(2)	Comparison of worst-c	case profiles and margin	assessment:
	Parameter	Test Profile Envelopes Specified (Yes/No/NA)	
	Temperature	Yes	See TAB C
	Pressure	Yes	See TAB C
	Relative Humidity	Yes	See TAB C
	Chemical Spray	Yes	<u>N/A</u>
	Submergence	N/A	N/A
	JUSTIFICATION/COMMENT	'S	

PAGE B-19A R1

BIND	ER NO. WBNEQ-MOT-OQ1 PLANT WBN UNIT(		
BIND	ER TITLE WESTINGHOUSE COMPUTED RCF		L_1R 26H 2-28-89
MOTO	RS ON RHR, CVCS, CS, AND SIS CHECKED WBK .	DATE <u>7/21/8</u>	, <u>7</u> , –
L.	SUMMARY COMPARISON OF TEST CONDITIONS TO SPE (Continued)	CIFIED CONDI	TIONS
	(3) Were margins applied to the test parame addressed in the test program to assure and uncertainties are accounted for? ( Yes/No/NA).	that normal	variation
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/NA (Hot Spot
	*Temperature: +15 degrees F	27°F	Margin) R <u>Yes</u>
	Pressure: +10% but no more than 10 psi	g <u>N/A</u>	N/A
	Radiation: +10% of accident dose	267%	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)		TAB C
	Voltage: ±10% of rated value	See	TAB_C
	Frequency: ±5% of rated value	See	TAB_C
	Environmental Transient: the initial transient and the peak temperature applied twice	See TAB C	and Below
	Vibration: +10% added to acceleration	See_	TAB C
	JUSTIFICATION/COMMENTS The accident par	cameters are	not
	significantly different from the max. no	ormal with th	le excep-
	tion of radiation. TAB C provides a dis	cussion on e	each of the
	parameters listed above. Only a stator	was tested b	<u>y</u>
	Westinghouse. In addition, 0588-Categor	y I requires	the
	application of the environmental transie	nt_twice.	
	0588-Category II does not.		
	*A 15°C (27°F) hot spot margin was added	to the stat	or temp-  R1
	erature as calculated in TAB C. This m	argin provid	es
	<u>conservatism for the Arrhenius aging an</u>	alysis.	

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ON RHE	, CVCS, CS, and SIS CHECKED DATE 14180
м. <u>о</u> г	ERABILITY TEST RESULTS
(1	) Identify the safety function(s) of this equipment: (Reference <u>See TAB A</u> ).
	JUSTIFICATION/COMMENTS
	————————————————————————————————————
. (2	) Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>N/A</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Only a stator was tested</u> .
(3	) Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>N/A</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Only a stator was tested</u> .
(4	) Did the test demonstrate the operability requirements for the require time interval for which the equipment is required to operate (yes/no/NA)? <u>No</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Only a stator was tested</u> .
(5	) Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>N/A</u> (Reference).
	JUSTIFICATION/COMMENTS <u>No abnormal conditions or anomalies</u>
	were identified.

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EQP006.51

BINDER N BINDER T	O. <u>WBNEQ-MOT-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>220</u> ITLE <u>WESTINGHOUSE MOTORS</u> COMPUTED <u>M</u> DATE <u>MOSE</u> <u>R</u> R , CVCS, CS, and SIS CHECKED <u>MAKE</u> DATE <u>M</u>	/F
ON RHR	, CVCS, CS, and SIS CHECKED	
Ha an wh (y	INTENANCE AND SURVEILLANCE s the qualification program identified those surveillance, maintenance d inspection parameters which are essential to maintain qualification ich aid in detecting degrading materials or equipment performance es/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder Qualification Maintenance Data Sheets).	ano
	STIFICATION/COMMENTS <u>See TAB G</u>	
_		
	·	
	PAGE B-22	

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	PUP CUCS CS and STC	DATE 7/1936 DATE 7/1986
0.	SUMMARY OF REVIEW	
		<u>Yes/No/NA</u>
	(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, all extrapolations of test data used in an analysis been justified and documented)?	Yes and
	(2) Any exceptions (i.e., sound reasons to the con- taken to the specified qualification level adequately justified?	trary) <u>N/A</u>
	(3) Choice of qualification methodology adequately justified?	Yes
	(4) If analysis was performed, complete the follow:	ing:
	(a) Were equipment performance requirements identified?	Yes
	(b) Were specific features and failure modes an effects analyzed?	ndYes
	(c) Were assumptions and mathematical models us together with appropriate justification f their use?	sed ForYes
	(d) Were environmental parameters which affect equipment performance identified?	<u>Yes</u>
	(5) Adequate similarity between equipment and test specimen established?	Yes
	(6) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition pri application of DBE conditions?	or to Yes
	(c) Absence of preaging in test/analysis justif	ied? <u>N/A</u>
	(d) Materials susceptible to thermal/radiation aging identified?	Yes

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BINDER N	IO. WBNEQ-MOT-001 PLANT WBN UNIT(S) 1	SHEET2 ⁴ OF
	a, CVCS, CS, and SIS CHECKED WILL DATE	[/86
0. <u>su</u>	MMARY_OF_REVIEW (Continued)	Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7	) Qualified life or replacement schedule established?	Yes
(8	) Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	N/A
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	) Criteria regarding test sequence satisfied?	Yes
(10)	) Criteria regarding spray satisfied?	N/A
	(a) Was the spray testing done while under the extremes of pressure and temperature?	N/A
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>N/A</u>
(11)	Criteria regarding submergence satisfied?	N/A
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	<u>N/A</u>
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	<u>N/A</u>

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BINDER NO. WBNEQ-MOT-001 PLANT WBN UNIT(S) 1	SHEET25OF27
BINDER TITLE WESTINGHOUSE MOTORS COMPUTED	056 R R
ON RHR, CVCS, CS, and SIS CHECKED WHATE TO	1186
	<u></u>
0. <u>SUMMARY OF REVIEW</u> (Continued)	
	<u>Yes/No/NA</u>
(15) Criteria regarding functional testing satisfied?	Yes
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
(b) Was an initial base line test done to establish required performance characteristics?	Yes
<pre>(c) Has the test/analysis demonstrated that performance performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?</pre>	2 <u>Yes</u>
(16) Criteria regarding instrument accuracy satisfied?	N/A
(17) Test duration margin (1 hour + function time) satisfied?	<u>*No</u>
(a) Is the minimum specified operating time at least 1 hour?	<u>N/A</u>
(b) If exception to the l-hour minimum operating time was taken, was adequate justification provided?	Yes
(18) Criteria regarding synergistic effects satisfied?	Yes
(19) Criteria regarding margins satisfied?	Yes
(20) Maintenance and surveillance requirements adequately identified?	_Yes
P. <u>DISCUSSION</u>	
*See TABS C and G. The accident conditions are not signifi	cantly
<u>different from the max. normal with the exception of radia</u>	
therefore, the major concern is radiation and aging. TAB	
PAGE <u>B-25-</u> a detailed discussion on each. Based on the analysis prov	
TAB C along with this section, it is concluded that the more	
<u>covered by this report are qualified for 40 years plus 100</u>	days
_post-accident.	

TVA 19537 (OF-3-86)

EQP006.51

BINDER TITLE <u>WEST</u> ON RHR, CVCS, CS		TORS		LF dat MML dat		
	(		UPPLEMENT 1 T-UNIQUE CH MOTORS	SCKLIST	Page 1 of 2	
EQUIPMENT IDENTI	ICATION					
(1) Is the motor plant motors	dentified which requ	l in the Lire qua	qualificat: lification (	ion report id (yes/no/NA)?	entical to the <u>No (Similar)</u>	
Item		<u>Plant</u>	Report	Acceptabl <u>(Yes/No/N</u>	• • • •	
(a) Insulati materi	on system 1 als	hermala: <u>Epox</u>		Yes	See <u>TAB</u> C	
	struction or random cast)	Reserve	-	_	Form 3170	
-		Form	Form	Yes	<u>(See Section</u> See	<u>E7</u>
(c) Insulati (B, F,		<u>B</u>	<u>B</u>	Yes	TAB C and WCAP-8687	
(d) Lubrican	t					
Manufa	cturer	Var.	Var.	Yes	See TAB <u>C and E</u>	
Туре		<u>*STO-2</u>	Var.	Yes	See <u>TAB</u> C	
(e) Bearing						
Manufa		Westin <u>house</u> plit Sle	<u>house</u>	- Yes	See <u>TAB_C&amp;E</u> See	
Туре		<u>&amp; Ball</u> See	<u> </u>	Yes	<u> </u>	
Bearin	g life	<u>Sec</u> C	<u>_N/A</u>	Yes	TAB C&E	
(f) Seals						
Manufa	turer <u>Unl</u>	<u>(nown</u>	<u>Unknown</u>	Yes	<u>Seals are metallic</u>	2
Type	Met	al	Metal	Yes	<u>See (5) on next p</u>	3
Materia	al <u>Bra</u>	155	Brass	Yes	See (5) on next pp	<u>r</u>

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	DER TITLE WESTINGHOUSE MOTORS COMPUTED	DATE <u>7/30/16</u> R			
	RHR, CVCS, CS, and SIS CHECKED	<u></u> дате //////			
<u>EQU:</u>	IPMENT IDENTIFICATION (Continued)	Page 2 of 2			
	<b>-</b> .	eptable Report es/No/NA) Section			
	(g) Motor lead Glass insulation <u>Same</u> Sleeving	See Yes TAB C			
	Comments:				
(2)	Does the qualification report indicate that the motorette insulation system is the same as that used on the motors (yes/no/NA)? $N/A$ (Reference <u>See TAB C "Similarity" &amp; Sections Ell, El2, and El3</u> ).				
	Comments: Qualification testing was not performed but a full size stator.	<u>o on a motorette,</u>			
(3)	Has the vendor provided the bearing rating (yes/ $(Reference TAB E)$ .	no/NA)? <u>Yes</u>			
	Comments: <u>Motor Data Sheets</u>				
(4)	Was the lubricant included in the test program (yes/no/NA)? <u>No</u> (Reference <u>Pg. 2 of WCAP-8687</u> ).				
	Comments: <u>Motor lubricant is qualified separate</u>	ely in TAB C.			
(5)	) Were the seals included in the test program (yes/no/NA)? <u>No</u> (Reference <u>See WCAP-8754, pg. 8-4, paragraph 6, TAB D</u> ).				
	Comments: Only a stator was tested. The seals are	e brass construc-			
	tion and are not age sensitive or susceptible to	radiation			

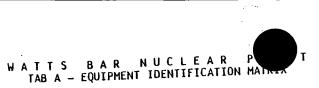
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PAGE R-1 R3

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BINDER NO. : WBNEQ-MOT -002 MANUFACTURER : JOY FAN/RELIANCE PAGE 1 OF 1

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	<u>event</u>	SAFETY FUNCTION
WBN-1-MTR -030-0038 -A 1-MTR -030-0038 -A 250 CONTAINMENT AIR RETURN FAN MOTORS 42.25-26.5-1770	733' 1" AC3 77K35-83165	A A A A	, 100D 100D 100D 1MO 1MO	NS /C	MTRS START ON A PHASE B CNTMT ISLN SIG & MUST OPR FOR DURATION OF EVENT. FANS ENHANCE ICE COND & CS HEAT REMVL. LIMIT H2 BUILD-UP
WBN-1-MTR -030-0039 -B 1-MTR -030-0039 -B 297 CONTAINMENT AIR RETURN FAN MOTORS 42.25-26.5-1770	740'11" AC4 77K35-83165	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MTRS START ON A PHASE B CNTMT ISLN SIG & MUST OPR FOR DURATION OF EVENT. FANS ENHANCE ICE COND & CS HEAT REMVL. LIMIT H2 BUILD-UP.

· · · · · · · · · · · · · · · · · · ·	R_2R_3R
PREPARER/DATE R. S. Raymond 6/9/86 CHECKED/DATE W. B. Kim 7/1/86	5 JDH <u>TDH</u> 1/18/89 <i>9/24</i> 89 <u>KBN</u> <u>×69</u> – 1/18/89 <i>9/24</i> 89

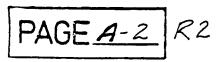
200 1011/

BINDER NO. WBNEQ-MOT-002 PLANT	WBN UNIT(S) 1 SHEET 1 OF 1
	R R
BINDER TITLE INDUCTION MOTOR-	COMPUTED / R2 JDH DATE 1-23-89
TYPE RN INSULATION-INSIDE	
CONTAINMENT	CHECKED/RZ_KBN DATE [25/89

### TAB A

#### NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- See Page B-1 for source of Category and Operating Time assignments.



BINDER NO.	. <u>WBNEQ-MOT-00</u> 2 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1</u> OF <u>29</u> R 2 R 3
	Induction motor       Computed RSR       Date 6/9/86       JDH       -TD H         NSULATION       -INSIDE       4/19/89       9/24 BA
A. DOCUMP	ENTATION (SEE NOTE)
Equip	ment Description <u>Squirrel-Cage Induction Motor</u>
Vendor	r/Manufacturer Joy Fan/Reliance Electric
Equipm	ment Model No.(s) <u>100hp, 460 VAC, 3ph, 60Hz, 1800rpm</u>
	Type RN Insulation
	Inside Containment
(1) 1 i 	FICATION REPORTS (SEE NOTE) Fitle/Number/Revision <u>Qualification Test-</u> RIMS <u>NEB 831213 426</u> ing of Jov Axivane Fan & Reliance Electric Motor Report X-604, Rev, 2 (TAB D, Section DATE 3-20-80 DATE 3-20-80
A	Title/Number/Revision <u>Type Test Support</u> RIMS <u>EEB 820602_304</u> Analysis Random Wound Motors, Report NUC-9 - Supplement, Rev. 2 (TAB D, Section D-2) DATE 7-1-78/7-15-81
Ţ	Citle/Number/RevisionEnd of Life TypeRIMS_B43_850919_500Cest-Random Wound Motors, Report NUC 22,DATE_2-10-84Rev. 2 (TAB D, Section D-3)DATE_2-10-84
OTHER	(ANALYSIS, VENDOR DATA, ETC.)
	/BN-OSG4-008 R11 (B45 870123 426) System 30, Category and Operating Times Calculation.
(5) 4	7E235-42 R2 Environmental Drawing
	GENNAL3-002 R3 (B45 860423 235) Reduction of Beta dose by sheet steel
(7) Q	IR NEB85016 (B45 850426 254) Watts Bar Nuclear Plant-NUREG-0588
	BPEVAR 86 02001 R0 (B43 860227 901) Degraded voltage for environmental qualification project
	/BNAPS2-041 R0 (B45 890526 235) determination of long-term R post accident temperature inside containment
Note:	Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

TYPE	R_2_R DER TITLE <u>INDUCTION MOTOR</u> COMPUTED <u>RSR</u> DATE <u>9/8/86</u> JDH E RN INSULATION-INSIDE 1/18/89 %
CONT	TAINMENT CHECKED WBK DATE 9/8/86 KBN 🛪 1/18/89 9/
в.	CONCLUSION OF REVIEW (Check only one block)
	X Equipment Qualified
	Equipment Satifies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation
	Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES (1) Water flow through
	the fan must be adequately addressed after the SCR is closed.
	See Open Item #1 in front of Dinder.
	· · · · · · · · · · · · · · · · · · ·
	· · · ·
	COMMENTS/RECOMMENDATIONS Refer to TAB C, Section 11.0.
	·
	· · · · · · · · · · · · · · · · · · ·

R TITLE INDUCTION MOTOR-TYPE RN COMPUTED Lagran DATE 69.86 R
JALIFICATION_CRITERIA
riteria Used to Demonstrate Qualification is in Accordance with the pollowing (Indicate All Documents Which are Applicable):
X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
JSTIFICATION/COMMENTS
NDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
EEE 334-1974, Type Test of Continuous Duty Class lE Motors
EMA MG1-1967, Motors and Generators

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BIN	DER NOWBNEQ-MOT -002 PLANT WBN UNIT(S) 1 SHEET 4 OF
BIN	DER TITLE INDUCTION MOTOR-TYPE RN COMPUTED Z. Jaymond DATE 6.9.86
INS	DER TITLE ^{INDUCTION MOTOR-TYPE RN} COMPUTED 2 Laymond DATE 69.86 ULATION-INSIDE CONTAINMENT CHECKED 44 B Harr DATE 64256
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	<u>X</u> Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS <u>Refer to Tab C, Sections 1.0 and 3.0.</u>
	· · · ·
	••••••••••••••••••••••••••••••••••••••

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BINDER NOWBNEQ-MOT -002 PLAN BINDER TITLE	IT <u>WBN</u> UN PERN COMPLITED I	IIT(S)	SHEET 5 OF R R
		JAPMAN DATE 6-7-86	
INSULATION-INSIDE CONTAINMENT	CHECKED M	1 <u>8 /277 –</u> DATE 6/17/86	, 
E. EQUIPMENT DESCRIPTION			
Is the equipment identific plant equipment which requ			
plane equipment which req.	alles qualli leacio	Qualification	
	<u>Plant Device</u>	<u>Document</u>	Reference
	Axivane Fan/	Axivane Fan/	Qual Rpt 1,
(l) Equipment Type	Motor	Motor	<u>Page 1</u>
	Joy Fan/	Joy Fan/	Qual Rpt 1,
(2) Manufacturer	<u>Reliance</u>	<u>Reliance</u>	<u>Page 1</u>
(3) Model Number(s)Motor	: Refer to	150/75hp,	Qual Rpt_1,
		1185/590 rpm	App E, Pg 3
· .	TAB A	460VAC, 3ph	
		60Hz, Type	
		RN Insul.	
_			
Fan:	NA		
(4) Serial Number(s)	Motors: <u>1XF-882396-A1</u>	<u>X-319739-A1-LT</u>	<u>Note l Below</u>
(4) Serial Mumber(s)	1XF-0023 90-A1	<u>X-319739-A1-61</u>	NOLE I BEIOW
	<u>1XF-882396-A2</u>		
		<del>موتانية معمد معمد المع</del> م	
(5) Identify Component-	Supplement 1. Con	nponent-Unique_Chec	klist-
Unique checksheet	<u></u>		
attached:	Motors		
JUSTIFICATION/COMMENTS NO	<u>ote 1 - Serial numb</u>	pers for plant moto	rs are found
in TAB F, on page 1 of res	anactive field war	fication shoots	The test
<u>In Ind I, on page 1 of tes</u>	spective field ver.	LIICALION SHEELS.	Ine_Lest
<u>motor serial number is fro</u>	om page 3, Appendia	<u>k E to Joy report X</u>	-604, Rev. 2
(TAB_D, Section D-1).			
		<u> </u>	
		• •	
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BINDER NO. WBNEQ-MOT-	-002 PLANT WBN	UNIT(S)_1	SHEET <u>6</u> 0F <u>29</u> R 2 R
BINDER TITLE <u>INDUCT</u> TYPE RN INSULATION-IN	CON MOTOR- COMPUTED R	<u>SR</u> DATE <u>6/9</u>	
CONTAINMENT		BK DATE <u>7/1</u>	186 +BU 118/89
		<u></u>	
F. INSTALLATION INT	<u>TERFACES</u>		
documentation an interface a requ	aces pertinent to EQ id ad/or evaluation and res airement for our applics equirement in QMDS, if a	ference the sou ation (Yes/No)?	rce. Is the (Note below.
	• • • •		
		Plant Requirement?	Reference
Interface	Identify Interface	(Yes/No)	Test Report
Mounting Bolts	<u>N/A</u>	N/A	
External Process Connections	N/A	<u>N/A</u>	
Electrical Connections	<u>Refer to Note 1 be</u> low	<u>No</u>	Qual Rpt 1, pg. 2 Refer to
Conduit Seals	<u>N/A</u>	<u>N/A</u>	Note 2 below
Connector	•		
Seals	<u>N/A</u>	<u>N/A</u>	
• Orientation	<u>N/A</u>	<u>      N/A                              </u>	
Physical Configuration	<u>N/A</u>	N/A	
Other			

# JUSTIFICATION/COMMENTS

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Note 1: During the LOCA simulation, leads were connected inside the pressure chamber to terminal studs protruding through insulating and sealing plate. Plant terminations are made inside a terminal box using materials analyzed in Watts Bar Binder WBNEQ-SPLC-001, 600 volts and below, Type NMCK Motor Connection Kit.

PAGE B-6 R2



BINDER NO. WBNEQ-MOT-002 PLANT	WBN	UNIT(	5)_1	SHEET_70F29
				R R
BINDER TITLE INDUCTION MOTOR-	COMPUTED_	RSR	DATE	6/9/86 JOH 1-18-89
TYPE RN INSULATION-INSIDE CONTAINMENT	CHECKED	WBK	DATE	7/1/86 tel 1/8/89

# F. INSTALLATION INTERFACES (Continued)

JUSTIFICATION/COMMENTS

Note 2: During LOCA simulation, no attempt was made to prevent chemical spray and moisture from entering the motor lead conduit (reference TAB E, Div. 2 Joy/TVA Telecon Confirmation Letter).

PAGE B-7 RZ

· · · · · · · · · · · · · · · · · · ·			
G. <u>TES</u>	<u> SEQUENCE</u>		
(1)	Test Sequence: Was the test sequence accident environment in accordance w (yes/no/NA)? (note below)		
		Yes/No/NA	Reference
	(a) Equipment inspected for damage	No	TAB C, Sec 4.1
	(b) Baseline performance measurements taken	Yes	Qual Rpt 1, <u>Appendix_E, p 2</u>
	(c) Equipment aged:		
	Thermal	Yes	Qual Rpt 1, page 5 Qual Rpt 1,
	Radiation	<u>No</u>	page 4 TAB C, Sec
	Wear	<u>No</u>	4.2.4
	(d) Vibration/seismic testing conducted	Yes	Qual Rpt 1, pages 7-11
	(e) Design basis event (DBE) exposure	Yes	Qual Rpt 1, pages 12-16
	(f) Post-DBE exposure	Yes	Qual Rpt 1, page 17
	(g) Final inspection and disassembly	Yes	Qual Rpt 1, page 18
(2)	Was the same piece of equipment used described in item (1) above (yes/no/		he test sequence
(3)	Have the test equipment, test equipm been appropriately documented (yes/n (Reference Qual Rpt 1, App A, p 11)	o/NA)? <u>Yes</u>	s and calibration d —
JUST	IFICATION/COMMENTS <u>Test equipment ac</u>	curacies and o	calibration data
	not significant in establishing conti		
. <u></u>			
		<u> </u>	

INSU	LATIO	Induction Motor-Type RN     COMPUTED I. J. Faymen DATE     Sheet      R      R      R      R      R      R      R      R       R       R
н.	AGIN	IG
	(1)	Was aging considered in the qualification program (Yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, page 5</u> ). JUSTIFICATION/COMMENTS
	(2)	Were the following effects considered in the aging program:
·		Aging Effect Yes/No/NA Reference Qual Rpt 1,
		Thermal aging Yes page 5 Qual Rpt 1,
		Radiation exposureYespage 4 Refer to TAB
		Vibration (non-seismic) aging Yes C, Sec 4.2.4
		Refer to TAB Operational (electrical/mechanical/process) <u>No</u> <u>C, Sec 4.2.4</u> stress aging
		JUSTIFICATION/COMMENTS
	(3)	Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)?NA (Reference ).
		JUSTIFICATION/COMMENTS There are no known synergistic effects based
		on review of the materials of construction for this motor.
	(4)	Thermal Aging:
		(a) Was thermal aging considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, page 5</u> ).
		JUSTIFICATION/COMMENTS Motor aged in vertical non-rotating
		position. Accelerated aging involved aging motor at a
		temperature of 415°F (213°C) for 108 hours.

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	DUCTION MOTOR-TYPE RN COMPUTED A lagrand DATE 6-9-86 SIDE CONTAINMENT CHECKED /// // from DATE 6/14/86
	UNICONCO VEZ / 22 UNIC (////00
H. <u>AGING</u> (C	Continued)
с (Ъ)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 2, pages 3-7, 19, 20</u> ).
	JUSTIFICATION/COMMENTS For a listing of materials in RN
	insulation_system, see Qual Rpt 1, App F.
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, page 5</u> ).
	JUST IF I CATION / COMMENTS
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, pages 5 and 6</u> ).
	<u>Parameter</u> <u>Plant Maximum Normal</u> <u>Test</u> Equivalent
	Temperature         TAB C, Sec 4.2.1         213°C         105°C           Time         TAB C, Sec 4.2.1         100 hrs         350,000 hrs
	JUSTIFICATION/COMMENTS
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? Yes (Reference ).
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 4.2.1</u>
(f)	aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>NA</u> (Reference).
(f)	of the technical data (yes/no/NA)? <u>NA</u>

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EQP135.27

BINDER NO. WI	BNEQ-MOT-002 PLANT WEN UNIT(S) 1 SHEET 11 OF 29
TYPE RN INSUI	R_3_R <u>INDUCTION MOTOR</u> COMPUTED_RSR DATE 6/9/86 JDH ATION-INSIDE 9/2/89
CONTAINMENT	CHECKED <u>WBK</u> DATE <u>6/12/86</u> ///////////////////////////////////
H. <u>AGING</u> (Co	ontinued)
(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, page 6 Qual Rpt 2, "Supplement" Page 3</u> ).
	JUSTIFICATION/COMMENTS
(h)	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>No</u> (Reference:).
	JUSTIFICATION/COMMENTS The effects of temperature rise
	during motor operation were accounted for in the
	establishment of qualified life for these motors.
	Refer to TAB C. Section 5.0 and WAC-324.
(5) Radi	ation Aging Exposure:
(a)	Was radiation aging exposure considered in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 1, Pg 4</u> ).
	JUSTIFICATION/COMMENTS Irradiation was considered
	unnecessary because tests conducted on the motor
	components show that direct damage to materials is
	negligible at levels considered, Refer to TAB C,
	Section 4.2.2 for additional information.
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 1. Appendix F</u> ).
	JUSTIFICATION/COMMENTS Refer to TAB C. Section 4.2.2
	for additional justification.
(c)	Was the basis for radiation aging exposure identified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference:).
	JUSTIFICATION/COMMENTS Refer to TAB C. Section 4.2.2
	for additional justification.

BINDER TITLE II TYPE RN INSULAT		
CONTAINMENT	CHECKED DATE 6/12/86	
H. <u>AGING</u> (Cont	tinued)	
	Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>NA</u> (Reference:	
		).
I	Plant normal ambient radiation dose (rd)	
2	fest exposure dose (rd)	
c	Cest exposure dose rate (rd/hr)	
1	Cest exposure source type (e.g., Co-60 gamma)	
	USTIFICATION/COMMENTS Refer to TAB C. Section 4.2.2	
(6) Vibrat	ion (non-seismic) Aging:	
Π	Vere the effects of non-seismic vibration induced durin Normal and abnormal operation addressed in the Qualification program ¹ Yes (Reference: <u>Qual Rpt</u>	
<u>1</u>	. pp, 7 and 8	).
J	USTIFICATION/COMMENTS	
i	as the basis for vibration aging identified and justif n the qualification program (Yes/No/NA)? <u>NA</u> Reference:	ied).
J	USTIFICATION/COMMENTS Refer to TAB C. Section 4.2.4	
(7) Operati	onal Stress Aging:	
op	re the effects of electrical, mechanical, and process erational stresses induced during normal and abnormal eration adressed in the qualification program es/No/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 2, Page 19</u>	
	······································	).
JU	STIFICATION/COMMENTS	
¹ Qualificati mental docu	on program refers to the test report and any supple- mentation including TVA analyses in TAB C of the Binder	R2
	PAGE <u>B-12</u> R2	

BINDER T	R <u>2</u> R FITLE <u>INDUCTION_MOTOR</u> _COMPUTED <u>RSR</u> _DATE <u>6/9/86</u>
TYPE RN	INSULATION-INSIDE
<u>; UN TA INM</u>	$\underline{\text{MENT}}  CHECKED \underline{WBK}  DATE \frac{6/12/8}{4} \frac{6}{4} \frac{1}{4} \frac{1}$
H. <u>AGIN</u>	NG (Continued)
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference:
	JUSTIFICATION/COMMENTS Refer to TAB C. Section 4.2.4
(8)	Was the qualified life of the equipment and its basis define in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	Qualified life (Document in QMDS) 40 years with maintenance
	program in TAB G.
	JUSTIFICATION/COMMENTS Refer to TAB C. Section 5.0
(9)	
(9)	Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes
(9)	Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes
(9)	Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? Yes
(9)	Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
(9)	Were replacement intervals for the equipment or its componen defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:

PAGE <u>B-13</u> R2

BINDER NO. WBNEQ-MOT-002 PLANT	WBNUNIT(S)1	SHEET <u>14</u> 0F <u>29</u> R_/R
BINDER TITLE INDUCTION MOTOR-TYPE RN	COMPUTED <u>RSR</u> DATE <u>6/9/86</u>	HOR 1/13/88
INSULATION-INSIDE CONTAINMENT	CHECKED WBK DATE 6/9/86	AT 6 JEA ARANY

# I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of EQC Binder for Detailed Materials Analysis) D - 12 - 13 . . . . .

Ma	terial/Property/Function	Radiation <u>Threshold</u>	References	Activation Energy	Reference
(a) <u>Ty</u>	pe RN insulation system	-	Note 1	1.17	TAB C Att. 1
	aring lubricant hevron SRI-2 grease)	<u>2 x 10⁸</u>	Note 2	<u>N/A</u>	R
(c)		<u> </u>		<u></u>	<u> </u>
(d)					
(e)					
JUSTIFI	CATION/COMMENTS			•	•
Note 1:	<u>Analysis of test data on</u>	insulation co	omponents show	w that direc	t damage to
	to materials is negligib	le at greater	radiation dos	ses than expe	erienced
	by TVA motors. Type RH	insulation, wi	hich is simila	ar to type RI	V, has
	withstood a total radiati	on dose of 2	.2 x 10 ⁸ RADS	<u>and maintai</u>	ined its
	ability to perform its re	equired functi	ion. Refer to	TAB C, Sect	ion
	4.2.2 for additional info	ormation.			
<u></u>		······································			
<u>Note 2:</u>	Refer to Digital Material	Aging and Ra	diation Effec	ts Library,	Library R.
	Code No. 157-83A and TAB	<u>C, Paragraph</u>	6.0.		

<ul> <li>not met (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 5-19).</li> <li>Identify Acceptance Criteria: Motor/fan assembly must operate during and after a simulated DBE described on page 16, following accelerated thermal aging and seismic testing.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App. A ).</li> <li>Identify baseline and functional testing: During DBE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria.</li> <li>JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D).</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>	NSULAI	TITLE INDUCTION MOTOR-TYPE RN COMPUTED 1.5 taymon DATE 6-9-86 R
<ul> <li>values of performance characteristics which would constitute failure i not met (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 5-19).</li> <li>Identify Acceptance Criteria: Motor/fan assembly must operate during and after a simulated DBE described on page 16, following accelerated thermal aging and seismic testing.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App. A).</li> <li>Identify baseline and functional testing: During DBE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria.</li> <li>JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D).</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>		UIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE ECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
<ul> <li>and after a simulated DBE described on page 16, following accelerated thermal aging and seismic testing.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App. A). Identify baseline and functional testing: During DBE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria.</li> <li>JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D).</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>		) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if
<ul> <li>thermal aging and seismic testing.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App. A). Identify baseline and functional testing: During DBE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria.</li> <li>JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D).</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>		
<ul> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App. A). Identify baseline and functional testing: During DEE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria.</li> <li>JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D).</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DEE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>		
<pre>Identify baseline and functional testing: During DBE testing, several conditions were monitored and periodically recorded as indicated in the referenced document. Continued motor operability or a lack thereof was the sole failure criteria. JUSTIFICATION/COMMENTS Refer to Tab C. Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D). (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15). JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</pre>	(2)	) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment
<pre>the referenced document. Continued motor operability or a lack thereof was the sole failure criteria. JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D). (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15). JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</pre>		
<pre>thereof was the sole failure criteria. JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0, Qualification Report X-604, Appendix A (TAB D). (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15). JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</pre>		conditions were monitored and periodically recorded as indicated in
JUSTIFICATION/COMMENTS <u>Refer to Tab C. Sections 4.1, 4.3.1, and 10.0,</u> <u>Qualification Report X-604, Appendix A (TAB D).</u> (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, pages 13-15).</u> JUSTIFICATION/COMMENTS <u>In a telecon between Bob Raymond of TVA and</u> <u>Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that</u> the motor/vaneaxial fan assembly was operated under low speed condi-		· · · · · · · · · · · · · · · · · · ·
Qualification Report X-604, Appendix A (TAB D). (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15). JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-		thereof was the sole failure criteria.
<ul> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Qual Rpt 1, pages 13-15).</li> <li>JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-</li> </ul>		JUSTIFICATION/COMMENTS Refer to Tab C, Sections 4.1, 4.3.1, and 10.0,
Combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, pages 13-15).</u> JUSTIFICATION/COMMENTS <u>In a telecon between Bob Raymond of TVA and</u> <u>Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that</u> the motor/vaneaxial fan assembly was operated under low speed condi-		Qualification Report X-604, Appendix A (TAB D).
Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that the motor/vaneaxial fan assembly was operated under low speed condi-	(3)	compinations) applied during DBE test (ves/no/NA)? Yes
the motor/vaneaxial fan assembly was operated under low speed condi-		JUSTIFICATION/COMMENTS In a telecon between Bob Raymond of TVA and
		Tom Bissett of Joy on 5-8-86, (TAB E, Div. 2), it was confirmed that
tions. 75 hp. 590 rpm during the DPR simulation All 1		the motor/vaneaxial fan assembly was operated under low speed condi-
tions, 75 hp, 590 rpm, during the DBE simulation. A bypass loop was		

PAGE B-15

			ATION-INSIDE		5/17/89,
CONT	<u>A INME</u>	NT		CHECKED WBK DATE	5/22/86 KB
J.	PERF		NCE SPECIFICA	CHARACTERISTICS NECESSARY TO FIONS CAN BE SATISFIED UNDER	
•	(4)			oads during baseline testing ions (Yes/No/NA)? <u>Yes</u> (Re	
		<u>Rpt</u> .	. 1, Appendix	E, Page 2	
		JUSI	CIFICATION/CON	MENTS <u>Baseline testing con</u>	ditions were
		equa	al to or more	<u>severe than normal operatin</u>	g condiditions.
	(5)		tify electric	cal characteristics necessar mance specifications can be	y to ensure the satisfied.
		(a)	Parameter	Plant Normal Conditions	Reference
			Voltage	480 V	<u>45W760-30-13</u>
			Load	40.000 CFM	<u>77K35-83165</u>
			Frequency	<u>60 Hz</u>	<u>77K35-83165</u>
			Accuracy	N/A	
			Other(s)		
			-		
			JUSTIFICATIO	N/COMMENTS Refer to TAB C.	Section 7.0
				on of voltage and frequency	
			<u>+04_44006004</u>		<u>requirements.</u>
					·

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PLUSEQ/65.29

<u>TYPE R</u> CONTAI	<u>N I</u>	NSULATION-INS	IDE	<u>5/9/86</u>
				···
<u>P</u>	ERF		CAL CHARACTERISTICS NECESSARY TO D FICATIONS CAN BE SATISFIED UNDER A	
. (1	b)	<u>Parameter</u>	Specific Accident Conditions	<u>Reference</u>
		Voltage	(1) 453.13 VAC (2) 458.38 VAC	WBPEVAR86020 Sheets D165 D225
		Load	Refer to Note 1 below	
		Frequency	<u>60 Hz</u>	TAB C <u>Section 7.0</u>
		Accuracy	N/A	
		Other(s)		
		<u>1-MTR-30-38-A</u>	N/COMMENTS <u>Minimum accident volta</u> A and -39-B (453.13 VAC and 458.38	VAC, respec-
(0	c)	<u>1-MTR-30-38-A</u> tively) are t <u>B contaiment</u>	N/COMMENTS <u>Minimum accident volta</u> A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	VAC, respec-
(6	c)	<u>1-MTR-30-38-A</u> <u>tively) are t</u> <u>B contaiment</u> <u>Parameter</u>	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>Atter a phase</u> <u></u>
((	c)	<u>1-MTR-30-38-A</u> tively) are t <u>B contaiment</u>	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>Atter a phase</u> <u></u>
((	c)	<u>1-MTR-30-38-A</u> <u>tively) are t</u> <u>B contaiment</u> <u>Parameter</u> Voltage Load	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>App. E. Page</u>
((	c)	<u>1-MTR-30-38-A</u> <u>tively) are t</u> <u>B contaiment</u> <u>Parameter</u> Voltage Load Frequency	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>App. E. Page</u>
(	c)	<u>1-MTR-30-38-A</u> <u>tively) are t</u> <u>B contaiment</u> <u>Parameter</u> Voltage Load	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>App. E. Page</u>
(	c)	<u>1-MTR-30-38-A</u> <u>tively) are t</u> <u>B contaiment</u> <u>Parameter</u> Voltage Load Frequency Accuracy	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>App. E. Page</u>
(	c)	<pre>1-MTR-30-38-A tively) are t B contaiment Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION fans_of_simil</pre>	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	<u>VAC. respec-</u> <u>after a phase</u> <u>Reference</u> Qual Report 1 <u>App. E. Page</u> Qual. Report <u>App. E. Page</u> <u>Qual. Report</u> <u>App. E. Page</u>
(	<b>c</b> )	<pre>l-MTR-30-38-A tively) are t B contaiment Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION fans of simil sized by the TVA motors ar</pre>	A and -39-B (453.13 VAC and 458.38 terminal voltages at T=15 seconds isolation signal. 	VAC. respec- after a phase 

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PAGE	<u>B-17</u>	RZ

			NIT(S) <u>1</u> SHEET <u>18</u> OJ R <u>2</u> R DATE <u>9/5/86</u> <del>JOH /-78-89</del>
TYPE RN	INSULATION-INSIDE		DATE $\frac{9/5/86}{480}$
K. <u>Req</u> i	JIRED OPERATING ENVIE	RONMENT	· · · ·
Refe	erence Environmental	Drawing No. <u>47E2</u>	35-42
(1)	Normal Max	(2) Ab	normal Max
	(a) Temperature (°	°F) <u>120       (</u> a	) Temperature (°F) <u>130</u>
	(b) Pressure (psig	(0.3 psig) ;) <u>14.7 ps</u> ia (b	(0.3 ps ) Pressure (psig) 1 <u>4.7 ps</u>
	(c) Humidity (%)		) Humidity (%) <u>100</u>
	(d) Radiation (rd)	2 x 10 ⁷ MAX (d	) Radiation (rd)
(3)	Process Interfaces:	Fan mounted on	motor shaft using a 3/4"
	<u>x 3/4" key. Motor</u>	is mounted to fa	n casing through 4 threade
	stud bolts in the f	ront section of	the motor
(4)	· · · <b>A</b> · · ·		ncy and duration of abnorm and will occur less than
	1% of the plant lif	e	· •
	·	•	·
(5)	Accident (worst cas parameter including	e for any combin peak, duration,	ation of specified acciden and profile):
	(a) Temperature (°		Accident type <u>LOCA/HELB</u>
•	(b) Pressure (psig	(11.2 psig) ) <u>25.6 psia</u>	Accident type <u>LOCA</u>
	(c) Humidity (%)	<u>100</u> 4.7x10 ⁸ Beta (refer to Sect. P)	Accident type <u>LOCA/MSLB</u>
	(d) Radiation (rd)	7 <u>4x10 Gamma</u> Refer to	Accident type <u>LOCA</u>

	TLE INDUCTION MOTOR- NSULATION-INSIDE	COMPUTED	RSR	_ DATE <u>6/9</u>	<u>9/86 JDH 7</u> 1/18/89 <b>9</b> /
CONTAINME	NT	CHECKED	WBK	_ DATE <u>6/1</u>	<u>1/18/89</u> <u>4</u> 1/18/89 9/2
K. <u>REOU</u>	IRED OPERATING ENVIRON	<u>1ENT</u> (Con	tinued)		
	Comments (duration/pea	ak/profile,	/spray (	compositio	on and pH.
	margin, etc.): <u>Actual</u>				
	of several profiles.	Refer to 2	TABC,	Section 2.	0, for addi-
	tional details. Chemi	ical spray	is addı	essed in	TAB C.
	Section 4.3.2.				
(6)	Is the equipment subjection can affect the perform				
	accident conditions ()				
	Section 4.2.3 and 4.3.	.3			)
(7)	Subject to submergence	e (Yes/No/N	VA)?No	(Refe	erence:
	TAB C. Section 9.0			•	)
	Identify initiation ti				
				i Summers	, chice
·					
4-1					
(8)	Is the equipment subject the total accident dos				tribution to
·	(Reference: <u>Environme</u>	ental DWG.	<u>47E235-</u>	42	).
	If yes, identify the f beta dose to be added				
	$2 \times 10^6$ See Section F				
	Z A IV BEE Section r				
(9)	Special environmental				
		carcurat10	ms (cen		
	Type			<u>RIMS N</u>	0.
	See TAB B, Section A				
		•			

BINDER NO. <u>WBNEQ-MOT-00</u> 2 PLANT_	WBN	UNIT(S)_1	
BINDER TITLE INDUCTION MOTOR-	COMPUTED <u>RS</u>	<u>r</u> date <u>9/5</u>	R_2_R /86 TO# 1-19-89
TYPE RN INSULATION-INSIDE CONTAINMENT	CHECKED WB	<u>K</u> DATE <u>9/5</u>	/86 1/18/89
L. <u>SUMMARY COMPARISON OF TEST</u>	CONDITIONS T	O SPECIFIED CON	
(1) Comparison of worst-c	ase maximum p	arameters:	R2
Parameter	Specified	<u>Demonstrated</u>	Reference
Operating Time	<u>2400 hrs.</u>	<u>10,145 hrs.</u> 350 peak,	Qual Rpt 1, page 17
Temperature (°F)	327	330 for <u>4 hours</u>	Qual Rpt 1, <u>pgs. 14 &amp;</u> 15 Qual Rpt 1
Pressure (psig)	11.2	78	<u>pg. 14, i</u> tem 5a Qual Rpt 1,
Relative Humidity (%)	100	100	<u>App. A., pg. 8</u>
Chemical Spray*	<u>    Refer</u> to 2x10 ⁶ Beta	TAB C. Section	
Radiation (rd)**	7 <u>6x10 Gam</u> ma	Refer to TAB <u>C. Sec 4.2.2</u>	Refer to TAB
Submergence	No	No	<u>C. Sec. 9</u> .0
*Includes spray concent pH. **Enter 40-year integrat dose and specify type	ted normal do		
(2) Comparison of worst-ca	ase profiles	and margin asse	essment:
Parameter	Test Pr Envelopes S (Yes/N	pecified	Reference
Temperature	Yes	L.	(1) above
Pressure	Yes	<u>L</u> .	(1) above
Relative Humidity	Yes		(1) above
Chemical Spray	Refer to TA Section 4.3	-	
Submergence	N/A		
JUSTIFICATION/COMMENTS	Additional	discussion in	TAB C.
Section 5.0			
•			

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	ER NC	. <u>WBNEQ-MOT-002</u> PLANT <u>WBN</u> UNIT(S)	SE R	IEET <u>21</u> 0F <u>2</u> _3_R
			ATE 6/9/86	TOH
	<u>RN</u> AINME	<u>NSULATION-INSIDE</u> NT CHECKED WBK D	ATE <u>6/12/8</u> 6	9/23/89
	<u>ATIWII:</u>		AIE <u>0/12/0</u> 0	9/23/89
-				
L.		ARY COMPARISON OF TEST CONDITIONS TO SPECI tinued)	FIED CONDIT	TIONS
	·			
	(3)	Were margins applied to the test paramete		
		addressed in the test program to assure t and uncertainties are accounted for? (No		
		Yes/No/NA).		.pp1200,
			Margin	
		Suggested Margins per IEEE-323(74)	Applied	<u>Yes/No/NA</u>
		Temperature: +15 degrees F	23°F	Yes
			550%	
		Pressure: +10% but no more than 10 psig	<u>(AP=66psig</u>	) <u>    Yes    </u>
		Radiation: +10% of accident dose		<u>No</u>
	•	Time: +107 (on 1 hours 1 constinut time	Refer to WAC-324	,
	-	Time: +10% (or 1 hour + operating time per NUREG-0588)	$(TAB_C)$	Yes
		Voltage: ±10% of rated value		No
	•	Frequency: ±5% of rated value	·	No
			efer to Qua <u>pgs 13-16</u>	
		Vibration: +10% added to acceleration	+33%	Yes
		JUSTIFICATION/COMMENTS For elaboration.	refer to fo	llowing
		sections of TAB C:		
		Temperature Section 4.3.1		
		Pressure Section 4.3.1		
		Radiation Section 4.2.2		
		RadiationSection 4.2.2TimeSection 5.0		
	,	Time Section 5.0 *Voltage Section 7.0 *Also, See TA	AB E, Div.	2,
	;	Time Section 5.0	AB E, Div.	2,

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M. <u>OPE</u>	RABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference).
	JUSTIFICATION/COMMENTS <u>Refer to TAB A</u>
(2)	see all all and the second of
	design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, pgs. 13-16</u> ).
	JUSTIFICATION/COMMENTS
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, page 17</u> ).
	JUSTIFICATION/COMMENTS
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, p 17</u> ).
	JUSTIFICATION/COMMENTS Per TAB A, TVA equipment required to operate
	for a period of 100 days. The equipment tested performed in post-DBE environment for 10,145 hours.
(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 4.3.3</u>

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BINDER NO. WBNEQ-MOT -002 PLANT WE	UNIT(S) <u>1</u> SHEET <u>23</u> OF <u>29</u>
BINDER TITLE INDUCTION MOTOR-TYPE RN	COMPUTED L.d. Augure DATE 69-86
INSULATION-INSIDE CONTAINMENT	CHECKED WE The DATE 6/14/80

#### N. MAINTENANCE AND SURVEILLANCE

• .

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? <u>Yes</u> (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS <u>Refer to TAB G for maintenance and surveillance</u>

practices generally accepted within industry.

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BINDER	TITLEINDUCTION MOTOR-TYPE RN COMPUTED	R R ∂-9-86 ○
INSULAT	TION-INSIDE CONTAINMENT CHECKED	486
0. <u>Sur</u>	MARY OF REVIEW	Yes/No/NA
(1)	Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
(2)	Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	Yes
(3)	Choice of qualification methodology adequately justified?	Yes
(4)	If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	Yes
	(b) Were specific features and failure modes and effects analyzed?	Yes
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
	(d) Were environmental parameters which affect equipment performance identified?	Yes
(5)	Adequate similarity between equipment and test specimen established?	Yes
(6)	Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
	(c) Absence of preaging in test/analysis justified?	Yes
	(d) Materials susceptible to thermal/radiation aging identified?	Yes

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BINDER NO. WBNEQ-MOT -002 PLANT WBN UNIT(S) 1 BINDER TITLE INDUCTION MOTOR-TYPE RN COMPUTED L. Laymond DATE	SHEET _25OF _29 RRR
 INSULATION-INSIDE CONTAINMENT CHECKED	
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	Yes
(a) Peak temperature adequate	Yes
(b) Peak pressure adequate	Yes
(c) Duration adequate	Yes
(d) Required profile enveloped adequately	Yes
(e) Steam exposure adequate	Yes
(9) Criteria regarding test sequence satisfied?	Yes
(10) Criteria regarding spray satisfied?	Yes
(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	No
(11) Criteria regarding submergence satisfied?	NA
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes
(b) Was beta radiation considered?	Yes
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes
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PAGE B-25

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			EQ-MOT-002 PLANT_ INDUCTION MOTOR-			(S) <u>1</u> DATE	R	HEET <u>26</u> OF <u>2</u> R <i>JDH 1-18-89</i>	<u> </u>
FYPE		VSULA	TION-INSIDE	CHECKED				LBN.	
0.	SUMMA	ARY O	F REVIEW (Continu	ed)	····			Yes/No/NA	2
	(15)	Crit	eria regarding fu	nctional t	esting s	satisf	ied?	Yes	
		(a)	Does the test pla acceptance crite:				rmed?	Yes	
		(b)	Was an initial ba establish require				ristics	? <u>No</u>	
		(c)	Has the test and performance spec: (e.g., voltage, electrical charac	ifications load frequ	and cha ency, an	racter d othe	er	Yes	
	(16)	Cri	teria regarding in	nstrument	accuracy	satis	fied?	NA	
	(17)		t duration margin isfied?	(1 hour +	functio	on time	e)	Yes	
		(a)	Is the minimum s least 1 hour?	specified	operatin	ig time	e at	Yes	
		(b)	If exception to time was taken, provided?	the 1-hou was adequa	r minimu ate just	m oper ificat	ating ion	<u>NA</u>	
	(18)	Crit	teria regarding sy	mergistic	effects	satis	fied?	NA	
	(19)	Crit	teria regarding ma	argins sat:	isfied?			Yes	
	(20)	Mair adec	ntenance and surve quately identified	eillance ro N?	equireme	nts		Yes	
Ρ.	DISCU	SSION	I						
1	4.7 x Beta minimu The va frame Plant. Divis: value to the throug likew: and wa	radia um of alue moto s. I ion 5 of 1 e Gam gh 2 ise i all t	ent radiation dose rads Beta and 4 x ation is reduced b 9/32 inch (see T is also applicabl ors were furnished the Beta reduction , GENNAL3-002) is ess than 2 x 10 ⁶ , ma level. Beta e 1/2 inch conduit nsignificant; con hickness from Des nd 0(15)(b) justi	10' rads by motor en AB E, Divi- te to this for both factor for 0.004, wh which is ffect on t of 0.195 m duit size ign Standa	Gamma. Iclosure ision 5, binder Sequoya or 1/4 in ich yie insigni the moto ominal from ven	The e thick RIMS since h and nch st lds an ficant r lead wall t ndor d 13.1.3	ffect of ness wh B70 860 the san Watts H eel (se effect in com s (which hickness rawing . For	of this nich is a 0428 004). me 444 Bar Nuclean ee TAB E, tive Beta nparison th go ss) is in TAB I Section	r R2

PAGE 8-26 R2

BINDER NO. WBNEQ-MOT -002 PLA BINDER TITLE INDUCTION MOTOR- INSULATION-INSIDE CONTAINME			S) Leymond DAPE Letter DATE 1/1	_ SHEET <u>27</u> OF <u>29</u> R R <b>7/3/</b> 6
	COMPONENT-U	LEMENT 1 INIQUE CHEC IOTORS	KLIST	
EQUIPMENT IDENTIFICATION				
(1) Is the motor identified plant motors which required	d in the qu uire qualif	alification ication (ye	n report identi es/no/NA)? <u>No</u>	ical to the
Item	Plant	Report	Acceptable (Yes/No/NA)	Report Section
(a) Insulation system materials	Type RN	Type RN	Yes	Refer to TAB C.
(b) Coil construction (form or random wound, cast)	Random	Random	Yes	Section 3.1 Qual Rpt
(c) Insulation class (B, F, H)	H	H	Yes	2, page 5 Qual Rpt
(d) Lubricant				1, page 1
Manufacturer	Chevron	Chevron	Yes	Refer to TAB C,
Туре	SRI-2	SRI-2	Yes	Section 6.0
(e) Bearing		New Depart	ure	
Manufacturer		Hyatt	Yes	Refer to (3)
Туре	Anti- friction	<u>Anti-</u> friction	Yes	
Bearing life (f) Seals	<u>156 yr</u>		Yes	Refer to TAB E, Div. 1
Manufacturer				
Туре	Laby- rinth	Laby- rinth	Yes	Refer to TAB C,
Material	Brass	<u>Brass</u>	Yes	Section 6.0

PAGE B:27

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INS	ULATION-INSIDE CONTAINMENT CHECKED NE For DATE 1/1/86
EQU	IPMENT IDENTIFICATION (Continued)
۰,	
	ItemPlantReportAcceptableReportItemPlantReport(Yes/No/NA)Section
	(g) Motor lead insulation <u>Nomex</u> <u>Nomex</u> <u>Yes</u> <u>TAB C</u> , Tape Glass Tape Glass Section 3.2
	Braid Braid Comments: The tested motor is representative of a line of motors
	identical in design parameters, methods of construction, etc. to
•	which the plant motors belong. Other parameters such as physical
	dimensions, horsepower, etc. may not be identical (refer to Qual.
	Rpt 1, pg. 1).
(2)	Does the qualification report indicate that the motorette insulation system is the same as that used on the motors (yes/no/NA)? Yes (Reference).
	Comments: Refer to Certificate of Similarity dated May 16, 1986
	(TAB E, Div. 1).
(3)	Has the vendor provided the bearing rating (yes/no/NA)? Yes (Reference).
	Comments: Bearing rating is detailed in Joy's Motor Bearing Life
	Calculation (TAB E, Div. 1). The bearing life or B10 life of the
	bearings is specified as 1,367,000 hours (B10 life is equivalent to
	L-10 life).
(4)	Was the lubricant included in the test program (yes/no/NA)? Yes (Reference Qual Rpt 1, App C, Pg 2).
	Comments:

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FOP135 27

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BINDER N BINDER T INSULAT:	WBNEQ-MOT -002 NO INDUCTION MOT ITLE ION-INSIDE CONTAT	WB PLANT IOR-TYPE RN INMENT	NUNIT(S) COMPUTED <i>L. Layer</i> CHECKED <i>LILE</i>	1 DATE _6-2	SHEET 2 R 7-86	29 29 OF R
	T IDENTIFICATION			∠ DATE	<u> </u>	
(5) Wer		uded in the	test program (yes/	no/NA)?	Yes	
Con	nments:					•
		PACE	B·29			

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<del>EQP135-27</del>



PRINT DATE: 01/11/89

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EINDER NO. : WBNEQ-MOT -003 MANUFACTURER : RELIANCE PAGE 1 OF 3

### WATTS & AR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

		-	OCATION				
EGIS_NUMBER DESCRIPTION		NO AZMITH_ MODEL_NUMEEE	ELEV(1) BE CONTRACT		OPER_TIME	EYENI	<u>SAFETY_FUNCTION</u>
WBN-1-HTR -030-0146 -A Abgts fan Motor	1-NTR -030-0146	-2 1YF-832305	737• A0 76K35-98324	-	1000	_	MOTOR IS REQUIRED TO DRIVE COOLER TO INSURE ADEQUATE COOLING AND CONTINUED CPERATION OF THE ABGTS.
WEN-2-MTR -030-0157 -B Abgts fan motor	2-MTR -030-0157		737' AO 76K35-08324		100p	-	NOTOR IS REQUIRED TO DRIVE CODLER TO INSURE ADEQUATE COOLING AND CONTINUED OPERATION OF THE ABGTS.
WBN-1-HTR -030-0175 -A RHR PUMP ROOM COOLER MOTOR	1-MTR -030-0175		675° A1 8485-334550		100D		MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- RELATED RHR PUMP MOTORS.
WBN-1-HTR -030-0176 -B RHR PUMP ROOM COOLER MOTOR	1-HTR -030-0176	-в 1YF-883397	676" A1 84 K5 - 834 55 0		1000	-	MOTOR IS REQUIRED TO DRIVE CODLER THAT COOLS THE SAFETY- RELATED RHR PUMP MOTORS.
WBN-1-MTR -030-0177 -A CTN SPR PUMP RM COOLER MOTOI	1-MTR -030-0177		676' 80 84 K5-834 35 0		1000	-	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- Related Containment Spray PUMP Motors.

22 PREPARER/DATE D. F. Ackerly 9/20/86 JDH 2-73-89 CHECKED/DATE N.M. Burstein 9/20/8

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SINDER NO. : WBNEQ-MOT -003 MANUFACTURER : RELIANCE PAGE 2 OF 3

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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBER UNIL_DEVICE_ID_NO AZMIIH_ Description Nodel_Number	LOCATION ELEY(1) EM/EAD CONIBAGI	CAI OPER_IIM	E EXENI	ZAEEIX-ENNCIION
WBN-1-MTR -030-0178 -B 1-MTR -030-0178 -B CTN SPR PUMP RM COOLER MOTOR 2YF-883397	676° 403 34 K5 - 5 34 5 50 - 1	a 1000	L	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- RELATED CONTAINMENT SPRAY PUMP MOTORS.
WBN-1-MTR -030-0179 -B 1-HTR -030-0179 -B SIS PUMP ROOM COOLER MOTOR 1YF-333397	69 2• 4 1 2 84 K5- 534 550-1	A 1000	_	MOTOR IS REQUIRED TO DRIVE CODLER THAT COOLS THE SAFETY- RELATED SIS PUMP MOTORS.
WBN-1-HTR -030-0180 -A 1-HTR -030-0180 -A SIS PUMP ROOM COOLER NOTOR 1YF-383397	69 24 A13 84 K5 - 834 550 - 1	a 100d	L	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- RELATED SIS PUMP MOTORS.
WBN-1-HTR -030-0182 -B 1-HTR -030-0182 -B CEN CHG PUMP RM COOLER NOTOR 3YF-383397	692• A10 84k5-834550-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0		MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- RELATED CENT. CHG. PUMP MOTORS
WBN-1-NTR -030-0183 -A 1-MTR -030-0183 -A CEN CHG PUMP RM COOLER MOTOR 3YF-833397	692* 409 8485-834550-1	A 1000 A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L AF/A CV/A RH/A 48	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS THE SAFETY- RELATED CENT. CHG. PUMP MOTORS

R_2_ R PREPARER/DATE D. F. Ackerly 9/20/86 IRH 2-73-89 KAN CHECKED/DATE N. M. Burstein 9/20/86 9*18*9

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PRINT DATE: 01/11/89



BINDER NO. : WONEQ-MOT -003 MANUFACTURER : RELIANCE PAGE 3 OF 3

# WATTS PAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBER DESC3IPTION		<u>UNII_DEVICE_ID</u>	NQAZUIIH_ HQQEL_UUMESR	LOCATION ELEV(1) BU/EAD CONIEACI	<u>CAI</u> (2)	Q258_IIM5	EVENI	SAFETY_EUNCTION	
WBN-D-MTR -065-0023 Egts fan hotor	– A	0-HTR -065-0023	-A 1¥F-832366	757• A16 76K35-083246-1	A	10 00	L	MOTOR DRIVES FAN WHICH MUST RUN FOR THE EGTS TO PERFORM ITS SAFETY-RELATED FUNCTION.	
WBN-J-MTR -065-0062 EGTS FAN HOTOR	<del>-</del> 8	0-MTR -065-0042	-8 1YF-892366	757° A16 76835-083246-1	A	1000	L	MOTOR DRIVES FAN WHICH MUST RUN FOR THE EGTS TO PERFORM ITS SAFETY-RELATED FUNCTION.	
		~ [.]							
		,					v		
				PREPARER/DATE_	D.	F. Ackerly	y 9/2	R Z R R	
Page A-3 R2				CHECKED/DATE	N. M	Burstein	n 9/2	20/86 2-13-89 3/9/89	

BINDER NO. WBNEQ-MOT-003 PLANT WBN UNIT(S) 1 SHEET 1 OF 1
BINDER TITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>R2 JDH</u> DATE <u>2-23-89</u>
<u>MENT</u> CHECKED R2X8 DATE 3/9/89

# TAB A

# NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- See Page B-1 for source of Category and Operating Time assignments.



PAGE A-4 R2

A. <u>DOCUMENTATION</u> (See Note) Equipment Description <u>Continuous Duty 460 volt motors</u> Vendor/Manufacturer <u>Reliance Electric Company</u> Equipment Model No.(s) <u>Totally enclosed fan-cooled random wound</u> <u>motors on shop orders 1YF, 2YF-, and</u> <u>3YF-883397, 1YF-882365, and 1YF-882366.</u> QUALIFICATION REPORTS (See Note)	BINDER TITLE <u>RELIANCE-RAND</u> WOUND MOTORS-OUTSIDE CONTA MENT	
<pre>Equipment Description Continuous Duty 460 volt motors Vendor/Manufacturer Reliance Electric Company Equipment Model No.(s) Totally enclosed fan-cooled random wound</pre>		
<ul> <li>Vendor/Manufacturer Reliance Electric Company</li> <li>Equipment Model No.(s) Totally enclosed fan-cooled random wound motors on shop orders 1YF, 2YF-, and 3YF-883397, 1YF-882365, and 1YF-882366.</li> <li>QUALIFICATION REPORTS (See Note)</li> <li>(1) Title/Number/Revision Summary Report RIMS EEE 820602304 Nuclear Power Motor System/NUC-9/July 1, 1978 including Supplement R2 dated July 15, DATE July 15, 1981 1981 (TAB D-1)</li> <li>(2) Title/Number/Revision Qualification Report/RIMS B43 850919 500 End of Life Tests/NUC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984</li> <li>(3) Title/Number/Revision Limitorque PWR Valve RIMS MED 830510 219 Oberator Test Report No. 600456 (excerpt TAB D-3) DATE Dec. 9, 1975</li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>(4) TVA Radiation Calculation WENNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WENNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WENOSG4-015, R8 (B45 870209 428)</li> </ul>	A. <u>DOCUMENTATION</u> (See Note)	)
<pre>Equipment Model No.(s) Totally enclosed fan-cooled random wound motors on shop orders 1YF-, 2YF-, and 3YF-883397, 1YF-882365, and 1YF-882366. QUALIFICATION REPORTS (See Note) (1) Title/Number/Revision <u>Summary Report</u> RIMS EEB 820602304 Nuclear Power Motor System/NUC-9/July 1, 1978 including Supplement R2 dated July 15, DATE July 15, 1981 1981 (TAB D-1) (2) Title/Number/Revision <u>Qualification Report/RIMS B43 850919 500</u> End of Life Tests/NUC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984 (3) Title/Number/Revision <u>Limitorque PWR Valve RIMS MED 830510 219</u> <u>Operator Test Report No. 600456 (excerpt TAB D-3)</u> DATE Dec. 9, 1975 OTHER (ANALYSIS, VENDOR DATA, ETC.) (4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235) (5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235) (6) System 30 Cat. &amp; Op. Times WBNOSG4-018, R8 (B45 870209 428)</pre>	Equipment Description	Continuous Duty 460 volt motors
<pre>motors on shop orders 1YF, 2YF-, and 3YF-883397, 1YF-882365, and 1YF-882366. QUALIFICATION REPORTS (See Note) (1) Title/Number/Revision <u>Summary Report</u></pre>	Vendor/Manufacturer	Reliance Electric Company
<ul> <li><u>3YF-883397, 1YF-882365, and 1YF-882366.</u></li> <li>QUALIFICATION REPORTS (See Note) <ol> <li>Title/Number/Revision <u>Summary Report RIMS EEB 820602304 Nuclear Power Motor System/NUC-9/July 1.</u></li> <li><u>1978 including Supplement R2 dated July 15, DATE July 15, 1981 1981 (TAB D-1)</u></li> </ol> </li> <li>Title/Number/Revision <u>Qualification Report/RIMS B43 850919 500 End of Life Tests/NUC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984</u></li> <li>Title/Number/Revision <u>Limitorque PWR Valve RIMS MED 830510 219 Operator Test Report No. 600456 (excerpt TAB D-3) DATE Dec. 9, 1975</u></li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	Equipment Model No.(s)	Totally enclosed fan-cooled random wound
<ul> <li>QUALIFICATION REPORTS (See Note)</li> <li>(1) Title/Number/Revision <u>Summary Report</u> RIMS <u>EEB 820602304</u> <u>Nuclear Power Motor System/NUC-9/July 1.</u> <u>1978 including Supplement R2 dated July 15, DATE July 15, 1981</u> <u>1981 (TAB D-1)</u></li> <li>(2) Title/Number/Revision <u>Qualification Report/RIMS B43 850919 500</u> <u>End of Life Tests/NUC-22 Rev. 2 (TAB D-2)</u> DATE Feb. 10, 1984</li> <li>(3) Title/Number/Revision <u>Limitorque PWR Valve RIMS MED 830510 219</u> <u>Operator Test Report No. 600456 (excerpt TAB D-3)</u> DATE Dec. 9, 1975</li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>(4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>		motors on shop orders 1YF, 2YF-, and
<ul> <li>(1) Title/Number/Revision Summary Report RIMS EEB 820602304 Nuclear Power Motor System/NUC-9/July 1, 1978 including Supplement R2 dated July 15, DATE July 15, 1981 1981 (TAB D-1)</li> <li>(2) Title/Number/Revision Qualification Report/RIMS B43 850919 500 End of Life Tests/NUC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984</li> <li>(3) Title/Number/Revision Limitorque PWR Valve RIMS MED 830510 219 Operator Test Report No. 600456 (excerpt TAB D-3) DATE Dec. 9, 1975</li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>(4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>		<u>3YF-883397, 1YF-882365, and 1YF-882366.</u>
<ul> <li>Nuclear Power Motor System/NUC-9/July 1, 1978 including Supplement R2 dated July 15, DATE July 15, 1981 1981 (TAB D-1)</li> <li>(2) Title/Number/Revision Qualification Report/RIMS B43 850919 500 End of Life Tests/NUC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984</li> <li>(3) Title/Number/Revision Limitorque FWR Valve RIMS MED 830510 219 Operator Test Report No. 600456 (excerpt TAB D-3) DATE Dec. 9, 1975</li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>(4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	QUALIFICATION REPORTS (S	ee Note)
End of Life Tests/NUC-22 Rev. 2 (TAB D-2)       DATE_Feb. 10, 1984         (3) Title/Number/Revision Limitorque PWR Valve RIMS_MED 830510 219         Operator Test Report No. 600456 (excerpt         TAB D-3)       DATE_Dec. 9, 1975         OTHER (ANALYSIS, VENDOR DATA, ETC.)         (4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)         (5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)         (6) System 30 Cat. & Op. Times WBNOSG4-008, R14 (B26 900110 206)         (7) System 65 Cat. & Op. Times WBNOSG4-015, R8 (B45 870209 428)	<u>Nuclear Power Motor</u> 1978 including Supp	System/NUC-9/July 1,
<ul> <li>(3) Title/Number/Revision Limitorque PWR Valve RIMS MED 830510 219 Operator Test Report No. 600456 (excerpt TAB D-3) DATE Dec. 9, 1975</li> <li>OTHER (ANALYSIS, VENDOR DATA, ETC.)</li> <li>(4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	(2) Title/Number/Revisi	on <u>Qualification Report/RIMS_B43 850919 500</u>
Operator Test Report No. 600456 (excerpt TAB D-3)       DATE Dec. 9, 1975         OTHER (ANALYSIS, VENDOR DATA, ETC.)       (4)       TVA Radiation Calculation WENNAL3-025, R0 (B45 860401 235)         (5)       TVA Radiation Calculation WENNAL3-031, R1 (B45 880826 235)         (6)       System 30 Cat. & Op. Times WENOSG4-008, R14 (B26 900110 206)         (7)       System 65 Cat. & Op. Times WENOSG4-015, R8 (B45 870209 428)	End of Life Tests/N	UC-22 Rev. 2 (TAB D-2) DATE Feb. 10, 1984
<ul> <li>(4) TVA Radiation Calculation WBNNAL3-025, R0 (B45 860401 235)</li> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	<u>Operator Test Repor</u>	t No. 600456 (excerpt
<ul> <li>(5) TVA Radiation Calculation WBNNAL3-031, R1 (B45 880826 235)</li> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	OTHER (ANALYSIS, VENDOR	DATA, ETC.)
<ul> <li>(6) System 30 Cat. &amp; Op. Times WBNOSG4-008, R14 (B26 900110 206)</li> <li>(7) System 65 Cat. &amp; Op. Times WBNOSG4-015, R8 (B45 870209 428)</li> </ul>	(4) TVA Radiation Calcu	lation WBNNAL3-025, R0 (B45 860401 235)
(7) System 65 Cat. & Op. Times WBNOSG4-015, R8 (B45 870209 428)	(5) TVA Radiation Calcu	Lation WBNNAL3-031, R1 (B45 880826 235)
	(6) System 30 Cat. & Op	. Times WBNOSG4-008, R14 (B26 900110 206)
(8) TVA degraded Voltage Calc WBP-EVAR 8602001, RO (B43 860227 901)	(7) System 65 Cat. & Op.	. Times WBNOSG4-015, R8 (B45 870209 428)
	(8) TVA degraded Voltage	e Calc WBP-EVAR 8602001, RO (B43 860227 901)

NA

	BINDER NO. WBNEQ-MOT-003 PLANT WBN UNIT(S) 1 SHEET 1a OF 28
	R R
	BINDER TITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>R2 JOH</u> DATE 2-23-89
ļ	WOUND MOTORS- OUTSIDE CONTAIN-
1	MENT CHECKED $ R2 KBV$ DATE $3/4/89$
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#### A. DOCUMENTATION

OTHER (ANALYSIS, VENDOR DATA, ETC.) (Continued)

(9) WBN Environmental Drawing 47E235-48 R3

(10) WBN Environmental Drawing 47E235-74 R1

(11) WBN Environmental Drawing 47E235-78 R3

(12) WBN Environmental Drawing 47E235-79 R1

(13) WBN Environmental Drawing 47E235-81 R1

(14) TVA Condensation Calc GENNAL6-002 R2 (B45 860812 236)

Note: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

	DER TITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>DFA</u> DATE <u>9/20</u> 86 <u>TOH</u> ND MOTORS-OUTSIDE CONTAIN- Z-23-39
MEN'	<u>CHECKEDNMB</u> DATE <u>9/20/86</u> 3/9/89
_	
Β.	CONCLUSION OF REVIEW (Check only one block)
	<u>X</u> Equipment Qualified
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation
	Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES Refer to open items
	listed in the front of this binder.
	1. Technical information from Reliance is outstanding.
	2. "T" drains must be repositioned.
	3. Installation of larger terminal boxes.
	4. Vendor drawings to reflect replacement parts installed.
	TOTALEMENT UNITES INSTALLED.
	and the second of the second parts installed.
	COMMENTS/RECOMMENDATIONS See TAB C. Section 9.0, Summary.

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BIND	ER TITLERELIANCE-RANDOM WOUND_ COMPUTED Que DATE 9/20/86
	ER TITLE <u>RELIANCE-RANDOM WOUND</u> COMPUTED Quely DATE 9/20/86
	I T
C.	QUALIFICATION CRITERIA
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
	<u>X</u> Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
	IEEE 323-1974 Qualifying Class lE Equipment for Nuclear Power
	Generating Stations
	IEEE 334-1974 Type Test of Continuous Duty 1E Motors
	NEMA MG-1 Motors and Generators
	IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	AC Electrical Machinery.

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	DER NO. WBNEQ-MOT-003 PLANT WBN UNIT(S) 1 SHEET 4 OF DER TITLE RELIANCE-RANDOM WOUND COMPUTED ATE 9/20/86 R R R MOTORS-OUTSIDE CONTAINMENT CHECKED DATE 9/22/86
	MOTORS-OUTSIDE CONTAINMENT CHECKED DATE 1/24/56
D.	<u>QUALIFICATION METHODOLOGY</u> (Check only one $block$ )
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.1 for additional
	details.

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EQU	IPMENT_DESCRIPTION	z		
ider	the equipment identiantiantiantiantiantiantiantiantiantia	fied in the qua equipment which	lification docum requires qualif	entation ication
		<u>Plant Device</u>	Qualification	Reference
(1)	Equipment Type	Induction Motors	Induction Motors	NUC-22, Section I <u>TAB D-2</u>
(2)	Manufacturer	Reliance	Reliance	NUC-22, Section I <u>TAB D-2</u> NUC-22,
(3)	Model Number(s)	RH Insulation Systems Other data	<u>3 hp</u> 575 VAC, <u>3 ph, 60 Hz</u>	Section I TAB D-2
		in TAB A	1800 rpm- no load RH Insulation System	
(4)	Serial Number(s)	Note 1	<u>1YF-882616-A1</u>	TAB D-2, NUC-22, Section I
(5)	Identify Component- Unique checksheet attached:	Motors - Suppl	ement l	
JUST	IFICATION/COMMENTS	<u>Refer to TAB C</u>	, Section 2.0, S	imilarity.
NOTE	1 - Motor serial nu	mbers may be re	ferred to as eit	her model
	or serial numbe	rs on the field	verification da	t <u>a sheets</u>

### PAGE B-5 R2

		70	3/9/89
. INSTALLATION IN	TERFACES		
List all interf	aces pertinent to EQ nd/or evaluation and	identified in the	qualificatio
interface a req	uirement for our appl	ication (Yes/No)?	(Note below.
ii yes, enter r	equirement in QMDS, i		tification.
Interface	Identify Interface	Plant Requirement? (Yes/No)	Reference <u>Test Report</u>
Mounting Bolts	NA	NA	
External	· · · ·		
Process Connections	NA	<u>NA</u>	
Electrical Connections	NA	NA	
. Conduit Seals	NA	NA	
Connector Seals	NA		
Orientation	NA	<u>NA</u>	
Physical Configuration	NA	NA	
Other	NA	NA	
JUSTIFICATION/CO	MMENTS See TAB C. Se	ection 6.0. Inter	faces

PAGE B-6 R2

					NIT(S)	DATE 9	SHEET7 OF R R /20/56
			UTSIDE CONTAINMENT C	HECKED	Acheglez	DATE _	9/2456
G. <u>I</u>	EST	SEQU	ENCE				
. (	1)	acci	Sequence: Was the test dent environment in acco /no/NA)? (note below)			323 (74	
		(a)	Equipment inspected for	damage	<u>No</u>		See comments
		(b)	Baseline performance measurements taken		Yes		NUC-22,IV.A ( <u>p_3)TAB_D-2</u>
		(c)	Equipment aged:				
			Thermal		Yes		NUC-22, IV. B. I ( <u>p 3) TAB D-2</u> NUC-22, IV. E
			Radiation		<u>Yes</u>		( <u>p</u> 5) TAB D-2 NUC-22, IV. B. 3
			Wear		Yes		( <u>p_3) TAB_D-2</u> NUC-22, IV.C&F
		(d)	Vibration/seismic testi conducted	ng	Yes		(pp 4&6) TAB D-2
		(e)	Design basis event (DBE exposure	)	<u>NA</u>		See comments
		(f)	Post-DBE exposure		NA		See comments
		(g)	Final inspection and disassembly		Yes		NUC-22,IV.H ( <u>p_6)TAB_D-2</u>
(:	2)	Was t descr	the same piece of equipme bed in item (1) above (	ent used (yes/no/l	throughou NA)? <u>Yes</u>	t the f	test sequence
(:	· 1	been	the test equipment, test appropriately documented rence <u>TAB D-2, NUC-22, S</u>	d (yes/no	o/NA)?	les*	nd calibration data
			ION/COMMENTS	ough_not	documente	d, insp	ection for
<u>ti</u>	lons	<u>indi</u>	inherent in baseline per cated in TAB A, signific the DBE result in only	<u>cant tran</u>	<u>isients</u> do	not oc	cur and the
<u>tu</u>	ire,	humi	dity, and in some cases, sents an extension of co	a marke	ed_increas	e in ra	diation.
ab	nori	<u>nal o</u>	perating conditions which aging phase of the test	ch are ad	ldressed b	y the t	tion 3.3).
ha	we b	been	ome of the test equipmen out of calibration, this rily performed at rated	s has no	bearing o	n the f	act that the motor

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н. <u>А</u>	AGIN	<u>G</u>		
(	1)	Was aging considered in the qualification pr (Yes/no/NA)? Yes (Reference TAB D-2, Section IV.B).	ogram NUC-22,	
		JUSTIFICATION/COMMENTS		
(	2)	Were the following effects considered in the		
、·	<i>4</i> ,	Were the following effects considered in the <u>Aging Effect</u>	Yes/No/NA	Reference
		Thermal aging	Yes	Refer to <u>H.4.a</u>
		Radiation exposure	Yes	Refer to H.5.a
		Vibration (non-seismic) aging	Yes	Refer to H.6.a
		Operational (electrical/mechanical/process) stress aging	Yes	H.O.a Refer to H.7.a
		JUSTIFICATION/COMMENTS		
(3	3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference	considered i	in the agir
(3	3)	Were all known synergistic effects which are significant effect on equipment performance	considered i	in the agin ).
(3	3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference	considered i  erials used	in the agin ). in these
	3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference JUSTIFICATION/COMMENTS <u>A review of the mate</u>	considered i  erials used	in the agin ). in these
	3) 4)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference JUSTIFICATION/COMMENTS <u>A review of the mat</u> motors indicates that there are no known syne	considered i erials used ergistic eff lification p -2, NUC-22,	in the agin ). in these fects. program p 3,
	3) 4)	<pre>Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference</pre>	considered i erials used ergistic eff lification p -2, NUC-22, p 3 and Appe	in the agin in these fects. program p 3, endix 3.)

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BINDE		EL IAN CE-RAN DOM	WOUND COMPUTED (Ichel.	DATE 9/20	/86 R R
			<u> </u>	) ale	
	MOTORS-OL	UTSIDE CONTAINM	ENTCHECKED0	DATE 1/20	
H.	<u>AGING</u> ((	Continued)			
	(b)	Were the mate	rials susceptible to therm	al aging d	legradation
		identified in	the qualification program	n (yes/no/N	IA)? <u>Yes</u>
		(Reference <u>1</u>	<u>AB D-1, NUC-9, p 19, Secti</u>	lon VI ).	
		JUSTIFICATION	/COMMENTS <u>Components susc</u>	<u>eptible_to</u>	thermal
		<u>degradation a</u>	re the insulation and lubr	cicants.	Lubricant_is
		routinely rep	laced, in accordance with t	<u>he QMDS (T</u>	AB G) and,
		<u>therefore, no</u>	t subject to long-term the	ermal degra	dation.
	(c)	Was the basis	for thermal aging identif	ied in the	qualificatio
		program (yes/	no/NA)? <u>Yes</u> (Reference <u>TAB</u>	<u>D-2, NUC-</u>	22, Section
			<u>IV.</u>	B.1, & App	<u>3, p2).</u>
		JUSTIFICATION	COMMENTS <u>In accordance</u>	with IEEE	334-1974,
		Section 9.0,	<u>a regression line develope</u>	d in NUC-9	_was_used
		<u>to obtain equ</u>	ivalent aging time and tem	perature.	
	(d)	Was the aging	acceleration rate justifi	ed and the	Darameters o
		time and tempe	erature identified in the	qualificat	ion program
		(yes/no/NA)? _	Yes (Reference <u>TAB D-2</u> , and App		ection_IV.B
		Damanah			
•		Parameter	<u>Plant Maximum Normal</u> Refer to TAB C,	<u>Test</u>	<u>Equivalent</u>
·	•	Temperature	Section 8.1	<u>255°C</u>	<u>155°C</u>
			<u>40 years</u>	<u>88 days</u>	<u>44 years</u>
·	·	Time			
		Time JUSTIFICATION/	COMMENTS <u>Refer to TAB C</u>	, Section 8	8.1.
			COMMENTS <u>Refer to TAB C</u>	, Section 8	8.1.
			COMMENTS <u>Refer to TAB C</u>	, Section (	8.1
			COMMENTS <u>Refer to TAB C</u>	, Section 8	8.1.
			COMMENTS <u>Refer to TAB C</u>	, Section a	8.1.

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MO TO RS-OI	UTSIDE CONTAINMENT CHECKED DATE 9/20/86
H. <u>AGING</u> (Co	Ontinued)
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-2, NUC-22, Section IV.B</u> <u>and App. 3</u> ).
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>NA</u> (Reference).
	JUSTIFICATION/COMMENTS <u>Accelerated aging parameters</u>
	developed in accordance with Section 9 of IEEE 334-1974
	using a system regression line.
(g)	
(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-1, NUC-9, Supp</u> .
(g) (h)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? Yes (Reference TAB D-1, NUC-9, Supp. p 2) JUSTIFICATION/COMMENTS
	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? Yes (Reference TAB D-1, NUC-9, Supp. p 2). JUSTIFICATION/COMMENTS Was the equipment operated during the thermal aging (yes/no/NA)? Yes (Reference TAB D-2 NUC-22, p 6)
	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? Yes (Reference TAB D-1, NUC-9, Supp. p 2) JUSTIFICATION/COMMENTS Was the equipment operated during the thermal aging (yes/no/NA)? Yes (Reference TAB D-2 NUC-22, p 6 Section IV, F&G, ).
	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? Yes (Reference TAB D-1, NUC-9, Supp
	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-1, NUC-9, Supp.</u> <u>p 2)</u> JUSTIFICATION/COMMENTS Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-2 NUC-22, p 6</u> <u>Section IV, F&amp;G, ).</u> JUSTIFICATION/COMMENTS <u>The accelerated thermal aging process</u> of the complete stator assembly and the motor leads accounts
	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-1, NUC-9, Supp.</u> <u>p 2)</u> JUSTIFICATION/COMMENTS Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>TAB D-2 NUC-22, p 6</u> <u>Section IV, F&amp;G,</u> ). JUSTIFICATION/COMMENTS <u>The accelerated thermal aging process</u> of the complete stator assembly and the motor leads accounts for the thermal stresses which would occur from prolonged

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BINDER NO. WBNEQ-MOT-003 PLANT WBN UNIT(S) 1 SHEET 11 OF 28
R_2_R BINDER TITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>DFA</u> DATE <u>9/20</u> 86 <u>JDH</u> NOUND MOTORS-OUTSIDE CONTAIN 2-23-89
1ENT CHECKED NMB DATE <u>9/20/86 KBN</u> 3/9/89
H. <u>AGING</u> (Continued)
(5) Radiation Aging Exposure:
(a) Was radiation aging exposure considered in the qualification program (Yes/No/NA)? Yes (Reference: <u>TAB D-2, NUC-22</u> , <u>p 5 Section IV.E</u> ).
JUSTIFICATION/COMMENTS <u>Complete motor assembly</u> ,
including bearings and lubricant, was exposed to a total
integrated dose of 2.2 x 10 rads, gamma.
(b) Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? Yes (Reference: <u>TAB D-1, NUC-9, p 8, Section III, and TAB D-2, NUC-22, Appendix I, p 1</u> ).
JUSTIFICATION/COMMENTS <u>Organic materials of the Relianc</u> e RH system, Spec. 4824-GZ, and bearing lubricants are
identified by Reliance specification number in Section
III of the NUC-9 report.
(c) Was the basis for radiation aging exposure identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-1, NUC-9, Section I.B (pp 1 &amp; 2)</u> ).
JUSTIFICATION/COMMENTS <u>Radiation test dose was selected</u>
to envelop applications occurring throughout a
significant radiation range.
(d) Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2, NUC-22, App, 5</u> ).
Plant normal ambient radiation dose (rd) <u>3.6x10</u> R2
Test exposure dose (rd) $2.2 \times 10^8$

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	BINDER NO. <u>WBNEQ-MOT-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>12</u> OF <u>28</u> R <u>2</u> R
0	BINDER TITLE       RELIANCE-RANDOM       COMPUTED       DFA       DATE       9/20       86       TDH         WOUND       MOTORS-       OUTSIDE       CONTAIN-       Z-23-89       Z-23-89         MENT       CHECKED       NMB       DATE       9/20/86       KBN
	3/9/89
	H. <u>AGING</u> (Continued) 220.5 hrs at .55 MRad/hr R2
	20 hrs at .05 MRad/hr Test exposure dose rate (rd/hr) 8 <u>5.7 hrs at 1.14 MRad/</u> hr
	Test exposure source type (e.g., Co-60 gamma) <u>Co-60, gamma</u>
	JUSTIFICATION/COMMENTS <u>Co-60 gamma source confirmed in</u>
	telecon on August 29, 1986, between Don Ackerly of TVA
	and Gary Wheeler of Reliance Electric.
	(6) Vibration (non-seismic) Aging:
	<ul> <li>(a) Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program¹ Yes (Reference:  R2 TAB D-2, NUC-22, p 3, Section IV.B.3).</li> </ul>
	JUSTIFICATION/COMMENTS <u>Mechanically aged per Section 9</u>
	of IEEE 334-1975 for one hour at 60 cycle per second
	vibration, with a deflection of 8 mils pk-pk.
	(b) Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2, NUC-22, p 3, Section IV.B.3</u> ).
	JUSTIFICATION/COMMENTS
	(7) Operational Stress Aging:
	<ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation adressed in the qualification program         (Yes/No/NA)? Yes (Reference: TAB D-2, NUC-22, p 3, Section IV.B.3; p 4, Section IV.C.4; and p 6, Section IV.F).</li> </ul>
	JUSTIFICATION/COMMENTS <u>Motor operated under load during</u> multiple frequency seismic tests which followed thermal, radiation, and vibration aging. Motor also operated under no-load conditions during vibration aging addressed in TAB B, Section H, Item 6.
	Qualification program refers to the test report and any supplemental documentation including TVA analyses in TAB C of the Binder.

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	R2 R
	TITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>DFA</u> DATE <u>9/20 86</u> <u>JDH</u>
MOUND_MC MENT	
	3/9/89
H. AGIN	IG (Continued)
	(b) Was the basis for stresses induced during operational
	aging identified and justified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	Refer to references in 7a).
	JUSTIFICATION/COMMENTS Motor operated under rated
	conditions during both series of seismic tests. This
	results in stresses much greater than those encountered
	through normal operation.
(8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2, NUC-22, p 7, Section V</u>
	(Reference: $\underline{\text{TAB }        \text$
	Qualified life (Document in QMDS) <u>40+ years</u> ).
	).
	Qualified life (Document in QMDS) <u>40+ years</u>
	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u>
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin, i.e., 44 years at a total temperature</u>
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin. i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin, i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components <u>defined in the qualification program (Yes/No/NA)? Yes</u> (Reference: <u>TAB D-1, NUC-9, p 17, Section V.2&amp;3</u> ).
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin, i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components <u>defined in the qualification program (Yes/No/NA)? Yes</u> (Reference: <u>TAB D-1, NUC-9, p 17, Section V.2&amp;3</u> ). JUSTIFICATION/COMMENTS <u>No replaceable items were identified</u>
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin, i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components <u>defined in the qualification program (Yes/No/NA)? Yes</u> (Reference: <u>TAB D-1, NUC-9, p 17, Section V.2&amp;3</u> ). JUSTIFICATION/COMMENTS <u>No replaceable items were identified</u> in the insulation system. The bearings and lubricants are
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin. i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components <u>defined in the qualification program (Yes/No/NA)? Yes</u> (Reference: <u>TAB D-1, NUC-9, p 17, Section V.2&amp;3</u> ). JUSTIFICATION/COMMENTS <u>No replaceable items were identified</u> <u>in the insulation system. The bearings and lubricants are</u> <u>routine maintenance items, the replacement of which is</u>
(9)	). Qualified life (Document in QMDS) <u>40+ years</u> JUSTIFICATION/COMMENTS <u>NUC-22 documents a qualified life of</u> <u>40 years plus 10% margin, i.e., 44 years at a total temperature</u> <u>of 155°C.</u> Were replacement intervals for the equipment or its components <u>defined in the qualification program (Yes/No/NA)? Yes</u> (Reference: <u>TAB D-1, NUC-9, p 17, Section V.2&amp;3</u> ). JUSTIFICATION/COMMENTS <u>No replaceable items were identified</u> <u>in the insulation system. The bearings and lubricants are</u> <u>routine maintenance items, the replacement of which is</u> <u>addressed in the Qualification Maintenance Data Sheets in</u>

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BINDER NO. WBNEQ-MOT-003	PLANT	WBN	UNIT(S)	1	SHEET_1	4_0F_28 R
BINDER TITLE RELIANCE-RANDOM	WOUND	COMPUTE	DFA	_DATE_9/20/86	2+2R 6/13/88	
MOTORS-OUTSIDE CONTAINMENT		CHECKED	DNMB	_DATE_9/20/86	ReffaseA	

### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of EQC Binder for Detailed Materials Analysis)

	Material/Property/Function	Radiation Threshold	References	Activation Energy	Reference
(a)	DuPont 10/Electrical/ Insulation	2.2x10 ⁸	Note 1	1.02 eV	TAB © Note 3
(b)	Chevron/Mechanical/ Lubricant SRI No. 2	8 2x10 rad	Note 2	Note 4	
(c)					
(d)					
(e)				<u></u>	
JUST	IFICATION/COMMENTS			•	
	1: The Reliance RH/DuPont 10				dose of
	2.2x10 [®] RADS and maintain				
	as documented in Reliance				
<u>Note</u>	2: Refer to Digital Materia	1 Aging and Ra	adiation Effe	cts Library	
	Code No. 157-83A and TAB				
<u>Note</u>					
<u>Note</u>	4: Consideration of long-ter	<u>rm thermal dec</u>	gradation of	the grease i	s not
<u> </u>	required because it is no				
<del></del>	life. A surveillance and				
	QMDS in TAB G to ensure p	proper operati	on.		
				<u></u>	

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	ID MOT	ITLE <u>RELIANCE-RANDOM</u> COMPUTED <u>DFA</u> DATE <u>9/26 86 TDA</u> <u>IORS- OUTSIDE CONTAIN-</u> CHECKED <u>NMB</u> DATE <u>9/26/86 FM</u> <u>4/10/16</u>
J.		IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE FORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITION
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2, NUC-22, p 6, Section IV.G</u> ).
	·	Identify Acceptance Criteria: Following accelerated aging
		and seismic testing intended to simulate the effects of all
		service conditions, the motor must continue to operate at
		its rated load.
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2, NUC-22, App. 2</u> ).
		Identify baseline and functional testing: No load, locked
		rotor, and dielectric tests done to baseline motor performance
		parameters. After all environmental aging and testing,
		baseline tests were repeated and full load tests were also
•		performed.
		JUSTIFICATION/COMMENTS Motor test results were essentially identical with no indication of diminished capability.
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB D-2. Nuc-22. pg 6. Sect. IV.G</u> ).
		JUSTIFICATION/COMMENTS The motor functioned under rated electrical and mechanical conditions during and following a simulation of the service conditions. The effects of the DBE result in only moderate increases in the temperature. humidity. and, in some cases, a marked increase in radiation. This can be represented as an extension of conditions existing during normal and abnormal operating conditions which is addressed by the thermal/radiation aging phase of

BINDER NO. WBNEQ-MOT-003	
BINDER TITLE <u>RELIANCE-RA</u> WOUND MOTORS- OUTSIDE CON	TAIN- 2-23-89
MENT	CHECKED <u>NMB</u> DATE <u>9/20/86</u> <u>KBN</u> 3/9/89
J. <u>EQUIPMENT ELECTRICAL</u> <u>PERFORMANCE SPECIFIC</u> (Continued)	CHARACTERISTICS NECESSARY TO ENSURE THE ATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
(4) Do the applied operating condi- <u>TAB D-1, NUC-22</u>	loads during baseline testing reflect normal tions (Yes/No/NA)? <u>Yes</u> (Reference:). Section I).
JUSTIFICATION/CO	OMMENTS <u>Baseline tests performed are</u>
<u>industry-standar</u>	d tests used to determine performance
<u>characteristics</u>	during normal operating conditions.
(5) Identify electri equipment perfor	cal characteristics necessary to ensure the mance specifications can be satisfied.
(a) <u>Parameter</u>	Plant Normal Conditions Reference
Voltage	NA
Load	NA
Frequency	NA R2
Accuracy	NA
Other(s)	
JUSTIFICATI	ON/COMMENTS Refer to TAB C. Section 5.0
for discuss	ion of voltage and frequency requirements.
(b) <u>Parameter</u>	Specific Accident ConditionsReference
Voltage	NA
Load	R2
Frequency	NA
Accuracy	NA
Other(s)	
JUSTIFICATION/CON discussion of vol	MENTS <u>Refer to TAB C. Section 5.0 for</u> tage and frequency requirements.

## PAGE B-16 R2

	IPMENT ELECTRICAL FORMANCE SPECIFIC				
	ntinued)	ALLUND CAN DI	SALISTICD (	MUER AUL	TDENT COMPT
(c)	Parameter	Demonstra	ited Conditic	ns	Reference
	Voltage	NA		<u>.</u>	
	Load	NA	·		
	Frequency	NA			
	Accuracy	NA	<u> </u>		
	Other(s)				
				•	
	JUSTIFICATION/C				
	JUSTIFICATION/C				
	discussion of v				
	discussion of v	roltage and fr	equency requ		•
	discussion of v	roltage and fr	equency requ	irements	•
	discussion of v	roltage and fr	equency requ	<u>irements</u>	•

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BINDER NC							R 3	R	
		RELIANCE-RANDOM		DFA	DATE				·
ENT	UKS-	OUTSIDE CONTAIN-	- CHECKED	NMB	DATE	9/20/	∕ 86 ≁	KAU (	
······································								31/90	
K. REOU	ITRED	OPERATING ENVIRON	MENT						
Refe	erence	e Environmental Dr		Worst 5_Shee		mmary	of t	he Ne	ext
(1)	Norn	nal Max	(2)	Abno	ormal Ma	x			
	(a)	Temperature (°F)	104	(a)	Temper	ature	(°F)	11	LO
	(b)	Pressure (psig)	ATM-	(b)	Pressu	re (ps:	ig)	A]	<u>.</u>
	(c)	Humidity (%)	80	(c)	Humidi	ty (%)			0
	(d)	Radiation (rd)	6 <u>3.6x10</u>	(d)	Radiat	ion (ro	d)	N	TA
(3)	Proc	ess Interfaces:	None						
(4)	 Stat	e anticipated occ itions: <u>8 hrs. p</u>	urrence fro						
(4)	Stat cond	itions: <u>8 hrs. p</u>	urrence fro er excursio	on tot	aling 1	ess tha	<u>an 1</u> 2	<u>% of</u>	
(4)	Stat cond		urrence fro er excursio	on tot	aling 1	ess tha	<u>an 1</u> 2	<u>% of</u>	
(4)	Stat cond	itions: <u>8 hrs. p</u>	urrence fro er excursio	on tot	aling 1	ess tha	<u>an 1</u> 2	<u>% of</u>	
(4) (5)	Stat cond <u>plan</u> Acci	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case	urrence from er excursion l of 1600 h for any con	nours nours	during in during in during in of s	ess that life of specifi	an 1: f pl:	<u>% of</u>	
	Stat cond <u>plan</u> Acci para	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p	urrence from er excursion l of 1600 h for any conteak, duration 110 for	nours nours abinat lon, a	during in during in during in of s	ess that life of specifi	an 1: f pl:	<u>% of</u>	
	Stat cond <u>plan</u> Acci	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p	urrence from er excursion l of 1600 h for any conteak, duration 110 for	nours nours nours noinat	during in during in during in of s	ess that life of specifi ile):	<u>an 1</u> <u>f pl</u> ied a	<u>ant.</u>	
	Stat cond <u>plan</u> Acci para	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p	for any con eak, durati 10 for al of 1600 h	nbinat	during 1 during 1 ion of s nd profi	ess that life of specifi ile): t type	<u>an 1</u> <u>f pl</u> Led :	<u>ant.</u> accid	ent
	Stat cond plan Acci para (a)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig)	for any con eak, durati 10 for eak, durati 110 for <u>30 days</u> <u>NA</u>	nours nours abinat lon, a	during during ion of a nd profi	ess that life of specifi ile): t type t type	<u>an 1</u> <u>f pl</u> Led a <u>HEL</u>	<u>ant.</u> accid LOCA B/LOC	ent A
	Stat cond plan Acci para (a) (b) (c)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig)	for any con eak, duration 10 for eak, duration 110 for 30 days	abinat	during 1 during 1 ion of s nd profi Accident Accident	ess that life of specifi ile): t type t type t type	an 1: f pl; ied ; HELI HELI	<u>x of</u> ant. accid LOCA B/LOC B/LOC	ent A
	Stat cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	urrence fro er excursion 1 of 1600 h for any con eak, durati 110 for 	abinat	during during ion of a nd profi Accident Accident	ess that life of specifi ile): t type t type t type type type	an 1: <u>f pl</u> ied a <u>HELI</u> <u>HELI</u>	X of ant. accid LOCA B/LOC B/LOC	ent
	Stat cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd)	for any cone eak, duration 10 for any cone eak, duration 30 days NA NA NA NA 8 1x10	abinat	during during ion of s nd profi Accident Accident Accident	ess that life of specifi ile): t type t type t type type type	an 1: <u>f pl</u> ied a <u>HELI</u> <u>HELI</u>	X of ant. accid LOCA B/LOC B/LOC	ent A
	Stat cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd)	for any cone eak, duration 10 for any cone eak, duration 30 days NA NA NA NA 8 1x10	abinat	during during ion of s nd profi Accident Accident Accident	ess that life of specifi ile): t type t type t type type type	an 1: <u>f pl</u> ied a <u>HELI</u> <u>HELI</u>	X of ant. accid LOCA B/LOC B/LOC	ent
	Stat cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd)	for any cone eak, duration 10 for any cone eak, duration 30 days NA NA NA NA 8 1x10	abinat	during during ion of s nd profi Accident Accident Accident	ess that life of specifi ile): t type t type t type type type	an 1: <u>f pl</u> ied a <u>HELI</u> <u>HELI</u>	X of ant. accid LOCA B/LOC B/LOC	ent A
	Stat cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd)	for any cone eak, duration 10 for any cone eak, duration 30 days NA NA NA NA 8 1x10	abinat	during during ion of s nd profi Accident Accident Accident	ess that life of specifi ile): t type t type t type type type	an 1: <u>f pl</u> ied a <u>HELI</u> <u>HELI</u>	X of ant. accid LOCA B/LOC B/LOC	ent A

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X.

DINDUK IN	O. <u>WBNE</u>	<u>EQ-MOT-003</u> H	LANT WBN	_ UNIT(	(S) <u>1</u>		C <u>17a</u> (
BINDER T	TTLE F	RELTANCE-RANDO	M COMPUTED	DFA	DATE	R	
		OUTSIDE CONTAI				<u>,,,,,,,,,,,,</u>	2/23/89 KRN
MENT			CHECKED	NMB	DATE	<u>9/26/86</u>	<u>KRN</u>
K. REQU	JIRED (	DPERATING ENVI	RONMENT				
		· ·	Drawing No.	47E23	5-48		
			-				
(1)	Norma	al Max	(2)	Abnor	mal Max	<b>Z</b>	
	(a)	Temperature (	°F) <u>104</u>	(a)	Tempera	ture (°F	r) <u>11</u>
	(b)	Pressure (psi	.g) <u>ATM-</u>	(ኔ)	Pressur	e (psig)	AT
	(c)	Humidity (%)	80	(c)	Humidit	y (%)	90
	(d)	Radiation (rd	$\frac{8.8 \times 10^{2}}{10}$	(d)	Radiati	on (rd)	<u>N</u>
(3)	Proce	ess Interfaces	: None				······
(4)			occurrence fre				
(4)			occurrence fre . per excursic				
(4)	condi	tions: <u>8 hrs</u>		on tota	<u>ling le</u>	<u>ss than</u>	<u>1% of</u>
	condi <u>plant</u>	tions: <u>8 hrs</u>	<u>, per excursio</u> otal of 1600 h	on tota	<u>ling le</u> uring l	<u>ss than</u> ife of p	<u>l% of</u>
(4)	condi <u>plant</u> Accid	tions: <u>8 hrs</u> <u>life and a t</u> ent (worst ca	<u>per excursions of 1600 h</u> otal of 1600 h se for any com g peak, durati	<u>nours d</u> binati	<u>ling le</u> uring l on of s	<u>ss than</u> <u>ife of p</u> pecified	<u>l% of</u>
	condi <u>plant</u>  Accid param	tions: <u>8 hrs</u> <u>life and a t</u> ent (worst ca meter includin	. per excursic otal of 1600 h se for any com	on tota nours d noinati non, an	<u>ling le</u> uring <u>l</u> on of s d profi	<u>ss than</u> <u>ife of p</u> pecified	1% of lant. accide
	condi <u>plant</u> Accid param (a)	tions: <u>8 hrs</u> <u>life and a t</u> ent (worst ca meter includin	<u>. per excursio</u> otal of 1600 h se for any com g peak, durati 110 for °F) <u>30 days</u>	binati on, an	<u>ling le</u> uring <u>l</u> on of s d profi ccident	<u>ss than</u> <u>ife of p</u> pecified le):	1% of lant. accide
	condi <u>plant</u> Accid param (a) (b)	tions: <u>8 hrs</u> <u>life and a t</u> ent (worst ca eter includin Temperature (	<u>. per excursic</u> otal of 1600 h se for any com g peak, durati 110 for °F) <u>30 days</u> g) <u>NA</u>	on tota nours d obinati on, an A A	<u>ling le</u> uring <u>l</u> on of s d profi ccident ccident	<u>ss than</u> <u>ife of p</u> pecified le): type	1% of lant. accide LOCA LOCA
	condi plant Accid param (a) (b) (c)	tions: <u>8 hrs</u> <u>life and a t</u> ent (worst ca eter includin Temperature ( Pressure (psi	<u>. per excursio</u> otal of 1600 h se for any com g peak, durati 110 for °F) <u>30 days</u> g) <u>NA</u> <u>NA</u>	on tota nours d binati on, an A A A A	ling le uring 1 on of s d profi ccident ccident ccident	<u>ss than</u> <u>ife of p</u> pecified le): type type	1% of lant. accide LOCA LOCA LOCA
	condi plant Accid param (a) (b) (c) (d)	tions: <u>8 hrs</u> <u>life and a t</u> lent (worst ca meter includin Temperature ( Pressure (psi Humidity (%)	<u>. per excursio</u> otal of 1600 h se for any com g peak, durati 110 for °F) <u>30 days</u> g) <u>NA</u> <u>NA</u>	binati on, an A A A A A A	ling le uring l on of s d profi ccident ccident ccident ccident	ss than ife of p pecified le): type type type	1% of lant. accide LOCA LOCA LOCA
(5)	condi plant Accid param (a) (b) (c) (d) (e)	tions: <u>8 hrs</u> <u>life and a t</u> lent (worst ca leter includin Temperature ( Pressure (psi Humidity (%) Radiation (rd Spray Type ed Motors: 1	<u>per excursions</u> otal of 1600 h se for any com g peak, durati 110 for °F) <u>30 days</u> g) <u>NA</u> <u>NA</u> 3) <u>1x10</u>	on tota nours d binati on, an A A A A A A A A A A A A A A A A A A A	ling le uring l on of s d profi ccident ccident ccident ccident	ss than ife of p pecified le): type type type	1% of lant. accide LOCA LOCA LOCA

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			T <u>WBN</u>	_ UNIT	'(S) <u>1</u>	SHEET R	2 R	_
		RELIANCE-RANDOM OUTSIDE CONTAIN-	COMPUTED_	DFA	DATE	9/20 86	JDH 2/23/89	-Bi
MENT			CHECKED	NMB	DATE	<u>9/20/86</u>		<u>Kë</u> 1/31
K. REQU	JIRED	OPERATING ENVIRON	MENT		<u></u>			;
Refe	erence	Environmental Dr	awing No.	47E23	5-74			
				·		·······		<u> </u>
(1)	Norm	al Max	(2)	Abno	rmal Max	۲.		
	(a)	Temperature (°F)	104	(a)	Tempera	ature (°F	')110	<u> </u>
	(b)	Pressure (psig)	ATM	(b)	Pressu	e (psig)	ATM	[
	(c)	Humidity (%)	80	(c)	Humidi	y (%):	90	I <u>.</u>
	(d)	Radiation (rd)	5 <u>4.3x10</u>	(d)	Radiati	ion (rd)	NA	<u> </u>
(3)	Proc	ess Interfaces:	None		· · · · ·			
	<u> </u>	· · · · ·	- <del></del>					
(4)		e anticipated occ itions: 8 hrs. p		-	-			ma
(4)	cond	itions: <u>8 hrs. p</u>	er excursio	on tot	aling le	<u>ss than</u>	1% of	
(4)	cond	-	er excursio	on tot	aling le	<u>ss than</u>	1% of	
(4) (5)	cond <u>plan</u> Acci	itions: <u>8 hrs. p</u>	er excursion 1 of 1600 h for any con eak, durati	nours nours nbinat	aling le during l ion of s	<u>ife of p</u> pecified	1% of	
	cond <u>plan</u> Acci	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p	er excursion 1 of 1600 h for any com- eak, duration 110 for	nours nours nbinat ion, a	aling le during l ion of s nd profi	<u>ife of p</u> pecified	<u>l% of</u> <u>lant.</u> accide	nt
	cond <u>plan</u> Acci para (a)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p	er excursion 1 of 1600 h for any com- eak, duration 110 for	nours nours nbinat ion, a	aling le during l ion of s nd profi Accident	<u>ife of p</u> pecified le):	<u>1% of</u> <u>lant.</u> accide LOCA	
	cond plan Acci para (a) (b)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F)	er excursion 1 of 1600 h for any com- eak, duration 110 for 30 days	nbinat	aling le during l ion of s nd profi Accident Accident	<u>ife of p</u> pecified le): type	<u>1% of</u> <u>lant.</u> accide <u>LOCA</u> LOCA	
	cond plan Acci para (a) (b) (c)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig)	er excursion 1 of 1600 M for any com- eak, duration 110 for 30 days NA	nours	aling le during l ion of s nd profi Accident Accident Accident	specified le): type	1% of lant. accide LOCA LOCA LOCA	
	cond plan Acci para (a) (b) (c) (d)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	er excursion 1 of 1600 M for any com- eak, duration 110 for 30 days NA NA 7	nbinat	aling le during l ion of s nd profi Accident Accident Accident	ss than ife of p pecified le): type type	1% of lant. accide LOCA LOCA LOCA	
(5)	cond plan Acci para (a) (b) (c) (d) (e)	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) Spray Type ed Motors: 1-MTR-	er excursion 1 of 1600 M for any com- eak, durath 110 for 30 days NA NA 7 1x10 NA	nbinat ion, a 	aling le during l ion of s nd profi Accident Accident Accident Accident	ss than ife of p pecified le): type type type	1% of lant. accide LOCA LOCA LOCA	
(5) A	cond <u>plan</u> Acci para (a) (b) (c) (d) (e) .ffect	itions: <u>8 hrs. p</u> <u>t life and a tota</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) Spray Type ed Motors: 1-MTR-	er excursion 1 of 1600 H for any com- eak, durath 110 for 30 days NA NA 7 1x10 NA -30-175-A, -30-175-A, -30-176-B,	nbinat ion, a 3 Rm Al Rm Al	aling 16 during 1 ion of s nd profi Accident Accident Accident Accident	ess than ife of p pecified le): type type type type	1% of lant. accide LOCA LOCA LOCA NA	

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	D. <u>WBNEQ-MOT-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>17c</u> OF R 2 R 3
BINDER TI	TLE RELIANCE-RANDOM COMPUTED DFA DATE 9/26 86 JDH
MENT	<u>CORS-OUTSIDE CONTAIN-</u> 2/23/89 <b>7</b> CHECKED <u>NMB</u> DATE <u>9/26/86</u> KBN <u>K</u> B
	3/19/89 2/-
K. <u>REQU</u>	JIRED OPERATING ENVIRONMENT
Refe	erence Environmental Drawing No. <u>47E235-78</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM</u> (b) Pressure (psig) <u>ATM</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) <u>1.8x10</u> (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>None</u>
(4)	
(4)	State anticipated occurrence frequency and duration of abnorma conditions: <u>8 hrs per excursion totaling less than 1% of</u>
	plant life and a total of 1600 hours during life of plant.
(5)	plant life and a total of 1600 hours during life of plant. Accident (worst case for any combination of specified accident
(5)	plant life and a total of 1600 hours during life of plant.
(5)	plant life and a total of 1600 hours during life of plant. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
(5)	plant life and a total of 1600 hours during life of plant. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): 110 for
(5)	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)30 days Accident typeLOCA
(5)	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F) 30 days       Accident type LOCA         (b) Pressure (psig)       NA         Accident type       LOCA
(5)	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)       30 days         Accident type       LOCA         (b) Pressure (psig)       NA         (c) Humidity (%)       NA         Accident type       LOCA
(5)	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F) 30 days       Accident type LOCA         (b) Pressure (psig)       NA       Accident type LOCA         (c) Humidity (%)       NA       Accident type LOCA         (d) Radiation (rd)       1.4x10 **       Accident type LOCA         (e) Spray Type       NA       Accident type NA
(5)	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)
· ·	plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F) 30 days       Accident type LOCA         (b) Pressure (psig)       NA       Accident type LOCA         (c) Humidity (%)       NA       Accident type LOCA         (d) Radiation (rd)       1.4x10 **       Accident type LOCA         (e) Spray Type       NA       Accident type NA

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DINDER T	$\frac{R_2}{R_3}$
	ITLERELIANCE-RANDOMCOMPUTEDDFADATE9/2086JDH4TORS-OUTSIDECONTAIN-2/2/2892/2/289
MENT	CHECKED NMB DATE <u>9/20/86</u> KBN // 3/9/89 //3
K. REQI	UIRED OPERATING ENVIRONMENT
Kei	erence Environmental Drawing No47E235-79
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM</u> (b) Pressure (psig) <u>ATM</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
·	(d) Radiation (rd) <u>3.6x10</u> (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>None</u>
•	
(4)	and duracion of abilitima
(4)	conditions: <u>8 hrs. per excursion totaling less than 1% of</u>
(4)	and duracion of abilitima
(4)	conditions: <u>8 hrs. per excursion totaling less than 1% of</u>
(4) (5)	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> plant life and a total of 1600 hours during life of plant.
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): 110 for
	conditions:       8 hrs. per excursion totaling less than 1% of         plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)       30 days         Accident type       LOCA         (b) Pressure (psig)       NA         Accident type       LOCA/HELB         (c) Humidity (%)       NA
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): <u>110 for</u> (a) Temperature (°F) <u>30 days</u> Accident type <u>LOCA</u> (b) Pressure (psig) <u>NA</u> Accident type <u>LOCA/HELB</u>
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): <u>110 for</u> (a) Temperature (°F) <u>30 days</u> Accident type <u>LOCA</u> (b) Pressure (psig) <u>NA</u> Accident type <u>LOCA/HELB</u> (c) Humidity (%) <u>NA</u> Accident type <u>LOCA/HELB</u> 7
	conditions:       8 hrs. per excursion totaling less than 1% of         plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)       30 days         Accident type       LOCA         (b) Pressure (psig)       NA         Accident type       LOCA/HELB         (c) Humidity (%)       NA         Accident type       LOCA/HELB         (d) Radiation (rd)       7         Accident type       LOCA         (e) Spray Type       NA
	conditions: <u>8 hrs. per excursion totaling less than 1% of</u> <u>plant life and a total of 1600 hours during life of plant.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): 10 for (a) Temperature (°F) <u>30 days</u> Accident type <u>LOCA</u> (b) Pressure (psig) <u>NA</u> Accident type <u>LOCA/HELB</u> (c) Humidity (%) <u>NA</u> Accident type <u>LOCA/HELB</u> (d) Radiation (rd) <u>1x10</u> Accident type <u>LOCA</u> (e) Spray Type <u>NA</u> Accident type <u>NA</u> Affected Motors: *1-MTR-30-179-B, Rm A12 *1-MTR-30-180-A, Rm A13
(5)	conditions:       8 hrs. per excursion totaling less than 1% of         plant life and a total of 1600 hours during life of plant.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         110 for         (a) Temperature (°F)       30 days         Accident type       LOCA         (b) Pressure (psig)       NA         Accident type       LOCA/HELB         (c) Humidity (%)       NA         Accident type       LOCA/HELB         (d) Radiation (rd)       1x10         Accident type       NA         Accident type       NA         Accident type       NA         Accident type       NA         Accident type       LOCA/HELB         (d) Radiation (rd)       1x10         Accident type       NA         Accident type       NA         Accident type       NA         Accident type       NA

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7

	TLE	RELIANCE-RANDOM	_ COMPUTED_	DFA	DATE	<u>9/20 86</u>	
MENT		OUTSIDE CONTAIN-	CHECKED	NMB	DATE	<u>9/20/86</u>	2/23/89 <u>KBN</u> 3/9/89
K. <u>REQU</u>	JIRED_	OPERATING ENVIRON	<u>IMENT</u>				
Refe	erence	Environmental D	rawing No.	471	235-81		
(1)	Norm	al Max	(2)	Abno	ormal Ma	<b>x</b>	
	(a)	Temperature (°F)	) <u>104</u>	(a)	Temper	ature (°F	)110
	(b)	Pressure (psig)	ATM-	(b)	Pressu	re (psig)	ATM
	(c)	Humidity (%)	80	(c)	Humidi	ty (%)	90
	(d)	Radiation (rd)	<u>4</u> <u>3.5x10</u>	(d)	Radiat	ion (rd)	NA
(3)	Proc	ess Interfaces:	None				
	<u> </u>						
(4)	State	anticipated occ	currence fre	equenc	y and di	uration of	f abnor
(4)	condi	ltions: <u>8 hrs.</u>	per excursi	<u>ion to</u>	taling 1	less than	1% of
(4)	condi	e anticipated occ ltions: <u>8 hrs.</u> : life and a tota	per excursi	<u>ion to</u>	taling 1	less than	1% of
	condi plant	ltions: <u>8 hrs.</u>	per excursi	lon to	taling 1 during 1	<u>less than</u> Life of pl	1% of
(4)	condi plant  Accid	ltions: <u>8 hrs.</u>	per excursi 1 of 1600 h for any com eak, durati	ion to nours	taling during du	less than life of pl	1% of
	condi <u>plant</u> Accid param	ltions: <u>8 hrs.</u> : life and a tota lent (worst case	per excursi 1 of 1600 h for any com eak, durati 110 for	on to nours abinat on, a	taling 1 during 1 ion of s nd profi	Less than Life of pl specified Lle):	1% of
	condi plant Accid param (a)	ltions: <u>8 hrs.</u> <u>life and a tota</u> lent (worst case neter including p	per excursi 1 of 1600 h for any com eak, durati 110 for	on to nours binat on, an	taling 1 during 1 ion of s nd profi Accident	Less than Life of pl specified Lle):	1% of Lant. acciden LOCA
	condi plant Accid param (a) (b)	ltions: <u>8 hrs.</u> <u>life and a tota</u> lent (worst case neter including p Temperature (°F)	per excursi 1 of 1600 h for any com eak, durati 110 for 	binat	taling 1 during 1 ion of s nd profi Accident Accident	Less than Life of pl specified Lle): type type	1% of Lant. acciden LOCA
	condi plant Accid param (a) (b) (c)	ltions: <u>8 hrs.</u> <u>life and a tota</u> lent (worst case neter including p Temperature (°F) Pressure (psig)	per excursion of 1600 h for any comeak, duration 110 for 30 days	binat	taling 1 during 1 ion of s nd profi Accident Accident	Less than Life of pl specified Lle): type type	1% of Lant. accider LOCA LOCA
	condi plant Accid paran (a) (b) (c) (d)	ltions: <u>8 hrs.</u> <u>life and a tota</u> lent (worst case neter including p Temperature (°F) Pressure (psig) Humidity (%)	per excursi l of 1600 h for any com eak, durati 110 for 	binat	taling 1 during 1 ion of s nd profi Accident Accident Accident	Life of pl specified Lle): type type	1% of Lant. acciden LOCA LOCA LOCA
	condi plant Accid param (a) (b) (c) (d) (e)	itions: <u>8 hrs.</u> <u>life and a tota</u> lent (worst case heter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) Spray Type ted Motors: 1-M	per excursion of 1600 h for any comeak, duration 110 for 30 days NA NA NA NA NA 7 1x10	binat on, a on, a , Rm A	taling 1 during 1 ion of s nd profi Accident Accident Accident Accident	Less than Life of pl specified Lle): type type type	1% of Lant. acciden LOCA LOCA LOCA

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	CHE	CKED <u>NMB</u> DATE <u>9/20/86 <i>KB</i>U</u> 3/4/84
K. <u>R</u>	EQUIRED OPERATING ENVIRONMENT	(Continued)
		rofile/spray composition and pH,
G	5) Is the equipment subject	· · · · · · · · · · · · · · · · · · ·
	can affect the performance accident conditions (Yes/I	to moisture or liquid intrusion white of the equipment under design bas No/NA)? <u>No</u> (Reference:
		gence and moisture intrusion
C		es/No/NA)? <u>No</u> (Reference:
		ding - B45 860110 218 and TAB C,
	· ·	nd moisture intrusion.
		nd duration of submergence:
	<u>No motors of this binder a</u>	re subject to submergence.
(8	) Is the equipment subject t the total accident dose (Y (Reference: <u>Section P-No</u>	o a beta radiation contribution to es/No/NA)? <u>NA</u> te l
	If yes, identify the fract beta dose to be added to t	ion of the unattenuated free field he total dose and justify:
(9	) Special environmental calc	ulations (temp., rad., etc.)
	Type	RIMS No.
	WBNNAL3-031	See TAB B, Section A

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	ITLE <u>RELIANCE-RANDOM</u> TORS-OUTSIDE CONTAIN-	COMPUTED DE		2-23-89
	· · · · · · · · · · · · · · · · · · ·	····		
L. <u>SUM</u>	MARY COMPARISON OF TEST	CONDITIONS 1	<u>O SPECIFIED CO</u>	NDITIONS
(1)	Comparison of worst-ca	se maximum p	arameters:	
\$	Parameter	<b>Specified</b>	<u>Demonstrated</u>	Reference   NUC-22,
	Operating Time	40 years + <u>100 days</u>		Section V, <u>TAB D-2</u> See TAB C,
	Temperature (°F)	135°C	<u>155°C</u>	Section_8.1
	Pressure (psig)	ATM	ATM	See TAB C, <u>Section 9</u> .0
	Relative Humidity (%)	100	_100	TAB C, <u>Section 8</u> .3
	Chemical Spray*	NA	<u>NA</u>	NA
				NUC-22, Section V,
• •	Radiation (rd)**	1.04x10 ⁸	2.2x10 ⁸	p 7, TAB D-2 and TAB C, <u>Section 8</u> .2 Refer to
	Submergence	NA	NA	TAB C, <u>Section 7</u> .0
	*Includes spray concent pH.	ration, flow	rate, density,	duration, and
*	**Enter 40-year integrat dose and specify type.	ed normal do	se plus integra	ited accident

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L. <u>SUM</u>	MARY COMPARISON OF TEST CONDITION		
(2)	Comparison of worst-case profile <u>Parameter</u> Env	es and margin assess Test Profile velopes Specified (Yes/No/NA)	Reference
	Temperature	Yes	TAB C, Sect. 8.1
	Pressure	Yes	TAB C, Sect. 3.5
	Relative Humidity	Yes	TAB C, Sect. 8.3
	Chemical Spray	NA	TAB C, Sect. 3.4
	Submergence	NA	TAB C, Sect. 7.0
	JUST IFICATION/COMMENTS		
(3)	Were margins applied to the test the test program to assure that accounted for? (Note margin appl	normal variation and	wise addressed in Uncertainties ar
	Suggested Margins per IEEE-323	Margin (74) Applied	Yes/No/NA
	Temperature: +15 degrees F	Note 1	Yes
	Pressure: +10% but no more than	10 psig	NA(Note 2)

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1	BINDER NO. WBNEQ-MOT-003 PLANT WBN UNIT(S) 1 SHEET 21 OF 28							
	BINDER TITLE RELIANCE-RANDOM WOUND COMPUTED Achily DATE 9/2/6/56							
L.	SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS (Continued)							
	Radiation: +10% of accident dose <u>10% Yes (Note 3)</u>							
	Time: +10% (or 1 hour + operating time <u>10%</u> <u>Yes (Note 1)</u> per NUREG-0588)							
	Voltage: ± 10% of rated value <u>NA (Note 4)</u>							
	Frequency: <u>+</u> 5% of rated value <u>NA (Note 4)</u>							
	Environmental Transient: the initial transient and the peak temperature applied twice <u>NA (Note 5)</u>							
	Vibration: +10% added to acceleration <u>NA (Note 6)</u>							
	JUSTIFICATION/COMMENTS							
	Note 1 - Refer to TAB C, Section 8.1.							
	Note 2 - Refer to TAB C, Section 3.5.							
	Note 3 - Refer to TAB C, Section 8.2.							
	Note 4 - Refer to TAB C, Section 5.0.							
	Note 5 - Refer to TAB C, Section 3.3.							
	<u>Note 6 - These motors do not experience significant process-</u>							
	related vibration and as such, the vibration margin							
	has been accounted for during the seismic/vibration							
	tests documented in the Nuc-22 report.							

PAGE 3-26

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M	TITLE <u>RELIANCE-RANDOM WOUND</u> COMPUTED ALL DATE 4/20/81C R
M. <u>OF</u>	PERABILITY TEST RESULTS
(1	) Identify the safety function(s) of this equipment: (Reference).
	JUSTIFICATION/COMMENTS Refer to TAB A and J(1).
(2	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference).
	JUSTIFICATION/COMMENTS TAB C, Section 3.3.
(3	) Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference).
	JUSTIFICATION/COMMENTS TAB C, Section 3.3.
(4	) Did the test demonstrate the operability requirements for the requir time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>NUC-22, p 7, Section V</u> ).
	JUSTIFICATION/COMMENTS Motor operated under full-load conditions
	following accelerated thermal aging, irradiation, and mechanical
	aging.
(5	) Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>NA</u> (Reference).
	JUSTIFICATION/COMMENTS No test anomalies were reported.
	PAGEB:27

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BINDER NO. WBNEQ-MOT-003 PLANT	WBN	UNIT(S)	1	SHEET 23 OF 28
BINDER TITLE RELIANCE-RANDOM WOUND		ITED achel	א DATE <u>1/ע</u>	<u></u>
MOTORS-OUTSIDE CONTAINMENT	CHECK		DATE 1/20	/86

### N. <u>MAINTENANCE AND SURVEILLANCE</u>

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS No replaceable items were identified in the

insulation system qualification program described in NUC-9 and NUC-22.

The bearings and lubricants are routine maintenance items, the replace-

ment of which is addressed in the Qualification Maintenance Data Sheets

(QMDS) in this binder. Basically, lubrication schedules, bearing

replacement intervals and electrical and mechanical surveillance

recommendations are detailed in the QMDS located in TAB G.

PAGE B 38

	TITLE RELIANCE-RANDOM WOUND COMPUTED DELLANCE DAT	Е <u>4/гиерис</u>
SUMMAR	Y OF REVIEW	Yes/No/NA
	cumented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	Yes
	y exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>NA</u>
(3) Ch	oice of qualification methodology adequately justified?	Yes
	analysis was performed, complete the following: ) Were equipment performance requirements	Yes
•	identified?	
(Ъ	) Were specific features and failure modes and effects analyzed?	Yes
(c	) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
( d	) Were environmental parameters which affect equipment performance identified?	Yes
	equate similarity between equipment and test specimen established?	<u>Yes</u>
(6) Ag	ing degradation evaluated adequately?	Yes
(a)	) Mechanical and/or cycle aging addressed?	<u>Yes</u>
(b	) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
(c)	) Absence of preaging in test/analysis justified?	NA
(a)	) Materials susceptible to thermal/radiation aging identified?	Yes
(e)	Normally operating state of device (e.g., normally energized) considered?	Yes

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BINDER TITLE RELIANCE-RANDOM WOUND COMPUTED ALL DATE 9/	1
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	<u>Yes</u>
(a) Peak temperature adequate	Yes
(b) Peak pressure adequate	Yes
(c) Duration adequate	Yes
(d) Required profile enveloped adequately	Yes
(e) Steam exposure adequate	<u>NA</u>
(9) Criteria regarding test sequence satisfied?	Yes
(10) Criteria regarding spray satisfied?	NA
(a) Was the spray testing done while under the extremes of pressure and temperature?	NA
(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>NA</u>
(11) Criteria regarding submergence satisfied?	Yes
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes Section P
(b) Was beta radiation considered?	Note 1
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes

PAGE <u>B-30</u>

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MOTORS-OUTSIDE CONTAINMENT CHECKED DA	9/21/86
<u>MOTORS-OUTSIDE CONTAINMENT</u> CHECKED <u>10</u> DA	ATE <u>4-70-</u>
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(15) Criteria regarding functional testing satisfied?	Yes
(a) Does the test plan/report specify an acceptar criteria for equipment performed?	nce <u>Yes</u>
(b) Was an initial base line test done to establi required performance characteristics?	ish <u>Yes</u>
(c) Has the test/analysis demonstrated that performance specifications and characterist (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	cics
(16) Criteria regarding instrument accuracy satisfied?	Yes
<pre>(17) Test duration margin (1 hour + function time)     satisfied?</pre>	<u>Yes</u>
(a) Is the minimum specified operating time at le l hour?	east <u>Yes</u>
(b) If exception to the 1-hour minimum operating was taken, was adequate justification provi	
(18) Criteria regarding synergistic effects satisfied?	Yes
(19) Criteria regarding margins satisfied?	Yes
(20) Maintenance and surveillance requirements adequat identified?	ely <u>Yes</u>
P. <u>Discussion</u>	
Note 1: Motors are located in areas throughout the a	uxiliary building.
Beta-radiation is confined to the reactor bu	ilding by plant
design; therefore, these motors are not requ	ired to be eval-
uated for the effects of beta radiation.	

		LE <u>RELIANCE-RANDOM</u> NS-OUTSIDE CONTAIN		EDDFA	DATE <u>9/26 8</u>	36 JDH
ENT			CHECKEI	D <u>NMB</u>	DATE <u>9/26/8</u>	
		=	<u></u>		<u></u>	
		COMPONE	SUPPLEMENT NT-UNIQUE MOTORS			Page 1 of 2
EQUI	PMENT	<u>IDENTIFICATION</u>				
(1)	the	he motor identified plant motors which er Note 1)	l in the qu require qu	ualificati ualificati	on report ide on (Yes/No/NA	entical to A)? <u>No</u>
		Item	Plant	Report	Acceptable <u>(Yes/No/NA)</u>	
	(a)	Insulation system materials	<u></u>	<u>RH</u>	Yes	TAB C, S <u>ect. 2.</u> 1
	(b)	Coil construction (form or random wound, cast)	R <u>andom</u>	Random	Yes	TAB D-1, Nuc-9, S <u>ect. I.</u> D TAB D-2,
•	(c)	Insulation class (B, F, H)	<u>    H         </u>	<u> </u>	Yes	Nuc-22, S <u>ect. II</u> I TAB D-2,
	(d)	Lubricant Manufacturer	Ch <u>evron</u>	Chevron	Yes	NUC-22, App 1, S <u>ect. I</u>
		Туре	SPT 0	CD T 0	<b>T</b>	TAB D-2, NUC-22, App 1,
	(e)	Bearing	<u>SRI-2</u>	<u>SRI-2</u>	<u>Yes</u>	S <u>ect. I</u>
		Manufacturer	<u>Note</u> 2	<u>Note 2</u>	Yes	
		Туре	Anti F <u>ricti</u> on	Anti <u>Fricti</u> on	Yes	TAB C, S <u>ect. 4.</u> 1
		Bearing life	*		Yes	TAB C, S <u>ect. 4.</u> 1
	- 1	*See TAB G, QMDS.				1

## PAGE B-32 R2

BINDER NO. WBNEQ-MOT-003	_ PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>28</u> OF <u>28</u>					
BINDER TITLE <u>RELIANCE-RA</u> WOUND MOTORS- QUTSIDE CON MENT						
	4/24/29					
EQUIPMENT IDENTIFICATION	(Continued) Page 2 of 2					
<u>Item</u>	Acceptable Report <u>Plant Report (Yes/No/NA) Section</u>					
(f) Seals						
Manufacturer	Note 2 Note 2 Yes NUC-9,					
Туре	<u>400654 400654 Yes</u> Sec <u>t.V.C.TAB D</u> NUC-9,					
Material	<u>Steel Steel Yes</u> Sec <u>t.V.C.TAB D</u> NUC-9, Sect. III. R2					
(g) Motor lead insulation	RH         RH         Yes         8, p         12, TAB D					
Comments: <u>Note 1:</u>	Tested motors are the same as installed					
except for the actu	al physical size and rating. Differences are					
	e use of long-time, industry standard design					
and construction pr						
Note 2: Tested equ	ipment utilized components determined to be					
acceptable by Relia	nce. Bearings and seals for equipment in					
TAB A were also provided by Reliance.						
(2) Does the qualification report indicate that the motorette insulation system is the same as that used on the motors (Yes/No/NA)? Yes (Reference: <u>Refer to TAB C, Section 2.1</u> ). Comments:						
(3) Has the vendor provided the bearing rating (Yes/No/NA)? <u>Yes</u> (Reference: <u>Refer to TAB C. Section 4.1</u> ). Comments:						
(4) Was the lubricant included in the test program (Yes/No/NA)? Yes (Reference: NUC-22 ). Comments: Lubricant is maintenance item only. Refer to TAB C R2 Section 4.2						
(5) Were the seals inclu (Reference: <u>_NUC-9</u> ,	ded in the test program (Yes/No/NA)? <u>Yes</u> ). R2					
Comments: <u>Refer to TAB C. Section 4.3</u>						

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BINDER NO. : WBNEQ-MOT -DE4 MANUFACTURER : LOUIS ALLIS PAGE 1 OF 2 ÷.,

### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBERUNIT_DEVICE_ID_N DESCRIPTION	IQAZMITH_ IQDEL_NUMBER	LCCATION ELEY(1) RM/BAD CONIBACI	CAI QPER_IIME (2)	EVENI	SAEETY_EUNCTION
WBN-1-HTR -030-0194 -A 1-HTR -030-0194 EL 737 PENETRATION ROOM COOLER MOTOR M	-4 1.0. 4-147740	737° A05 84 K5-834550-2	A 100D A 1M0 A 1N0 A 1N0 A 1M0 A 1M0	AF/A CV/A	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS SAFETY RELATED EQUIPMENT IN THE PENETRATION ROOM
WBN-2-MTR -030-0194 -A 2-MTR -030-0194 EL 737 PENETRATION ROOM COOLER MOTOR M		737' A09 84K5-834550-2	A 1MO A 1MO A 1MO	AF/A CV/A	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS SAFETY RELATED EQUIPMENT IN THE PENETRATION ROOM
WBN-1-MTR -030-0195 -B 1-MTR -030-0195 EL 737 PENETRATION ROOM COOLER MOTOR M.	-8 -0. 4-147740	737' A05 84K5-834550-2	A 1MO A 1MO A 1MO	AF/A CV/A	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS SAFETY RELATED EQUIPMENT IN THE PENETRATION ROOM
WBN-2-HTR -030-0195 -8 2-HTR -030-0195 EL 737 PENETRATION ROOM CODLER NOTOR H.		737' A09 84K5-834550-2	A 1HO A 1MO A 1MO	AF/A ( CV/A :	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS SAFETY RELATED EQUIPMENT IN THE PENETRATION ROOM
NBN-1-HTR -030-0196 -A 1-HTR -030-0196 EL 713 PENETRATION ROOM COOLER MOTOR M.	-A .0. 4-147739	713° A06 84K5-834550-2	A 1HO A 1MO A 1NO	AF/A ( Cv/a s	MOTOR IS REQUIRED TO DRIVE COOLER THAT COOLS SAFETY RELATED EQUIPMENT IN THE PENETRATION ROOM

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PRINT DATE: 01/11/89

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> SINDER NO. : WBNEQ-MOT -904 HANUFACTURER : LOUIS ALLIS PAGE 2 OF 2

> > R_2_

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### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

	OCATION
DESCRIPTION NNIL DEVICE ID NOVEL NUMBER AINITH.	ELEV(1) BULEAD CAI OPER_TIME EVENT SAFETY_EUNCIION CONTRACT (2)
WBN-1-MTR -030-0197 -B 1-HTR -030-0197 -B EL 713 PENETRATION ROOM COOLER MOTOR N.O. 4-147739	713' AO6 A 100D L MOTOR IS REQUIRED TO DRIVE 84K5-834550-2 A 1MO AF/A COOLER THAT COOLS A 1MO CV/A SAFETY RELATED EQUIPMENT A 1MO RH/A IN THE PENETRATION ROOM A 1MO AE
WBN-2-MTR -030-0200 -A 2-MTR -030-0200 -A EGTS COOLER FAN MOTOR H.D. 4-147746	757° A16 A 100D L EVENT L:THE EGTS MUST WORK TO E4K5-334550-2 C RH/A PREVENT RELEASE OF RADIOACTIVE C CV/A GASES.THESE MTRS MUST FUNCTION C AF TO PREVENT OVERHEATING EGTS. C AB
WBN-2-MTR -030-0207 -B 2-MTR -030-0207 -B Egts Cooler Fan Mdtor N.D. 4-147746	757° A15 A 100D L EVENT L:THE EGTS MUST WORK TO 84K5-534550-2 C RH/A PREVENT RELEASE OF RADIOACTIVE C CV/A GASES.THESE MTRS MUST FUNCTION C AF TO PREVENT OVERHEATING EGTS. C AE

PREPARER/DATE D F Ackerly

CHECKED/DATE N M Burstein

PAGE P 1 N R2

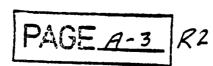
BINDER NO. WBNEQ-MOT-004 PLANT_	WBN UNIT	(S) <u>1</u> SHEET <u>1</u> 0F <u>1</u>
BINDER TITLE LOUIS ALLIS - INDUCTION MOTORS - OUTSIDE	COMPUTED /RZ JDH	R R _ DATE <u>2·2-89</u>
CONTAINMENT	CHECKED/R2 KBN	_ DATE 2/8/89

#### TAB A

### NOTES

1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.

2. See Page B-3 R2 for source of Category and Operating Time Assignments.



BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 1 OF BINDER TITLE LOUIS ALLIS-INDUCTION COMPUTED due by 23/86 MOTORS-OUTSIDE CONTAINMENT CHECKED DATE 8/23/86	_1  -
TAB B TABLE OF CONTENTS	

- TAB B-1 Louis Allis NH5 Insulation System (For service to 1X10⁵ rads total)
- TAB B-2 Louis Allis NH7 Insulation System (For service to 1X10 rads total)
- TAB B-3 Louis Allis NH9 Insulation System (For service to 1X10 rads total)

PAGE 6-1

## LOUIS ALLIS NH5 INSULATION SYSTEM

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INDUCTI	TITLE LOUIS ALLIS - COMPUTED DFA D ON MOTORS - OUTSIDE MENT CHECKED NMB D	3-9-89
A. <u>DOC</u>	UMENTATION (see note)	
Equ	ipment Description <u>Squirrel-Cage Inducti</u>	on Motor
Ven	dor/Manufacturer Louis Allis	
Equ	ipment Model No.(s) <u>3hp, 460 Vac, NH5 ins</u>	ulation system
	<u>M.O. No. 4-147739</u>	
QUAI	LIFICATION REPORTS (see note)	
(1)	Title/Number/Revision <u>Insulation Sys Study</u> Class H - Safety Class 1E-600 Volt AC State (for SVC to 1x10 ⁵ rads); M&M Report 272	_RIMS_ <u>B71_860512_103</u> or _DATE_ <u>January_28, 19</u>
(2)		
	·	_DATE
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)	
(3)	System 30 Category and Operating Times WBNO (B45 870123 426)	0SG4-008 R11
(4)	WBN Environmental Dwg. 47E235-56 R1.	
(5)	TVA Radiation Calculation WBNNAL3-029 R1 (B	26 881031 011).
(6)	Nuclear Qualification Report 4-147739-NQR,	Rev. A (TAB E-1).
(7)	TVA Degraded Voltage Calculation WBP-EVAR 8 (B43 860227 901).	602001 RO
(8)	Material Aging Calculation WAC-081 (TAB D-7	).
NOTE	Documents listed above are used throughout equipment qualification. The revision leve Information Management System (RIMS) number above, need not be repeated in other sector This listing includes only those documents essential to qualification and accordingly considered a complete listing of binder res	vels and Records & ers, as listed ions of the binder. s which are

PAGE B-3	R2
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BINDER TITLE	E LOUIS ALLIS-INDUCTION COMPUTED COLLED DATE 9/15/86
MOTORS - OI	UTSIDE CONTAINMENT CHECKED DATE 9/15/1
	USION OF REVIEW (Check only one block)
<u> </u>	_ Equipment Qualified
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
- <u>19</u>	_ Equipment Qualification Not Established by Documentation
	_ Equipment Not Qualified Based on Test Failures
	TEMS AND QUALIFICATION DEFICIENCIES <u>Refer to open items</u>
	in the front of this binder.
<u>1. Wee</u>	ephole to be drilled in terminal box (Open Item 6)
COMMENT	FC / BECOMENDA STON O
	IS/RECOMMENDATIONS
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· · · · · · · · · · · · · · · · · · ·	

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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 3 OF 30 BINDER TITLE LOUIS ALLIS-INDUCTION COMPUTED Computed DATE \$\frac{2\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma}\\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma}\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma_{\sigma}\sigma_{\sigma_{\sigma}\sigma_{\sigma_{\sigma_{\sigma_{\sigma}\sigma_{\sigma_{\sigma}\sigma_{\sigma_{\sigma}\sigma_\\sigma_\sigma_\sigma_\sigma_\\sigma_\\sigma_\\sigma_\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma_\\sigma\\sigma_\sigm
C. <u>QUALIFICATION CRITERIA</u> Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable): Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974) Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN) JUSTIFICATION/COMMENTS
IEEE 334-1974       Type Test of Continuous Duty Class 1E Motors         NEMA MG1-1982       Motors and Generators         IEEE 117-1974       Evaluation of Insulating Materials for Random-Wound         AC Electric Machinery
PAGEB-5

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	DER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 4 OF DER TITLE LOUIS ALLIS-INDUCTION COMPUTED Occurry DATE 8/28/86 R TORS - OUTSIDE CONTAINMENT CHECKED DATE 8/28/96
D.	<u>QUALIFICATION METHODOLOGY</u> (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	Test of Similar Items with Supporting Analysis
	X Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS <u>Refer to TAB_C, Section 3.0, for additional</u>
	details.
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	PAGE <u>B-lo</u>

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BIND	ER NO	D. <u>WBNEQ-MOT-00</u> 4 PL	ANT <u>WBN</u>	UNIT(S)1	
		ITLE <u>LOUIS ALLIS -</u> N MOTORS - OUTSIDE	COMPUTED DF.		2.2-89
<u>CONT</u>	AINMI	ENT	CHECKED <u>NM</u>	B DATE <u>8/28</u>	186+1944169
Е.	EQUI	IPMENT DESCRIPTION			
-	iden	the equipment identination to the plant of t	ified in the quai equipment which	lification docum requires qualif	entation ication
			<u>Plant Device</u> Induction	Qualification Document	<u>Reference</u> TAB C
	(1)	Equipment Type	Motor	<u>Motorettes</u>	Sect 3.1
	(2)	Manufacturer	Louis Allis	Louis Allis	Qual Rpt 1 <u>Title Pg</u>
	(3)	Model Number(s)	<u>3hp, 460 Vac</u>	<u>NH5 Ins. Sys.</u>	
			<u>NH5 Ins. Sys</u> .		
			<u>M.O. 4-14773</u> 9	<u> </u>	
	(4)	Serial Number(s)	<u>4-147739-001</u>	NA	TAB E-1
			4-147739-002		Rpt <u>4-147739-</u> NQ Rev A, Sect
	(5)	Identify Component Unique checksheet	- <u>Supp 1, Compon</u>	ent Unique Check	:list,
		attached:	Motors.		
	JUST	IFICATION/COMMENTS	The equipment	provided for the	plant
	cons:	<u>ists of complete mo</u>	tor assemblies w	hich included a	random
	wound	l stator with the N	H5 insulation sy	stem. The quali	fication
	repoi	tt documents the mol	torette testing	performed on the	NH5
	insul	lation system in acc	cordance with IE	<u>EE 117-1974. Ap</u>	<u>plicabilit</u> y
	of th	ne data from the qua	alification report	rt is dependent	<u>solely</u>
:	upon_	the use of the NH5	<u>system (L.A. Sys</u>	<u>stem P4-9060) in</u>	the
	stato	er assembly and is i	ndependent of th	<u>ne motor horsepo</u>	wer rating.
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BINDER NO. WBNEQ-MOT-004 PLANT_	WBN UNIT	(S) <u>1</u> SHEET <u>6</u> OF <u>30</u>
	COMPUTED_DFA	R <u>2</u> R DATE <u>8/28/86 JD</u> #
INDUCTION MOTORS - OUTSIDE CONTAINMENT	CHECKED <u>NMB</u>	<b>2-2-89</b> DATE <u>8/28/86</u>

## F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

		Plant	
<u>Interface</u>	Identify Interface	Requirement? (Yes/No)	Reference <u>Test Report</u>
Mounting Bolts	NA	NA	
External Process Connections	NA	NA	
Electrical Connections	NA	NA	
Conduit Seals	NA	NA	R
Connector Seals	NA	NA	
Orientation	NA	NA	
Physical Configuration	NA	NA	
Other			
JUSTIFICATION/CC	MMENTS Refer to TAB	C. Section 6.0.	Interfaces.
	PAGE 8-8	R2	

MOTORS	ITLE LOUIS ALLIS-INDUCTION COMPUTED	h $0$	<u>\$128/96</u>
G. <u>Tes</u>	T_SEQUENCE		······
. (1)	Test Sequence: Was the test sequenc accident environment in accordance w (yes/no/NA)? (note below)	e established ith IEEE-323 ( <u>Yes/No/NA</u>	to simulate the 74), paragraph 6.3 <u>Reference</u>
	(a) Equipment inspected for damage	No	TAB_C, Sect 3.2
	(b) Baseline performance measurements taken	<u>    Yes                                </u>	Note 1, Also TAN <u>Att 1, Sect B.2</u>
	(c) Equipment aged:		Qual. Rpt 1, App pg 1, Subsect C. also TAB C,
	Thermal	Yes	$\frac{\text{Att 1, Sect B.4}}{\text{TAB C,}}$
	Radiation	<u>NA</u>	Att 1, Sect C.2
	Wear	NA	TAB_C, Sect 3.1
	(d) Vibration/seismic testing conducted	Yes	TAB_C, Sect 3.2
	(e) Design basis event (DBE) exposure	NA	TAB C, Sect 3.3
	(f) Post-DBE exposure	<u>NA</u>	TAB C, Sect 3.3
	(g) Final inspection and disassembly	NA	Note_2
(2)	Was the same piece of equipment used described in item (1) above (yes/no/1	throughout the NA)? <u>Yes</u>	e test sequence
(3)	Have the test equipment, test equipme been appropriately documented (yes/no (Reference <u>Note 2</u>	ent accuracies p/NA)? <u>NA</u>	and calibration da
	JUSTIFICATION/COMMENTS <u>Note1 - Ret</u>	fer_to_QualRp	et 1, App I,
	Att 2, LTP-110, pg 1, Method of Test,		

BIND	DER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 8 OF 30 DER TITLE LOUIS ALLIS-INDUCTION COMPUTED ALLIS DATE 8/28/56 R TORS - OUTSIDE CONTAINMENT CHECKED DATE 9/29/66
G.	TEST_SEQUENCE (continued)
	Note 2 - The continued ability of the motorette and the insulation
	system to function is predicated upon its ability to
	withstand dielectric proof tests as shown in TAB C, Att.1,
	Sect B.7. Failure of a dielectric proof test is a con
	clusive failure and does not require accurate and calibrat-
	ed_test_equipment.

PAGE <u>B-10</u>

BINDER NO	
BINDER TIT	
H. <u>AGI</u>	NG
. (1)	Was aging considered in the qualification program (Yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, App I, pg 1,</u> <u>Test Procedure, Sect A).</u>
	JUSTIFICATION/COMMENTS <u>Aging factors were applied to models of</u> the stator insulation following methods outlined in IEEE 117-1974.
(2)	Were the following effects considered in the aging program:
	Aging Effect Yes/No/NA Reference Refer to
	Thermal aging <u>Yes</u> <u>H.4.a</u> Refer to
	Radiation exposure <u>Yes</u> <u>H.5.a</u> Refer to
	Vibration (non-seismic) aging <u>Yes</u> <u>H.6.a</u> Refer to
	Operational (electrical/mechanical/process) Yes H.7.a stress aging
	JUSTIFICATION/COMMENTS <u>Motorette testing consists of subjecting</u>
	models of insulation systems to a series of exposures to heat,
	vibration, moisture, and other environmental parameters to
	simulate the effects of long service, thereby simulating the
	cumulative effect of extended operation. Refer to TAB C,
	Section 3.1.
(3)	Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? <u>NA</u> (Reference
	JUSTIFICATION/COMMENTS <u>A review of the materials used in these motors</u>
	indicates that there are no known synergistic effects.
(4)	Thermal Aging:
	(a) Was thermal aging considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Qual. Rpt 1, App I</u> , PAGE <u>B-/</u> <u>pg 1, Test Procedure, Section C.1).</u>
	JUSTIFICATION/COMMENTS <u>Also refer to TAB C, Att 1, Sect B.4.</u>

MOT	DRS – OUTS	OUIS ALLIS-INDUCTION COMPUTED CLULLY DATE S/25/56 R R R
H.	AGING ((	Continued)
••	(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 1, App I, Att 1).</u>
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Att 1, Sect B.1.</u>
	(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, App 1,</u>
		Att 2, LTP-110, pg 2, Method_of_Test, Sect_3.a).
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Att 1, Sect B.4.</u>
	(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference
		) <u>.</u>
		<u>Parameter Plant Maximum Normal Test Equivalent</u>
		Temperature
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.0.</u>
	(e)	Was the Arrhenius methodology used for accelerated aging? (yes/no/NA)? <u>Yes</u> (Reference
		<u> </u>
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.0.</u>
	(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>NA</u> (Reference
		).
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.0.</u>

INDUCTION MC	LOUIS ALLIS – COMPUTED DFA DATE 8/28/86 JDH TORS – OUTSIDE 2.2.89
UONTAINMENT	CHECKED NMB DATE 8/28/86
H. <u>AGING</u> (C	ontinued)
(g)	If a regression line was used for determining accelera aging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>Yes</u> (Reference:
	JUSTIFICATION/COMMENTS Qualification of motors throug
	the use of motorette tests involves the use of the
	equation of a regression-type implied average life
	characteristic. Refer to TAB C. Sect 3.0.
(h)	(Yes/No/NA)? <u>NA</u> (Reference:
	JUSTIFICATION/COMMENTS <u>Refer to TAB C. Sect 3.1.</u>
(5) Radi	ation Aging Exposure:
. (a)	Was radiation aging exposure considered in the qualifi program (Yes/No/NA)? <u>Yes</u> (Reference:
	JUSTIFICATION/COMMENTS Refer to TAB C. Att 1, Sect C.:
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? Ye (Reference: <u>Qual Rept 1. App 2</u>
	JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 1,
	Section C.2
(c)	Was the basis for radiation aging exposure identified i the qualification program (Yes/No/NA)? <u>NA</u> (Reference:

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		<u>2</u> R
INDUCTION MOT	LOUIS ALLIS – COMPUTED DFA DATE 8/28/86 ORS – OUTSIDE 2 CHECKED NMB DATE 8/28/86	-2-89
H. <u>AGING</u> (Co	ontinued)	· · · · · · · · · · · · · · · · · · ·
(d)	Is the radiation test exposure dose and dose rat acceptable (Yes/No/NA)? <u>NA</u> (Reference:	:e
	Plant normal ambient radiation dose (rd) $-9.3 \times 10^3$	)•
	Test exposure dose (rd)	
	Test exposure dose rate (rd/hr)	
	Test exposure source type (e.g., Co-60 gamma)	
	JUSTIFICATION/COMMENTS Refer to TAB C, Att 1, S	ect C.2
(6) Vibr	cation (non-seismic) Aging:	
(a)	Were the effects of non-seismic vibration induce normal and abnormal operation addressed in the qualification program ¹ Yes (Reference: _	d during  R:
	JUSTIFICATION/COMMENTS Refer to TAB c, Att 1, Se	<u>ect B.5</u>
(b)	Was the basis for vibration aging identified and in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qual Rpt 1, App 1, Att 2, LTP-110, p</u>	
	Method of Test, Sect 3.b	).
·	JUSTIFICATION/COMMENTS Mechanical stress testing	<u>د</u>
	performed in accordance with Sect 2.2.3 of IEEE 1	<u>17–197</u> 4
	to simulate forces on the winding that occur in a	<u>in</u>
	actual motor.	
¹ Qualificat mental doc	tion program refers to the test report and any sup cumentation including TVA analyses in TAB C of the	ple- R2 Binder.

PAGE	<u>B-14</u>	RZ

	LE LOUIS ALLIS-INDUCTION COMPUTED ALLIS DATE 8/28/86 R R OUTSIDE CONTAINMENT CHECKED DATE 8/28/86
H. AGIN	NG (Continued)
	Operational Stress Aging:
	(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operatio addressed in the qualification program (yes/no/NA)? Yes (Reference
	).
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.1</u>
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference
	).
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.1</u>
(8)	Was the subject of th
(	Was the qualified life of the equipment and its basis defined in the qualification program (yes/no/NA)? Yes (Reference
(	was the qualified life of the equipment and its basis defined in the qualification program (yes/no/NA)? Yes(Reference).
	qualification program (yes/no/NA)? Yes         (Reference).
	qualification program (yes/no/NA)? Yes
	qualification program (yes/no/NA)? Yes         (Reference).
	qualification program (yes/no/NA)? Yes

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	NO. <u>WBNEQ-MOT-00</u> 4 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>14</u> OF R <u>2</u> R_
	TITLE LOUIS ALLIS - COMPUTED DFA DATE 8/28/86 JDH DN MOTORS - OUTSIDE Z-2189
CONTAIN	
H. AGIN	IG (Continued)
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference:
	、
	······································
	JUSTIFICATION/COMMENTS No replacement items were identified
	in the insulation system qualification program described in
	M&M Rpt 272. The bearings and lubricants are routine
	maintenance items, the replacement of which are addressed in
	individual Qualification Maintenance Data Sheets in this binder
	Basically, lubrication schedules, bearing replacement
	intervals and electrical and mechanical surveillance
•	
	recommendations, particularly regarding the neoprene slingers
	and gaskets, are detailed.

PAGE B-16 RZ

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BINDE	R TIT	LE	LOUIS A	LLIS-I	NDUCTIO	<u>N</u> COMP	UTED <u>Ack</u>	erly	_DATE	9/2/86	
MOTOR	<u>S - 0</u>	JTSI	DE CONT	AINMEN	T	СНЕС	KED <u>NMB</u>	<u></u>	_DATE	9/2/86	5 <b>et</b> 1/21/19
I. <u>MA</u>	TERIA	LS A	NALYSIS			<u>/</u> -					
Ra	diati	on, I	ion of Degrada nalysis	tion a	als Sus nd Agin	ceptible g. (See S	to Signifi ection C c	icant of EQ	: Therm C Bind	al and ler for	/or Detailed
			•		unction	Radia <u>Thresho</u>	tion <u>ld Refere</u>	ences		Actival ergy	tion <u>Referen</u> TAB D-7,
• (a	) <u>Ty</u>	<u>pe NI</u>	<u>15 insu</u>	lation	system	<u>1 x 10⁵</u>	Note_1		1.24	<u>Ca</u>	WAC-081, alc No 1
(b	) ( <u>CI</u>	nevro	y Lubri on SRI-	2 Grea		<u>2 x 10⁸</u>	<u>Note 2</u>	<u> </u>	<u>Note</u>	4	
(c			ne/Mech & gas		/	<u>2 x 10⁶</u>	<u>Note 3</u>	}	Note	4	
(d	)										
(e	)						<u> </u>				·····
	<u> </u>			ENTS							
JU	STIFIC				nold is	actual ra	ting of s	vstei		fer to	 TAB_C
JU	STIFIC	Rac	iation	thresi	nold is	actual ra	ating of s	ystei	m. Ret	fer to	TAB C,
JU	STIFIC	Rac		thresi	nold is	actual ra	ating of s	ystei	m. Re1	fer to	 Тав с,
JU! <u>No:</u>	STIFIC	Rac Att	<u>iation</u> . 1, Se	thresh							
JU! <u>No:</u>	STIFIC	Rac Att Ref	iation . 1, Se er to [	thresh ec. C. Digital	Materi	al Aging	and Radia	tion	Effect		
JU! <u>No:</u>	STIFIC	Rac Att Ref	iation . 1, Se er to [	thresh ec. C. Digital	Materi	al Aging		tion	Effect		
JU! <u>No</u>	STIFIC te 1: te 2:	Rac Att Ref	iation . 1, Se er to E rary Co	thresh ec. C. Digital ode No.	<u>Materi</u> 157-83	al Aging A, and TA	and Radia B C, Sect	tion 4	Effect	ts Libr	ary,
JU!	STIFIC	Rac Att Ref Lib	iation . 1, Se er to [ rary Cc er to [	thresh ec. C. Digital ode No.	<u>Materi</u> 157-83 Materi	al Aging A, and TA al Aging	and Radia B C, Sect and Radia	tion ion 4	Effect 4.2 Effect	ts Libr	ary,
JU! <u>No</u> <u>Not</u>	STIFIC te 1: te 2:	Rac Att Ref Lib Ref	<u>er to E</u> er to E er to E	thresh ec. C. Digital ode No.	<u>Materi</u> 157-83 <u>Materi</u> 202-83	<u>al Aging</u> <u>A, and TA</u> <u>al Aging</u> , Radiati	and Radia B C, Sect and Radia on Library	tion ion 4 tion y Coc	Effect 4.2 Effect	ts Libr	ary, ary,
JU! <u>No</u> <u>Not</u>	STIFIC te 1: te 2:	Rac Att Ref Lib Ref Lib Con	iation . 1, Se er to E rary Co rary Co siderat	thresh ec. C. Digital ode No. Digital	Materi 157-83 Materi 202-83 long-t	al Aging A, and TA al Aging , Radiati erm therm	and Radia B C, Sect and Radia on Library al degrada	tion ion 4 tion y Coc	Effect 4.2 Effect le 094-	ts Libra s Libra 83. t requi	ary, ary, ired
JU! <u>No</u> <u>Not</u>	STIFIC te 1: te 2:	Rac Att Ref Lib Ref Lib Con bec	iation . 1, Se er to E rary Co rary Co siderat	thresh ec. C. Digital ode No. Digital ode No. tion of	Materi 157-83 Materi 202-83 long-t t and s	al Aging A, and TA al Aging , Radiati erm therm lingers a	and Radia B C, Sect and Radia on Library al degrada	tion ion 4 tion y Coo ation	Effect 4.2 Effect de 094- d is no ered to	ts Libr s Libr 83. t requi	ary, ary, ired ostances
JU! <u>No</u> <u>Not</u>	STIFIC te 1: te 2:	Rac Att Ref Lib Con bec and	iation . 1, So er to E rary Co siderat ause lu device	thresh ec. C. Digital ode No. Digital ode No. tion of obrican	Materi 157-83 Materi 202-83 long-t t and s infini	<u>al Aging</u> <u>A, and TA</u> <u>al Aging</u> <u>, Radiati</u> <u>erm therm</u> <u>lingers a</u> <u>te lives.</u>	and Radia B C, Sect and Radia on Library al degrada	tion ion 4 tion y Coc ation nside	Effect 4.2 Effect 1 is no red to ce and	ts Libra s Libra 83. t requi be sub mainte	ary, ary, ired ostances enance

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PAGE B-TT RI

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R1

BINDE	R NO.	WBNEQ-MOT-004       PLANTWBNUNIT(S)       1       SHEET       16       OF         LE       LOU IS ALLIS-INDUCTION       COMPUTED       Outside containment       R       R       R         OUTSIDE CONTAINMENT       CHECKED       Date       8/28/86
	)RS -	OUISIDE CONTAINMENT CHECKED DATE 8/28/8
J.	EQU: SPE	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure not met (yes/no/NA)? <u>Yes</u> (Reference <u>Qual Rpt 1, App 1, Att 2,</u>
		LTP-110, pg 2, Method of Test, Sect 3.d).
		Identify Acceptance Criteria: <u>Failure to withstand 10 minute applied</u>
		potential tets at the folowing levels: turn to turn - 120 Vac; coil
		to coil - 600 Vac; coil to ground - 600 Vac.
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Qual Rpt 1, App 1,
		Att 2, LTP-110, pg 1, Method of Test, Sect 2).
		Identify baseline and functional testing: Functional tests listed in
		section J.1 above. Each motorette was subjected to the following
		baseline tests: turn to turn - 400 Vac; coil to coil - 2000 Vac;
		<u>coil to ground - 2000 Vac.</u>
		JUSTIFICATION/COMMENTS <u>Also refer to TAB C, Att 1, Sects B.2. &amp; B.7</u>
		Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>NA</u> (Reference
		).
<b>`</b> .		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.3.</u>
		PAGE <u>B - 18</u>

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EQP139.26

			<u>EQ-MOT-00</u> 4 PLANT <u>WBN</u>		S) <u>1</u>	R_2_R_	
INDU	JCTION	MOTO	<u>RS – OUTSIDE</u>	D_DFA		2-2-89	
CON:	<u>CA INME</u>	<u></u>	CHECKED	NMB	DATE <u>872</u> °	8/86 KB2 212 HA	
J.	PERF		ELECTRICAL CHARACTERISTI CE SPECIFICATIONS CAN BE				<u>[10N</u>
à	(4)		ne applied loads during b ating conditions (Yes/No/)	aseline te: NA)? <u>Yes</u>	sting ref (Refere	lect normal nce:	-
			IFICATION/COMMENTS Volta				_). -
	•		ng baseline testing descr	•			
		<u>abov</u>	the maximum service vol	tage for mo	otors rat	ed 460 Vac.	•
	(5)	Iden equi	ify electrical character ment performance specific	lstics nece cations car	essary to 1 be sati:	ensure the sfied.	
·		(a)	Parameter Plant Normal	Condition	<u>15</u>	Reference	. ,
			Voltage <u>NA</u>	-,		· · · · · · · · · · · · · · · · · · ·	
			Load <u>NA</u>				
			Frequency <u>NA</u>			·	
			Accuracy <u>NA</u>		<u> </u>		
			Other(s)				
			JUSTIFICATION/COMMENTS R	efer to TA	B C. Sect	: 5.0 for	
			discussion of Voltage and				
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•							
					•		
					<u> </u>		
			Г <u></u>	······	]		
				B-19	R7		

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	N MOTORS - OUT	LIS – COMPUTED DFA DATE 8/ SIDE CHECKED NMB DATE 8/	2-2-89
PER		CAL CHARACTERISTICS NECESSARY TO EN FICATIONS CAN BE SATISFIED UNDER AC	
	Parameter	Specific Accident Conditions	
	Voltage	NA	
	Load	NA	
	Frequency	NA	
	Accuracy		
	Other(s)		
	<u></u>		
	JUSTIFICATION	V/COMMENTS Refer to TAB C, Sect 5.	0 for
		V/COMMENTS <u>Refer to TAB C, Sect 5.</u>	
	discussion of	voltage and frequency requirement	S
(c)	discussion of		
(c)	discussion of Parameter Voltage	voltage and frequency requirement Demonstrated ConditionsNA	S
(c)	discussion of Parameter Voltage Load		S
(c)	discussion of Parameter Voltage Load Frequency	<pre> E voltage and frequency requirement</pre>	S
(c)	discussion of Parameter Voltage Load Frequency Accuracy		S
(c)	discussion of Parameter Voltage Load Frequency	<pre> E voltage and frequency requirement</pre>	S
(c)	discussion of Parameter Voltage Load Frequency Accuracy	<pre> E voltage and frequency requirement</pre>	S
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s)	<pre> E voltage and frequency requirement</pre>	s
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION	<pre> E voltage and frequency requirement</pre>	S. Reference

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INDUCTION	TLE_LOUIS ALLIS -       COMPUTED_DFA       DATE 9/15/86       TDH         MOTORS - OUTSIDE       CHECKED_NMB       DATE 9/15/86       TDH         INT       CHECKED_NMB       DATE 9/15/86       THE
K. <u>REQU</u>	IRED OPERATING ENVIRONMENT
Refe	rence Environmental Drawing No. <u>47E235-56</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM-</u> (b) Pressure (psig) <u>ATM-</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $9_{3\times 10}^{3}$ (d) Radiation (rd)
(3)	Process Interfaces: <u>None</u>
(4)	State anticipated occurrence frequency and duration of abnormal conditions: <u>8 hours per excursion and will occur less than</u> <u>1% of the plant life.</u>
(5)	Accident (worst case for any combination of specified accident parameters including peak, duration, and profile): (1)196/15 min
	decaying to 110 in 24 hrs continuing for 30 days
	(a) Temp (°F) ** <u>days</u> Accident type <u>LOCA</u>
	<ul> <li>(a) Temp ("F) ** days Accident type LOCA</li> <li>(b) Pressure (psig) ATM Accident type HELB</li> </ul>
	(b) Pressure (psig) <u>ATM</u> Accident type <u>HELB</u>
	(b) Pressure (psig)ATMAccident type         (c) Humidity (%)Accident type         (d) Function of the second seco
	(b) Pressure (psig)ATMAccident typeHELB(c) Humidity (%)100Accident typeHELB(d) Radiation (rd) $1.1 \times 10^{4} \star$ Accident typeLOCA
•	(b)Pressure (psig)ATMAccident typeHELB(c)Humidity (%)100Accident typeHELB(d)Radiation (rd) $1.1 \times 10^{4*}$ Accident typeLOCA(e)Spray TypeNAAccident typeLOCA*Radiation site specific dose per TVA Calculation

INDUCTION CONTAINME	I MOTORS - OUTSIDE CHECKED_	<u>3-9-89</u> _ <u>NMB</u> DATE <u>8/28/86 KBN</u> 3/1/89
к. <u>requ</u>	IRED OPERATING ENVIRONMENT (Co	ntinued)
	Comments (duration/peak/profil margin, etc.): <u>Motors are loc</u>	
	are not subject to chemical sp	ray
(6)		<pre>isture or liquid intrusion whit the equipment under design bas )? <u>Yes</u> (Reference:</pre>
	WBN Environmental Drawing 47E2	35-56,
**	also refer to TAB C. Sect 7.0	
(7)	Subject to submergence (Yes/No.	/NA)? <u>No</u> (Reference:
	TAB C. Sect 7.0 and WBN Enviro	onmental Dwg. 47E235-56
	Identify initiation time and du	uration of submergence:
(8)	Is the equipment subject to a t the total accident dose (Yes/No (Reference: <u>Section P - Note</u>	D/NA)? <u>NA</u>
	If yes, identify the fraction of beta dose to be added to the to	of the unattenuated free field
(9)	Special environmental calculati	.ons (temp., rad., etc.)
	Type	RIMS No.
	WBNNAL3-029	<u>See TAB B-1 Sect A</u>
		•

L. SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS. (1) Comparison of worst-case maximum parameters:          Parameter       Specified       Demonstrated       Reference         Operating Time       Note1	BINDER TI MOTORS	IO. <u>WBNEQ-MOT-004</u> PLANT_ ITLE LOUIS ALLIS-INDUCTI - OUTSIDE CONTAINMENT		The	SHEETOF RR 8/28/86
Parameter       Specified       Demonstrated       Reference         Operating Time       Note 1	L. <u>SUN</u>	MARY COMPARISON OF TEST	CONDITIONS T	0 SPECIFIED COND	ITIONS_
Operating Time       Note 1	(1)	Comparison of worst-ca	ise maximum pa	arameters:	
Temperature (°F)       Note 1         Pressure (psig)       ATM       Att 1. Sect 3.5         Relative Humidity (X)       100       Att 1. Sect 3.6         *Chemical Spray       NA       TAB C, Sect 3.4         **Radiation (rd)       2.03x10 ⁴ Att 1. Sect C.2         Submergence       NA       TAB C, Sect 7.0         *Includes spray concentration, flowrate, density, duration, and pH.         **Enter 40-year integrated normal dose plus integrated accident dose and specify type.         (2)       Comparison of worst-case profiles and margin assessment:         Temperature       Yes         Att 1. Sect C.1         Pressure       Yes         Att 1. Sect 3.5         TAB C, Sect 3.4		Parameter	Specified	Demonstrated	Reference
Pressure (psig)       ATM       Att 1. Sect 3.5         Relative Humidity (%)       100       Att 1. Sect B.6         *Chemical Spray       NA       TAB C, Sect 3.4         **Radiation (rd)       2.03x10 ⁴ Att 1. Sect C.2         Submergence       NA       TAB C, Sect 7.0         *Includes spray concentration, flowrate, density, duration, and pH.         **Enter 40-year integrated normal dose plus integrated accident dose and specify type.         (2)       Comparison of worst-case profiles and margin assessment:         Temperature       Yes         Att 1. Sect 0.1         Pressure       Yes         Att 1. Sect 0.1         Pressure       Yes         Att 1. Sect 0.1         Pressure       Yes         Att 1. Sect 0.1         Submergence       NA         TAB C, Sect 3.5         TAB C,         Reference         Yes         Att 1. Sect 0.1         Pressure       Yes         Att 1. Sect 3.5         TAB C, Sect 3.4         Submergence       NA         TAB C, Sect 3.4         Submergence       NA         TAB C, Sect 7.0         JUSTIFICATION/COMMENTS		Operating Time	Note 1		
TAB C,         TAB C,         Attl Sect 3.4         TAB C, Sect 7.0         *Includes spray concentration, flowrate, density, duration, and pH.         **Enter 40-year integrated normal dose plus integrated accident dose and specify type.         (2) Comparison of worst-case profiles and margin as sessment:         Test Profile         Envelopes Specified         (Yes         TAB C, Sect 3.5         TAB C, Sect 3.5         TAB C, Sect 3.5         TAB C, Sect 3.5         TAB C, Sect 3.4         "Total c,         Pressure         Yes         TAB C, Sect 3.5         TAB C, Sect 3.5         TAB C, Sect 3.4         Submergence         Yes         TAB C, Sect 3.4         Submergence         NA         TAB C, Sect 3.4         Submergence<		Temperature ( [°] F)	Note_1		
Relative Humidity (%)       100       Att 1 Sect B.6         *Chemical Spray       NA       TAB C, Sect 3.4 TAB C,         **Radiation (rd)       2.03x10 ⁴ Att 1. Sect C.2         Submergence       NA       TAB C, Sect 7.0         *Includes spray concentration, flowrate, density, duration, and pH.         **Enter 40-year integrated normal dose plus integrated accident dose and specify type.         (2)       Comparison of worst-case profiles and margin as sessment:         Temperature       Yes         Temperature       Yes         Pressure       Yes         Relative Humidity       Yes         Att 1. Sect 3.4         Submergence       NA         Tab C, Sect 3.5         Tab C,         Submergence       Yes         Tab C,       Sect 3.4         Yes       Att 1. Sect C.1         Pressure       Yes         TAB C, Sect 3.5       TAB C,         Relative Humidity       Yes         Att 1. Sect 7.0       JUSTIFICATION/COMMENTS         Note 1: Worst case temperature is the result       Of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		Pressure (psig)	ATM		
**Radiation (rd)       2.03x10 ⁴ Att 1. Sect C.2         Submergence       NA       TAB C, Sect 7.0         *Includes spray concentration, flowrate, density, duration, and pH.         **Enter 40-year integrated normal dose plus integrated accident dose and specify type.         (2)       Comparison of worst-case profiles and margin assessment:         Test Profile         Parameter       Test Profile         Envelopes Specified        Yes       Att 1. Sect C.1         Pressure       Yes         Att 1. Sect 3.5         Relative Humidity       Yes         Submergence       NA         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		Relative Humidity (%)	100	•	6
**Radiation (rd) 2.03x10 ⁴ Att 1. Sect C.2 Submergence		*Chemical Spray	<u>NA</u>		
<ul> <li>*Includes spray concentration, flowrate, density, duration, and pH.</li> <li>**Enter 40-year integrated normal dose plus integrated accident dose and specify type.</li> <li>(2) Comparison of worst-case profiles and margin assessment:         <ul> <li>Test Profile</li> <li>Envelopes Specified</li> <li>(Yes/No/NA)</li> <li>Reference</li> <li>TAB C,</li> <li>Relative Humidity</li> <li>Yes</li> <li>Att 1. Sect 3.5</li> <li>Relative Humidity</li> <li>Yes</li> <li>Att 1. Sect 3.4</li> <li>Submergence</li> <li>NA</li> <li>TAB C, Sect 3.4</li> <li>Submergence</li> <li>NA</li> <li>TAB C, Sect 7.0</li> <li>JUSTIFICATION/COMMENTS Note 1: Worst case temperature is the result of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F</li> </ul> </li> </ul>		**Radiation (rd)	2.03×10 ⁴	•	<u>.2</u>
<ul> <li>**Enter 40-year integrated normal dose plus integrated accident dose and specify type.</li> <li>(2) Comparison of worst-case profiles and margin assessment:         <ul> <li>Test Profile</li> <li>Envelopes Specified</li> <li>(Yes/No/NA)</li> <li>TAB C,</li> <li>Temperature</li> <li>Yes</li> <li>Att 1. Sect C.1</li> </ul> </li> <li>Pressure</li> <li>Yes</li> <li>Att 1. Sect 3.5</li> <li>TAB C,</li> <li>Relative Humidity</li> <li>Yes</li> <li>Att 1. Sect 3.4</li> <li>Submergence</li> <li>NA</li> <li>TAB C, Sect 3.4</li> <li>Submergence</li> <li>NA</li> <li>TAB C, Sect 7.0</li> <li>JUSTIFICATION/COMMENTS Note 1: Worst case temperature is the result of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F</li> </ul>		Submergence	<u>NA</u>	TAB C, Sect 7	.0
and specify type.         (2) Comparison of worst-case profiles and margin assessment:         Test Profile         Parameter       Test Profile         Envelopes Specified		*Includes spray concent	ration, flowr	ate, density, du	ration, and pH.
Parameter       Test Profile         Parameter       Test Profile         Envelopes Specified       Reference         Tab C,       Att 1. Sect C.1         Pressure       Yes       Att 1. Sect 3.5         Relative Humidity       Yes       Att 1. Sect B.6         Chemical Spray       NA       TAB C. Sect 3.4         Submergence       NA       TAB C. Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F					
Parameter       Envelopes Specified (Yes/No/NA)       Reference         Tab C,       TAB C,       TAB C,         Temperature       Yes       Att 1, Sect C.1         Pressure       Yes       TAB C, Sect 3.5         Relative Humidity       Yes       Att 1, Sect B.6         Chemical Spray       NA       TAB C, Sect 3.4         Submergence       NA       TAB C, Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		<pre>**Enter 40-year integrat    and specify type.</pre>	ed normal dos	æ plus integrate	d accident dose
Temperature       Yes       Att 1, Sect C.1         Pressure       Yes       TAB C, Sect 3.5         Relative Humidity       Yes       Att 1, Sect B.6         Chemical Spray       NA       TAB C, Sect 3.4         Submergence       NA       TAB C, Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		and specify type.			
Relative Humidity       Yes       Att 1. Sect B.6         Chemical Spray       NA       TAB C. Sect 3.4         Submergence       NA       TAB C. Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		and specify type. Comparison of worst-ca	se profiles a Tes Envelo	nd margin assess t Profile opes Specified	ment: <u>Reference</u>
Relative Humidity       Yes       Att 1. Sect B.6         Chemical Spray       NA       TAB C. Sect 3.4         Submergence       NA       TAB C. Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F         (42.280)       Att 1. Sect B.6		and specify type. Comparison of worst-cas <u>Parameter</u>	se profiles a Tes Envelo	nd margin assess t Profile opes Specified es/No/NA)	ment: <u>Reference</u> TAB C,
Submergence       NA       TAB C, Sect 7.0         JUSTIFICATION/COMMENTS       Note 1: Worst case temperature is the result         of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F         (42.282)       i. 2(c)		and specify type. Comparison of worst-cas <u>Parameter</u> Temperature	se profiles a Tes Envelo	and margin assess t Profile opes Specified es/No/NA) Yes	ment: <u>Reference</u> TAB C, <u>Att 1. Sect C.1</u> <u>TAB C. Sect 3.5</u>
JUSTIFICATION/COMMENTS <u>Note 1: Worst case temperature is the result</u> of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		and specify type. Comparison of worst-ca: <u>Parameter</u> Temperature Pressure	se profiles a Tes Envelo	nd margin assess t Profile opes Specified <u>s/No/NA)</u> Yes Yes	ment: <u>Reference</u> TAB C, <u>Att 1. Sect C.1</u> <u>TAB C. Sect 3.5</u> TAB C,
of a HELB and is 196°F (91°C) for 15 minutes, decaying to 110°F		and specify type. Comparison of worst-cas <u>Parameter</u> Temperature Pressure Relative Humidity	se profiles a Tes Envelo	and margin assess t Profile opes Specified <u>ss/No/NA)</u> <u>Yes</u> <u>Yes</u>	Reference         TAB C,         Att 1, Sect C.1         TAB C, Sect 3.5         TAB C,         Att 1, Sect B.6
		and specify type. Comparison of worst-cas <u>Parameter</u> Temperature Pressure Relative Humidity Chemical Spray	se profiles a Tes Envelo	nd margin assess t Profile opes Specified <u>s/No/NA)</u> <u>Yes</u> <u>Yes</u> <u>Yes</u> NA	ment:ReferenceTAB C, Att 1.TAB C, Sect 3.5TAB C, Att 1.TAB C, Sect 3.4
(43.3°C) in 24 hrs. and continuing for 30 days. PAGE		and specify type. Comparison of worst-cas <u>Parameter</u> Temperature Pressure Relative Humidity Chemical Spray Submergence	se profiles a Tes Envelo 	nd margin assess t Profile opes Specified <u>s/No/NA)</u> <u>Yes</u> <u>Yes</u> <u>NA</u> <u>NA</u>	ReferenceTAB C,Att 1. Sect C.1TAB C, Sect 3.5TAB C,Att 1. Sect B.6TAB C, Sect 3.4TAB C, Sect 7.0
		and specify type. Comparison of worst-cas <u>Parameter</u> Temperature Pressure Relative Humidity Chemical Spray Submergence JUSTIFICATION/COMMENTS	se profiles a Tes Envelo (Ye  	Ind margin assess t Profile opes Specified (S/NO/NA) Yes Yes Yes NA NA NA St_case_temperatu	Reference         TAB C,         Att 1, Sect C.1         TAB C, Sect 3.5         TAB C,         Att 1, Sect B.6         TAB C, Sect 3.4         TAB C, Sect 7.0         ure is the result

 $\{i\}_{i \in \mathcal{I}}$ 

is 110°F for a duration of 100 days. See TAB C, Att 1, Sect C.1.

BINDER TI	O. WBNEQ-MOT-004 PLANT WBN UNIT(S) TLE LOUIS ALLIS-INDUCTION COMPUTED		SHEET22_OF3 RR 28/86
L. <u>SUM</u>	MARY COMPARISON OF TEST CONDITIONS TO SPECI	FIED_CONDITI	ONS (Continued)
(3)	Were margins applied to the test paramete the test program to assure that normal va accounted for? (Note margin applied, yes/	riation and	ise addressed in uncertainties are
	Suggested Margins per IEEE-323(74)	Margin Applied	Yes/No/NA ·
	Temperature: +15 degrees F	<u>Note 1</u>	Yes
	Pressure: +10% but no more than 10 psig		<u>NA (2)</u>
	Radiation: +10% of accident dose	<del></del>	<u>Yes(6)</u>
•.	Time: +10% (or 1 hour + operating time per NUREG-0588)	<u>Note1</u>	Yes
	Voltage: <u>+</u> 10% of rated value		<u>NA (3)</u>
	Frequency: <u>+</u> 5% of rated value		<u>NA (3)</u>
	Environmental Transient: the initial transient and the peak temperature applied twice		NA_(4)
	Vibration: +10% added to acceleration		<u>NA (5)</u>
	JUSTIFICATION/COMMENTS:		
	Note 1 Per TAB C, Att 1, Sect C.1, a wors is 15,079.61 years with a max. how The required operating time is 40. margin exists in the relationship temperature criteria.	t spot temp of 27 years. A	of_88.33°C. Significant
	(2) Refer to TAB C, Sect 3.5.		
	(3) Refer to TAB C, Sect 5.0.		
	(4) Refer to TAB C, Sect 3.3.		
	(5) These motors do not experience signif	icant_proces	s-related_
	vibration and as such, a vibration ma	irgin above t	<u>he levels</u>
	addressed in TAB C, Att 1, Sect B.5 i		
	(6) Refer to TAB C, Att 1, Sect C.2.		PAGE B-2

	RABILITY_TEST_RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference
	JUSTIFICATION/COMMENTS <u>Motors utilizing the stator insulation</u>
	system tested, must be capable of starting and maintaining operation. Refer to TAB A.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	).
	JUSTIFICATION/COMMENTSRefer to TAB C, Sect 3.3.
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	). JUSTIFICATION/COMMENTS <u>Refer to TAB C, Sect 3.3.</u>
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>NA</u> (Reference
	).
	JUSTIFICATION/COMMENTS <u>TAB C, Att 1, Sect D.</u>

	ER TIT	LE LOUIS A OUTSIDE CO	LLIS-INDUCT	<u>ION</u> СОМР		Ly DATE S	28/84  28/86	01 R 	
М.	OPER	ABILITY TES	T_RESULTS (	Continued)					
	(5)	Abnormal C addressed (Reference	onditions: and resolved	l (yes/no/l	rmal condit: NA)? <u>NA</u>		omalies p	roperly	
								).	
		JUSTIFICAT	ION/COMMENTS	<u>No anor</u>	nalies_were	noted thr	oughout t	he	
		<u>motorette</u>	testing.						
				PAGE					

BINDER NO PLANT	WBN	UNIT(S)	1	SHEET	²⁵ OF <u>30</u>
BINDER TITLE LOUIS ALLIS-INDUCTION	COMPU	TED acherl	🛶 DATE	8/28/86 R	R
MOTORS - OUTSIDE CONTAINMENT	_ СНЕСК	ED	) _ DATE	8/28/86	

13.44

## N. MAINTENANCE AND SURVEILLANCE

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes____ (Enter all requirements in Section G of the Binder - Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS <u>No replaceable items were identified in the</u> <u>insulation system qualification program described in M&M Report 272</u> <u>relative the insulation system. The bearings and lubricants are</u> <u>routine maintenance items, the replacement of which are addressed in</u> <u>individual Qualification Maintenance Data Sheets in this binder.</u> <u>Basically, lubrication schedules, bearing replacement intervals and</u> <u>electrical and mechanical surveillance recommendations, particularly</u> <u>regarding the neoprene slingers and gaskets, are detailed in the QMDS</u> <u>located in TAB G.</u>

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BINDER NO	SHEETOF RR 2/28/86
0. <u>SUMMARY OF REVIEW</u>	Yes/No/NA
(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	Yes
(3) Choice of qualification methodology adequately justified?	Yes
(4) If analysis was performed, complete the following:	
(a) Were equipment performance requirements identified?	Yes
(b) Were specific features and failure modes and effects analyzed?	Yes
(c) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
(d) Were environmental parameters which affect equipment performance identified?	<u>Yes</u>
(5) Adequate similarity between equipment and test specimen established?	<u>Yes</u>
(6) Aging degradation evaluated adequately?	Yes
(a) Mechanical and/or cycle aging addressed?	Yes
(b) Equipment aged to end of life condition prior to application of DBE conditions?	<u>Yes</u>
(c) Absence of preaging in test/analysis justified?	<u>NA</u>
(d) Materials susceptible to thermal/radiation aging identified?	<u>Yes</u>

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INDER NO	WBNEQ-MOT-004PLANT WBN UNIT(S) 1	SHEET OF
INDER TIT	LE LOUIS ALLIS-INDUCTION COMPUTED Charles DATE \$28	<u> </u>
MOTORS	- OUTSIDE CONTAINMENT CHECKED DATE \$29	<u> </u>
0. <u>Sum</u>	MARY OF REVIEW (Continued)	Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7)	Qualified life or replacement schedule established?	Yes
( 8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	_Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	<u>NA</u>
(9)	Criteria regarding test sequence satisfied?	<u>Yes</u>
(10)	Criteria regarding spray satisfied?	<u>NA</u>
	(a) Was the spray testing done while under the extremes of pressure and temperature?	NA
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>NA</u>
(11)	Criteria regarding submergence satisfied?	Yes
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	NA
	(b) Was beta radiation considered?	Section P - <u>Note 1</u>
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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BINDER N	DWBNEQ-MOT-004 PLANTWBN UNIT(S)1		3
BINDER TI	TLE LOUIS ALLIS-INDUCTION COMPUTED Cherly DATE \$	R R	
MOTORS	- OUTSIDE CONTAINMENT CHECKED DATE	128/86	
		, 	
0. <u>Sum</u>	MARY OF REVIEW (Continued)	Yes/No/NA	
(15)	Criteria regarding functional testing satisfied?	_Yes	
	(a) Does the test plan/report specify an acceptance criteria for equipment performed?	<u>Yes</u>	
	(b) Was an initial base line test done to establish required performance characteristics?	<u>Yes</u>	
	(c) Has the test/analysis demonstrated that performanc performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	e <u>Yes</u>	
(16)	Criteria regarding instrument accuracy satisfied?	<u>NA</u>	
(17)	Test duration margin (1 hour + function time) satisfied?	Yes	
	(a) Is the minimum specified operating time at least l hour?	Yes	
	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	NA	
(18)	Criteria regarding synergistic effects satisfied?	<u>NA</u>	
(19)	Criteria regarding margins satisfied?	Yes	
(20)	Maintenance and surveillance requirements adequately identified?	Yes	
P. <u>DIS</u>	USSION		
NOTI	. Motors are located in areas throughout the Auxiliary	<u>z Building.</u>	
	Beta-radiation is confined to the Reactor Bldg. by p	· · · · · · · · · · · · · · · · · · ·	
	design; therefore, these motors are not required to		
	evaluated for the effects of beta radiation.		
		nan an an an an an an an an an	

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BINDER TITLE LOUIS ALLIS-INI MOTORS - OUTSIDE CONTAINMEN	COI		date 9/2	\$/\$6 'slal.
	Сп		<u> </u>	
	<u> </u>	· · · · · · · · · · · · · · · · · · ·	· · · · · ·	
	COMPONENT-UN	LEMENT 1 NIQUE CHEC DTORS		e 1 of 2
EQUIPMENT IDENTIFICATION				
(1) Is the motor identified plant motors which rec	ed in the qua quire qualifi	lificatio ication (y	n report identi es/no/NA)? <u>No_</u>	cal to the
Item	<u>Plant</u>	<u>Report</u>	Acceptable (Yes/No/NA)	Report <u>Section</u>
(a) Insulation system materials	<u></u>	<u>_NH5</u> P4-9060)	Yes	refer to (2) <u>supplement</u>
(b) Coil construction (form or random wound, cast)			¥	Qual Rpt 1,
	<u>Random</u>	<u>Random</u>	<u>Yes</u>	<u>App 1, Intro</u>
(c) Insulation class (B, F, H)	<u> </u>	<u>     H         </u>	Yes	Qual Rt 1, pg 1, Scope
(d) Lubricant				
Manufacturer	Chevron	<u>NA</u>	Yes	<u>refer to</u> TAB C,
Туре	<u>SRI-2</u>	<u>NA</u>	<u>    Yes</u>	Sect 4.2
(e) Bearing				
Manufacturer	<u>MRC</u> Anti-	<u>NA</u>	Yes	refer to (3) <u>this_supplement</u>
Туре	friction	<u>NA</u>	Yes	<del>~~</del>
Bearing life				
(f) Seals				
Manufacturer		<u>NA</u>		refer to (5)
Туре	Slinger	<u>NA</u>	Yes	this supplement
Material	<u>Neoprene</u>	<del></del>	Yes	

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	ER NO. <u>WBNEQ-MOT-00</u> 4 PLA	NT <u>WBN</u>	UNIT		SHEET <u>30</u> 0F_ R <u>2</u> R
INDUC	ER TITLE <u>LOUIS ALLIS -</u> CTION MOTORS - OUTSIDE AINMENT			_ DATE <u>8/28/</u>	86 <u>JDH</u> 2-2-89
EQUI	PMENT IDENTIFICATION (C	ontinued)			Page 2 of
	Item	<u>Plant</u>	Report	Acceptable <u>(Yes/No/NA)</u>	
			Si <u>Rubber</u>	Yes	Att 1,
	Comments:				
(2)	Does the qualification system is the same as (Reference:	that used on	icate that n the moto	ors (Yes/No/1	tte insulati NA)? <u>Yes</u>
	Comments: <u>TAB.E-1, dom</u>				······································
(3)	item B.2 Has the vendor provided	cument 4-14	7739-NQR,	Rev A, Shee	<u>t 1,</u>
(3)	item B.2 Has the vendor provided	cument 4-14	7739-NQR,	Rev A, Shee (Yes/No/NA)?	<u>t 1,</u> ? ? <u>Yes</u> ).
(3)	item B.2 Has the vendor provided (Reference: Comments: <u>Refer to TA</u> Was the lubricant inclu	the bearin B C, Sect 4	7739-NQR, ng rating 4.1. test prog	Rev A, Sheet (Yes/No/NA)?	<u>t 1,</u> ? <u>Yes</u> ).
	item B.2 Has the vendor provided (Reference: Comments: <u>Refer to TA</u> Was the lubricant inclu (Reference: Comments: <u>Refer to TA</u>	the bearin B C, Sect 4 aded in the B C, Sect 4	7739-NQR, ng rating 4.1. test prog	Rev A, Sheet (Yes/No/NA)? gram (Yes/No/	<u>t 1,</u> ? <u>Yes</u> ). //NA)? <u>No</u> ).
	item B.2 Has the vendor provided (Reference:	the bearin the bearin <u>AB C, Sect 4</u> ded in the <u>AB C, Sect 4</u> in the tes	7739-NQR, ng rating 4.1. test prog	Rev A, Sheet (Yes/No/NA)? gram (Yes/No/	<u>t 1,</u> ? <u>Yes</u> ). //NA)? <u>No</u> ). // NA)? <u>No</u> ).
(4)	item B.2 Has the vendor provided (Reference:	the bearin AB C. Sect 4 aded in the B C. Sect 4 in the tes	7739-NQR, ng rating 4.1. test prog 4.2.	Rev A, Sheen (Yes/No/NA)? ram (Yes/No/ (Yes/No/NA)	<u>t 1,</u> ? <u>Yes</u> ). //NA)? <u>No</u> ). /? <u>No</u> ).
(4)	item B.2 Has the vendor provided (Reference:	the bearin AB C. Sect 4 aded in the B C. Sect 4 in the tes	7739-NQR, ng rating 4.1. test prog 4.2.	Rev A, Sheen (Yes/No/NA)? ram (Yes/No/ (Yes/No/NA)	<u>t 1,</u> ? <u>Yes</u> ). //NA)? <u>No</u> ). /? <u>No</u> ).

## LOUIS ALLIS NH7 INSULATION SYSTEM

PAGE B-33

	3-9-89
	MENTATION (See Note)
	pment Description <u>Squirrel-Cage Induction Motor</u>
	lor/Manufacturer <u>Louis Allis</u>
Equ	pment Model No.(s) <u>3hp, 460VAC, NH7 Insulation System</u>
	<u>M.O. Nos. 4-147740 and 4-147745</u>
QUA	JFICATION REPORTS (See Note)
(1)	Title/Number/Revision Insulation Sys Study RIMS B71 860512 102
	Class 200°C - Safety Class 1E-600 Volt A.C.DATE March 26, 1986
	Random Wound Stator (1 x 10 ⁷ Rads Total) M&M
	Report No. 280B
(2)	Title/Number/Revision Insulation Sys Study RIMS B71 860512 101
	Class 200 + °C - Safety Class 1E - 600 VAC DATENovember 13,1980
	Random Wound Stator (1 x 10 ^Z Rads Total) M&M
	Report No. 280A-1
(3)	Title/Number/RevisionRIMS
	DATE
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)
	IEEE paper 32C3-76 and support documentation (proprietary-
(4)	

IDUCTIO NTAINM	ITLE <u>LOUIS ALLIS</u> COMPUTED <u>DFA</u> DATE <u>9/15/86</u> <u>70H</u> <u>3-9-89</u> ENT CHECKED <u>NMB</u> DATE <u>9/15/86</u> <u>KBr</u> <u>3/9/89</u>	
(5)	WBN Environmental Dwg. 47E235-48 R3	1
(6)	Material Aging Calculation WAC-169 (TAB D-6)	
(7)	TVA Radiation Calculation WBNNAL3-007 R1 (B45 860919 235) 283	
(8)	Nuclear Qualification Report 4-147740-NQR, Rev. A (TAB E-2)	
(9)	Nuclear Qualification Report 4-147745-NQR, Rev. A (TAB E-3)	
(10)	System 30 Category and Operating Times-WBNOSG4-008 R11	R2
	(B45 870123 426)	RZ
(11)	TVA Degraded Voltage Calculation WBP-EVAR 8602001 R0	
	(B43_860227_901)	
NOTE:	Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.	R2
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		1
	PAGE B-35 R2	

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10 TO	DER TITLE LOUIS ALLIS - INDUCTION COMPUTED CLUby DATE 8/23/86	
	DATE <u>7 270-</u>	
•	QUALIFICATION CRITERIA	
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):	
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
	JUSTIFICATION/COMMENTS	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET NEMA MG-11982 Motors and Genertors.	
j		
<u>]</u> -	NEMA MG-11982 Motors and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors.	
] - -	NEMA MG-11982 Motors_and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors. IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound	
] - -	NEMA MG-11982 Motors and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors.	
] - -	NEMA MG-11982 Motors_and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors. IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound	
] - -	NEMA MG-11982 Motors_and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors. IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound	
] - -	NEMA MG-11982 Motors_and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors. IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound	
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] - -	NEMA MG-11982 Motors_and Genertors. IEEE 334-1974 Type Test of Continuous Duty Class lE Motors. IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound	

BINDER NO WBI	<u>NEQ-MOT-004</u> PLANT_ <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>4</u> OF
	LOUIS ALLIS - INDUCTION COMPUTED Cherly DATE 8/23/8/2
MOTORS - OUTS	SIDE CONTAINMENT CHECKED DATE 8/25/560
	CHECKED DATE 9/23/800
D. <u>QUALIFICA</u>	ATION METHODOLOGY (Check only one block)
· ]	Fest of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
]	Test of Similar Items with Supporting Analysis
X A	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
H	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
JUSTIFICA	TION/COMMENTS Refer to TAB C, Section 3.0 for additional
<u>details.</u>	
<u> </u>	

BINDER TITLE LOUIS ALLIS -       COMPUTED_DFA       DATE 8/23/86 TDA         INDUCTION MOTORS - OUTSIDE       27.399         CONTAINMENT       CHECKED_NME       DATE 8/25/86 TDA         E. EQUIPMENT DESCRIPTION       Is the equipment identified in the qualification documentation identical to the plant equipment which requires qualification (Yes/No/NA)?       Qualification         Plant_Device       Document       Reference         Induction       Motor       Motorette       Sect. 3.1         Qual Rpt 1       (2)       Monfacturer       Louis Allis       Louis Allis       Title Page         (3)       Model Number(s)       3 hp. 460VAC       NET ins. sys.	BINDER NO. <u>WBNEQ-MOT-00</u> 4 PLAN	VT <u>WBN</u>	UNIT(S)1	SHEET <u>5</u> 0F <u>29</u> R 2 R
E. EQUIPMENT DESCRIPTION Is the equipment identified in the qualification documentation identical to the plant equipment which requires qualification (Yes/No/NA)? <u>No</u> Qualification Plant Device Induction Plant Device Induction Motorette Qualification Plant Device Induction Motorette Qualification (1) Equipment Type Motor Motorette Qualification Qualification Qualification Qualification Qualification Qualification Plant Device Induction Motorette Qualification Qualification Qualification Qualification Motorette Qualification Qualification Motorette Qualification Qualification Motorette Qualification Motorette Qualification Motorette Qualification Motorette Qualification Motorette Qualification Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motorette Motoret				186 JDH
Is the equipment identified in the qualification documentation identical to the plant equipment which requires qualification (Yes/No/NA)? <u>No</u> Qualification Plant Device Document Reference TAB C, (1) Equipment Type Notor Motorette Sect. 3.1 Qual Rpt 1 (2) Manufacturer Louis Allis Louis Allis Title Page (3) Model Number(s) Louis Allis Louis Allis Louis Allis Just Page (3) Model Number(s) Louis Allis Louis Allis Louis Allis Louis Allis Louis Allis (4) Serial Number(s) Louis Allis Louis Allis Louis Allis Louis Allis (4) Serial Number(s) Louis Allis Louis Allis Louis Allis Louis Allis Louis Allis (5) Identify Component- Supplement 1. Component - Unique Unique checksheet attached: Checklist. Motors  JUSTIFICATION/COMMENTS The equipment provided for the plant consists of complete motor assemblies which includes a random wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System F4-9128) in the Stator assembly and is independent of the motor horsepower rating.	CONTAINMENT	CHECKED <u>NM</u>	<u>B</u> DATE <u>8/25</u>	/86 / 18/43
identical to the plant equipment which requires qualification (Yes/No/NA)?	E. EQUIPMENT DESCRIPTION			
Plant Device Induction       Document TAB C, Qual Rpt 1         (1) Equipment Type       Motor       Motorette Qual Rpt 1         (2) Manufacturer       Louis Allis       Louis Allis         (3) Model Number(s)       3 hp. 460VAC       NH7 ins. sys.         (4) Serial Number(s)       4-147740-001 4-147745       Motor         (4) Serial Number(s)       4-147745-001 4-147745-001       NA         (5) Identify Component- Unique checksheet attached:       Supplement 1. Component - Unique Unique checksheet attached:       Checklist. Motors         JUSTIFICATION/COMMENTS       The equipment provided for the plant       report documents the motorette testing performed on the NH7         insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon       the data from the qualification report is dependent solely upon         the use of the NH7 system (Louis Allis System P4-9128) in the       stator horsepower rating.	identical to the plant e			
Induction       TAB C,         (1) Equipment Type       Motor       Motorette       Sect. 3.1         Qual Rpt 1       Qual Rpt 1       R:         (2) Manufacturer       Louis Allis       Louis Allis       Title Page         (3) Model Number(s)       3 hp. 460VAC       NH7 ins. sys.			•	
<ul> <li>(1) Equipment Type Motor Motorette Sect. 3.1 Qual Rpt 1 Qual Rpt 1</li> <li>(2) Manufacturer Louis Allis Louis Allis Title Page</li> <li>(3) Model Number(s) 3 hp. 460VAC NH7 ins. sys.</li> <li>(4) Serial Number(s) 4-147740 4-147745</li> <li>(4) Serial Number(s) 4-147740-001 NA Note 1 4-147745-002 4-147740-002</li> <li>(5) Identify Component- Supplement 1, Component - Unique Unique checksheet attached: Checklist, Motors</li> <li>JUSTIFICATION/COMMENTS The equipment provided for the plant consists of complete motor assemblies which includes a random wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.</li> </ul>			Document	
<ul> <li>(2) Manufacturer Louis Allis Louis Allis Title Page</li> <li>(3) Model Number(s) 3 hp, 460VAC NH7 ins. sys.</li> <li>4-147740</li> <li>4-147740</li> <li>4-147745</li> <li>(4) Serial Number(s) 4-147740-001 NA Note 1</li> <li>4-147740-002</li> <li>4-147745-001</li> <li>4-147745-001</li> <li>4-147745-001</li> <li>(5) Identify Component- Supplement 1. Component - Unique Unique checksheet attached: Checklist. Motors</li> <li>JUSTIFICATION/COMMENTS The equipment provided for the plant consists of complete motor assemblies which includes a random wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.</li> </ul>	(1) Equipment Type		Motorette	<u>Sect. 3.1</u>
4-147740	(2) Manufacturer	Louis Allis	Louis Allis	
4-147745         (4) Serial Number(s)       4-147740-001 4-147740-002 4-147745-001 4-147745-002         (5) Identify Component- Supplement 1. Component - Unique Unique checksheet attached:       Checklist. Motors         JUSTIFICATION/COMMENTS       The equipment provided for the plant         consists of complete motor assemblies which includes a random         wound stator with the NH7 insulation system. The qualification         report documents the motorette testing performed on the NH7         insulation in accordance with IEEE 117-1974. Applicability of         the data from the qualification report is dependent solely upon         the use of the NH7 system (Louis Allis System P4-9128) in the         stator assembly and is independent of the motor horsepower rating.	<pre>(3) Model Number(s)</pre>	<u>3 hp. 460VAC</u>	<u>NH7 ins. sys.</u>	
<ul> <li>4-147740-002 4-147745-001 4-147745-002</li> <li>(5) Identify Component- Supplement 1, Component - Unique Unique checksheet attached:</li> <li>Checklist, Motors</li> <li>JUSTIFICATION/COMMENTS The equipment provided for the plant consists of complete motor assemblies which includes a random wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.</li> </ul>	• •			
Unique checksheet attached: <u>Checklist, Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> <u>consists of complete motor assemblies which includes a random</u> wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	<pre>(4) Serial Number(s) .</pre>	<u>4–147740–002</u> 4–147745–001	<u>NA</u>	<u>Note 1</u>
consists of complete motor assemblies which includes a random wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	Unique checksheet		_	que
wound stator with the NH7 insulation system. The qualification report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	JUSTIFICATION/COMMENTS	The equipment	provided for the	e_plant
report documents the motorette testing performed on the NH7 insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	consists of complete mot	or assemblies v	which includes a	random
insulation in accordance with IEEE 117-1974. Applicability of the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	wound stator with the NH	17 insulation sy	vstem. The qual:	ification
the data from the qualification report is dependent solely upon the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	report documents the mot	orette testing	performed on the	e NH7
the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	insulation in accordance	with IEEE 117-	-1974. Applicab:	ility of
the use of the NH7 system (Louis Allis System P4-9128) in the stator assembly and is independent of the motor horsepower rating.	the data from the qualif	ication report	is dependent so	lely upon
	<u>stator assembly and is i</u>	ndependent of t	the motor horsepo	ower_rating.
				-
priate NQR report. These reports are in sub-tabs located in TAB E.		•		
LAXFILL AXFILL HAX HIG VAN SAVO AVCOUCH IN IND D.			<u></u>	• تا <u>ل ۲۵۱۲ مەيە مە</u>

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BINDER NO. <u>WBNEQ-MOT-00</u> 4 PLANT_	WBN	UNIT(	s)	L
BINDER TITLE LOUIS ALLIS -	COMPUTED_	DFA	DATE	R_2_R 8/23/86_JDH
INDUCTION MOTORS - OUTSIDE CONTAINMENT	CHECKED			2-2-89 8/23/8648 2/399
				<u> </u>

## F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

Interface	Identify Interface	Plant Requirement? (Yes/No)	Reference <u>Test Report</u>	
Mounting Bolts	NA	NA	<u> </u>	
External Process Connections	NA	<u>NA</u>	·	
Electrical Connections	NA	NA	K	22
Conduit Seals	NA	NA		
Connector Seals	NA	<u>NA</u>		
Orientation	NA	NA		
Physical Configuration	NA	NA		
Other				

JUSTIFICATION/COMMENTS Refer to TAB C. Section 6.0, Interfaces.

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BINDER		LOUIS ALLIS - INDUCTION COMPUT	ED achurch DAT	R R ГЕ %/25/56
MOTORS	- OUTS	SIDE CONTAINMENT CHECKE		ΓΕ <u>δ/25/δφ</u>
G. <u>TES</u>	T SEQI	JENCE		
(1)	acc	: Sequence: Was the test sequen ident environment in accordance s/no/NA)? (note below)	ce established with IEEE-323 (	to simulate the 74), paragraph 6.3.2
	(yez	S/NO/NA): (NOLE BELOW)	<u>Yes/No/NA</u>	Reference
	(a)	Equipment inspected for damage	<u>No</u>	TAB_C, Sect. 3.2 TAB_C, Att. 2,
	(b)	Baseline performance measurements taken	Yes	Sect. B.3.b
	(c)	Equipment aged:		
		Thermal	Yes	TAB C, Att. 2, Sect. B.3.d
		Radiation	Yes	TAB C, Att. 2, <u>Sect. C. 2</u>
		Wear	<u>NA</u>	TAB C, <u>Sect. 3.1</u>
	(d)	Vibration/seismic testing conducted	Yes	TAB C, Sect. 3.2, an <u>Att. 2, Sect. B.3.e</u>
	(e)	Design basis event (DBE) exposure	NA	TAB_C, Sect. 3.3
	(f)	Post-DBE exposure	NA	TAB C, Sect. 3.3
	(g)	Final inspection and disassembly	NA	Notel
(2)	Was desc	the same piece of equipment used ribed in item (1) above (yes/no,	l throughout the NA)? <u>Yes</u>	e test sequence
(3)	been	the test equipment, test equipment, test equipment, test equipment, appropriately documented (yes/renewed).	nent accuracies no/NA)? <u>NA</u>	and calibration data
	JUST	IFICATION/COMMENTS		
	<u>func</u> <u>proo</u> <u>diel</u>	<u>1 - The ability of the motorett</u> tion is predicated upon its abil f tests in TAB C, Attachment 2, ectric proof test is a conclusiv rate and calibrated test equipme	<u>ity to withstan</u> <u>Section B.3.e.</u> Te failure and o	nd dielectric Failure of a

BIND	ER NO	D. WBNEQ-MOT-004 PLANT WBN UNIT(S	5) 1	SHEET 8OF
BIND	ER TI	TLE LOUIS ALLIS - INDUCTION COMPUTED	uly DATE \$/23	R R
MO TO	ORS -	OUTSIDE CONTAINMENT CHECKED	DATE 9/16	<u>k6</u>
Н.	<u>AGI1</u>	NG		
	(1)	Was aging considered in the qualificatio (Yes/no/NA)? <u>Yes</u> (Reference	n program	
		JUSTIFICATION/COMMENTS Refer to TAB C,	Attachment 2, S	ections
		B.1, B.2, and B.3.d.		
	(2)	Were the following effects considered in	the aging prog	ram:
		Aging Effect	Yes/No/NA	Reference
		Thermal aging	Yes	<u>Refer to H.4.a</u>
		Radiation exposure	Yes	<u>Refer to H.5.a</u>
		Vibration (non-seismic) aging	Yes	Refer to H.6.a
		Operational (electrical/mechanical/proces stress aging	ss) <u>Yes</u>	Refer to H.7.a
		JUSTIFICATION/COMMENTS Motorettes testing	ng consists of s	<u>subjecting</u>
		models to heat, vibration, and moisture t	to simulate the	effects of
		long service, thereby, simulating the cur	<u>mulative effect</u>	of extended
		operation.		
	(3)	Were all known synergistic effects which significant effect on equipment performan program (yes/no/NA)? <u>NA</u> (Reference	nce considered i	n the aging
		JUSTIFICATION/COMMENTS <u>A review of the magnetic sectors</u>	naterials used i	n these
		motors indicates that there are no known	synergistic eff	ects.
	(4)	Thermal Aging:		
		(a) Was thermal aging considered in the (yes/no/NA)? <u>Yes</u> (Reference	qualification p	orogram
		JUSTIFICATION/COMMENTS Refer to TAB	C. Attachment	2.

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EQP139.41

*****	LOUIS ALLIS - COMPUTED DFA DATE 8/23/86 JDH
	<u>CHECKED NMB</u> DATE <u>8/26/86</u>
H. <u>AGING</u> (Co	ontinued)
(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification Report 1, pp 2-4, Section B</u> ).
·	JUSTIFICATION/COMMENTS Also refer to TAB C, Attachment
	2, Section B.
(c)	Was the basis for thermal aging identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:).
	JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2,
	Sections B.2 and B.3.
(d)	Was the aging acceleration rate justified and the parameter of time and temperature identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	· ) .
	). <u>Parameter Plant Maximum Normal Test Equivalent</u>
	Parameter       Plant Maximum Normal       Test       Equivalent         Temperature
	Temperature         Time         JUSTIFICATION/COMMENTS         Refer to TAB C, Attachment 2,
	Temperature
(e)	Temperature Time
(e)	Temperature Time JUSTIFICATION/COMMENTS <u>Refer to TAB C, Attachment 2,</u> <u>Section B.3.d.</u> Was the Arrhenius methodolgy used for accelerated aging
	Temperature         Time         JUSTIFICATION/COMMENTS         Refer to TAB C, Attachment 2,         Section B.3.d.         Was the Arrhenius methodolgy used for accelerated aging         (Yes/No/NA)?       Yes         (Reference:      ).         JUSTIFICATION/COMMENTS       Refer to TAB C, Section 3.0
(e) (f)	Temperature         Time         JUSTIFICATION/COMMENTS         Refer to TAB C, Attachment 2,         Section B.3.d.         Was the Arrhenius methodolgy used for accelerated aging         (Yes/No/NA)?       Yes         (Reference:        ).         JUSTIFICATION/COMMENTS         Refer to TAB C, Section 3.0         If activation energies were used for determining accelerated
	Temperature         Time         JUSTIFICATION/COMMENTS         Refer to TAB C, Attachment 2,         Section B.3.d.         Was the Arrhenius methodolgy used for accelerated aging         (Yes/No/NA)?       Yes         (Reference:        ).         JUSTIFICATION/COMMENTS         Refer to TAB C. Section 3.0         If activation energies were used for determining accelerate         aging parameters, are they properly referenced to the source         of the technical data (Yes/No/NA)?

		LOUIS ALLIS – COMPUTED DFA DATE 8/23/86 JDH PORS – OUTSIDE 2-2-89	
ONTAINM	IENT	CHECKED NMB DATE 8/25/86	
H. <u>AGIN</u>	<u>IG</u> (Co	ntinued)	
	(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>Yes</u> (Reference:)	1 ).
		JUSTIFICATION/COMMENTS Qualification of the motors	
		through the use of motorette tests involves the use of	
	·	the equation of a regression-type implied average life	
		characteristic. Refer to TAB C, Section 3.0	
	(h)	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>NA</u> (Reference:	
÷		JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.1	•
(5)	Radi	ation Aging Exposure:	
	(a)	Was radiation aging exposure considered in the qualificat program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification</u>	i
		Report, 1, p 5, Data Evaluation, Section B)	•
		JUSTIFICATION/COMMENTS Also refer to TAB C. Attachment	
		2. Section C.2.	
	(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification Report 1, Attachment 7</u> )	•
		JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2,	
		Section C.2	
	(c)	Was the basis for radiation aging exposure identified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference:)	•
		JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2,	
		Section C.2.	

	<u>IG</u> (Co	ontinued)
•	(d)	Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>NA</u> (Reference:)
		Plant normal ambient radiation dose (rd) <u>8.8 x 10⁵</u>
		Test exposure dose (rd)
		Test exposure dose rate (rd/hr)
		Test exposure source type (e.g., Co-60 gamma)
		JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2,
		Section C.2.
(6)	Vibra	ation (non-seismic) Aging:
	(a)	Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program ¹ <u>Yes</u> (Reference:).
		JUSTIFICATION/COMMENTS <u>Refer to TAB C, Attachment 2,</u> Section B.3.e.
		Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? Yes)
		JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2,
		Section B.3.e.

PAGE <u>8-45</u>	R2

	O. WBNEQ-M	$\frac{40T-004}{R} = \frac{12}{R} = 12$
MOTORS -	OUTS IDE	ALLIS - INDUCTION COMPUTED Actually DATE $\frac{R}{23/36}$ CONTAINMENT CHECKED DATE $\frac{8/25/86}{25/86}$
	NG (Cont	
(7)	(a) We op ad	onal Stress Aging: ere the effects of electrical, mechanical, and process perational stresses induced during normal and abnormal operation dressed in the qualification program (yes/no/NA)? <u>Yes</u> Reference
	JU	STIFICATION/COMMENTS Refer to TAB C, Section 3.1
	id	as the basis for stresses induced during operational aging entified and justified in the qualification program res/no/NA)? <u>Yes</u> (Reference
	υ	STIFICATION/COMMENTS Refer to TAB C, Section 3.1.
(8)	Was the qualific (Referen	qualified life of the equipment and its basis defined in the ation program (yes/no/NA)? <u>Yes</u> ce
( 8)	qualific (Referen	ation program (yes/no/NA)? <u>Yes</u>
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce d life (Document in QMDS) <u>Expected qualified life is 40 + years</u>
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce d life (Document in QMDS) <u>Expected qualified life is 40 + years</u>
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce d life (Document in QMDS) <u>Expected qualified life is 40 + years</u>
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce d life (Document in QMDS) <u>Expected qualified life is 40 + years</u>
(8)	qualific (Referen Qualifie	ation program (yes/no/NA)? <u>Yes</u> ce d life (Document in QMDS) <u>Expected qualified life is 40 + years</u>

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	NO. <u>WBNEQ-MOT-004</u> PLANT WBN UNIT(S) 1 SHEET 13 OF R 2 R R
	CITLE       LOUIS ALLIS       COMPUTED       DFA       DATE       8/23/86       JDH         DN       MOTORS       —       OUTSIDE       2.2.289
CONTAINM	
H. <u>AGIN</u>	IG (Continued)
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	· · · · · · · · · · · · · · · · · · ·
	JUSTIFICATION/COMMENTS No replaceable-items were identified
	in the insulation system qualification program described in
	M&M Reports 280B and 280A-1. The bearings and lubricants are
	routine maintenance items, the replacement of which are
	addressed in individual Qualification Maintenance Data Sheets
	in this binder. Basically, lubrication schedules, bearing
	replacement intervals and electrical and mechanical
	surveillance recommendations, particularly regarding the
	neoprene slingers and gaskets, are detailed.
	•
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BINDER NO:	WBNEQ-MOT-004	PLANT	WBN UI	NIT(S)	1 SHE	ET <u>14</u> OF <u>2</u> R 1 R
	LE LOUIS ALLIS-	TNDUCTION	COMPUTE	) Ackenly		
			•	D <u>Ackerly</u>		
<u> 1010RS – C</u>	UTSIDE CONTAINME	NT	CHECKED	NMB	DATE <u>8/28/</u>	86 6/21/88
. <u>MATERIA</u>	LS ANALYSIS				·	
	ication of Mater tion and Aging (					
Ma	terial/Property/		adiation hreshold	References	Activation Energy	
(a) <u>NH</u>	7 Insulation/Ele	<u>ctrical</u>	<u>1 x 10⁷</u>	Note 1	. 92	
(b) <u>Ch</u>	evron SRI-2/Lubr	icant	<u>2 x 10⁸</u>	Note_2	Note 4	
	<u>oprene/mechanica</u> inger & gasket	1/	<u>2 x 10⁶</u>	Note 3	Note 4	
(d)		-,·,		•		
(e)					·	
JUSTIFI	CATION/COMMENTS_	Detailed Ma	<u>terial Ana</u>	<u>lysis is TA</u>	<u>B C, Attachr</u>	<u>ment 2.</u>
Note 1:	Value shown is	insulation	rating.	Radiation t	hreshold is	actual
<u> </u>	rating of syst	<u>em. Refer</u>	to TAB C,	Attachment	2.	
Note 2:	Refer to Digit	al Material	Aging and	Radiation	Effects Libr	arv.
	Library Code No					
Note 3:	Refer to Digita					arv
	Library Code No					<u> </u>
Note 4:	Consideration of					irod
	because lubrica					
* <u>************************************</u>	and devices with					
	program is esta		LINE VMD2	IN TAB G TO	ensure prop	er
	operation.		<u> </u>			•

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	)RS -	OUTSIDE CONTAINMENT
		TLE LOUIS ALLIS - INDUCTION COMPUTED Actual DATE $\frac{8}{23/84}$ R OUTSIDE CONTAINMENT CHECKED DATE $\frac{8}{25/84}$
J.		IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? Yes (Reference
		).
		Identify Acceptance Criteria: <u>Refer to TAB C, Attachment 2, Section</u>
		<u>B.3.e.</u>
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference
		Identify baseline and functional testing: <u>Refer to TAB C, Attachment 2,</u>
		Sections B.3.b and B.3.e.
		JUSTIFICATION/COMMENTS
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? NA
	(3)	Does the qualification report/analysis describe loads (or load
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? NA
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>NA</u> (Reference).
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>NA</u> (Reference).

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CONTAINM	ITLE <u>LOUIS ALLIS</u> N <u>MOTORS – OUTSID</u> INT		DATE <u>8/23/8</u> 6_ <i>JDH</i> 2-2-89 DATE <u>8/25/8</u> 6 <del>///////////////////////////////////</del>	7
<u></u>	<u> </u>		DATL 0/20/00/00/00/00/00	<u></u>
PERI		CHARACTERISTICS NECESS ATIONS CAN BE SATISFIEI		DITIC
· (4)	÷ • • • • • • • •	loads during baseline t tions (Yes/No/NA)? <u>Yes</u>		
	JUSTIFICATION/C	OMMENTS <u>Voltages appli</u>	ed to the motorette	<u> </u>
	<u>during baseline</u>	testing addressed in 1	AB C, Attachment 2,	
	Section B.3.b a	re conservatively typic	al of the stressing	
	occurring in mo	tors rated 460 VAC.		
(5)	<b>.</b>	ical characteristics ne rmance specifications o	cessary to ensure th an be satisfied.	he
	(a) <u>Parameter</u>	<u>Plant Normal Conditi</u>	ons Reference	e
	Voltage	NA	·	
	Load	NA	· · · · · · · · · · · · · · · · · · ·	
	Frequency	NA	. <u></u>	
	Accuracy	NA		
			· · · ·	
	Other(s)		•	
	Other(s)	. <u></u>		]
	Other(s)			
		ION/COMMENTS Refer to	TAB C, Section 5.0	
	JUSTIFICAT	ION/COMMENTS <u>Refer to</u> sion of Voltage and Fre		
	JUSTIFICAT			
	JUSTIFICAT			
	JUSTIFICAT			   

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	ITLE LOUIS ALL		
INDUCTION CONTAINMI	<u>MOTORS – OUTS</u> ENT		<b>2-2-89</b> 2- <b>8/25/86/02/16/</b> 2-1-89
<u>PERI</u>		AL CHARACTERISTICS NECESSARY TO ICATIONS CAN BE SATISFIED UNDER	
(b)	Parameter	Specific Accident Conditions	Reference
	Voltage	NA	· · · · · · · · · · · · · · · · · · ·
	Load	NA	
	Frequency	NA	·
	Accuracy	NA	
	Other(s)	•	
	·		
	•		
			·
	•	/COMMENTS Refer to TAB C, Sect	
	•	/COMMENTS <u>Refer to TAB C, Sect</u> voltage and frequency requirem	
(c)	discussion of		
(c)	discussion of	voltage and frequency requirem	ents.
(c)	discussion of Parameter	voltage and frequency requirem	ents.
(c)	<u>discussion of</u> Parameter Voltage	voltage and frequency requirem 	ents.
(c)	<u>discussion of</u> Parameter Voltage Load	voltage and frequency requirem Demonstrated Conditions NA NA	ents.
(c)	discussion of Parameter Voltage Load Frequency	voltage and frequency requirem Demonstrated Conditions NA NA NA	ents.
(c)	discussion of Parameter Voltage Load Frequency Accuracy	voltage and frequency requirem Demonstrated Conditions NA NA NA	ents.
(c)	discussion of Parameter Voltage Load Frequency Accuracy	voltage and frequency requirem Demonstrated Conditions NA NA NA	ents.
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s)	voltage and frequency requirem Demonstrated Conditions NA NA NA	ents.
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/	voltage and frequency requirem Demonstrated Conditions NA NA NA NA	ents.

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TNDC	DER TI	D. <u>WBNEQ-MOT-00</u> 4 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>18</u> OF R <u>2</u> R <u></u> ITLE <u>LOUIS ALLIS -</u> COMPUTED <u>DFA</u> DATE <u>9/15/86</u> <u>JDH</u>
	JUTION	<u>MOTORS – OUTSIDE</u> 2-2-89
CONT	<u>CA INME</u>	ENT CHECKED NMB DATE 9/15/86
К.	REQU	JIRED OPERATING ENVIRONMENT
	Refe	erence Environmental Drawing No. <u>47E235-48</u>
	(1)	Normal Max (2) Abnormal Max
		(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
		(b) Pressure (psig) <u>ATM(-)</u> (b) Pressure (psig) <u>ATM(-</u>
		(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
		(d) Radiation (rd) $8.8 \times 10^5$ (d) Radiation (rd)
	(3)	Process Interfaces: <u>None</u>
	(5)	parameter including peak, duration, and profile): (1) 196 for 15 min.
		decaying to 110 in 24 hours and
		continuing for
		·
		$\begin{array}{c} 30 \text{ days} \\ (2) 110 \text{ for } 100 \\ \end{array} $
		(2) 110 for 100 (1) HELB
		(2) 110 for 100 (1) HELB (a) Temp. (°F) (**) <u>days</u> Accident type (2) LOCA
		(2) 110 for 100       (1) HELB         (a) Temp. (°F) (**) days       Accident type (2) LOCA         (b) Pressure (psig) ATM(-)       Accident type HELB
		(2) 110 for 100       (1) HELB         (a) Temp. (°F) (**) days       Accident type (2) LOCA         (b) Pressure (psig) ATM(-)       Accident type HELB         (c) Humidity (%)       100       Accident type HELB
		(2) 110 for 100(1) HELB(a) Temp. (°F) (**) daysAccident type (2) LOCA(b) Pressure (psig) $ATM(-)$ Accident type HELB(c) Humidity (%) 100Accident type HELB(d) Radiation (rd) 1.2x10 ^{6*} Accident type LOCA

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INDUCTION CONTAINME	ITLE LOUIS ALLIS – COMPUTED DFA DATE 9/15/86 JOH N MOTORS – OUTSIDE ENT CHECKED NMB DATE 9/15/86 KBA 3-9-89			
K. <u>REQU</u>	UIRED OPERATING ENVIRONMENT (Continued)			
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>Motors are located outside containment and</u>			
are not subject to chemical spray,				
(6)	Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>No</u> (Reference:			
	WBN Environmental Dwg 47E235-48 and TAB C, Section 7.0 )			
(7)	Subject to submergence (Yes/No/NA)? <u>No</u> (Reference:			
	WBN Environmental Dwg 47E235-48 and TAB C, Section 7.0 ).			
	Identify initiation time and duration of submergence:			
(8)	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? NA			
	the total accident dose (Yes/No/NA)? <u>NA</u> (Reference: <u>Section P-NOTE 1</u> ).			
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:			
(9)	Special environmental calculations (temp., rad., etc.)			
	Type RIMS No.			
	WBNNAL3-007 See TAB B-2. Sect. A			
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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 20 OF 29 BINDER TITLE LOUIS ALLIS - INDUCTION COMPUTED Cheeping DATE $\frac{S/23/\Omega_0}{S}$ R MOTORS - OUTSIDE CONTAINMENT CHECKED DATE $\frac{S/23/\Omega_0}{S}$	9					
L. <u>SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS</u> (1) Comparison of worst-case maximum parameters:						
Parameter Specified Demonstrated Reference						

Operating Time	Note 1		
Temperature ( ^O F)	Note 1		
Pressure (psig)	<u>ATM(-)</u>	Sect. 3.5	
Relative Humidity (%)	100%	TAB C, Att.2, Sect. B.3.e	
*Chemical Spray	NA	TAB C, <u>Sect. 3.4</u>	
**Radiation (rd)	<u>2.08x10⁶</u>	TAB C, Att. 2, <u>Sect. C.2</u>	
Submergence	<u>NA</u>	TAB C, Sect. 7.0	

*Includes spray concentration, flowrate, density, duration, and pH.
**Enter 40-year integrated normal dose plus integrated accident dose
and specify type.

(2) Comparison of worst-case profiles and margin assessment:

	Parameter	Test Profile Envelopes Specified (Yes/No/NA)	Reference
	Temperature	Yes	TAB C, Att.2, Sect. C.1
	Pressure	Yes	TAB C, Sect. 3.5
	Relative Humidity	Yes	TAB C, Att.2,Sect.B.3.e
	Chemical Spray	NA	TAB C, Sect. 3.4
	Submergence	NA	TAB C, Sect. 7.0
	JUSTIFICATION/COMMENTS <u>Note</u>	<u>e l: Worst case temperat</u>	ure is the result of an
	HELB and is 196°F (91°C) for	<u>15 minutes, decaying t</u>	:0_110°F (43.3°C) in
	24 hours and continuing for	30_days.	
PAGE B-54	Worst case life is based upo	n conditions resulting	from a LOCA which is
	110°F for a duration of 100	days. See TAB C, Attac	hment 2, Section C.1.

BINDER NO. WBNEO-MOT-004 PLANT WBN UNIT	(c) 1 ·	
	F	R R
BINDER TITLE LOUIS ALLIS – COMPUTED DFA INDUCTION MOTORS – OUTSIDE	DATE <u>8/23/8</u>	36 <u>J0H</u> 5/16/89
	DATE <u>8/25/8</u>	
		5/16/89 KBN
L. <u>SUMMARY COMPARISON OF TEST CONDITIONS TO SPE</u> (Continued)	CIFIED CONDI	TIONS
(3) Were margins applied to the test parame addressed in the test program to assure and uncertainties are accounted for? ( Yes/No/NA).	that normal	variation
	Margin <u>Applied</u>	Yes/No/NA
Temperature: +15 degrees F	Note 1	Yes
Pressure: +10% but no more than 10 psi	g	<u>NA (2)</u>
Radiation: +10% of accident dose		<u>Yes (6)</u> R2
Time: +10% (or 1 hour + operating time per NUREG-0588)	<u>Note 1</u>	Yes
Voltage: ±10% of rated value		<u>NA (3)</u>
Frequency: ±5% of rated value		<u>NA (3)</u>
Environmental Transient: the initial transient and the peak temperature applied twice		<u>NA (4)</u>
Vibration: +10% added to acceleration		<u>NA (5)</u>
JUSTIFICATION/COMMENTS		
Note (1) Per TAB C. Attachment 2. Section expected life is 6.066.79 years with a m perature of 95.40°C. The required operaty years. A significant margin exists in the between time and temperature criteria.	aximum hot s ting time is he relations	<u>40.27</u>
Note (2) Refer to TAB C. Section 3.5.	·	
Note (3) Refer to TAB C. Section 5.0.	·····	
Note (4) Refer to TAB C, Section 3.3.		
Note (5) These motors do not experience related vibration and as such, a vibrati levels addressed in TAB C, Attachment 3, not required.	on margin ab	ove the
Note (6) Refer to TAB C. Attachment 2, Second	ection C.2.	

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	- OUTSIDE CONTAINMENT CHECKED DATE 8/25/86
. <u>ope</u> i	RABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference
	).
	JUSTIFICATION/COMMENTS Motors utilizing the stator insulation
	system tested, must be capable of starting and maintaining
	operation. Refer to TAB A.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	).
	JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.3.
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	).
	JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.3.
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? (Reference
	) <u>.</u>
	JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 2, Section D.

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	TILE LOUIS ALLIS - INDUCTION COMPUTED CLUE DATE 8/23/86
M. <u>OPEI</u>	RABILITY TEST RESULTS (Continued)
• (5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference
	).
	JUSTIFICATION/COMMENTS <u>In the DuPont test, results were reported on</u>
	only 9 motorettes at 260 °C. The omission of the data regarding one
	motorette out of a total set of 50 motorettes does not have a
	significant adverse effect upon the implied average life characteris-
	tic developed through the use of the test data.
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BINDER NO. WBNEQ-MOT-004 PLANT WBN	UNIT(S)	SHEET 24 OF 29
BINDER TITLE LOUIS ALLIS - INDUCTION	COMPUTED Actualy DATE 8/23	R R
MOTORS - OUTSIDE CONTAINMENT	CHECKED DATE 9/25	<u>ki</u>

## N. MAINTENANCE AND SURVEILLANCE

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? <u>Yes</u> (Enter all requirements in Section G of the Binder - Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS <u>No replaceable items were identified in the</u> <u>insulation system qualification program.</u> The bearings and lubricants <u>are routine maintenance items, the replacement of which are addressed</u> <u>in individual Qualification Maintenance Data Sheets in this binder.</u> <u>Basically, lubrication schedules, bearing replacement intervals and</u> <u>electrical and mechanical surveillance recommendations particularly</u> <u>regarding the neoprene slingers and gaskets, are detailed in the QMDS</u> <u>located in TAB G.</u>

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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 BINDER TITLE LOUIS ALLIS - INDUCTION COMPUTED	SHEET <u>25</u> OF R R S/23/84
MOTORS - OUTSIDE CONTAINMENT CHECKED	8/16/86
0. <u>SUMMARY OF REVIEW</u>	Yes/No/NA
(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	Yes
(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	Yes
(3) Choice of qualification methodology adequately justified?	Yes
(4) If analysis was performed, complete the following:	
(a) Were equipment performance requirements identified?	<u>Yes</u>
(b) Were specific features and failure modes and effects analyzed?	Yes
(c) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
(d) Were environmental parameters which affect equipment performance identified?	Yes
(5) Adequate similarity between equipment and test specimen established?	Yes
(6) Aging degradation evaluated adequately?	Yes
(a) Mechanical and/or cycle aging addressed?	Yes
(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
(c) Absence of preaging in test/analysis justified?	NA
<pre>(d) Materials susceptible to thermal/radiation     aging identified?</pre>	Yes

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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 BINDER TITLE LOUIS ALLIS - INDUCTION COMPUTED CLULL DATE S MOTORS - OUTSIDE CONTAINMENT CHECKED DATE S	SHEETOF RR /28/86
0. <u>SUMMARY OF REVIEW</u> (Continued)	
(e) Normally operating state of device (e.g., normally energized) considered?	Yes/No/NA Yes
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	<u>Yes</u>
(a) Peak temperature adequate	Yes
(b) Peak pressure adequate	Yes
(c) Duration adequate	<u>Yes</u>
(d) Required profile enveloped adequately	_Yes
(e) Steam exposure adequate	<u>NA</u>
(9) Criteria regarding test sequence satisfied?	_Yes
(10) Criteria regarding spray satisfied?	<u>NA</u>
(a) Was the spray testing done while under the extremes of pressure and temperature?	<u>NA</u>
(b) Does the spray concentration, flow rate density. duration, and pH used in tests meet or exceed those to be used for the plant?	N <u>A</u>
(11) Criteria regarding submergence satisfied?	<u>Yes</u>
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes
(b) Was beta radiation considered?	Section P- <u>Note 1</u>
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes

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	SHEET27	
INDER TITLE LOUIS ALLIS - INDUCTION COMPUTED CICLER DATE 3	128/56	
MOTORS - OUTSIDE CONTAINMENT CHECKED $\frac{1}{2}$ DATE $\frac{5}{2}$	28/86	
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA	
(15) Criteria regarding functional testing satisfied?	Yes	
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes	
(b) Was an initial base line test done to establish required performance characteristics?	<u>Yes</u>	
(c) Has the test/analysis demonstrated that performanc performance specifications and characteristics (e.g voltage. load frequency. and other electrical characteristics) can be ensured?	e <u>Yes</u>	
(16) Criteria regarding instrument accuracy satisfied?	<u>NA</u>	
<pre>(17) Test duration margin (1 hour + function time)     satisfied?</pre>	Yes	•
(a) Is the minimum specified operating time at least 1 hour?	<u>Yes</u>	
(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>_NA</u>	
(18) Criteria regarding synergistic effects satisfied?	<u>NA</u>	
(19) Criteria regarding margins satisfied?	Yes	
(20) Maintenance and surveillance requirements adequately identified?	Yes	
P. <u>DISCUSSION</u>		
NOTE 1: Motors are located throughout the Auxiliary Build	ing. Beta_	
radiation is confined to the Reactor Building by	plant	
design; therefore, these motors are not required	to be	
evaluated for the effects of beta radiation.		
	44 45 45 45 46 46 46 46 46 46 46 46 46 46 46 46 46	
PAGE B-61		

TVA 19537 (OE-3-86)

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	<u>.                                    </u>			
C	OMPONENT-UN	EMENT 1 IQUE CHECKI TORS		el of 2
EQUIPMENT IDENTIFICATION				
<li>(1) Is the motor identified plant motors which requ</li>				cal to the
Item	<u>Plant</u>	<u>Report</u>	Acceptable (Yes/No/NA)	Report Section
(a) Insulation system materials	NH7 (P4-9128)	NH7 <u>(P4-9128)</u>	Yes	Qual. Rpt.1, p_1, Object
(b) Coil construction (form or random wound, cast)	<u>random</u>	random	Yes	Qual. Rpt. 1, Title Page
(c) Insulation class (B, F, H)	H	<u> </u>	Yes	Qual. Rpt. 1, p 5, Data Eval. <u>Sect.A, Thermal</u>
(d) Lubricant				
Manufacturer	<u>Chevron</u>	NA	Yes	Refer to TAB C, Sect. 4.2
Туре	SRI-2	NA	Yes	·····
(e) Bearing				
Manufacturer	MRC	NA	Yes	Refer to (3) <u>this supplement</u>
Туре	Anti- friction	NA	Yes	
Bearing life	<u></u>	<del></del>	- <u></u>	
(f) Seals				Refe <del>r</del> to (5)
Manufacturer		NA		this supplement
Type	<u>Slinger</u>	<u>NA</u>	Yes	
Material	Neoprene		Yes	

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	DER NO. WBNEQ-MOT-004		$- UNIT(S) _ 1$	St.	HEET <u>29</u> OF R R
BIND	DER TITLE LOUIS ALLIS -	COM	PUTED Ichell	DATE $\frac{1}{2} \frac{1}{2} \frac{1}{2}$	'e
MOTO	DRS - OUTSIDE CONTAINM	<u>ÆNT</u> CHE	CKED	DATE 8/25/86	<u> </u>
EQUI	IPMENT IDENTIFICATION	(Continued)		Page 2	of 2
·.					_
	Item	<u>Plant</u>	Report	Acceptable <u>(Yes/No/NA)</u>	
	(g) Motor lead	Nomer II/	Nomex/w		TAB C, Att. 2,
	insulation		<u>I Glass Braid</u>	Yes	<u>Sect. C.3</u>
	Comments:	······		<del> </del>	
				<u> </u>	
		<del></del>	<u></u>	<u></u>	
(2)	Does the qualificati is the same as that (Reference	used on the moto	ors (yes/no/NA)	torette insul ? <u>Yes</u>	lation system
					).
	Comments: <u>Refer to T</u>	CAB C, Attachment	3, Sections B	and B.2.	
(3)	Has the vendor provi		rating (yes/no		·
(3)	Has the vendor provi (Reference	ded the bearing	rating (yes/no	/NA)? <u>Yes</u>	
(3)	Has the vendor provi (Reference	ded the bearing	rating (yes/no	/NA)? <u>Yes</u>	).
	Has the vendor provi (Reference Comments: <u>Refer to T</u>	ded the bearing AB C, Section 4.	rating (yes/no	/NA)? <u>Yes</u>	).
(3)	Has the vendor provi (Reference Comments: <u>Refer to T</u> Was the lubricant in	ded the bearing AB C, Section 4.	rating (yes/no 1.	/NA)? <u>Yes</u> s/no/NA)? N	).
	Has the vendor provi (Reference Comments: <u>Refer to T</u>	ded the bearing CAB C, Section 4.	rating (yes/no 1.	/NA)? <u>Yes</u>	).
	Has the vendor provi (Reference Comments: <u>Refer to T</u> Was the lubricant in	Add the bearing AB C, Section 4.	rating (yes/no 1. st program (ye	/NA)? <u>Yes</u> s/no/NA)?N	). No).
	Has the vendor provi (Reference Comments: <u>Refer to T</u> Was the lubricant in (Reference	AB C, Section 4. AB C, Section 4.	rating (yes/no 1. st program (ye .2. program (yes/n	/NA)? <u>Yes</u> s/no/NA)? <u>No</u>	).
(4)	Has the vendor provi (Reference Comments: <u>Refer to T</u> Was the lubricant in (Reference Comments: <u>Refer to T</u> Were the seals includ (Reference	AB C, Section 4. AB C, Section 4.	rating (yes/no 1. st program (ye .2. program (yes/n	/NA)? <u>Yes</u> s/no/NA)?N o/NA)? <u>No</u>	).

## LOUIS ALLIS NH9 INSULATION SYSTEM

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BINDER T	D. <u>WBNEQ-MOT-00</u> 4 PLAN ITLE <u>LQUIS ALLIS -</u> M MOTORS - OUTSIDE	COMPUTED_DFA	$T(S) 1 SHEET 1 OF R 2 R DATE 9/15/86 \frac{J0H}{3-7-89}$	
	INT			
A. DOCUM	<u>1ENTATION</u> (See Note)			ļI
Equip	oment Description	<u>Squirrel-Cage Indu</u>	ction Motor	
Vendo	or/Manufacturer	Louis Allis		
Equip	oment Model No.(s)	<u>3hp, 460 Vac, NH9</u>	insulation system,	
		M.O. 4-147746		
QUAL	FICATION REPORTS (Se	ee Note)		ļ
(1)	Title/Number/Revisio	on <u>Insulation System</u>	mRIMS_ <u>B71_860512_104</u>	
(2)	Evaluation Qualifica 1E Normal Service. Title/Number/Revisio	M&M Report No. 282	assDATE_Sept. 20, 1983 RIMS	
			DATE	
OTHER	(ANALYSIS, VENDOR	DATA, ETC.)		F
(3)	Material Aging Calcu	lation WAC-082 (TA)	B D-8).	
(4)	WBN Environmental Dw	g. 47E235-78 R3.	· · · · ·	
			R1 (B45 880826 235).	
(6)	<u>System 30 Category a</u> (B45 870123 426),			
(7)	<u>Nuclear Qualificatio</u>	n Report 4-147746-1	NQR. Rev. A (TAB E-4)	
(8)	TVA Degraded Voltage (B43 860227 901).	Calculation WBP-EV	JAR 8602001 Rev. 0	
NOTE :	equipment qualific Information Manage above, need not be This listing inclu essential to quali	ation. The revision ment System (RIMS) repeated in other des only those docu	lingly should not be	R

PAGE <u>8-65</u> R2

PLUSEQ/73.44

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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 2	D
BINDER TITLE LOUIS ALLIS - INDUCTION COMPUTED ALLIS DATE 9/15/94	
MOTORS - OUTSIDE CONTAINMENT CHECKED DATE 4/15/86	
B. <u>CONCLUSION OF REVIEW</u> (Check only one block)	^{**}
X Equipment Qualified	
Equipment Satisfies All Requirements Except Qualified Life of	or
Justification of Replacement Schedule	
Equipment Qualification Not Established by Documentation	
Equipment Not Qualified Based on Test Failures	
OPEN ITEMS AND QUALIFICATION DEFICIENCIES <u>Refer to Open_Items_listed</u>	
in the front of this binder.	
1. Obtain revised field verification (Open Item 1)	
COMMENTS / RECOMMENDATIONS	
·	
·	
PAGE_B-66	

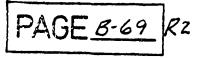
DINIO	ER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET 3 OF ER TITLE LOUIS ALLIS - INDUCTION COMPUTED ALLIN DATE 428/Sto
	DRS - OUTSIDE CONTAINMENT CHECKED DATE \$\frac{28/\$6}{26/\$6}
с.	QUALIFICATION CRITERIA
•	Criteria Used to Demonstrate Oualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
	<u>X</u> Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Oualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors.
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators
<b>.</b> .	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound
	IEEE 334-1974 Type Test of Continuous Duty Class 1E Motors. NEMA MG1-1982 Motors and Generators IEEE 117-1974 Evaluation of Insulating Materials for Random-Wound

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	ER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S) 1 SHEET	
	ER TITLE LOUIS ALLIS - INDUCTION COMPUTED CLE DATE 3/28/96	
D.	<u>OUALIFICATION METHODOLOGY</u> (Check only one block)	
	Test of Identical Item Under Identical Conditions or Under Conditions with Supporting Analysis	Similar
	Test of Similar Items with Supporting Analysis	
	<u>X</u> Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions	
	Experience with Identical or Similar Equipment Under Simila Conditions with Supporting Analysis	r
	JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.0 for additional	
	details.	_
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<ul> <li>E. EQUIPMENT DESCRIPTION Is the equipment identified in the qualification documentation identical to the plant equipment which requires qualification (Yes/No/NA)?</li></ul>			· · · · · · · · · · · · · · · · · · ·	······	<u>B</u> DATE <u>8/28</u>	
<pre>identical to the plant equipment which requires qualification (Yes/No/NA)?</pre>	Ε.	<u>EQUI</u>	PMENT_DESCRIPTION			
Plant Device Induction       Document TAB C         (1) Equipment Type       Motor       Motorettes Motor       Sect. 3.1 Qual. Rpt 1         (2) Manufacturer       Louis Allis       Louis Allis       Title Page         (3) Model Number(s)       3hp. 460 Vac       NH9 Ins. Sys.		iden	tical to the plant of			
Qual. Rpt 1         (2) Manufacturer       Louis Allis       Louis Allis       Title Page         (3) Model Number(s)       3hp. 460 Vac       NH9 Ins. Sys.				Induction	Document	TAB C
(3) Model Number(s)       3hp, 460 Vac       NH9 Ins. Sys.         NH9 Ins. Sys			Equipment Type	Motor	<u>Motorettes</u>	
NH9 Ins. Sys		(2)	Manufacturer	Louis Allis	Louis Allis	<u>Title Pag</u> e
M0 4-147746         (4) Serial Number(s)       4-147746-001       NA       TAB E-4         Rpt 4-       4-147746-002       147746-         NQR,Rev A,       Sect B       Sect B         (5) Identify Component-       Supplement 1. Component - Unique       NQR,Rev A,         JUSTIFICATION/COMMENTS       The equipment provided for the plant       Consists of complete motor assemblies which includes a random-         wound stator with the NH9 insulation system. The qualification       report documents the motorette testing performed on the NH9         insulation system in accordance with IEEE 117-1974. Applicability		(3)	Model Number(s)	<u>3hp, 460 Vac</u>	<u>NH9 Ins. Sys.</u>	
<ul> <li>(4) Serial Number(s) <u>4-147746-001</u> NA TAB E-4 Rpt 4- <u>4-147746-002</u> <u>147746-</u> NQR,Rev A, <u>Sect B</u></li> <li>(5) Identify Component- <u>Supplement 1. Component - Unique</u> Unique checksheet attached: <u>Checklist. Motors</u></li> <li>JUSTIFICATION/COMMENTS The equipment provided for the plant consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability</li> </ul>				<u>NH9 Ins. Sys</u>		
(5) Identify Component- <u>Supplement 1. Component - Unique</u> Unique checksheet attached: <u>Checklist. Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability				<u>MO 4-147746</u>		I
(5) Identify Component- <u>Supplement 1. Component - Unique</u> Unique checksheet attached: <u>Checklist. Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability		(4)	Serial Number(s)	4-147746-001	NA	
(5) Identify Component- <u>Supplement 1, Component - Unique</u> Unique checksheet attached: <u>Checklist. Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability						Rpt 4- 147746-
Unique checksheet attached: <u>Checklist, Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability						
attached: <u>Checklist, Motors</u> JUSTIFICATION/COMMENTS <u>The equipment provided for the plant</u> <u>consists of complete motor assemblies which includes a random</u> <u>wound stator with the NH9 insulation system. The qualification</u> <u>report documents the motorette testing performed on the NH9</u> <u>insulation system in accordance with IEEE 117-1974. Applicability</u>		(5)	Identify Component-	- <u>Supplement 1</u>	<u>Component - Uni</u>	ique
consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability				Checklist, Mo	otors	
consists of complete motor assemblies which includes a random- wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability		JUST	IFICATION/COMMENTS	The equipment	provided for the	<u>plant</u>
wound stator with the NH9 insulation system. The qualification report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability		<u>cons</u>	ists of complete mot	or assemblies w	which includes a	random-
report documents the motorette testing performed on the NH9 insulation system in accordance with IEEE 117-1974. Applicability			·			
insulation system in accordance with IEEE 117-1974. Applicability						
						·
of the data from the qualification report is dependent solely	·					-
upon the use of the NH9 system (Louis Allis System P4-9061) in			•			



BINDER NO. WBNEQ-MOT-004 PLANT_	WBN	UNIT(S)1	SHEET_6	OF <u>29</u>
BINDER TITLE LOUIS ALLIS -	COMPUTED DFA	A. DATE	R_2_R_ 8/28/86_JOH_	
INDUCTION MOTORS - OUTSIDE	· ·		2-2-89	
CONTAINMENT	CHECKED NM	<u>B</u> DATE	8/28/86 KB1 218/89	

## F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

Interface	<u>Identify Interface</u>	Requirement? (Yes/No)	Reference
			<u>Test Report</u>
Mounting Bolts	NA	<u>NA</u>	
External Process Connections	NA	<u>NA</u>	
Electrical Connections	<u> </u>	<u>NA</u>	
Conduit Seals	NA	NA	
Connector Seals	NA	NA	
Orientation	NA	NA	
Physical Configuration	NA	<u>NA</u>	
Other			
JUSTIFICATION/CO	OMMENTS <u>Refer to TAB</u>	C. Section 6.0.	Interfaces
······································			
	PAGE B	70 RZ	
	LI-AUC D	/~~/~~	

NDU		MOTO	LOUIS ALLIS - DRS - OUTSIDE	_ COMPUTED <u>DFA</u>  _ CHECKED <u>NMB</u>		2-2-89 3/28/86 ^{KB} 2451 ²⁴
3.	TESI	SEQU	JENCE			<u></u>
	(1)	the	: Sequence: Was accident environ agraph 6.3.2 (Yes	ment in accord	ance with IH	shed to simulate SEE-323 (74),
					<u>Yes/No/NA</u>	<u>Reference</u> TAB C
		(a)	Equipment inspe	cted for damag	e <u>No</u>	<u>Sect 3.2</u>
		(b)	Baseline perform measurements tal		Yes	Note 1 also, TAB C, Att 3, <u>Sect B-2</u>
		(c)	Equipment aged:			Qual Rpt 1, p2 Discussion
		(0)	Thermal		Yes	<u>Sect_D</u>
						Qual Rpt 1, pl
			Radiation		<u>Yes</u>	Discussion <u>Sect C</u>
			Wear		NA	T <u>AB C, Sect 3.</u> 1 R2
		(d)	Vibration/seism: conducted	ic testing	Yes	T <u>AB_C, Sect_3.</u> 2
		(e)	Design basis eve exposure	ent (DBE)	NA	TAB_C, Sect 3.3
		(f)	Post-DBE exposu	re	NA	T <u>AB C, Sect 3.</u> 3
		(g)	Final inspectior disassembly	n and	<u>NA</u>	Note 2 R2
	(2)	Was sequ	the same piece of ence described in	equipment use item (1) abov	ed throughou ve (Yes/No/N	t the test A)? <u>Yes</u>
	(3)	cali	the test equipme bration data been erence: <u>Note 2</u>	appropriately	oment accura 7 document (	cies and Yes/No/NA)? <u>Yes</u> ).
	JUS	TIFIC.	ATION/COMMENTS N	lote 1 - Refer	to Qualific	ation Report 1.
	<u>Att</u>	achme	nt 6, Document LI	<u>P-110, page 1</u> ,	Method of	Test, Sect 2.
	Not	<u> 2 –</u>	The ability of t	<u>he motorette a</u>	nd the insu	lation system
	fund	<u>ction</u>	is predicated up	on its ability	to withsta	nd dielectric
			sts in TAB C, Att			

		a la sur a l						
BINDE	ER NO.	WBNEQ-MOT-004 PLANT WBN UNIT(S) 1	SHEET OF2					
BINDE		LE LOUIS ALLIS - INDUCTION COMPUTED	RR					
			alala					
		CHECKED	_ DATE <u>8/29/86</u>					
H.	<u>AGI</u>	йĞ	· · · · · · · · · · · · · · · · · · ·					
·	(1)	) Was aging considered in the qualification program (Yes/no/NA)? <u>Yes</u> (Reference <u>Qualification Report 1.</u>						
		page 1, Discussion, Section B	).					
		JUSTIFICATION/COMMENTS <u>Aging factors were</u> the stator insulation_following_methods_outl	applied to models of ined in IEEE 117-1974.					
	(2)	Were the following effects considered in the	e aging program:					
		<u>Aging Effec</u> t	<u>Yes/No/NA Reference</u>					
		Thermal aging	<u>Yes</u> <u>H.4.a</u>					
		Radiation exposure	Yes H.5.a					
		Vibration (non-seismic) aging	Yes H.6.a					
		Operational (electrical/mechanical/process) stress aging	Yes H.7.a					
		JUSTIFICATION/COMMENTS Motorette_testing_co	<u>onsists of subjecting</u>					
		models. of insulation systems. to a series	of <u>exposures to</u>					
		radiation. heat. vibration, and moisture to	simulate the effects					
		of long service. thereby simulating the cum	ulative effect of					
		<u>extended operation.</u> <u>Refer to TAB C.</u> <u>Section</u>	<u>n</u> 3 <u>.</u> 1.					
·	<b>(3)</b>	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference	considered in the aging					
		JUSTIFICATION/COMMENTS <u>A review of the mate</u> motors indicates that there are no known syn	erials used in these nergistic effects.					
	(4)	Thermal Aging:						
		(a) Was thermal aging considered in the qua (yes/no/NA)? <u>Yes</u> (Reference <u>Quali</u>	lification program					
		page 4, Test Program, Section B, Therma						
		JUSTIFICATION/COMMENTS <u>Also refer to 1</u> Section B.4.	TAB_C, Attachment_3, PAGEB-					

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MOTORS - OUTS	DUIS ALLIS - INDUCTION COMPUTED October DATE 8/28/86
H. <u>AGING</u> ((	Continued)
(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>Qualification Report 1, Attachment 3).</u>
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Att. 3, Section B.1.</u>
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? Yes (Reference Qualification
	Report 1, page 4, Section B, Thermal Qualification ).
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Att. 3, Section B.4.</u>
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? Yes (Reference
	<u> </u>
	<u>Parameter Plant Maximum Normal Test Equivalen</u> t
	Temperature
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.0</u>
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference
	<u>).</u>
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.0</u>
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? NA (Reference
	)
	JUSTIFICATION/COMMENTS Refer to TAB C. Section 3.0

	<u>LOUIS ALLIS –</u> COMPUTED <u>DFA</u> DATE <u>8/28/86</u> <u>JDH</u> ORS – OUTSIDE <u>2-2-89</u>		
CONTAINMENT	CHECKED NMB DATE 8/28/86		
H. <u>AGING</u> (Co	ntinued)		
(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>Yes</u> (Reference:	! • •	
	JUSTIFICATION/COMMENTS Qualification of the motors		
	through the use of motorette tests involves the use of		
	the equation of a regression-type implied average life		
	characteristic. Refer to TAB C, Section 3.0		
(h)	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>NA</u> (Reference:)		
	JUSTIFICATION/COMMENTS <u>Refer to TAB C. Section 3.1.</u>		
(5) Radi	ation Aging Exposure:	-	
(a)	Was radiation aging exposure considered in the qualificat program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification</u>	i	
	Report 1, page 2, Section A. Radiation Qualification )	•	
	JUSTIFICATION/COMMENTS Also refer to TAB C. Attachment		
	3. Section B.3.		
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification Report 1. Attachment 3</u> )	•	
	JUSTIFICATION/COMMENTS		
. (c)	Was the basis for radiation aging exposure identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification Rpt 1, page 2, Subsection A.1</u>		
	General )	•	
	JUSTIFICATION/COMMENTS		

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CONTAINMENT CHECKED NMB DATE 8/28/86
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H. <u>AGING</u> (Continued)
(d) Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualifica-</u>
tion Report 1, page 3, Section A.4.a. ).
Plant normal ambient radiation dose (rd) <u>1.8 x 10³ TID normal</u>
Test exposure dose (rd) $1.1 \times 10^2$ TID R
Test exposure dose rate (rd/hr) $0.49 \times 10^{6}$ for 2245 hrs
Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
JUSTIFICATION/COMMENTS
(6) Vibration (non-seismic) Aging:
(a) Were the effects of non-seismic vibration induced during R normal and abnormal operation addressed in the qualification program ¹ Yes (Reference:
Qualification Report 1, page 4, Section B.1 ).
JUSTIFICATION/COMMENTS Refer to TAB C, Attachment 3,
Section B.5.
(b) Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Qualification Rpt 1, page 4, Sect B.3.b</u> ).
JUSTIFICATION/COMMENTS Mechanical stress testing
performed in accordance with Section 2.2.3 of IEEE
117-1974 to simulate winding forces that occur in an
actual motor.
¹ Qualification program refers to the test report and any supple-
mental documentation including TVA analyses in TAB C of the Binder.

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H.	<u>AGIN</u>	<u>1G</u> (C	ontinued)
	(7)	0per	ational Stress Aging:
		(a)	Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? Yes (Reference).
			JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.1.</u>
		(b)	Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference
			JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.1.</u>
		qualli	ne qualified life of the equipment and its basis defined in the fication program (yes/no/NA)? <u>Yes</u> rence
		Qualif	). Fied life (Document in QMDS) <u>Expected qualified life is</u>
			<u>40+ years.</u> FICATION/COMMENTS <u>Refer to TAB C, Attachment 3, Section D.</u>

		WBN UNI	T(S) <u>1</u>	SHEET <u>13</u> 01 R <u>2</u> R
	ITLE <u>LOUIS ALLIS</u> C N MOTORS - OUTSIDE	COMPUTED_DFA	DATE <u>8/28</u>	
CONTAINM		HECKED <u>NMB</u>	DATE <u>8/28</u>	3/86 48/89 _
			•	·····
H. <u>AGIN</u>	G (Continued)	,		
(9)	Were replacement interva defined in the qualifica (Reference:	ls for the equ tion program (	ipment or it Yes/No/NA)?	s components Yes
			A	>
	JUSTIFICATION/COMMENTS	<u>No replaceable</u>	items were	identified
	in the insulation system	qualification	program des	<u>cribed in</u>
	M&M report 282. The bea	rings and lubr	<u>icants are r</u>	outine
	maintenance items, the r	eplacement of y	which are ad	dressed in
	individual Qualification	<u>Maintenance</u> Da	<u>ata Sheets i</u>	n this
	binder. Basically, lubr	ication schedu	les, bearing	replacement
	intervals and electrical	and mechanica.	l surveillan	<u>ce recommen-</u>
	dations, particularly rep	garding the neg	prene_sling	ers_and
	gaskets, are detailed.		•	
			]	
		AGE <u><i>B-77</i></u>	KZ	

	דדדו ר					DATE OVOC	R <u>1</u>
			ALLIS-INDUCTI		D <u>Ackerly</u>	DATE <u>8/28</u>	
MOTORS	<u>- OUT</u>	SIDE CONT	TAINMENT	CHECKED	NMB	_DATE <u>8/28</u>	/86 c/1/28
			· · · · · · · · · · · · · · · · · · ·	•			
I. <u>MATE</u>	RIALS	ANALYSIS	5				
Radi	ation	ation of , Degrada Analysis	ition and Agi	sceptible to ng (See Secti	Significant on C of EQC	Thermal and Binder for	d/or Detailed
		•	erty/Functio	Radia <u>n Threshold</u>			ivation <u>Referenc</u>
(a)	Туре	NH9 Insu	lation Sys	<u>1.1 x 10⁹</u>	Note 1	1.22	Note 3
(b)		<u>ing Lubri</u> vron SRI-	<u>cant</u> 2 grease)	<u>2.0 x 10⁸</u>	Note 2	Note 5	
(c) (d)		<u>rene/mech</u> ger & gas		<u>2 x 10⁶</u>	Note 4	Note 5	
(e)	. <u> </u>						<u> </u>
(8)							
	<u> </u>						-
	IFICA	TION/COMM	ENTS <u>Note 1:</u>	The NH9 system	em withstood	a total do	ose of
				The NH9 system intained its			
		<u>1.1 x 10⁹ </u>	rads and ma		ability to p	erform its	required
		<u>1.1 x 10² function</u>	rads and ma	intained its	ability to po g a post-expo	erform its osure diele	required
		<u>1.1 x 10²</u> function Refer to (	<u>rads and ma</u> as demonstrat Qualification	intained its a ted by passing n Report 1, pa	ability to po g a post-expo age 2, Sectio	erform its osure diele on A.	required
JUST:	2: 1	<u>1.1 x 10²</u> function Refer to Refer to 1	rads and ma as demonstrat Qualification Digital Mater	intained its ted by passing n Report 1, pa rial Aging and	ability to po g a post-expo age 2, Section d Radiation (	erform its osure diele on A. Effects,	required
JUST:	2:	<u>1.1 x 10²</u> function Refer to 1 Refer to 1 Library Co	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8	intained its a ted by passing n Report 1, pa rial Aging and B3A, and TAB (	ability to p g a post-exp age 2, Section d Radiation 4 C, Section 4	erform its osure diele on A. Effects, .2.	required ctic test.
JUST Note Note	2:	<u>1.1 x 10²</u> function Refer to 1 Refer to 1 Library Ca Refer to 1	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8 Material Agir	intained its ted by passing n Report 1, pa rial Aging and B3A, and TAB ( ng Calculation	ability to po g a post-expo age 2, Section d Radiation 4 C, Section 4 n WAC-082. F	erform its osure diele on A. Effects, .2. Refer to TA	required ctic test. B D-8.
JUST: Note	2:   ] 3:   4:	<u>1.1 x 10²</u> function Refer to 1 Library Ca Refer to 1 Refer to 1	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8 Material Agin Digital Mater	intained its a ted by passing n Report 1, pa rial Aging and B3A, and TAB ( ng Calculation rial Aging and	ability to p g a post-expo age 2, Section d Radiation 4 C, Section 4 n WAC-082. F d Radiation E	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib	required ctic test. B D-8.
JUST Note Note Note	2:   ] 3:   4:	<u>1.1 x 10²</u> function Refer to 1 Library Co Refer to 1 Refer to 1 Library Co	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8 Material Agir Digital Mater	intained its a ted by passing n Report 1, pa rial Aging and 33A, and TAB ( ng Calculation rial Aging and 33A, Radiation	ability to p g a post-exp age 2, Section d Radiation 4 h WAC-082. F d Radiation E h Library Coc	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib de 094-83.	required ctic test. B D-8. rary,
JUST Note Note	2:   3:   4:   5: (	<u>1.1 x 10²</u> function Refer to 1 Refer to 1 Refer to 1 Refer to 1 Library Co Considerat	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8 Material Agin Digital Mater ode No. 202-8 tion of long	intained its a ted by passing n Report 1, pa rial Aging and 33A, and TAB ( ng Calculation rial Aging and 33A, Radiation term thermal	ability to po g a post-expo age 2, Section d Radiation 4 C, Section 4 MAC-082. F d Radiation E Library Coc degradation	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib de 094-83. is not req	required ctic test. B D-8. rary, uired
JUST Note Note Note	2:   3:   4: F 5: (	<u>1.1 x 10²</u> function Refer to 1 Refer to 1 Library Co Refer to 1 Refer to 1 Library Co Considerat	rads and ma as demonstrat Qualification Digital Mater ode No. 157-8 Material Agin Digital Mater ode No. 202-8 tion of long ubricant and	intained its a ted by passing n Report 1, pa rial Aging and 33A, and TAB ( ng Calculation rial Aging and 33A, Radiation term thermal slingers are	ability to po g a post-expo age 2, Section d Radiation 4 h WAC-082. F h Radiation 6 h Library Coc degradation not consider	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib de 094-83. is not req red to be s	required ctic test. B D-8. rary, uired ubstances
JUST Note Note Note	2: 1 3: F 4: F 5: C	<u>1.1 x 10²</u> <u>function</u> <u>Refer to 1</u> <u>Refer to 1</u> <u>Library Ca</u> <u>Refer to 1</u> <u>Refer to 1</u> <u>Considerat</u> <u>Decause 10</u> <u>Or devices</u>	rads and mains as demonstration Qualification Digital Mater ode No. 157-8 Material Agin Digital Mater ode No. 202-8 tion of long ubricant and s with infini	intained its a ted by passing n Report 1, pa rial Aging and 33A, and TAB ( ng Calculation rial Aging and 33A, Radiation term thermal slingers are te lives. A	ability to po g a post-expo age 2, Section d Radiation H C, Section 4 h WAC-082. F d Radiation E h Library Coo degradation not consider surveillance	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib de 094-83. is not req red to be si e and main	required ctic test. B D-8. rary, uired ubstances tenance
JUST Note Note Note	2: 1 3: F 4: F 5: C	<u>1.1 x 10²</u> <u>function</u> <u>Refer to 1</u> <u>Refer to 1</u> <u>Library Ca</u> <u>Refer to 1</u> <u>Refer to 1</u> <u>Considerat</u> <u>Decause 10</u> <u>Or devices</u>	rads and mains as demonstration Qualification Digital Mater ode No. 157-8 Material Agin Digital Mater ode No. 202-8 tion of long ubricant and s with infini	intained its a ted by passing n Report 1, pa rial Aging and 33A, and TAB ( ng Calculation rial Aging and 33A, Radiation term thermal slingers are	ability to po g a post-expo age 2, Section d Radiation H C, Section 4 h WAC-082. F d Radiation E h Library Coo degradation not consider surveillance	erform its osure diele on A. Effects, .2. Refer to TA Effects Lib de 094-83. is not req red to be si e and main	required ctic test. B D-8. rary, uired ubstances tenance

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INDUCI	CION	TLE_LOUIS ALLIS -       COMPUTED DFA       DATE 8/28/86 JDH         MOTORS - OUTSIDE       2-2-89         MOTORS - OUTSIDE       DATE 8/28/86 JDH
CONTAI	INME	NT CHECKED NMB DATE 8/28/86
	-	PMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE ORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDI
. (	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (Yes/No/NA)? Yes (Reference: Qualification Report 1, page 4, Section B.3.d
		Identify Acceptance Criteria: Failure to withstand 30 minu
		applied potential tests at the following levels: turn-to-tu
		120 VAC; coil-to-coil and coils-to=ground, 600 VAC.
(2)	(2)	Performance Characteristics: Does the report/analysis prov the performance characteristics for the equipment which sho be verified before, after, and periodically during the test judge equipment performance (Yes/No/NA)? Yes (Reference: Qualification Report 1, Attachment 6, LTP-110,
		page 1. Method of Test. Section 2
		Identify baseline and functional testing: <u>Functional tests</u>
		listed in section J.1 above. Each motorette was subjected
		the following baseline tests: turn-to-turn, 400 VAC; coil-
		to-coil, 2000 VAC; coils-to-ground, 2000 VAC.
		JUSTIFICATION/COMMENTS Also refer to TAB C. Att 3. Section
		<u>B.2 and B.7.</u>
(	(3)	Does the qualification report/analysis describe loads (or 1 combinations) applied during DBE test (Yes/No/NA)? <u>NA</u> (Reference:
		JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.3

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		LOUIS ALLIS ORS - OUTSIDI		R_2_R_ DATE <u>8/28/86_JD#</u> 2-2-89	
CONTAINM			CHECKED NMB	DATE 8/28/86	
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PER	IPMEN FORMAN	NCE SPECIFICA	CHARACTERISTICS NECESS	SARY TO ENSURE THE D UNDER ACCIDENT CONDI	TIO
-					
(4)	opei	the applied l cating condit	oads during baseline t lons (Yes/No/NA)? <u>Yes</u>	esting reflect normal	-
					_).
	JUSI	TIFICATION/CC	MENTS <u>Voltages appli</u>	ed to the motorettes	
				.2 were chosen to be	
				motors rated 460 VAC.	
(5)				cessary to ensure the	-
		pment perfor	ance specifications c	an be satisfied.	
	(a)	Parameter	<u>Plant Normal Conditi</u>	ons Reference	-
		Voltage	NA	· · · · · · · · · · · · · · · · · · ·	-
		Load	NA		-
		Frequency	NA		_
		Accuracy	NA		
		Other(s)			
		JUSTIFICATI	N/COMMENTS <u>Refer to</u>	TAB C, Section 5.0	
		for discuss:	on of voltage and free	<u>uency requirements.</u>	

	D. <u>WBNEQ-MOT-00</u> 4		
	ITLE <u>LOUIS ALLI</u> <u>MOTORS - OUTSI</u>		
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	····		
PERI	IPMENT ELECTRICA FORMANCE SPECIFI atinued)	L CHARACTERISTICS NECESSARY TO ENSURE THE CATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITI	<u>ons</u>
(b)	Parameter	Specific Accident Conditions Reference	_ 1
-	Voltage	NA	
	Load	NA	
	Frequency	NA	_
	Accuracy	NA	_
	Other(s)		
			_
,	JUSTIFICATION/	COMMENTS Refer to TAB C. Sect. 5.0 for	-
		COMMENTS Refer to TAB C, Sect. 5.0 for	-
		COMMENTS Refer to TAB C, Sect. 5.0 for	_ _
(c)	discussion of	voltage and frequency requirements.	- - -
(c)	discussion of y	Demonstrated Conditions Reference	 R
(c)	discussion of	Demonstrated Conditions Reference	- - _   R
(c)	<u>discussion of</u> <u>Parameter</u> Voltage Load	voltage and frequency requirements.            Demonstrated Conditions       Reference          NA          NA	- - - - - -
(c)	<u>discussion of</u> <u>Parameter</u> Voltage Load Frequency	voltage and frequency requirements.	  R
(c)	<u>discussion of</u> <u>Parameter</u> Voltage Load	voltage and frequency requirements.            Demonstrated Conditions       Reference          NA          NA	- - - - -
(c)	discussion of Parameter Voltage Load Frequency Accuracy	voltage and frequency requirements.	- - _   R
(c)	discussion of Parameter Voltage Load Frequency Accuracy	voltage and frequency requirements.	- - - -
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s)	Demonstrated Conditions       Reference         NA	- - -   R -
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C	Demonstrated Conditions       Reference         NA	  -   R
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C	Demonstrated Conditions       Reference         NA	- - _   R
(c)	discussion of Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C	Demonstrated Conditions       Reference         NA	- - - - -

BINDER NO	D. <u>WBNEQ-MOT-00</u> 4 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>18</u> OF 29 R 2 R
INDUCTION	ITLE LOUIS ALLIS – COMPUTED DFA DATE <u>9/15/86</u> <u>N MOTORS – OUTSIDE</u> ENT CHECKED NMB DATE <u>9/15/86</u> <u>2-2-89</u> CHECKED NMB DATE <u>9/15/86</u> <u>2-2-89</u>
K. <u>REQI</u>	JIRED OPERATING ENVIRONMENT
Refe	erence Environmental Drawing No. <u>47E235-78</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM</u> (b) Pressure (psig) <u>ATM</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $1.8 \times 10^3$ (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>None</u>
•	
(4)	State anticipated occurrence frequency and duration of abnormal conditions: 8 hours per excursion and will occur less than 1%
. ·	of the plant life.
(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): 110 for (a) Temp. (°F)(**) 100 days Accident type LOCA R
	(b) Pressure (psig) <u>NA</u> Accident type
	(c) Humidity (%) <u>NA</u> Accident type
	(d) Radiation (rd) <u>1.9x10⁶*</u> Accident type <u>LOCA</u>  R
	(e) Spray Type <u>NA</u> Accident type
	* Location specific dose per TVA calculation WBNNAL3-031.
	Section C.
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INDU	JCTION	ITLE <u>LOUIS ALLIS –</u> I MOTORS – OUTSIDE INT	CHECKED NMB	DATE <u>9/15/86</u> <u>JDH</u> 3-939 DATE <u>9/15/86 (BN</u> 3/9/89				
к.	<u>REQI</u>	REQUIRED OPERATING ENVIRONMENT (Continued)						
		Comments (duration/peak/profile/spray composition and margin, etc.): <u>Motors are located outside containmen</u>						
		<u>are not subject to ch</u>	emical spray.					
	(6)		mance of the	re or liquid intrusion w equipment under design ba No (Reference:				
	(7)			mental Dwg 47E235-78				
	(7)	J		<u>No</u> (Reference:				
		Identify initiation t	ime and durat	on of submergence:				
	(8)	Is the equipment subj the total accident do (Reference: <u>Section</u>	se (Yes/No/NA)	radiation contribution t				
		If yes, identify the beta dose to be added	fraction of th to the total	e unattenuated free fiel dose and justify:				
				·				
	(9)	Special environmental	calculations	(temp., rad., etc.)				
		Type		RIMS No.				
		WBNNAL3-031	<u></u>	<u>See TAB B-3. Sect A</u>				

BINDER 1	TITLE LOUIS ALLIS -	COMPUTED_DF	-	R2R B6_ <i>J0H</i>
	N MOTORS - OUTSIDE			3-9-89
CONTAINM	ENT	CHECKEDNM	<u>B</u> DATE <u>8/28/8</u>	
				3/9/89
L. <u>SUM</u>	MARY COMPARISON OF TEST	CONDITIONS	TO SPECIFIED CONDI	TIONS
(1)	Comparison of worst-ca	ase maximum	parameters:	
	Parameter	<u>Specified</u>	<u>Demonstrated</u> F TAB C, Att. 3,	<u>leference</u>
	Operating Time	<u>100 days</u>	Sect. D TAB C, Att. 3,	 
	Temperature (°F)	110	Sect. D	
	Pressure (psig)	ATM	TAB C, <u>Sect. 3.5</u>	•
	Relative Humidity (%)	100	TAB C, Att. 3, <u>Sect. B.6</u>	
	Chemical Spray*	NA	TAB C, Sect. 3.4	
	Radiation (rd)**	1.9018x10 ⁶	TAB C, Att. 3,	
		gamma	Sect. D TAB C,	
	Submergence	NA	<u>Sect. 7.0 _</u>	
	*Includes spray concent pH.	ration, flow	wrate, density, du	ration, and
	**Enter 40-year integrat dose and specify type.	•		
(2)	Comparison of worst-ca	ise profiles	and margin assess	ment:
		Test Pr		
	Parameter	Envelopes S		-
	rarameter	(Yes/N		ference
			ጥልጽ	C 4++ 2
	Temperature	Yes	<u>Sect</u>	
	Temperature Pressure	Yes	S <u>S</u> SECT TAB SSECT	D C, . 3.5
	-	-	S Sect TAB S Sect TAB S Sect S Sect	D C, . 3.5 C, Att. 3, . B.6
	Pressure	Yes	Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           TAB           TAB           TAB           TAB           TAB	D C, . 3.5 C, Att. 3, . B.6
	Pressure Relative Humidity	Yes	Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB	D C, . 3.5 C, Att. 3, . B.6 C, 3.4
	Pressure Relative Humidity Chemical Spray	Yes Yes NA NA	Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB	D C, . 3.5 C, Att. 3, . B.6 C, 3.4 C,
	Pressure Relative Humidity Chemical Spray Submergence	Yes Yes NA NA	Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB	D C, . 3.5 C, Att. 3, . B.6 C, 3.4 C,
	Pressure Relative Humidity Chemical Spray Submergence	Yes Yes NA NA	Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB           Sect           TAB	D C, . 3.5 C, Att. 3, . B.6 C, 3.4 C,

PAGE <u>8-84</u>	RZ
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	· (*) 9		
BINDER NO	D. WBNEQ-MOT-004 PLANT WBN UNIT(S)	1	SHEETOF
BINDER TI	TLE COMPUTED	elyDATE 8/	125/86
MOTORS -	TLE LOUIS ALLIS - INDUCTION COMPUTED		28/8(
L. <u>SUM</u>	MARY COMPARISON OF TEST CONDITIONS TO SPECI	FIED CONDITI	ONS (Continued)
(3)	Were margins applied to the test paramete the test program to assure that normal va accounted for? (Note margin applied, yes/	riation and	
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	<u>Yes/No/NA</u>
	Temperature: +15 degrees F	<u>Note l</u>	Yes
	Pressure: +10% but no more than 10 psig		<u>NA(2)</u>
	Radiation: +10% of accident dose	10%	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)	Note 1	Yes
	Voltage: <u>+</u> 10% of rated value	<del></del>	<u>NA(3)</u>
	Frequency: <u>+</u> 5% of rated value		<u>NA(3)</u>
	Environmental Transient: the initial transient and the peak temperature applied twice		NA(4)
	Vibration: +10% added to acceleration		NA(5)
	JUSTIFICATION/COMMENTS: Note 1: Per TAB C	, Att. 3, Se	
	worst_case_expected_life_was_calculated_t	<u>o_be_1,098,2</u>	26 years
	with a maximum hot spot temperature of 78	.33°C. The r	equired
	operating time is 40.27 years. A signific	cant margin	exists_in
	the relationship between the time and tem	perture_crite	eria.
	(2) Refer to TAB C, Section 3.5.		
	(3) Refer to TAB C, Section 5.0.		
	(4) Refer to TAB C, Section 3.3.		
	(5) These motors do not experience signifi	icant_process	s-related
	vibration and as such, a vibration margin	<u>above_the_le</u>	evels
	addressed in TAB C, Att. C, Section B.5 is	<u>not</u> require	ed. PAGEZ

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	DWBNEQ-MOT-004 PLANTWBNUNIT(S) SHEET OF
BINDER TI	TLE LOUIS ALLIS - INDUCTION COMPUTED Achelydate 8/28/86R
MOTORS	- OUTSIDE CONTAINMENT
	DATE <u>\$\\$\\$\\$\</u>
M. OPE	RABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference
	).
	JUSTIFICATION/COMMENTS Motors utilizing the stator insulation
	system tested, must be capable of starting and maintaining
	operation. Refer to TAB A.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	).
	JUSTIFICATION/COMMENTS Refer to TAB C, Section 3.3.
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>NA</u> (Reference
	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.3.</u>
(4)	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.3.</u>
( <b>4</b> )	JUSTIFICATION/COMMENTS <u>Refer to TAB C. Section 3.3.</u> Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate
(4) ,	JUSTIFICATION/COMMENTS <u>Refer to TAB C, Section 3.3.</u> Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>NA</u> (Reference).

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M. <u>OPERABILITY TEST RESULTS</u> (Continued) (5) Abnormal Conditions: Were abnormal conditions or anomalies proper addressed and resolved (yes/no/NA)? <u>NA</u>	23 OF
addressed and resolved (yes/no/NA)? <u>NA</u> (Reference). JUSTIFICATION/COMMENTS <u>No anomalies were noted throughout the</u>	
	operly
	1.
motorette testing.	

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BINDER NO. WBNEQ-MOT-004		UNIT(S)		OF2	.9
BINDER TITLE LOUIS ALLIS	- INDUCTION COMP	PUTED Refuely DA	ате <u>8/28/56                                    </u>	R	-
MOTORS - OUTSIDE CONTAI	MENT CHEC		ATE 8/28/86		-

#### N. <u>MAINTENANCE AND SURVEILLANCE</u>

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes_____ (Enter all requirements in Section G of the Binder - Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS <u>No replaceble items were identified in the</u> <u>insulation system qualification program described in M & M report 282.</u> <u>The bearings and lubricants are routine maintenance items, the replace-</u> <u>ment of which are addressed in individual Qualification Maintenance</u> <u>Data Sheets in this binder. Basically, lubrication schedules, bearing</u> <u>replacement intervals, and electrical and mechanical surveillance</u> <u>recommendations, particularly regarding the neoprene slingers and</u> <u>gaskets, are detailed in the QMDS located in TAB G.</u>

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BINDER NO. WBNEQ-MOT-004 PLANT WBN UNIT(S)	SHEET OF
BINDER TITLE LOUIS ALLIS - INDUCTION COMPUTED CLUL, DATE S MOTORS - OUTSIDE CONTAINMENT CHECKED DATE S	R R /28/91c /26/96
0. <u>SUMMARY OF REVIEW</u>	Yes/No/NA
(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	Yes
(3) Choice of qualification methodology adequately justified?	Yes
<ul><li>(4) If analysis was performed, complete the following:</li><li>(a) Were equipment performance requirements identified?</li></ul>	<u>Yes</u>
(b) Were specific features and failure modes and effects analyzed?	Yes
(c) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
(d) Were environmental parameters which affect equipment performance identified?	<u>Yes</u>
(5) Adequate similarity between equipment and test specimen established?	Yes
(6) Aging degradation evaluated adequately?	Yes
(a) Mechanical and/or cycle aging addressed?	Yes
(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
(c) Absence of preaging in test/analysis justified?	<u>NA</u>
(d) Materials susceptible to thermal/radiation aging identified?	Yes

MAUE B-89

BINDER TI MOTORS	TLE LOUIS ALLIS - INDUCTION COMPUTED Coluctory DATE 8/2 - OUTSIDE CONTAINMENT CHECKED DATE 8/2	
0. <u>Sum</u>	MARY OF REVIEW (Continued)	/ Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	
(7)	Qualified life or replacement schedule established?	<u>Yes</u>
(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	NA
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	NA
	(a) Was the spray testing done while under the extremes of pressure and temperature?	<u>NA</u>
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	NA
(11)	Criteria regarding submergence satisfied?	Yes
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes Section P -
	(b) Was beta radiation considered?	Note 1
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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BINDER NO		_ SHEET OF
BINDER TI	TLE LOUIS ALLIS - INDUCTION COMPUTED Chily DATE 8/2	RR .s:/s(
MOTORS ·	- OUTSIDE CONTAINMENT CHECKED DATE Y	×/86
0. <u>Sum</u>	MARY OF REVIEW (Continued)	Yes/No/NA
(15)	Criteria regarding functional testing satisfied?	Yes
	(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
	(b) Was an initial base line test done to establish required performance characteristics?	Yes
	<ul> <li>(c) Has the test/analysis demonstrated that performance performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?</li> </ul>	e <u>Yes</u>
(16)	Criteria regarding instrument accuracy satisfied?	NA
(17)	Test duration margin (1 hour + function time) satisfied?	Yes
	(a) Is the minimum specified operating time at least l hour?	Yes
	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>NA</u>
(18)	Criteria regarding synergistic effects satisfied?	NA
(19)	Criteria regarding margins satisfied?	<u>Yes</u>
(20)	Maintenance and surveillance requirements adequately identified?	<u>Yes</u>
P. <u>DISC</u>	USSION	
NOTE	1: Motors are located throughout the Auxiliary Buildi	ng. Beta
	radiation is confined to the Reactor Building by p	lant
	design; therefore, these motors are not required t	o_be
	evaluated for the effects of beta radiation.	
	PAGE <u>B-91</u>	

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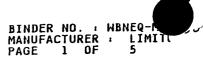
	ELOUIS ALLIS - IN	r	1	herly DATE 5/2	R R ~~~~~~~~~~~~~~~~~~~~~~~~~~~
		СН	ECKED		20/06
			EMENT 1		el of 2
• :		COMPONENT-UN MC	TORS	LIST	
EQUIPMENT	<u>IDENTIFICATION</u>				
(1) Is t plar	the motor identified at motors which requ	l in the qua lire qualifi	lification cation (ye	report identi s/no/NA)? <u>No</u>	cal to the
	Item	<u>Plant</u>	Percet	Acceptable <u>(Yes/No/NA)</u>	Report Section
		NH9	<u>Report</u> NH9	(les/NO/NA)	Refer to
(a)	Insulation system	(P4-9061	•		(2) this
	materials	<u>-115)</u>	<u>-115)</u>	Yes	supplement
(b)	Coil construction				
	(form or random wound, cast)	RANDOM	RANDOM	Yes	Qual. Rpt 1 p_1,_OBJECT
	•	MADON	MANDON	<u> </u>	Refer to
(c)	Insulation class	77			Note 1 in
	(B, F, H)	<u> </u>	<u> </u>	Yes	Comments
(d)	Lubricant				
	Manufacturer	CHEVRON	NA	Yes	<u>Refer_to</u>
	<b>m</b>				TAB C
	Туре	<u>SRI-2</u>	NA	Yes	Section 4.2
(e)	Bearing				
	Manufacturer	MRC	NA	Yes	<u>Refer to</u>
					(3) this
	Туре <u>Аг</u>	tifriction	<u> </u>	Yes	<u>Supplement</u>
	Bearing life		<u>NA</u>		
(f)	Seals				
	Vorufact				
	Manufacturer	یند هی مقدم (۱۹۹۹)	<u> </u>		Refer to
	Туре	<u>Slinger</u>	NA	Yes	<u>(5) this</u>
	Material	Neoprene	NA	Yes	Supplement
				100	

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	ER NO. <u>WBNEQ-MOT-00</u> 4 PLANT		4.2.5	R	HEET <u>29</u> 0F <u>29</u>
	ER TITLE <u>LOUIS ALLIS -</u> CTION MOTORS - OUTSIDE	_ COMPUTED	DFA	DATE <u>8/28/8</u>	6 <u>J0H</u>
	AINMENT	_ CHECKED_	NMB	DATE <u>8/28/8</u>	6KBN
	o ·	•			3/9/89
FOU.	IPMENT IDENTIFICATION (Cont				
	IIMENI IDENIIFICATION (CON	(indea)			Page 2 of 2
				Acceptable	Report
	Item	<u>Plant</u> H	<u>Report</u>	(Yes/No/NA)	
	(g) Motor lead N(	)MEX w/ NC	) MFY ዓ/		TAB C, Att. 3,
	÷	<u>Braid</u> GI			<u>Sect. D</u>
	Comments: <u>Note 1 - TAB F</u>	-4, Docume	ent 4-14	7746-NQR. Rev	<u>A.</u>  R
	page 3. Item 12.				
					<u>_</u>
(2)	Does the qualification re	port indic	ate tha	t the motoret	te insulation
	system is the same as tha (Reference: <u>TAB E-4, Do</u>	cument 4-1	the mot 47746-N	ors (Yes/No/NA OR, Rev A, pag	A)? <u>Yes</u> ze 1
	Section D.2				R
			<u> </u>		).
	Comments:				
(3)	Has the vendor provided t	he bearing	rating	(Vee/Ne/NA)?	Vac
(3)	Has the vendor provided t (Reference: <u>TAB E-4, Doc</u>	he bearing ument 4-14	rating 7746-NQI	(Yes/No/NA)? R. Rev A, page	<u>Yes</u> 4 R
(3)	(Reference: <u>TAB E-4, Doc</u>	ument 4-14	<u>7746–NQ</u>	R. Rev A. page	<u>    4                                </u>
(3)	(Reference: <u>TAB E-4, Doc</u>	ument 4-14	7746–NQI	R, Rev A, page	<u>   4                                 </u>
(3)	(Reference: <u>TAB E-4, Doc</u>	ument 4-14	7746–NQI	R, Rev A, page	<u>   4                                 </u>
(3)	(Reference: <u>TAB E-4, Doc</u>	ument 4-14	7746–NQI	R, Rev A, page	<u>   4                                 </u>
(3)	(Reference: <u>TAB E-4, Doc</u> <u>item 13</u> Comments: <u>Also refer to</u> Was the lubricant included	IAB C, Sec	7746-NQ	R, Rev A, page	<u>4                                    </u>
	(Reference: <u>TAB E-4, Doc</u> <u>item 13</u> Comments: <u>Also refer to</u> Was the lubricant included	IAB C. Sec	tion 4.	R, Rev A, page	<u>4                                    </u>
	(Reference: <u>TAB E-4, Doc</u> <u>item 13</u> Comments: <u>Also refer to</u> Was the lubricant included (Reference:	IAB C. Sec	tion 4.;	R, Rev A, page	<u>   4                                 </u>
	(Reference: <u>TAB E-4, Doc</u> <u>item 13</u> Comments: <u>Also refer to</u> Was the lubricant included	IAB C. Sec	tion 4.;	R, Rev A, page	<u>   4                                 </u>
(4)	<pre>(Reference: <u>TAB E-4, Doc</u> item 13 Comments: <u>Also refer to</u> Was the lubricant included (Reference:</pre>	IAB C. Sec	7746-NQ	R, Rev A, page	<u>4                                    </u>
(4)	<pre>(Reference: TAB E-4, Doc item 13 Comments: Also refer to Was the lubricant included (Reference: Comments: <u>Refer to TAB</u> Were the seals included in</pre>	IAB C. Sec	7746-NQ	R, Rev A, page	<u>4                                    </u>
(4)	<pre>(Reference: TAB E-4, Doc item 13 Comments: Also refer to Was the lubricant included (Reference:</pre>	IAB C. Sec i in the to C. Section	7746-NQI tion 4.: est prog 4.2. program	R, Rev A, page gram (Yes/No/N (Yes/No/NA)?	<u>4</u>  R: ). ). ). ).
(4)	<pre>(Reference: TAB E-4, Doc item 13 Comments: Also refer to Was the lubricant included (Reference: Comments: <u>Refer to TAB</u> Were the seals included in</pre>	IAB C. Sec i in the to C. Section	7746-NQI tion 4.: est prog 4.2. program	R, Rev A, page gram (Yes/No/N (Yes/No/NA)?	<u>4</u>  R: ). ). ). ).
(4)	<pre>(Reference: TAB E-4, Doc item 13 Comments: Also refer to Was the lubricant included (Reference:</pre>	IAB C. Sec i in the to C. Section	7746-NQI tion 4.: est prog 4.2. program	R, Rev A, page gram (Yes/No/N (Yes/No/NA)?	<u>4</u>  R: ). ). ). ).
(4)	<pre>(Reference: TAB E-4, Doc item 13 Comments: Also refer to Was the lubricant included (Reference:</pre>	IAB C. Sec d in the to C. Section	7746-NQI tion 4.: est prog 4.2. program 4.3.	R, Rev A, page	<u>4</u>  R: ). ). ). ).





PRINT DATE: 06/27/90

### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO		LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAI</u> (2)	OPER TIME	<u>event</u>	SAFETY FUNCTION
WBN-1-MVOP-062-0061 -B SEAL FLOH RETURN ISOLATION	1-FCV -062-0061 VALVE SB		729º 7º AC4 71C62-54114-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	REQUIRED TO CLOSE AND REMAIN CLOSED AFTER PHASE AISOLATION SIGNAL IS RECEIVED AND RESET. SEE NOTE 4.
WBN-1-MVOP-063-0072 -A CNTMT SUMP TO RHR PUMP A-A	1-FCV -063-0072 SB	-A -3	685' A07' 71C62-54114-1	A B B B B	100D 1m0 1m0 1m0 1m0 1m0	L RH/A CV/A AB AF	L: NORM CLOSED VLV MUST OPEN TO ALIGN SUCTION OF RHR PUMP TO SUMP FOR "SI" RECIRC, MUST REMAIN OPEN DURING RECIRC MODE CLOSE TO MITIGATE SING FAILURE
HBN-1-MVOP-063-0073 -B CNTMT SUMP TO RHR PUMP B-B	1-FCV -063-0073 SB-		685' A07' 71C62-54114-1	A B B B	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A AB AF	L: NORM CLOSED VLV MUST OPEN TO ALIGN SUCTION OF RHR PUMP TO SUMP FOR "SI" RECIRC, MUST REMAIN OPEN DURING RECIRC MODE CLOSE TO MITIGATE SING FAILURE
WBN-1-MVOP-063-0172 -B RHR TO RCS HOTLEG 1 & 3 FLOI	1-FCV -063-0172 N ISLN VLV SB-	-B -2	713' A28 71C62-54114-1	A A A A	100D 1m0 1m0 1m0 1m0	L RH/A CV/A AB AF	NEEDED TO TRANSFER FROM COLD LEG RECIRC TO HOT LEG RECIRC. SEE NOTE 4.
WBN-1-MVOP-067-0087 -A Lower CNTMT A Cooler Disch 1	1-FCV -067-0087 ISLN VALVE IC	-A '		A A A A	100D 1m0 1m0 100D 100D	L RH/C CV/C FW/C MS/C	ISOL FLOW TO VENT COOLER UPON RECEIPT OF PHASE 'A' CONTAINMENT ISOLATION SIGNAL. SEE NOTE 4.

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R.3 PREPARERIDATE KEITH B. NAPIER 12/12/8 CHECKED/DATE D. L. KIRBY 12/12/89 1/10/9



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BINDER NO. : WBNEQ-.... -001 MANUFACTURER : PAGE 2 OF 5

### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCITION	UNIT DEVICE ID NO. MODEL 1	AZMITH	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CA</u> (2)	I <u>OPER TIME</u>	EVENT	SAFETY FUNCTION
W3N-1-MVOP-067-0095 -A Lower CNTMT C Cooler Disch	1-FCV -067-0095 - ISLN VALVE IC	A		A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	ISOL FLOW TO VENT COOLER UPON RECEIPT OF PHASE 'B' CONTAINMENT ISOLATION SIGNAL SEE NOTE 4.
WBN-1-MVOP-067-0103 -B Lower Cntmt B Cooler Disch	1-FCV -067-0103 - ISLN VALVE IC	B		A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FN/C MS/C	ISOL FLOW TO VENT COOLER UPON RECEIPT OF PHASE 'B' Containment isolation signal SEE Note 4.
HBN-1-MVOP-067-0111 -B Loher Cntmt D Cooler Disch	1-FCV -067-0111 - ISLN VALVE IC	<b>B</b> .		A A A A	100D 1MO 1MO 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE ON A CONTAIN MENT ISOL SIGNAL AND REMAIN CLOSED. SEE NOTE 4.
WBN-1-MVOP-067-0295 -A UPPER CNTMT VENT CLR A ISLN	1-FCV -067-0295 - VALVE IC SMB-000	A 030	807'6" UC 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE ON A CONTAIN MENT ISOL SIGNAL AND REMAIN CLOSED. SEE NOTE 4.
WBN-1-MVOP-067-0296 -A Upper CNTMT vent CLR C ISLN	1-FCV -067-0296 - VALVE IC SMB-000	A 206	807'7" UC 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C MS/C FW/C	VLV MUST CLOSE ON A CONTAIN MENT ISOL SIGNAL AND REMAIN CLOSED. SEE NOTE 4.

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PAGEA-2 R3



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PRINT DATE: 12/07/89

BINDER NO. : WBNEQ-NUV -001 MANUFACTURER : LIMITORQUE PAGE 3 OF 5

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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL NUM	AZMITH	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
HBN-1-MVOP-067-0297 -B Upper Chimt Vent Clr B Isln	1-FCV -067-0297 -B VALVE IC SMB-000	148	807'7" UC 79KA2-824589-1	A A A A	100D 1MO 1MO 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE ON A CONTAIN MENT ISOL SIGNAL AND REMAIN CLOSED. SEE NOTE 4.
WBN-1-MVOP-067-0298 -B UPPER CNTMT VENT CLR D ISLN	1-FCV -067-0298 -B VALVE IC SMB-000	338	807'7"UC 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE ON A CONTAIN MENT ISOL SIGNAL AND REMAIN CLOSED. SEE NOTE 4.
WBN-1-MVOP-068-0332 -B RCS PRZR REL FLOW CONTROL	1-FCV -068-0332 -B SB-00	104	787' 7" UC 71C62-54114-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FH/C MS/C	VLVS MUST BE CAPABLE OF FUNCTIONING AT ANY TIME FOR ACCIDENT MITIGATION
WBN-1-MVOP-068-0333 -A RCS PRZR REL FLOW CONTROL	1-FCV -068-0333 -A SB-00	104	787 <b>' 7" UC</b> 71C62-54114-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FN/C MS/C	VLVS MUST BE CAPABLE OF FUNCTIONING AT ANY TIME FOR ACCIDENT MITIGATION
WBN-1-MVOP-070-0087 -B RC PHP THERM BAR RET CNTMT I	1-FCV -070-0087 -В SLN VALVE SMB-00		732111" AC4 78K24-823298	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	CLOSE ON PHASE 'B' ISOL SIGNAL AND STAY CLOSED AFTER RESET OF SIGNAL TO MAINTAIN CNTMT ISOLATION. SEE NOTE 4.

R_<u>3</u> R_____ R PREPARER DATE Kuich 1. 12/12/51 CHECKED/DATE 828

R3



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PRINT DATE: 06/27/90

### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER	UNIT DEVICE ID NO. MODEL	<u>N</u> ŪM	<u>AZMITH</u>	LOCATION ELEV(1) BM/RAD CONTRACT	<u>CAI</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
 WBN-1-MVOP-070-0089 -B RC PMP OIL CLR RET CNTMT I	1~FCV -070-0089 ISLN VALVE	- B			A A A A	100D 1M0 1M0 100D 100D	ŘH∕C CV∕C	CLOSE ON PHASE 'B' ISOLATION SIGNAL AND STAY CLOSED AFTER RESET OF SIGNAL TO MAINTAIN CNTMT ISOLATION. SEE NOTE 4.
WBN-1-MVOP-074-0001 -A RHR System Isolation Valve	1-FCV -074-0001 SB-2	-A	354	710'11" LC 71C62-54114-1	C A/B C C C	NA 15MN/1MO NA NA NA		VLV MUST CLOSE IF OPEN AND Remain closed to mitigate RHR BREAK
WBN-1-MVOP-074-0002 -B RHR System Isolation Valve	1-FCV -074-0002 SB-2	- B	300	723' 0" AC4 71C62-54114-1	C A C C C C	NA 1MO NA NA NA	ŘH∕C CV∕C FW∕C	VLV MUST CLOSE IF OPEN AND REMAIN CLOSED TO MITIGATE RHR BREAK. POS IND IS PAM VARIABLE K AND MUST BE MONITORED FOR RHR BREAK. SEE NOTE 4.
HBN-1-MVOP-074-0003 -A Rhr Pump A-A Inlet flow Cn	1-FCV -074-0003 ITRL VLV SB-2	-A		676' All 71C62-54114-1	C C C	1WK/100D NA NA NA NA NA	RH/A	VLV MUST CLOSE DURING SMITCH-OVER FROM THE RWST TO THE CNTMT SUMP
WBN-1-MVOP-074-0008 -A RHR System Isolation Bypass	1-FCV -074-0008 VALVE SB-1	-A	304 '	722' 1" AC4 71C62-54114-1	A C C	1MO NA NA	ŘH/C CV/C FW/C	VLV MUST CLOSE IF OPEN AND REMAIN CLOSED TO MITIGATE RHR BREAK. POS IND IS PAM VARIABLE & AND MUST BE MONITORED FOR RHR BREAK. SEE NOTE 4.

PREPARER/DATE KEITH B. NAPIER 12/12/89 CHECKED/DATE D.L. KIRBY 12/12/89 1/10/90

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PRINT DATE: 08/01/89



BINDER NO. : WBNEQ-MOV -001 MANUFACTURER : LIMITORQUE PAGE S OF 5

## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZM DESCRIPTION MODEL NUMBER	LOCATION LTHELEV(1)_ <u>RM/RAD_CAT_OPER_T</u> CONTRACT(2)	IME EVENT SAFETY FUNCTION
WBN-1-MVOP-074-0009 -B 1-FCV -074-0009 -B 348 RHR SYSTEM ISOLATION BYPASS VALVE SB-1	709'11" LC C NA	L IF OPEN, VLV MUST CLOSE
	71C62-54114-1 A/B 15MN/1 C NA C NA C NA C NA	MO RH/C AND REMAIN CLOSED FOR CV/C ACCIDENT MITIGATION FW/C MS/C
WBN-1-MVOP-074-0021 -B 1-FCV -074-0021 -B RHR PUMP B-B INLET FLOW CONTROL VALVE SB-2	676' A10 A/B 1WK/10 71C62-54114-1 C NA C NA C NA C NA C NA	OD L VLV MUST CLOSE DURING RH/A SWITCH-OVER FROM THE CV/A RWST TO THE CONTAINMENT AB SUMP AF

	R <u> </u>
PREPARER/DATE_DFC5/20/86	
CHECKED/DATE WBK 5/21/86	<u></u>
	2/8/89

Page A-5 R2

BINDER NO. WBNEQ-MOV-001	PLANT	WBN	UNIT(	S)	L SH	IEET_ <u>1</u>	_OF1
					R_	<u>3</u> R	4
BINDER TITLE LIMITORQUE		COMPUTED	<u>/R1 RHM</u>	DATE	2/8/89	<u>KBN</u>	CAL
MOTORIZED VALVE OPERATORS	<u>WITH</u>					12/12/3	89 7/10/90
TYPE RH INSULATED MOTOR		CHECKED_	<u>/R1 KBN</u>	DATE	<u>2/8/89</u>	DLK	KBN
						12/12/	89 7/10/90
							_

#### TAB A - EQUIPMENT IDENTIFICATION MATRIX

The following notes apply to all pages of this TAB A.

- 1) Elevations shown are <u>actual</u> elevations for equipment located in the Reactor Building and <u>floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- 2) See TAB B, Section A for a complete listing of the calculations used in this binder and their revision level.

The following notes are equipment specific.

- 3) Field verification for valve 1-FCV-74-3 shows an incorrect floor elevation. As constructed drawing 47W432-1 Rev. H shows the valve to be located in 1A-A RHR Pump Room and floor elevation 676'-0".
- 4) The category and operating time listed for this device is the most limiting, and is for the internal limit switch which is being used to monitor a PAM function. The safety function listed is for the MVOP. The PAM safety function is as follows: This limit switch performs a PAM type B function and must be monitored for the duration of each event.

R4



WBEP-0023Q

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'BI <u>MO</u>	NDER T TORIZE	NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 1 OF R_/ R_ TITLE_LIMITORQUE COMPUTED_DFC DATE 9/22/86 CHM Z/3/89 INSULATED MOTOR CHECKED WBK/HDR DATE 9/22/86	
А	. <u>Docu</u>	MENTATION	
	Equi	pment Description <u>Motorized Valve Actuator with Type RH</u>	-
	Vend	or/Manufacturer Limitorque	-
		pment Model No.(s) See EQC TAB A	•
	QUAL	IFICATION REPORTS (See EQC TAB D Table of Contents)	R
	(1)		
		Actuator, Qualification for Nuclear Service #B0058 and Appendix A DATE 1-11-80	
	(2)		•
	(-)	Actuator, Actuators for PWR Service	•
		#600456DATE_12-9-75	•
	(3)		
		Actuator, Temperature Related to High Rev. A Superheat Ambient #B0027 DATE 10-18-78	
	OTHE		
	(4)	Limitorque Valve Actuators with Type LR Motor for Westinghouse PWR Report B0212 Dated 4/10/85.	
	(5)	Supplement report to NUC-9 Rev. 1, 4-14-80, Reliance Electric Company Summary Report - Nuclear Power Plant Motor Systems Type Test Support Analysis - Random Wound Motors.	
	(6)	Qualification Type Test Report of Multi-Point Terminal Strips, for Use in Limitorque. Valve Actuators for PWR Service Dated July 1, 1982. Report B0119.	
	(7)	Limitorque telex dated March 24, 1986.	R]
	(8)	WAC-49	
	(9)	Limitorque letter dated September 25, 1985 (B70 850925 012)	
	(10)	Limitorque letter dated September 5, 1985 (B70 850910 004)	
	(11)	Limitorque telex dated November 6, 1985 (B70 851107 021)	
	(12)	TVA telex dated November 6, 1985, (B70 851107 022)	
	(13)	WAC-67	
			R1

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	BINDER NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 1a OF 3 R 3 R 4	3
· · ·	BINDER TITLE LIMITORQUE COMPUTED /R1 RHM DATE 2/8/89 KBN ////	4
	TYPE RH INSULATED MOTOR       CHECKED /R1 KBN DATE 2/8/89 DLK         12/12/89 7/10/9	10
	A. DOCUMENTATION	
	OTHER (ANALYSIS, VENDOR DATA, ETC.) (Continued)	
	<pre>(14) Category and Operating Times, System 62, WBNOSG4-013 R12 B26 900327 200</pre>	
	<pre>(15) Category and Operating Times, System 63, WBNOSG4-014 R11 B26 900309 227</pre>	R4
	<pre>(16) Category and Operating Times, System 67, WBNOSG4-016 R14 B26 900319 215</pre>	
	(17) Category and Operating Times, System 68, WBNOSG4-017 R9 B26 890510 506	
	<pre>(18) Category and Operating Times, System 70, WBNOSG4-018 R13 B26 900110 200</pre>	
	<pre>(19) Category and Operating Times, System 74, WBNOSG4-020 R8 B26 900309 232</pre>	R4
	(20) Environmental Drawing No. 47E235-41 Rl	
	(21) Environmental Drawing No. 47E235-42 R2	
	(22) Environmental Drawing No. 47E235-61 Rl-	
<i>.</i>	(23) Environmental Drawing No. 47E235-74 R1	
	(24) Environmental Drawing No. 47E235-77 Rl	
	(25) Calculation GENNAL3-001 R0 - 40 year Containment Dose B45 851117 235	
	(26) Calculation WBNNAL3-004 R0 - Accident Dose - Reactor Building B45 860205 235	
	(27) Calculation WBNNAL3-025 R0 - 40 year Dose-Outside Shield Building B45 860401 235	
	(28) Calculation WBNTSR-051, R0 - Reduction of Beta Dose by Sheet Steel B26 891129 202	
	(29) Environmental drawing number 47E235-59, R2, and DCA-P-02351-18-0 in accordance with DCN P-02351-A (B26 881210 801)	R4
	Note: Documents listed above are used throughout this binder for equipment qualifications. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references. PAGE B-1A R4	

WBEP-0023Q

	BINDER NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 2 OF 33
s. ₁ . 1	BINDER TITLE LIMITORQUE COMPUTED DFC DATE 9/22/86 RATA MOTORIZED VALVE OPERATORS WITH
	TYPE RH INSULATED MOTOR CHECKED WBK/HDR DATE 9/22/86
	B. <u>CONCLUSION OF REVIEW</u> (Check only one block)
	X Equipment Qualified
	Equipment Gualified Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES
	(1) Qualification Status of Actuators 1-MVOP-67-87-A, 1-MVOP-67-95-A,
	established after replacement. See Open Item No. 1.
	(2) <u>Deficient internal cable is to be replaced per ECN 6025.</u> Complete
	field verification must be resubmitted to the DNE binder preparer
	upon resolution of Open Item No. 2.
	(3) Nylon crimp connectors on the field winding leads must be replaced
	with acceptable nuclear grade connectors. Complete revised field
	verification must be resubmitted to the DNE binder preparer upon
	resolution of Open Item No. 3.
	(4) <u>Heaters in the motor and limit switch compartments must be</u>
	decommissioned prior to unit start-up. Complete revised field
	verification must be resubmitted to the DNE binder preparer upon
	resolution of Open Item No. 4, [R1]
	(5) Black durez limit switch rotors must be replaced with qualified sub-
	components. Complete revised field verification must be resubmitted
	to the DNE binder preparer upon resolution of Open Item No. 5.  R1
	(6) Verification of the manufacturer and model number of the terminal
	blocks installed in the limit switch compartment must be determined
	before qualification status of the terminal block can be established.
	See Open Item No. 6. R1

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	DER NO. <u>WBNEQ-MOV-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>2</u>
<u>MOT</u>	RR DER TITLE_LIMITORQUECOMPUTED/R: RodenDATE 2-14-89 ORIZED VALVE OPERATORS WITH E RH INSULATED MOTORCHECKED/R: KEN_DATE Z/16/94
в.	<u>CONCLUSION OF REVIEW</u> (Check only one block) (continued)
	X       Equipment Qualified         Equipment Satisfies All Requirements Except Qualified         Life or Justification of Replacement Schedule         Equipment Qualification Not Established by Documentation         Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES(continued)
(7)	Valve actuators must be fitted with T-drains in the low point of
	limit switch compartments. Revised field verification must be
	submitted upon resolution of Open Item No. 7.
(8)	OMDS requires that Class H Reliance motors must have a T-drain
	installed in the low point of the motor housing. Revised field
	verification must be submitted upon resolution of Open Item No.
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PAGE B-2A R1

BINDE	R NO. WBNEQ-MOV -001 PLANT WBN UNIT(S) 1 SHEET 3	OF
BINDE	R TITLE MOTORIZED VALVE COMPUTED A CONDATE Skille R	R
OPF	R TITLE MOTORIZED VALVE COMPUTED 1 COP DATE 5/1/86 R	
С.	QUALIFICATION CRITERIA	
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):	
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
	JUSTIFICATION/COMMENTS	
	The Limitorque Environmental Qualification Program was conducted per	
	IEEE-382 (1972), "IEEE Guide for Type Test of Class lE Electric	
	Valve Operators for Nuclear Power Generating Stations" and meets the	
	requirements of IEEE-323 (1974) as they apply to valve actuators	
!	(TR B0058, Section 2.1).	
-	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
•	IEEE 382-1972	
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	PAGE 6-3-	

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	ER NO. WBNEQ-MOV -001 PLANT WBN UNIT(S) 1 SHEET 4 O
BIND	ER TITLE IMITORQUE MOTORIZED VALUE MPUTED DATE 5/21/86 R R
01	ER TITLE IMITORQUE MOTORIZED VALVE MPUTED DATE 5/24/84 PERATORS WITH TYPE RH INSULATED MOTORCKED A Conference Date 5/24/86
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Simila Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS The Limitorque Qualification Program was
	<u>conducted to encompass the entire family of actuators - SMB, SB,</u>
	SBD, and SMB/HBC in all available unit sizes (SMB-000 to SMB-5).
	This was accomplished by type testing. See EQC TAB C, Section 1.0.
	EQC TAB E Attachment 1 identifies the actuator plant ID number, the
	Limitorque shop order number, the actuator serial number, and the
	documentation reference which establishes traceability to the appli-
	cable_test_report.
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BINDER NO. WBNEQ-MOV -001 PLA	ANTWBN	UNIT(S)1	SHEET _	⁵ OF <u>33</u>
BINDER TITLELIMITORQUE MOTOR	IZED VALVE	red at Cop DA	ТЕ	R
OPERATORS WITH TYPE RH IN				
E. EQUIPMENT DESCRIPTION	·····			

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? <u>No</u>

•			Qualification	
		<u>Plant Device</u>	Document	<u>Reference</u>
		Motor Operated	Motor Operated	600456,
(1)	Equipment Type	Valve Actuator	Valve Actuator	<u>Sect. 2.0</u> 600456.
(2)	Manufacturer	Limitorque	Limitorque	<u>Sect. 2.0</u> 600456,
(3)	Model Number(s)	See_EQC TAB A	<u>SMB-0</u>	<u>Sect. 2.0</u>
	•			
		See EQC TAB E	Actuator	600456,
(4)	Serial Number(s)	<u>Attachment 1</u>	189835	Sect. 2.0
			Motor	600456,
			2Y267074A1 EZ	Sect. 2.0
		See EQC TAB E	Actuator	600456,
	Order No.	Attachment 1	600456-A	Sect. 2.0

None

(5) Identify Component-Unique checksheet attached:

JUSTIFICATION/COMMENTS <u>The Limitorque qualification program was</u> <u>conducted to encompass the entire family of actuators - SMB, SB,</u> <u>SBD, and SMB/HBC in all available unit sizes (SMB-000 to SMB-5,</u> <u>Reference #B0058, Section 2.1). This was accomplished by conducting</u> <u>the testing on a mid-size unit SMB-0 with a Reliance motor, 60 HZ,</u> <u>460 VAC, insulation Class RH, type-P motor, size 40 ft.-lb. stall,</u> <u>8 ft.-lb. run (Reference #600456, Section 2.0). See EQC TAB C,</u> <u>Section 1.</u>

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TVA 19597-(82-5-86)

BINDER NO. WBNEQ-MOV-001	PLANT	WBN	UNIT(	5)1	L SH	EET <u>6</u>	_0F <u>_33</u> _
BINDER TITLE <u>LIMITORQUE</u> MOTORIZED VALVE OPERATORS	WITH	COMPUTED_	DFC	DATE	.R_ <u>5/21/86</u>	1 R Rom 2-14-39	
TYPE RH INSULATED MOTOR		CHECKED.	WBK	DATE	5/21/86	<u>Kêr</u> 416/89	

# F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification R1 documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

		Plant	
Interface	<u>Identify Interface</u>	Requirement? <u>(Yes/No)</u>	Reference Test Reserve
	<u></u>		<u>Test Report</u>
Mounting Bolts	NA	NA	NA
External Process Connections	NA	<u>NA</u>	NA
Electrical Connections	See Comments	Yes	600456 <u>Sect. 3.4.1</u>
Conduit Seals	None	NA	NA
Connector	•		
Seals	None	NA	NA
Orientation	NA	NA	NA
Physical Configuration	NA	NA	NA
Other	NA	NA	NA
JUSTIFICATION/CO	MMENTS Control and po	ower lead connect	ions were
made through fle	xible pressure tight of	conduit connectio	ns run
between the unit	tested and the access	s ports of the te	est chamber
(reference #6004)	56. Section 3.4.1); ho	wever, conduit s	seals and
special connection	ons are not required.	See EOC TAB C,	Section 2
for justification	1. There are no speci	fic "installatio	m_interfaces"   R1
for this equipmer	it specified throughout	t the qualificat	ion program.
		<i>.</i>	

PAGE B-6 R1

OPERAT	LELIMITORQUE MOTORIZED VALUE ORS WITH TYPE RH INSULATED MOTOR CHECKE	D A DA	ate <u>3/21/86</u>
G. <u>TES</u>	SEQUENCE		
(1)	Test Sequence: Was the test sequence: Was the test sequence accident environment in accordance (yes/no/NA)? (note below)	e with IEEE-32	3 (74), paragraph 6
		<u>Yes/No/NA</u>	<u> </u>
	(a) Equipment inspected for damag	ge <u>No</u>	<u>Comment</u> 600456,
	(b) Baseline performance measurements taken	Yes	Tabl II&III, & <u>App. B</u>
	(c) Equipment aged:		
	Thermal	Yes	600456, <u>Sect. 3.1.1</u> 600456,
	Radiation	Yes	<u>Sect. 3.1.3 &amp; 3.</u> 600456, Sect.
	Wear	Yes	<u>3.1.2</u> B0058, Sect.
	(d) Vibration/seismic testing conducted	Yes <u>Seismic</u>	2.1; 600456, <u>Sect. 3.2</u>
	(e) Design basis event (DBE) exposure	Yes	600456, Sect. 4. 4.4.5, Tabl III Fig 6
	(f) Post-DBE exposure	¥	600456, Sect. 4.4 4.4.5, Tabl III
	(g) Final inspection and disassembly	<u>Yes</u>	<u>Fig 6</u> 600456, Sect. 3.3 <u>4.5, &amp; 4.7</u>
(2)	Was the same piece of equipment us described in item (1) above (yes/n see TAB C, Section 4 for details.	ed throughout o/NA)? <u>Yes, 6(</u>	the test sequence 0456 Sect. 4.7.1:
(3)	Have the test equipment, test equi been appropriately documented (yes (Reference <u>#600456, App. F, Tabl I</u>	/no/NA)? Yes	ies and calibration
JUST	IFICATION/COMMENTS Low level vibra	<u>tion is addres</u>	used in the
	TAB C, Section 3. See EQC TAB C, S		
	sequence with respect to radiation		
	requirement_of IEEE 323-1974; how		•

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	LELIMITORQUE MOTORIZED VALUE ORS WITH TYPE RH INSULATED MOTOR CHECKED	DATE 5/21/86	
H. <u>AG</u>	ING		
(1)	Was aging considered in the qualification (Yes/no/NA)? <u>Yes</u> (Reference <u>B0058</u> )	n program <u>Section 3.0 ar</u>	nd 600456
	Section 3.1).		
	JUSTIFICATION/COMMENTS <u>None</u>		
(2)	Were the following effects considered in	the aging progr	:am:
	Aging Effect	Yes/No/NA	Refe
	Thermal aging	Yes	B0058,Sec 600456,Se
	Radiation exposure	Yes	600456,Se B0058,See
	Vibration (non-seismic) aging	Yes	B0058, Sect. 2.1
	Operational (electrical/mechanical/proces stress aging		600456,Se B0058,See
	JUSTIFICATION/COMMENTS None		
(3)	Were all known synergistic effects which significant effect on equipment performan program (yes/no/NA)? <u>NA</u> (Reference	ce considered i	have a n the age
	JUSTIFICATION/COMMENTS No known synergis	tic_effects.	
(4)	Thermal Aging:		
	(a) Was thermal aging considered in the ( (yes/no/NA)? <u>Yes</u> (Reference <u>600456</u> )	qualification p Sect. 3.1.1; BO	rogram 058, Sect
	JUSTIFICATION/COMMENTS <u>Thermal aging</u>	g was conducted	<u>on</u>
	Reliance motor stator. See EQC TAB C	<u>Section 4.0 f</u>	or_full_
	details.		

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BINDER 1	TITLELIMIT	-MOV -001 PLANT WBN UNIT(S) 1 SHEET 9 O TORQUE MOTORIZED VALUE COMPUTED $1 \neq Cop$ DATE $\frac{5/31/86}{8}$	
OPERA	OPERATORS WITH TYPE RH INSULATED MOTOR CHECKED 46 DATE 5/21/86		
H. <u>A</u>	GING ((	Continued)	
•	(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>B0058, Sect. 3.2</u> ).	
		JUSTIFICATION/COMMENTS All organic materials subject to	
		thermal aging degradation.	
	(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 3.2</u>	
		JUSTIFICATION/COMMENTS See EQC TAB C, Section 4.0 for full	
		details.	
	(d)	Was the aging acceleration rate justified and the parameters time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>600456,Sect. 3.1.1; B0058,Sect. 3</u>	
•		<u>Parameter Plant Maximum Normal Test Equivale</u>	
		Temperature         120°F         180°C         130°F           Time         40 Years         100 Hr         40 Yrs	
		JUSTIFICATION/COMMENTS Motor stator thermal aging conducted;	
		analysis conducted on other organic materials. See EQC TAB C	
		Section 4.0.	
	(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? Yes (Reference B0058, Sect. 3.2 ).	
		JUSTIFICATION/COMMENTS Thermal regression curve_used for	
		motor stator: analysis used for other materials. See EQC	
		TAB C. Section 4.0.	
	(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>NA</u> (Reference <u>NA</u> ).	

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TVA 19597402-9-86)

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	T TYTE	$-\underline{MOV} - \underline{OO1}  PLANT \underline{WBN}  UNIT(S) \underline{1}  SHEET \underline{10}  O$
	v	TORQUE MOTORIZED VALCEMPUTED DATE 5/21/86
OPERATO	RS WIT	TH TYPE RH INSULATED MOTOR CHECKED WE DATE 5/21/86
H. AGI	<u>NG</u> ((	Continued)
	(g)	If a regression line was used for determining accelerated agi parameters, are test points or failure modes identified on th line (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 3.2.1.2</u> ).
		JUSTIFICATION/COMMENTS <u>Thermal regression curve used for</u>
		motor_stator. See EQC TAB C, Section 4.0.
	(h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>No</u> (Reference <u>NA</u> ).
		JUSTIFICATION/COMMENTS Operation of equipment during thermal
		aging is not required.
(5)	Radi	ation Aging Exposure:
	(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>600456, Sect. 3.1.3</u> B0058, Sect. 3.4
		JUSTIFICATION/COMMENTS <u>None</u>
	(b)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 3.2)</u> .
		JUSTIFICATION/COMMENTS <u>A specific listing of materials subje</u>
		to radiation degradation was not provided; however, organic
		materials, as stated in Section 3.2 of B0058, would be subjec
		to radiation degradation. During the radiation exposure for
		the test, the whole actuator was radiation aged.
	(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>600456, Sect. 3.1.3 &amp; 3.3, and B0058, Sect. 3.4</u> ).
		JUSTIFICATION/COMMENTS Aging dose was combined with the
		accident dose. 4 Mrd was applied for normal dose; 200 Mrd
		was applied for accident dose.
		PAGE B-1C

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· · · · · ·	BINDER NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 11 OF 33
N 4 4	BINDER TITLE LIMITORQUE COMPUTED DFC DATE 5/21/86 Radio MOTORIZED VALVE OPERATORS WITH
	TYPE RH INSULATED MOTOR CHECKED WBK DATE 5/21/86
	H. AGING (Continued)
	(d) Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference: <u>600456</u> , <u>Section 3.1.3, 3.3, and Appendix C</u> ).
	Plant normal ambient radiation dose (rd) <u>20E06</u>
	Test exposure dose (rd) <u>204E06</u>
	Test exposure dose rate (rd/hr) <u>1.0E06</u>
	Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
	JUSTIFICATION/COMMENTS <u>Test dose included normal aging</u> plus accident dose.
	(6) Vibration (non-seismic) Aging:
	<ul> <li>(a) Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program* Yes (Reference: <u>B0058</u>,</li> </ul>
	<u>Section 2.1</u> ).
	JUSTIFICATION/COMMENTS <u>Non-seismic vibration is not</u> addressed in the Limitorque Test Program. See EQC TAB C, Section 3.0.
	(b) Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>No</u> (Reference: <u>B0058, Section 2.1</u> ).
	JUSTIFICATION/COMMENTS <u>See EOC TAB C. Section 3.0 for</u> justification of omission of non-seismic vibration aging.
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	* Qualification program refers to the test report and any supple- R1 mental documentation including TVA analyses in TAB C of the Binder.
	PAGE B-11 R1

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BINDER	NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 12
BINDER MOTORIZ	TITLE LIMITORQUE COMPUTED DFC DATE 5/21/86 Refer ED VALVE OPERATORS WITH
TYPE RH	INSULATED MOTOR CHECKED WBK DATE $5/21/86$ $\frac{KEV}{2/6/24}$
	NG (Continued)
(7)	reserved offood wing.
	(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation adressed in the qualification program (Yes/No/NA)? Yes (Reference: 600456, Section 3.1.2,
	Appendix B
	JUSTIFICATION/COMMENTS The actuator was cycled (mech-
	anical aging) 1208 times; seating thrust was monitored.
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference:
	600456, Section 3.1.2, Appendix B
	JUSTIFICATION/COMMENTS The actuator was cycled (mech-
	anical aging) 1208 times; seating thrust was monitored.
(8)	
	Qualified life (Document in QMDS) <u>40 Years</u>
	JUSTIFICATION/COMMENTS See EOC TAB C. Section 4.0 for full
	details on qualified life and aging.

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BINDER NO. WBNEO-MOV-001 PLANT___ WBN UNIT(S) 1 SHEET 12a OF 33 R_____ R_____ BINDER TITLE LIMITORQUE COMPUTED / RI RAM DATE 2/8/89 MOTORIZED VALVE OPERATORS WITH TYPE RH INSULATED MOTOR CHECKED / Z/ KEN DATE Z/8/69 H. AGING (Continued) (9) Were replacement intervals for the equipment or its components. defined in the qualification program (Yes/No/NA)? __Yes___ (Reference: <u>B0058, Section 5.0 and 7.0</u> ). R1 JUSTIFICATION/COMMENTS None . . 1 PAGE B-12A R1

BINDER NO. WBNEQ-MOV -001 PLANT WBN	UN	IT(S)	SHEE	г <u>13</u> оғ			
BINDER TITLELIMITORQUE MOTORIZED VAL		01 Cap DAT	F 5/21/86	RR			
OPERATORS WITH TYPE RH INSULATED N							
I. MATERIALS ANALYSIS							
Identification of Materials Sus Radiation Degradation and Aging Materials Analysis)	ceptible to (Use Secti	Significant on C of EQC	Thermal an Binder for	d/o <del>r</del> Detailed			
Material/Property/Function	Radiation <u>Threshold</u>	<u>Reference</u>	Activation Energy	Referenc			
(a) <u>Melamine (white)</u>	2.04x10 ⁸ Rads	600456 Sect: 3.1.3	1.35	See			
(b) <u>Fiberite (brown)</u>	2.09x10 ⁸ Rads	<u>B0212</u> Sect. 6.7	1.78	<u>See</u> Comments			
(c) <u>G.P. Phenolic (black)</u>	2.09x10 ⁸ Rads	<u>B0212</u> Sect. 6.7	1.63	<u>See</u> Comments			
(d) <u>Motor Insulation-RH</u>	<u>2.04x10⁸</u> Rads	600456 Sect. 3.1.3	1.02	<u>See</u> Comments			
(e) <u>Wiring Insulation</u>	<u>NA</u>	<u>NA</u>	NA	TAB C Sect. 4.4			
JUSTIFICATION/COMMENTS <u>Radia</u>	tion thresh	old_does_not	apply. Li	<u>mitorque</u>			
<u>has done radiation exposure pe</u>	r the refer	enced Limito	rque_test_r	eports.			
	The values listed in threshold column represent the testing parameters.						
Activation_energies_are_document	Activation energies are documented in TABS "D" and "E" as follows:						

(c) G. P. Phenolic - Limitorque letter dated 9/5/85 (B70 850910 004)

(d) Motor Insulation - RH (WAC-49) (TAB "E").

See TAB C. Section 4.1 for material analysis of phenolics and Section 4.2 for analysis of motor insulation.

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BINDE	ER TITLE IMITORQUE MOTORIZED VAL COMPUTED A Log DATE 5/2/86 R ERATORS WITH TYPE RH INSULATED MOTOR CHECKED WATE DATE 5/2/86
	ERATORS WITH TYPE RH INSULATED MOTOR CHECKED WATE DATE 5/2/86
J.	EQUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANC
	SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failur not met (yes/no/NA)? Yes (Reference B0058, Sect. 4.1.8)
	Identify Acceptance Criteria: The actuator must be capable of
	opening or closing a valve on demand.
	(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verify before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Report 600456, Sect. 4.6 and Appendix B
	Identify baseline and functional testing: Motor potential, run cur-
	rent, power, stroke time, peak current, and seating thrust were mea-
	sured prior to the start of the test and are summarized in Table II.
	of Report 600456. Insulation resistance to ground is tabulated in
	Table II. See TAB C. Section 9 for summary.
	(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference <u>See Comment</u> ).
	JUSTIFICATION/COMMENTS Load cycling during the test is tabulated in
	Table III of the test report.
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BINI	DER NO	. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 15 01	
MOTO	<u>)RIZED</u>	R_1R	
J.	PERF	PMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE CORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDIT Stinued)	<u>10</u>
	(4)	Do the applied loads during baseline testing reflect normal operating conditions (Yes/No/NA)? <u>Yes</u> (Reference:	
		600456 Section 3.1.2	).
		JUSTIFICATION/COMMENTS Thrust measurements correspond to	
		the thrust rating for the actuator. In addition, Appendix B	
		of the test report shows baseline, mechanical aging, and	
		post-test thrust measurements.	
	(5)	Identify electrical characteristics necessary to ensure the equipment performance specifications can be satisfied.	
		(a) <u>Parameter Plant Normal Conditions</u> <u>Reference</u>	
		Voltage <u>490 VAC</u> <u>Table III</u>	
		Load Approx 20.000 lbs thrust Table III	
		Frequency <u>See Comment</u>	
		Accuracy NA	
		Other(s)	
		_NA	
		JUSTIFICATION/COMMENTS <u>Although not specifically</u>	
		stated, we have no reason to believe that Limitorque	
		used anything other than a 60 Hz power source.	
L		PAGE B-15 R1	

	BINDER N	IOWBNEQ-MOV-001	PLANT WBN U	NIT(S) <u>1</u> SHEET <u>16</u> OF <u>33</u>
-	BINDER	TITLELIMITORQUE	COMPUTED	<u>R_/_R</u> C DATE <u>5/21/86</u> <u>2940</u>
		D VALVE OPERATORS		z-14 <del>-29</del> <u>K</u> DATE <u>5/21/86</u> <u>المح</u>
				2/16/89
	J. <u>EQU</u> PEH	<u> IIPMENT ELECTRICAI</u> RFORMANCE SPECIFIC	CHARACTERISTICS NEC TIONS CAN BE SATISE	ESSARY TO ENSURE THE - IED UNDER ACCIDENT CONDITIONS -
	(Co	ontinued)		<u>140 VIDDA 1100100011 UVID111010</u> -
	(b)	Parameter	<u>Specific Accident C</u>	onditions <u>Reference</u> R1
		Voltage	See TAB C. Section	n_6NA
		Load	See Comment	NA
		Frequency	60 Hz	See comments below
		Accuracy	NA	
		Other(s) _NA		
		JUSTIFICATION/C	MMENTS Load require	ed will be thrust necessary
		to stroke the v	lve. Frequency var:	iations would only occur
		<u>during the load</u>	ng of the diesel gen	nerators. Since Unit 2 is
		<u>not operational</u>	the diesels cannot	be overloaded to the point
		of causing freq	ency variations. Th	nis is based on maximum
		loading occurri	g during a LOCA on I	Unit 1 with a full load
		<u>rejection on Un</u>	t 2.	
	(c)	Parameter	Demonstrated Cond	iitions <u>Reference</u>  R1 600456
		Voltage	475VAC	Table III
		Load	Approx. 20,000 1bs	600456 s thrust Table III
		Frequency	See Comment	See Comment
		Accuracy	NA	NA   R1
		Other(s)	······································	
		voltages starti in EQC TAB C. S we have no reas	r tests under accide ction 6.0. Although	on for lack of reduced ent conditions is presented not specifically stated. mitorque used anything
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BINDER NO	. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 17 OF 33
BINDER TI	TLE_LIMITORQUECOMPUTED_DFC_DATE 5/21/86 R970 VALVE OPERATORS WITH
	NSULATED MOTOR CHECKED WBK DATE 5/21/86 / BA
K. <u>Requ</u>	IRED OPERATING ENVIRONMENT
Refe	rence Environmental Drawing No. <u>See pp. 17A-E</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>See Abo</u> ve (a) Temperature (°F) <u>See Abo</u> ve
	(b) Pressure (psig) <u>See Abo</u> ve (b) Pressure (psig) <u>See Abo</u> ve
-	(c) Humidity (%) <u>See Abo</u> ve (c) Humidity (%) <u>See Abo</u> ve
	(d) Radiation (rd) <u>See Abo</u> ve (d) Radiation (rd) <u>See Abo</u> ve
(3)	Process Interfaces: <u>Valve body and stem connection configura-</u> tion eliminates significant additional heating of the degrada- ble actuator parts due to elevated temperatures in process fluids.
(4)	State anticipated occurrence frequency and duration of abnormal conditions: <u>Abnormal temperatures could occur as a result of</u> outside temperature excursions, temporarily greater than
	design heat loads, or degraded environment control system.
	This could exist for up to 8 hours per excursion and will
	occur less than 1% of the plant life. See TAB C, Sect. 4.0.
(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
	(a) Temperature (°F) <u>327</u> Accident type <u>EQC TAB A</u>
	(b) Pressure (psig) <u>12</u> Accident type <u>EQC TAB A</u>
	(c) Humidity (%) $100$ Accident type EOC TAB A 4.7x108(beta)* LOCA-See
	(d) Radiation (rd) <u>4x10'(gamma)</u> Accident type <u>EQC TAB A</u> R1 8.35pH, 0.18M H ₃ BO ₃ 2000PPM boron 0.033M
	NaOH LOCA-See (e) Spray Type D <u>uration 30d</u> Accident type <u>EQC TAB A</u>
•	* The effect of beta radiation was considered, see TAB C R1 Section 10.0

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BINDER MOTORI TYPE R	R TIT	WBNEQ-MOV-001       PLANTWBNUNIT(S)1       SHEET_17a_OFR         RR       RR         CLE_LIMITORQUECOMPUTEDDFCDATE       9/12/86       R_HM         VALVE_OPERATORS_WITH       CHECKED_WBK/HDRDATE       9/12/86       KBNJ         VSULATED_MOTOR -       CHECKED_WBK/HDRDATE       9/12/86       KBNJ
к. <u></u>	REQUI	RED OPERATING ENVIRONMENT
F	lefer	ence Environmental Drawing No. <u>47E235-41</u>
(	(1) 1	Normal Max (2) Abnormal Max
		(a) Temperature (°F) <u>110</u> (a) Temperature (°F) <u>120</u>
	I	(b) Pressure (psig) <u>0.3</u> (b) Pressure (psig) <u>0.3</u>
		(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
		(d) Radiation (rd) $1.0 \times 10^6$ (d) Radiation (rd) <u>NA</u>
(	3) I	Process Interfaces: <u>Valve body and stem connection confi</u>
	8	guration eliminates significant additional heating of the
	<u>0</u>	degradable actuator parts due to elevated temperatures in
	Ę	process fluids.
(	4) s	State anticipated occurrence frequency and duration of abnormal conditions: <u>Abnormal conditions could exist for up to 8 hours</u>
	₽	per excursion and will occur less than 1% of the plant life.
(.	5) A P	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
	(	(a) Temperature (°F) <u>160</u> Accident type <u>LOCA</u>
	(	(b) Pressure (psig) <u>12.0</u> Accident type <u>LOCA</u>
	(	(c) Humidity (%) $100$ Accident type LOCA $4.7 \times 10^8$ (beta)
	(	(d) Radiation (rd) <u>3.8x10⁷ (gamma</u> ) Accident type <u>LOCA</u>
	1	e) Spray Type <u>See Sheet 1</u> 7 Accident type LOCA

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IND IOTO	ER TI RIZEI	R_IR TILE_LIMITORQUECOMPUTED_DFC_DATE 5/21/86 RHm D VALVE OPERATORS WITH2/8/89						
		INSULATED MOTOR CHECKED WBK DATE 5/21/86						
к.	<u>REQU</u>	JIRED OPERATING ENVIRONMENT						
	Refe	erence Environmental Drawing No. <u>47E235-42</u>						
	(1)	Normal Max (2) Abnormal Max						
		(a) Temperature (°F) <u>120</u> (a) Temperature (°F) <u>130</u>						
		(b) Pressure (psig) <u>0.3</u> (b) Pressure (psig) <u>0.3</u>						
		(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>100</u>						
		(d) Radiation (rd) $\frac{7}{8 \times 10}$ (d) Radiation (rd) <u>NA</u>						
	(3)	Process Interfaces: <u>Valve body and stem connection configura-</u>						
		tion eliminates significant additional heating of the						
		degradable actuator parts due to elevated temperatures in						
		process fluids.						
	(4)	State anticipated occurrence frequency and duration of abnorm conditions: Abnormal conditions could exist for up to 8 hours						
		per excursion and will occur less than 1% of the plant life.						
	(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):						
		(a) Temperature (°F) <u>327</u> Accident type <u>MSLB</u>						
		(b) Pressure (psig) <u>12.0</u> Accident type <u>LOCA</u>						
		(c) Humidity (%) $100$ Accident type LOCA $4.7 \times 10^8$ (beta)						
		(d) Radiation (rd) <u>4.0x10⁷ (gamma)</u> Accident type <u>LOCA</u>						
		(e) Spray Type <u>See Sheet 1</u> 7 Accident type <u>LOCA</u>						

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K. REO	UIRED OPERATING ENVIRON		2/8/8
	erence Environmental Dr		
NO1		.awing No. <u>.4/E2</u>	<u></u>
(1)	Normal Max	(2) Abn	ormal Max
	(a) Temperature (°F)	) <u>104</u> (a)	Temperature (°F) <u>11(</u>
	(b) Pressure (psig)	<u>ATM(-)</u> (b)	Pressure (psig) <u>AT</u>
	(c) Humidity (%)	<u>80</u> (c)	Humidity (%) <u>90</u>
	(d) Radiation (rd)	<u>7.5x10</u> (d)	Radiation (rd) <u>NA</u>
(3)			stem connection config
	<u>tion eliminates signi</u>	<u>ficant addition.</u>	al heating of the
	<u>degradable_actuator_p</u>	<u>arts due to ele</u>	vated temperatures in
	process fluids		
(4)		urrence frequen conditions coul	cy and duration of abn d-exist for up to 8 hor
			an 1% of the plant life
			-
		for any combina	tion of specified accid
(5)	parameter including p		
(5)			Accident type <u>HELB</u>
(5)	(a) Temperature (°F)		
(5)	(b) Pressure (psig)	ATM	Accident type <u>LOCA</u>
(5)	<ul><li>(b) Pressure (psig)</li><li>(c) Humidity (%)</li></ul>	<u>NA</u> 6	Accident type <u>LOCA</u> Accident type <u>LOCA</u>
(5)	<ul> <li>(b) Pressure (psig)</li> <li>(c) Humidity (%)</li> <li>(d) Radiation (rd)</li> </ul>	-	Accident type <u>LOCA</u>
(5)	<ul><li>(b) Pressure (psig)</li><li>(c) Humidity (%)</li></ul>	<u>NA</u> 6	

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MOTOR	<u>RIZEL</u>	R_IR         TLE_LIMITORQUE       COMPUTED_DFC       DATE 5/21/86       Rated in the second s
		ZIEIBA
к.	REOU	IRED OPERATING ENVIRONMENT
		rence Environmental Drawing No. <u>47E235-74</u>
	(1)	Normal Max (2) Abnormal Max
		(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
		(b) Pressure (psig) <u>ATM(-)</u> (b) Pressure (psig) <u>ATM(-)</u>
		(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
		(d) Radiation (rd) $4.3 \times 10^{5}$ (d) Radiation (rd) <u>LOCA</u>
	(3)	Process Interfaces: Valve body and stem connection configura-
		tion eliminates significant additional heating of the
		degradable actuator parts due to elevated temperatures in
		process fluids.
	(4)	State anticipated occurrence frequency and duration of abnorma conditions: Abnormal conditions could exist for up to 8 hours
		per excursion and will occur less than 1% of the plant life.
	(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
		(a) Temperature (°F) <u>110</u> Accident type <u>LOCA</u>
		(b) Pressure (psig) <u>NA</u> Accident type <u>LOCA</u>
		(c) Humidity (%) <u>NA</u> Accident type <u>LOCA</u>
		(d) Radiation (rd) <u>1x10</u> Accident type <u>LOCA</u>
		(e) Spray Type <u>NA</u> Accident type
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••••	I INSULATED MOTOR CHECKED WBK/HDR DATE 9/12/86 Kon 2/624
K. <u>R</u> I	QUIRED OPERATING ENVIRONMENT
Re	eference Environmental Drawing No. <u>47E235-77</u>
(1	.) Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>ATM</u> (b) Pressure (psig) <u>ATM</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) <u>1.8x10</u> (d) Radiation (rd) <u>NA</u>
(3	) Process Interfaces: <u>Valve body and stem connection confi-</u>
	guration eliminates significant additional heating of the
	degradable actuator parts due to elevated temperatures in
	process fluids.
(4	) State anticipated occurrence frequency and duration of abnorn conditions: <u>Abnormal conditions could exist for up to 8 hour</u>
•	per excursion and will occur less than 1% of the plant life.
(5	) Accident (worst case for any combination of specified accider parameter including peak, duration, and profile):
	(a) Temperature (°F) <u>190</u> Accident type <u>LOCA</u>
	(b) Pressure (psig) <u>ATM</u> Accident type <u>LOCA</u>
	(c) Humidity (%) <u>90</u> Accident type <u>LOCA</u>
	(d) Radiation (rd) <u>lx10</u> Accident type <u>LOCA</u>
	(e) Spray Type <u>NA</u> Accident type

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	. <u>WBNEQ-MOV-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>18</u> R <u>/</u> R
	TLE LIMITORQUE COMPUTED DFC DATE 5/21/86 RHM VALVE OPERATORS WITH
	INSULATED MOTOR CHECKED WBK DATE 5/21/86
K. <u>REQU</u>	IRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>See EQC TAB C, Item 11.0 for discussion</u>
	on chemical spray
(6)	Is the equipment subject to moisture or liquid intrusion wh can affect the performance of the equipment under design ba accident conditions (Yes/No/NA)? <u>No</u> (Reference:
	See EQC TAB C. Item 2
(7)	Subject to submergence (Yes/No/NA)? <u>Yes</u> (Reference:
	EQC TAB C. Item 13.0
	Identify initiation time and duration of submergence:
	See discussion on submergence in EOC TAB C, Item 13.0. Sub
	mergence is not a qualification concern based on assessment
(8)	Is the equipment subject to a beta radiation contribution t the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>EOC TAB C. Item 10</u>
	If yes, identify the fraction of the unattenuated free fiel beta dose to be added to the total dose and justify:
	4.69 x 10 ^Z beta see discussion on beta radiation in TAB C.
	Item 10.0
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See TAB B Section A.
	items 25, 26 and 27

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	ER NO. <u>WBNEQ-MOV-001</u> PLAN	TWBN	UNIT(S) 1	
I RINDI	ER TITLE <u>LIMITOROUE</u>			R_1 R
	RIZED VALVE OPERATORS WITH		DFC DATE	5/21/86 CHM ZI8/89
	RH INSULATED MOTOR		WBK DATE	5/21/86 KAN
				<u>48/89</u>
L.	SUMMARY COMPARISON OF TES	T CONDITIONS	TO SPECIFIED	CONDITIONS
	(1) Comparison of worst-	case maximum	parameters:	-
	Parameter	<u>Specified</u>	Demonstrate	d Reference
				600456, Sect.
	Operating Time	_100d	30d	<u>4.4.1, Fig</u> 6
	Temperature (°F)	207	215	600456, Sect.
	Temperature (F)	327	315	<u>4.4.1, Fig</u> 6
	Pressure (psig)	_12.0	78	600456, Sect.
	riessure (parg)	Steam	70 Steam	<u>4.4.1, Fig</u> 7 600456
	Relative Humidity (%		100	
1		H;0.18M H ₃ BO ₃		<u>Sect. 4.4</u> .3
		2000PPM Boron		600456
	Chemical Spray* 0.0.			
				600456
	Radiation (rd)**	120E06	204E06	<u>Sect. 3.3</u>
		TAB C,		
	Submergence	Item 13.0	None	NA
	<pre>*Includes spray concer    pH.</pre>	ncración, 110	vrace, densit	y, duration, and
	**Enter 40-year integra dose and specify type	ated normal do	ose plus inte	grated accident
	dose and specify type	e.		grated accident
	dose and specify type ***See K(8) for discuss:	e. ion on Beta Ra	adiation.	
	dose and specify type ***See K(8) for discuss:	e. ion on Beta Ra	adiation. and margin a	
	dose and specify type ***See K(8) for discuss:	e. ion on Beta Ra case profiles Test Pr	adiation. and margin a rofile	
	dose and specify type ***See K(8) for discuss:	e. ion on Beta Ra case profiles Test Pr Envelopes S	adiation. and margin a rofile	
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o Parameter	e. ion on Beta Ra case profiles Test Pr Envelopes S	adiation. and margin a rofile Specified	assessment:
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o	e. ion on Beta Ra case profiles Test Pr Envelopes S	adiation. and margin a rofile Specified	assessment: <u>Reference</u>
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No	adiation. and margin a rofile Specified No/NA)	Reference 600456 Fig 6 600456
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o Parameter	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N	adiation. and margin a rofile Specified No/NA)	Reference 600456 Fig 6 600456 Fig 5,6,7
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature Pressure	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No Yes	adiation. and margin a rofile Specified <u>No/NA)</u>	Reference 600456 Fig 6 600456 Fig 5,6,7 600456
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No	adiation. and margin a rofile Specified <u>No/NA)</u>	Reference 600456 Fig 6 600456 Fig 5,6,7 600456 Sect. 4.4.3
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature Pressure Relative Humidity	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N <u>No</u> Yes	adiation. and margin a rofile Specified No/NA) a	Reference 600456 Fig 6 600456 Fig 5,6,7 600456 Sect. 4.4.3 600456
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature Pressure	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No Yes	adiation. and margin a rofile Specified No/NA) a	Reference 600456 Fig 6 600456 Fig 5.6.7 600456 Sect. 4.4.3 600456 Sect. 4.4.2
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o <u>Parameter</u> Temperature Pressure Relative Humidity	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N <u>No</u> Yes	adiation. and margin a rofile Specified No/NA) a	Reference 600456 Fig 6 600456 Fig 5,6,7 600456 Sect. 4.4.3 600456
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o Parameter Temperature Pressure Relative Humidity Chemical Spray Submergence	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No Yes Yes Yes No	adiation. and margin a rofile Specified <u>No/NA)</u>	Reference         600456         Fig 6         600456         Fig 5.6.7         600456         Sect. 4.4.3         600456         Sect. 4.4.2         TAB C,         Item 13.0
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-( <u>Parameter</u> Temperature Pressure Relative Humidity Chemical Spray Submergence JUSTIFICATION/COMMENT	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No Yes Yes Yes No TS EOC TAB C.	adiation. and margin a rofile Specified <u>No/NA)</u>	Reference         600456         Fig 6         600456         Fig 5,6.7         600456         Sect. 4.4.3         600456         Sect. 4.4.2         TAB C,         Item 13.0
	dose and specify type ***See K(8) for discuss: (2) Comparison of worst-o Parameter Temperature Pressure Relative Humidity Chemical Spray Submergence	e. ion on Beta Ra case profiles Test Pr Envelopes S (Yes/N No Yes Yes No TS EQC TAB C, mparison of re	adiation. and margin a rofile Specified No/NA) a a a a a a a a a a a a a a a a a a a	Reference         600456         Fig 6         600456         Fig 5.6.7         600456         Sect. 4.4.3         600456         Sect. 4.4.2         TAB C,         Item 13.0         presents         test profile

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BINDER N(	D. <u>WBNEQ-MOV-001</u> PLANT <u>WBN</u> UNIT(S)_		
BINDER T	ITLE <u>LIMITORQUE</u> COMPUTED <u>DFC</u> D		Rym_
<u>MOTORIZEI</u>	D VALVE OPERATORS WITH		2/8/89
<u>IIFE RH</u>	INSULATED MOTOR CHECKED WBK D	DATE <u>5/21/86</u>	Z/BIER
		·····	
L. <u>SUM</u> (Cor	MARY COMPARISON OF TEST CONDITIONS TO SPECI Itinued) See TAB C. Item 13.0. for discussion on s		
	respect to beta radiation, the metallic m	ass of the	operator
	<u>eliminates the concern for beta radiaion.</u>		
(3)	Were margins applied to the test paramete addressed in the test program to assure t and uncertainties are accounted for? (No Yes/No/NA).	hat normal	variation
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/N
	Temperature: +15 degrees F	None	No
	Pressure: +10% but no more than 10 psig	10%	Yes
	Radiation: +10% of accident dose	10%	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)	+10%	Yes
	Voltage: ±10% of rated value .	See <u>Comment</u>	No
	Frequency: ±5% of rated value	NA	NA
	Environmental Transient: the initial transient and the peak temperature applied twice	2 DWELLS	Yes
	Vibration: +10% added to acceleration	NA	NA
	JUSTIFICATION/COMMENTS #600456, Section	3.0 states	that the
	test actuator was subjected to additional	load cycli	ng after
	environmental tests and prior to final in	<u>spection as</u>	an added
4 	test margin. EOC TAB C. Section 7.0 pres	<u>ents justif</u>	ication
	for margin with respect to test temperatu		
	EQC TAB C. Section 6.0 for justification	for lack of	reduced
	voltage testing.		

PAGE B-25 R1

		RI TLELIMITORQUE COMPUTEDDFCDATE 5/21/86 RAWA VALVE OPERATORS WITH
		<u>VALVE OPERATORS WITH</u> NSULATED MOTOR CHECKED WBK DATE <u>5/21/86</u> درانهای میلید درانهای میلید درانهای میلید درانهای میلید درانهای میلید درانهای میلید درانهای میلید درانهای میلید در در در در در میلید در در د
Μ.	<u>OPER</u>	ABILITY TEST RESULTS
ŗ	(1)	Identify the safety function(s) of this equipment: (Reference: <u>B0058, Section 2.4</u>
		JUSTIFICATION/COMMENTS The basic function of a valve
		actuator is to provide the required torque and/or thrust
		to open or close the valve as required.
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (Yes/No/NA)? Ye (Reference: 600456, Section 4.4.5 and 5.0
	•	JUSTIFICATION/COMMENTS The test unit functioned adequate
		throughout the entire test.
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (Yes/No/NA)? Yes (Reference: 600456, Section 4.4.5 and
		5.0
		JUSTIFICATION/COMMENTS The test unit functioned adequate
		throughout the entire test.
	(4)	Did the test demonstrate the operability requirements for required time interval for which the equipment is required operate (Yes/No/NA)? <u>No</u> (Reference:
		600456, Figure 6
		JUSTIFICATION/COMMENTS See EQC TAB C. Section 7.0 for
		justification of actuator operability post-accident.

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MOTORIZE	ITLELIMITORQUECOMPUTEDDFCDATE5/21/86RefuD VALVE OPERATORS WITH2/8/89INSULATED MOTORCHECKEDWBKDATE5/21/86KGN
M. <u>Ope</u>	RABILITY TEST RESULTS (Continued)
(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (Yes/No/NA)? <u>Yes</u> (Reference: <u>600456, Section 4.4.5 and 4.6</u>
	JUSTIFICATION/COMMENTS Minor problems were experienced during and after the LOCA test; however, these had no
	effect on actuator performance. See referenced sections of Limitorque report 600456.
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BINDE	ER NO. WBNEQ-MOV -001 PLANT WBN UNIT(S) 1 SHEET 22 O
BIND	ER TITLE LIMITORQUE MOTORIZED VALVE COMPUTED 2 1 Cor DATE 5/21/86
0P	PERATORS WITH TYPE RH INSULATED MOTOR CHECKED WAR DATE JUST
N.	MAINTENANCE AND SURVEILLANCE
	Has the qualification program identified those surveillance, maintenance and inspection parameters which are essential to maintain qualification which aid in detecting degrading materials or equipment performance (yes/no/NA)? <u>Yes</u> (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets). JUSTIFICATION/COMMENTS <u>See EQC TAB G.</u>
	JUSTIFICATION/COMMENTS <u>See EQC TAB G</u> .

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BINDER T	TILE MITORQUE MOTORIZED VALUE COMPUTED DATE 5/2 DATE	21/86
OPERA	TORS WITH TYPE RH INSULATED MOTOR CHECKED WIGHT DATE 5/4	186
0. <u>su</u>	MMARY OF REVIEW	
		<u>Yes/No/NA</u>
(1	) Documented evidence of qualification adequate	<u>Yes</u>
	(Have all assumptions, mathematical models, and all extrapolations of test data used in an	·
	analysis been justified and documented)?	
(2	) Any exceptions (i.e., sound reasons to the contrary)	NA
	taken to the specified qualification level adequately justified?	
( )		
()	) Choice of qualification methodology adequately justified?	<u>Yes</u>
(4	) If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	<u>NA</u>
	(b) Were specific features and failure modes and	
	effects analyzed?	NA
	(c) Were assumptions and mathematical models used	
	together with appropriate justification for their use?	N A
		<u>NA</u>
	(d) Were environmental parameters which affect equipment performance identified?	NA
(5		
	) Adequate similarity between equipment and test specimen established?	<u>Yes</u>
(6	) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes*
	(c) Absence of preaging in test/analysis justified?	Yes
	(d) Materials susceptible to thermal/radiation	Yes
	aging identified?	
*0	nly the motor was pre-aged prior to application of DBE co AB C for aging of switch materials.	onditions. Se

TVA 19597400.586)

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10 ° 13 8	BINDER NO. WBNEQ-MOV-001 PLANT WBN UNIT(S) 1 SHEET 25 0	F <u>33</u>
•	BINDER TITLE LIMITORQUE COMPUTED DFC DATE 5/21/86 2344 2384	
	TYPE RH INSULATED MOTOR CHECKED WBK DATE 5/21/86 KBN	
	0. SUMMARY OF REVIEW (Continued)	
	Yes/No/N	A
	(15) Criteria regarding functional testing satisfied? <u>Yes</u>	_
	(a) Does the test plan/report specify an acceptance criteria for equipment performed? Yes	-
	(b) Was an initial base line test done to establish required performance characteristics? Yes	
	(c) Has the test analyis demonstrated that performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	
	(16) Criteria regarding instrument accuracy satisfied? <u>NA</u>	
	<pre>(17) Test duration margin (1 hour + function time)     satisfied?</pre>	_
	(a) Is the minimum specified operating time at least 1 hour?	_
	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	_
	(18) Criteria regarding synergistic effects satisfied? <u>Yes</u>	-
	(19) Criteria regarding margins satisfied? <u>Yes</u>	-
	(20) Maintenance and surveillance requirements adequately identified?	-
	P. DISCUSSION	
	, 	-
		R1
		-
		-'
) '		

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 BINDER NO. WBNEQ-MOV-003 PLANT
 WBN
 UNIT(S)
 1
 SHEET 1
 OF 1

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 R
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 BINDER TITLE LIMITORQUE ACTUATORS
 COMPUTED R1
 RHM
 DATE
 2/8/89
 KBN
 ¥ØV

 12/12/89
 7/18/90

 OUTSIDE CONTAINMENT WITH CLASS B
 CHECKED
 R1
 KBN
 DATE
 2/16/89
 DLK
 ££ m1

 MOTORS
 12/12/89
 7/18/90
 12/12/89
 7/18/90

#### TAB A - EQUIPMENT IDENTIFICATION MATRIX

The following notes apply to all pages of this TAB A.

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- 2. See TAB B, Section A for a complete listing of the calculations used in this binder and their revision level.

The following notes are equipment specific.

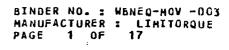
- 3. Power is to be removed from 1-FCV-62-98 and 1-FCV-62-99 motors by ECN 6701. After the ECN and field verification is complete, the binder must be revised to reflect the motors as Cat. C and the actuators as Cat. B.
- 4. The category and operating time listed for this device is the most limiting, and is for the internal limit switch which is being used to monitor a PAM function. The safety function listed is for the MVOP. The PAM safety function is as follows: This limit switch performs a PAM type B function and must be monitored for the duration of each event.

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PAGE A-1 R5







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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPHENT IDENTIFICATION MATRIX

EQIS_NUMBER UNII. DESCRIPTION	DEVICE TO NO. ATMITH	LOCATION ELEY(1) BH/BAD CQNIBACI	CAI QPER_IIME	EYENI	SAEETY_EUNCTION
WBH-1-NVOP-026-0241 -3 1-FCV Ann Standpipe ISLN Valve	л -026-0241 -д SB-00	713" A28 77K51-822598-6	A/B 5NN/100D	L	VLV MUST CLOSE ON A PHASE A CONTAINMENT ISOL SIGNAL
WBN-1-HVOP-026-0242 -A 1-FCV Ann standpipe ISLN Valve	-026-0242 -A S9-00	713° A28 77K51-822598-6	A/B 5MN/1000	L	VLV MUST CLOSE ON A PHASE A CONTAINMENT ISOL SIGNAL
WBN-1-HVOP-026-0243 -A 1-FCV Reactor Coolant Pump Spray ISLN V	-026-J243 -A ALVE 58-00	713 A28 77K51-822598-6	A/B 5MN/100D		VLV MUST CLOSE ON A PHASE A CONTAINMENT ISOL SIGNAL
WGN-1-HVOP-026-0244 -B 1-FCV ANN SPRINKLER SYS ISLN VALVE	-026-0244 -B SB-00	713° A28 77K51-822598-6	A/B 5MN/100D		VLV MUST CLOSE ON A PHASE A CONTAINMENT ISOL SIGNAL
WBN-1-HVOP-026-0245 -A 1-FCV Ann Sprinkler Sys Isln Valve Cont	-020-0245 -A SB-00	71 3° A28 77 K5 1-822598-6	A/B 5MN/1000	<b>L</b> .	VLV MUST CLOSE ON A PHASE A CONTAINMENT ISOL SIGNAL
					:
•		PREPARER/DATE_ CHECKED/DATE_	· · · · ·		R_1 R R /86 Ratur 2/86 Kar

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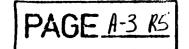
BINDER NO. : WBNEQ-MOV -003 MANUFACTURER : LIMITORQUE PAGE 2 OF 17

PRINT DATE: 07/07/90

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER MODEL NUMBER	-LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAI</u> <u>OPER TIM</u> (2)	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-MVOP-062-0063 -A 1-FCV -062-0063 -A SEAL FLOW RETURN ISLN VALVE SB-00	713' A28 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AF AB	VLV IS REQUIRED TO CLOSE AND REMAIN CLOSED AFTER THE PHASE A ISOLATION SIGNAL IS RECEIVED AND RESET. SEE NOTE 4.
WBN-1-MVOP-062-0090 -A 1-FCV -062-0090 -A Charging Flow ISLN valve smb-00	713' A28 71C62-54114-1	A/B 5MN/100D A/B 5D/1MO A/B 15MN/1MO A/B 5D/1MO A 1MO	L RH∕A CV∕A Ab Af	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-013. SEE TAB B FOR REVISION LEVEL.
WBN-1-MVOP-062-0091 -B 1-FCV -062-0091 -B Charging Flow ISLN Valve SMB-00	713' A28 71C62-54114-1	A/B 5MN/100D A/B 5D/1MO A/B 15MN/1MO A/B 5D/1MO A 1MO	RH/A	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-013. SEE TAB B FOR REVISION LEVEL.
WBN-1-MVOP-062-0098 -A 1-FCV -062-0098 -A Charging Pump 1A-A min Flow SMB-00	713' A28 71C62-54114-1	B 100D B 1M0 B 1M0 B 1M0 B 1M0 B 1M0	L RH⁄A CV⁄A Ab Af	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-013. SEE TAB B FOR REVISION LEVEL.
WBN-1-MVOP-062-0099 -B 1-FCV -062-0099 -B Charging Pump 1A-A min Flow SMB-00	713' A28 71C62-54114-1	B 100D B 1M0 B 1M0 B 1M0 B 1M0 B 1M0	L RH/A CV/A AB AF	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-013. SEE TAB B FOR REVISION LEVEL.

E8 m 7/18/90 CHECKED/DATE NMB 9/12/86



BINDER NO. : WBNEQ-MOV -003 Manufacturer : Limitorque Page 3 of 17

PRINT DATE: 07/07/90

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# WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER UNIT DEVICE ID NO. DESCRIPTION MODEL NU	AZMITH_ MBER	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	
WBN-1-MVOP-062-0132 -A 1-LCV -062-0132 -A VCT OUTLET ISOLATION VALVE LEVEL CONTROL SB-00		713' A07' 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A AB AF	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-013. SEE TAB B FOR REVISION LEVEL. SEE NOTE 4.	R5
WBN-1-MVOP-062-0133 -B 1-LCV -062-0133 -B VCT OUTLET ISOLATION VALVE LEVEL CONTROL SB-00		713' A07' 71C62-54114-1	A A A A	100D 1m0 1m0 1m0 1m0 1m0	L RH/A CV/A AB AF	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNDSG4-013. SEE TAB B FOR REVISION LEVEL. SEE NOTE 4.	
→WBN-1-MVOP-063-0001 -A 1-FCV -063-0001 -A RWST TO RHR PUMP FLOW CONTROL VALVE SB-2		692" A08 71C62-54114-1	A/B A/B	1WK/100D 1WK/1M0	L RH∕A	FOR L:VLV MUST OPEN AND REMAIN OPEN TO PERMIT SAFETY INJECTION.FOR RH/A VLV MUST CLOSE AND REMAIN CLOSED TO PREVENT RWST DRN	
WBN-1-MVOP-063-0003 -A 1-FCV ~063-0003 -A SIS PUMP RECIRC TO RWST VALVE SMB-00	•	692 <b>'</b> AD8 71C62-54114-1	A/B	1WK/100D	L	VALVE MUST CLOSE WHEN GOING FRM INJ PHASE TO RECIRC AND MUST STAY CLOSED DURING RECIRC.	
WBN-1-MVOP-063-0004 -B 1-FCV -063-0004 -B SIS PUMP 1A-A DISCH TO RWST SHUTOFF VLV SMB-00		692' A13 71C62-54114-1	A⁄B	1WK/100D	L	VLV MUST BE CLOSED BEFORE ALINGING THE SIS FOR RECIR VLV MUST REMAIN CLOSED TO PREVENT FLOW FROM SUMP INTO THE RWST	

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PREPARER/DATE_	JWH	9/9/86	KBN 7/1/90		<u> </u>
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BINDER NO. : WBNEQ-MOV -003 MANUFACTURER : LIMITORQUE PAGE 4 OF 17

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#### WATTS BAR NUCLEAR PLANT TABA-EQUIPHENT IDENTIFICATION MATRIX

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EQIS_NUMBERUNII_DEVICE_ID_NO Description Mode	AZBIIB_	OCATION ELEY(1) BH/BAD CQNIRAGI	CAI QPEB_IIME (2)	EVENI	SAEETY_EUNCTION
WBN-1-HVOP-063-0005 -9 1-FCV -063-0005 RWST TO SIS PUNP FLOW CONTROL VALVE SB-00	-a 0	69 2• A08 71 66 2- 54 114-1	A/B 1WK/100D		VLV MUST CLOSE WHEN GOING FROM INJECTION PHASE TO RECIRC AND MUST STAY CLOSED DURING RECIRC TO PREVENT FLOW FROM SUMP INTO THE RWST
WBH-1-HVOP-063-0006 -B 1-FCV -063-0006 SIS PUHP INLET TO CVCS CHG PUHP VALVE SB-00		69 2° AO 8 71 C6 2-54 114-1	A/B 1WK/100D		VLV IS NORMALLY CLOSED AND MUST BE OPERABLE TO PROVIDE SUPPLY FROM RHR TO SIS DURING ECCS RECIRC.
WBN-1-NVOP-063-0007 -A 1-FCV -063-0007 SIS PUNP INLET TO CVCS CHG PUNP VALVE SB-00		692° A08 71662-54114-1	A/8 1wK/100D	-	VLV IS NORMALLY CLOSED AND MUST BE OPERABLE TO PROVIDE SUPPLY FROM RHR TO SIS DURING ECCS RECIRC.
WBN-1-HVOP-063-0008 -A 1-FCV -063-0008 RHR HXA TO CVCS CHG PUMP SB-00		713° A28 71C62-54114-1	A/B 1WK/1000 B 1Ng	RH/A	L:OPEN & REMAIN OPEN DURING RECIRC TO ALLOW SUCTION FOR SI & CC PMP. RH/A:REMAIN CLOSED TO PREVENT DRAINING RWST
WBN-1-MVOP-063-0011 -9 1-FCV -063-0011 RHR HTX & TO SIS PUMP SB-00		713". A28 71C62-54114-1	A/B 1WK/100D B 1M0	RH/A	L:OPEN & REHAIN OPEN DURING RECIRC TO ALLOW SUCTION FOR SI & CC PMP. RH/A:REMAIN CLOSED TO PREVENT DRAINING RWST.
					_ <b>1</b>
		PREPARER/DATE_	JWH	9/9/	R_IR 86 Rodm
Page A-5 R1		CHECKED/DATE.	NMB	9/12	2/8/89 186 1840 Z/14/89

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#### PRINT DATE: 07/07/90

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## WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION ELEV(1) RM∕RAD CONTRACT	CAT (2)	OPER TIME	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-MVOP-063-0022 -B 1-FCV -063-0022 -B SIS PMP COLD LEG INJECTION SBD-00	713' A28 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A AF AB	VLV MUST SWITCH FROM COLD Leg to HDT leg recirc. See Note 4.
WBN-1-MVOP-063-0025 -B 1-FCV-063-0025 -B SIS BORON INJECTION TANK SHUTOFF VALVE SBD-00	71 <b>3'</b> A28 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A Ab Af	FOR LIVLV MUST OPEN AND REMAIN OPEN AFTER AN SI SIGNAL.FOR OTHERS: VLV MUST REMAIN CLOSED TO MAINTAIN RCP SEAL INJ PATH SEE NOTE 4.
WBN-1-MVOP-063-0026 -A 1-FCV -063-0026 -A SIS BORON INJECTION TANK SHUTOFF VALVE SBD-00	713* A28 71C62-54114-1	A A A A	100D 1m0 1m0 1m0 1m0 1m0	L RH/A CV/A Ab Af	FOR LIVLV MUST OPEN AND REMAIN OPEN AFTER AN SI SIGNAL.FOR OTHERS: VLV MUST REMAIN CLOSED TO MAINTAIN RCP SEAL INJ PATH SEE NOTE 4.
WBN-1-MVOP-063-0047 -A 1-FCV -063-0047 -A SIS PMP 1A-A INLET VALVE SB-00	692' A13 71C62-54114-1	A	100D	L	VLV MUST REMAIN OPEN DURING BOTH INJ AND RECIRC PHASE OF SI ,AND REMAIN OPERABLE TO ISOLATE PASSIVE FAILURE
WBN-1-MVOP-063-0048 -B 1-FCV -063-0048 -B SIS PMP 1B-B INLET VALVE SB-00	692' A12 71C62-54114-1	A	100D	L	VLV MUST REMAIN OPEN DURING BOTH INJ AND RECIRC PHASE OF SI, AND REMAIN OPERABLE TO ISOLATE PASSIVE FAILURES.

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# WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	
WBN-1-MVOP-063-0093 -A 1-FCV -063-0093 -A RHR TO RCS 2 AND 3 FLOW CONTROL VALVE SBD-2	713' A28 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A AF AB	SEE NOTE 4.	R5
WBN-1-MVOP-063-0094 -B 1-FCV -063-0094 -B RHR TO RCS 1 AND 4 FLOW CONTROL VALVE SBD-2	713' A28 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH/A CV/A AF AB	VLV IS REQUIRED TO OPERATE TO TRANSFER FROM COLD LEG TO HOT LEG RECIRC SEE NOTE 4.	;
WBN-1-MVOP-063-0152 -A 1-FCV -063-0152 -A SIS PUMP 1A-A OUTFLOW CONT VALVE SB-00	713' A28 71C62-54114-1	A	100D	L	VLV MUST BE OPEN FOR COLD LEG INJECTION AND RECIRC Modes of SI.VLV IS CLOSED For hot LEG RECIRC	
WBN-1-MVOP-063-0153 -B 1-FCV -063-0153 -B SIS PUMP 1B-B OUTFLOW CONT VALVE SB-00	713' A28 71C62-54114-1	A	100D	L	VLV MUST OPEN FOR COLD LEG Injection and recirc modes OF SI.VLV IS CLOSED FOR Hot LEG RECIRC	
WBN-1-MVOP-063-0156 -A 1-FCV -063-0156 -A SIS PUMP OUTLET TO RCS LOOP 1 AND 3 HL SBD-00	713' A28 71C62-54114-1	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L RH⁄A CV⁄A AF AB	VLV MUST SWITCH FROM COLD LEG Hot leg recirc. See note 4.	R5

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## WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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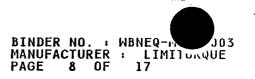
EQIS NUMBER UNIT DEVICE ID NO. AZ DESCRIPTION MODEL NUMBER	ITHELEV(1)_RM∠RAD CONTRACT	CAI OPER II (2)	IE EVEN]	SAFETY FUNCTION
WBN-1-MVOP-063-0157 -B 1-FCV -063-0157 -B SIS PUMP OUTLET TO RCS LOOP 2 AND 4 HL SBD-00	713' A28 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A Af Ab	VLV MUST SWITCH FROM COLD LEG HOT LEG RECIRC. SEE NOTE 4.
WBN-1-MVOP-063-0175 -B 1-FCV -063-0175 +B SIS PUMP 1B-B DISCHARGE TO RWST SHUT VLV SMB-00	692 • A12 71C62-54114-1	A/B 1WK/100I	) L	VLV MUST BE CLOSED BEFORE ALIGNING THE SIS FOR RECIRC. VLV MUST REMAIN CLOSED TO PREVENT FLOW FROM SUMP INTO THE RWST.
WBN-1-MVOP-063-0177 -A 1-FCV -063-0177 -A SIS PUMP INLET TO CVCS CHG PUMP SB-00	692' AD8 71C62-54114-1	A 100D	L	N.O. VLV MUST REMAIN OPEN TO ALLOW OPER OF RECIRC MODES OF SI AND MUST REMAIN OPERABLE TO ISOLATE PASSIVE FAILURE OF AN ADJACENT COMPONENT.
WBN-1-MVOP-067-0083 -A 1-FCV -067-0083 -A 000 Lower CNTMT A COOLER SUPPLY ISLN VALVE SMB-000	718' 2" ANN 74C38-083015	A 100D A 1M0 A 1M0 A 100D A 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0088 -B 1-FCV -067-0088 -B 01 Lower CNTMT A CLRS DISCH ISLN VALVE IC SMB-000	718' ANN 74C38-083015	A 100D A 1M0 A 1M0 A 100D A 100D	L RH/C CV/C FW/C MS/C	

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EQIS NUMBER UNIT DEVICE	ID NO. AZMITH	-LOCATION	CAT	OPER TIME	EVENT	SAFETY FUNCTION
	MODEL NUMBER	CONTRACT	(2)	I		
WBN-1-MVOP-067-0091 -A 1-FCV -067- Lower CNTMT C CLRS Supply ISLN VALVE	0091 -A 190 SMB-000	720' ANN 74C38-083015	A A A	100D 1mo 1mo	L RH/C CV/C	VLV MUST CLOSE AND REMAIN CLOSED ON A PHASE B ISOL SIGNAL. SEE NOTE 4.
			A A	100D 100D	FW/C MS/C	
WBN-1-MVOP-067-0096 -B 1-FCV -067- Lower CNTMT C CLRS DISCH ISLN VALVE	0096 -B 190 SMB-000	720' ANN 74C38-083015	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED ON A PHASE B ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0099 -B 1-FCV -067-	0099 – B 172	720' ANN			1.0.0	
LOWER CNTHT B CLRS SUPPLY ISLN VALVE	SMB-000 SMB-000	74C38-083015	A A A A	100D 1M0 1M0 100D 100D	RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0104 -A 1-FCV -067- Lower CNTMT B CLRS DISCH ISLN VALVE OC	0104 -A 170 SMB-000	720' ANN 74C38-083015	A A	100D 1M0	L RH/C	VLV MUST CLOSE AND REMAIN CLOSED ON A PHASE B
			A A A	1MO 100D 100D	CV/C FW/C MS/C	ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0107 -B 1-FCV-067- Lower CNTMT D CLRS SUPPLY ISLN VALVE	0107 -B 000 SMB-000	719' ANN 74C38-083015	A A A	100D 1M0 1M0	L RH/C CV/C	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B
			A A	100D 100D 100D	FW/C MS/C	ISOL SIGNAL. SEE NOTE 4.

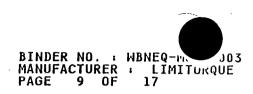
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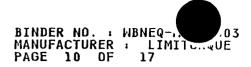
EQIS NUMBER UNIT DEVICE ID NO. AZMITH			ME EVEN	SAFETY FUNCTION
MODEL NUMBER WBN-1-MVOP-067-0112 -A 1-FCV -067-0112 -A 350 LOWER CNTMT D CLRS DISCH ISLN VALVE OC SMB-000	<u>CONTRACT</u> 720' ANN 74C38-083015	(2) A 100D A 1M0 A 1M0 A 100D A 100D	L RH/C CV/C FW/C MS/C	
WBN-1-MVOP-067-0123 -B 1-FCV -067-0123 -B CNTMT SPRAY HTX B SUPPLY CONTROL VALVE SMB-000	737' A01 74C38-083015	A 30D	L	VLV MUST OPEN TO PROVIDE WATER TO CNTMT SPRAY HTX
WBN-2-MVOP-067-0123 -B 2-FCV -067-0123 -B CNTMT SPRAY HTX B SUPPLY CONTROL VALVE SMB-000	737 • A01 74C38-083015	B 100D	L	VLV IS NORMALLY CLOSED AND MUST REMAIN CLOSED DURING MITIGATION OF EVENT
WBN-1-MVOP-067-0124 -B 1-FCV -067-0124 -B CNTMT SPRAY HTX B DISCHARGE VALVE SMB-000	713' A06 74C38-083015	A 30D	L	VLV MUST OPEN TO PROVIDE WATER TO CNTMT SPRAY HTX
WBN-2-MVOP-067-0124 -B 2-FCV -067-0124 -B CNTMT SPRAY HTX B DISCHARGE VALVE SMB-000	713' A19 74C38-083015	B 100D	L	VLV NORMALLY CLOSED AND MUST REMAIN CLOSED DURING MITIGATION OF EVENT

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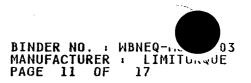
EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> <u>OPER</u> (2)	TIME EVENT	SAFETY FUNCTION
WBN-1-MVOP-067-0125 -A 1-FCV -067-0125 -A CNTMT SPRAY HTX A SUPPLY CNTRL VALVE SMB-000	737 <b>4</b> A01 74C38-083015	A 30D	L	VLV MUST OPEN TO PROVIDE WATER TO CNTMT SPRAY HTX
WBN-2-MVOP-067-0125 -A 2-FCV -067-0125 -A CNTMT SPRAY HTX A SUPPLY CNTRL VALVE SMB-000	737' A01 74C38-083015	B 100D	L	VLV NORMALLY CLOSED AND MUST REMAIN CLOSED DURING MITIGATION OF EVENT.
WBN-1-MVOP-067-0126 -A 1-FCV -067-0126 -A CNTMT SPRAY HTX A DISCH VALVE SMB-000	713' A06 74C38-083015	A 30D	L	VLV MUST OPEN TO PROVIDE WATER To CNTMT SPRAY HTX
WBN-2-MVOP-067-0126 -A 2-FCV -067-0126 -A CNTMT SPRAY HTX A DISCH VALVE SMB-000	713' A19 74C38-083015	B 100D	L	VLV NORMALLY CLOSED AND MUST REMAIN CLOSED DURING MITIGATION OF EVENT.
WBN-1-MVOP-067-0130 -A 1-FCV -067-0130 -A 300 Upper CNTMT vent CLR A supply ISLN valve SMB-000	796' 3" ANN 79KA2-824589-1	A 100D A 1MO A 1MO A 1MO A 100D A 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED ON A CNTMT ISOL SIGNAL. SEE NOTE 4.

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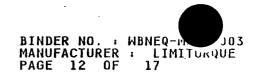
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WBN-1-MVOP-067-0131 -B 1-FCV -067-0131 -B UPPER CNTMT VENT CLR A ISLN VALVE OC SMB-000	300	795' 3" ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST FUNCTION TO ISOLATE FLOW TO COOLER UPON RECEIPT OF A PHASE B CNTMT ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0133 -A 1-FCV -067-0133 -A UPPER CNTMT VENT CLR C SUPPLY ISLN VALVE SMB-000	300	798' 4" ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED ON A CNTMT ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0134 -B 1-FCV -067-0134 -B Upper CNTMT CLR C DISCH ISLN VALVE SMB-000	320	799' 5" ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST FUNCTION TO ISOLATE FLOW TO COOLER UPON RECEIPT OF A PHASE B CNTMT ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0138 -B 1-FCV -067-0138 -B Upper Cntmt vent CLR B supply ISLN valve SMB-000	310	797' 2" ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D		VLV MUST CLOSE AND REMAIN CLOSED ON A CNTMT ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-067-0139 -A 1-FCV -067-0139 -A Upper CNTMT vent CLR B ISLN valve oc SMB-000	310	798' 4" ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C <u>CV/C</u> FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED ON A CNTMT ISOL SIGNAL. SEE NOTE 4.

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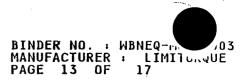
EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO.	<u>AZMITH</u>	LOCATION	ÇAŢ	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
	MODEL NUM	BER	CONTRACT	(2)			
WBN-1-MVOP-067-0141 -B Upper Cntmt Vent Clr D Sup		310	808' ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST CLOSE AND REMAIN CLOSED ON A CNTMT ISOL SIGNAL. SEE NOTE 4:
WBN-1-MVOP-067-0142 -A Upper Cntmt vent Clr D ISL	1-FCV -067-0142 -A N VALVE OC SMB-000	312	809' ANN 79KA2-824589-1	A A A A	100D 1M0 1M0 100D 100D	L RH/C CV/C FW/C MS/C	VLV MUST FUNCTION TO ISOLATE FLOW TO COOLER UPON RECEIPT OF A PHASE B CNTMT ISOL SIGNAL. SEE NOTE 4.
WHN-1-MVOP-070-0090 -A RCP Therm bar ret cntmt is	1-FCV -070-0090 -A LN VALVE SMB-00		713' A28 74C38-083015	A A A A	100D 1M0 1M0 1M0 1M0 1M0	L AB AF⁄A CV⁄A RH⁄A	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B ISOL IS INITIATED. SEE NOTE 4.
WBN-1-MVOP-070-0092 -A RCP OIL CLR RET CNTMT ISLN	1-FCV -070-0092 -A VALVE SMB-000		713' A28 74C38-083015	A A A A	100D 1m0 1m0 1m0 1m0 1m0	L AB AF⁄A CV⁄A RH⁄A	VLV MUST CLOSE AND REMAIN CLOSED ON A PHASE B ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-070-0133 -A RCP THERM BAR CNTMT ISLN V	1-FCV -070-0133 -A Alve Smb-000		737' A05 74C38-083015	A∕B	5MN/100D	L	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B ISOL IS INITIATED

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAT</u> <u>OPER TIME</u> (2)	<u>event</u>	SAFETY FUNCTION
WBN-1-NVOP-070-0134 -B 1-FCV -070-0134 -B RCP THERM BAR CNTMT ISLN VALVE SMB-000	737' A05 74C38-083015	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L AB AF⁄A CV⁄A RH⁄A	VLV MUST CLOSE AND REMAIN CLOSED AFTER A PHASE B ISOL IS INITIATED. SEE NOTE 4.
WBN-1-MVOP-070-0140 -B 1-FCV -070-0140 -B RCP OIL CLR HDR CNTMT ISLN VALVE SMB-000	713' A28 74C38-083015	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L AB AF∕A CV∕A RH∕A	VVL MUST CLOSE AND REMAIN CLOSED ON A PHASE B ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-070-0143 -A 1-FCV -070-0143 -A Excess Letdown HTX CNTMT INLET ISLN VLV SMB-000	713' A28 74C38-083015	A 100D A 1140 A 1M0 A 1M0 A 1M0 A 1M0	L AB AF⁄A CV⁄A RH⁄A	VLV MUST CLOSE AND REMAIN CLOSED ON A PHASE A ISOL SIGNAL. SEE NOTE 4.
WBN-1-MVOP-070-0183 -A 1-FCV -070-0183 -A Sample HTY HDR OUTLET VALVE SMB-000	713' A13 74C38-083015	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF/A	VALVE IS REQUIRED TO BE OPERABLE TO ISOLATE NON- QUALIFIED PIPING IN THE EVENT OF A CCS LINE BREAK.
WBN-0-MVOP-070-0206 -B 0-FCV-070-0206 -B CDWE BLDG RETURN SMB-000	692' A01 77K32-822484-1	A/B 1WK/100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	RH/A	CONFIG. OTHERS: VLV REQ'D TO FUNCTION TO PROTECT AGAINST A

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### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> CONTRACT	<u>CAT</u> <u>OPER TIME</u> (2)	<u>EVENI</u>	SAFETY FUNCTION
WBN-1-MVOP-070-0207 -B 1-FCV -070-0207 -B Cond Demin Waste Evap Bldg Supply SMB-000	737' A01 77K32-822484-1	A/B 1WK/100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF	FOR L:VLV MUST BE OPERABLE TO REALIGN THE CCS TO THE POST ACCIDENT CONFIG. FOR OTHERS: VLV MUST BE OPERABLE TO ISOLATE THE CDWE.
WBN-2-MVOP-070-0207 -B 2-FCV ~070-0207 -B Cond Demin Waste Evap Bldg Supply SMB-000	7 <b>37'</b> A01 77K32-822484-1	A/B 1WK/100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF	FOR L: VLV MUST BE OPERABLE TO REALIGN THE CCS TO THE POST ACCIDENT CONFIG. FOR OTHERS: VLV MUST BE OPERABLE TO ISOLATE THE CDWE.
WBN-0-MVOP-070-0208 -A 0-FCV -070-0208 -A Cond Demin Waste Evap Bldg Supply SMB-000	737' A01 77K32-822484-1	A/B 1WK/100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF/A	FOR L: VLV MUST BE OPERABLE TO REALIGN THE CCS TO POST ACCIDENT CONFIG. FOR OTHERS: VLV MUST BE OPERABLE TO ISOLATE THE CDWE.
WBN-1-MVOP-070-0215 -A 1-FCV -070-0215 -A Sample HX Inlet ISLN VALVE		A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF	VLV IS REQUIRED TO OPERATE TO ISOLATE NON-Q PIPING IN EVENT OF CSC LINE BREAK
WBN-1-MVOP-072-0002 -B 1-FCV -072-0002 -B CNTMT SPRAY HDR B ISLN VALVE SB-0	737' A05 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AF AB	VLV MUST BE OPEN AND REMAIN OPEN DURING THE MITIGATION OF THE EVENT TO PERMIT FLOW TO THE CONTAINMENT SPRAY HEADERS. SEE NOTE 4.

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# WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT_DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION <u>Elev(1)</u> <u>RM/RAD</u> <u>Contract</u>	<u>CAT</u> <u>OPER_TIM</u> (2)	E EVENT	SAFETY FUNCTION
WBN-1-MVOP-072-0013 -B 1-FCV -072-0013 -B CNTMT SPRAY PMP B RECIRC FLOW VLV SMB-000	692' A08 74C38-083015	A 30D	L	VLV MUST REMAIN OPERABLE TO ALLOW MINIMUM RECIRC TO PREVENT PUMP BURNOUT
WBN-1-MVOP-072-0021 -B 1-FCV -072-0021 -B RWST TO SPRAY HDR B FLOW CONTROL VALVE. SB-0	676' Al6 71C62-54114-1	A/B 1WK/100D A 30D A 30D A 30D A 30D A 30D	L RH/A CV/A Ab Af	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-019. SEE TAB B FOR REVISION LEVEL.
WBN-1-MVOP-072-0022 -A 1-FCV -072-0022 -A RWST TO SPRAY HDR A FLOW CONTROL VALVE SB-0	676' A16 71C62-54114-1	A/B 1WK/100D A 30D A 30D A 30D A 30D A 30D	L RH/A CV/A AB AF	FOR LENGTHY DISCUSSION OF SAFETY FUNCTION SEE CAT & OP TIMES CALCULATION WBNOSG4-019. SEE TAB B FOR REVISION LEVEL.
WBN-1-MVOP-072-0034 -A 1-FCV -072-0034 -A CNTMT SPRAY PMP A RECIRC FLOW CONT VLV SMB-000	692' A08 74C38-083015	A 30D	L	VLV MUST REMAIN OPERABLE TO ALLOW MINIMUM RECIRC TO PREVENT PUMP BURNOUT.
HBN-1-MVOP-072-0039 -A 1-FCV -072-0039 -A CNTMT SPRAY HDR A ISLN VALVE SB-0	737' A05 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AF AB	VLV MUST BE OPEN AND REMAIN OPEN DURING THE MITIGATION OF THE EVENT TO PERMIT FLOW TO THE CONTAINMENT SPRAY HEADERS. SEE NOTE 4.

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### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO, AZMITH DESCRIPTION MODEL NUMBER MODEL NUMBER	LDCATION <u>ELEV(1)</u> RM/RAD CONTRACT	<u>CAT</u> <u>OPER I</u> (2)	ME EVENI	SAFETY FUNCTION
WBN-1-MVOP-072-0040 -A 1-FCV -072-0040 -A RHR SPRAY HDR A ISLN VALVE SB-00	713' A08 71C62-54114-1	A 100D A 1MO A 1MO A 1MO A 1MO A 1MO	L RH/A CV/A Af Ab	VLV INITIALLY CLOSED DURING A LOCA MAY BE MANUALLY OPENED TO ASSIST CS SYSTEM. SEE NOTE 4.
WBN-1-MVOP-072-0041 -B 1-FCV -072-0041 -B RHR SPRAY HDR B ISLN VALVE SB-00	713' A28 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AF AB	VLV INITIALLY CLOSED DURING A LOCA MAY BE MANUALLY OPENED TO ASSIST CS SYSTEM. SEE NOTE 4.
WBN-1-MVOP-072-0044 -A 1-FCV-072-0044 -A CNTMT SUMP TO HDR A FLOW CONTROL VALVE SB-0	685' A07' 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A Ab Af	VLV CLOSED WHEN CS PMPS TAKING SUCTION FROM RWST. MUST OPEN FOR SUCTION FROM SUMP. MUST NOT FAIL IN MANNER TO DRAIN RWST. SEE NOTE 4. R5
WBN-1-MVOP-072-0045 -B 1-FCV -072-0045 -B CNTMT SUMP TO HDR B FLOW CONTROL VALVE SB-0	685' A07' 71C62-54114-1	A 100D A 1M0 A 1M0 A 1M0 A 1M0 A 1M0	L RH/A CV/A AB AF	VLV CLOSED WHEN CS PMPS TAKING Suction from RWST. MUST OPEN
WBN-1-MVOP-074-0012 -A 1-FCV -074-0012 -A RHR PMP A-A MINI FLOW VALVE SMB-000	692' A08 71C62-54114-1	A 100D	<b>L</b>	MUST OPEN FOR PMP PROTECTION During ECCS oper. When RCS Press above PMP Shutoff Head A safety regmt to close to Allow the RHRS to meet flow.

PREPARER/DATE JWH 9/9/86 7/u/20 EBM 7/18/90 CHECKED/DATE NMB 9/12/86





BINDER NO. : WBNEQ-MOV -003 MANUFACTURER : LIMITORQUE PAGE 17 OF 17

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# WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>Cat</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-MVOP-074-0024 -B 1-FCV -074-0024 -B RHR PMP B-B MINI FLOW VALVE SMB-000	676' A08 71C62-54114-1	A	100D	L	MUST OPEN FOR PMP PROTECTION DURING ECCS OPER. WHEN RCS PRESS ABOVE PMP SHUTOFF HEAD A SAFETY REQMT TO CLOSE TO ALLOW THE RHRS TO MEET FLOW.
WBN-1-MVOP-074-0033 -A 1-FCV -074-0033 -A RHR HT EXH A BYPASS SB-00	713' A12 71C62-54114-1	A	100D	L	VLV N.O. TO ASSURE ALIGN FOR INJ PHASE OF ECCS. MUST REMAIN OPERABLE TO SWITCH FROM COLD TO HOT LEG RECIRC TO PROTECT AGAINST PASSIVE FAILURES.
WBN-1-MVOP-074-0035 -B 1-FCV -074-0035 -B RHR HT EXH B BYPASS CROSS TIE VALVE SB-00	713' A11 71C62-54114-1	A	1000	L	VLV N.O. TO ASSURE ALIGN FOR INJ PHASE OF ECCS. MUST REMAIN OPERABLE TO SWITCH FROM COLD TO HOT LEG RECIRC TO PROTECT AGAINST PASSIVE FAILURES.

		R_/_	R <u>3</u> R
PREPARER/DATE JWH	9/9/86		Robu
CHECKED/DATE NMB	9/12/86	278784 KBN	9/21/09 KKN
		2116189	9/21/89

PAGE A-18 R3

BINDER NO. WBNEQ-MOV-003	PLANT WBN UNIT(S) 1 SHEET 1 OF $R = R$
BINDER TITLE LIMITORQUE	COMPUTED DATE 8/22/36
ACTUATORS OUTSIDE CONTAINN CLASS B MOTORS	MENT WITH CHECKED DATE \$12786
	INTRODUCTION TO TAB B
	<u>Use of Test Reports</u>
Report No.	Purpose in Binder
B0003	Main Test Report for Qualification
B0058	Summary Report of Limitorque EQ Testing and EQ Philosophy
B0212	Aging of General Purpose Phenolic Material and Low Level Vibration Testing
B0119	Qualification of Marathon Terminal Blocks
B0080	Thermal Aging of Class B Motors
600198	Used to Show Actuators do not Require Conduit Sealing

PAGE B-1

UTSIDE	CITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 9/9/86 RAM z/8/89 CONTAINMENT WITH CLASS B CHECKEDNB DATE 9/12/86 KBA
IOTORS	• 2/46/89
A. DOCL	MENTATION
Equi	pment Description Motor Operated Valve Actuators
Vend	or/Manufacturer <u>Limitorque</u>
Equi	pment Model No.(s) <u>See Tab A</u>
QUAI	JIFICATION REPORTS
(1)	Title/Number/Revision Limitorque ValveRIMS_B70851119105
	Actuators for Outside Containment #B0003 DATE 6-2-76
(2)	
	Actuator Qualification for Nuclear Services #B0058 DATE 1-11-80
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)
(3)	· · · · · · · · · · · · · · · · · · ·
(4)	MEB 811215 508
(5)	MEB 820604 547
	MEB 841212 503
(6)	
(6)	<u>B70 850910 004</u>
(7)	B70 850925 012
(7) (8)	B70 850925 012 B70 850926 001

PAGE B-2 R1

OUTSIDE MOTORS	CONTAINMENT WITH CLASS B CHECKED MB DATE 9/12/86 KBN 2/16/389	
A. DOCU	MENTATION	
OTHE	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)	
(12)	Limitorque Test Report B0212	
(13)	Limitorque Test Report B0119	
(14)	WAD-28 (AD-67)	
(15)	WAD-27 (AD-74)	
(16)	WAC-101	
(17)	WAC-111	
(18)	WAC-130	
(19)	WAC-131	
(20)	WCAP-7410-L	
(21)	<u>B71 860623 004</u>	
(22)	B70 851107 021 ·	
(23)	<u>B71 860806 004</u>	
(24)	Limitorque Letter dated March 19, 1987 (B70 870325 001)	F
(25)	Limitorque Telex dated July 11, 1988 (B36 890208 001)	"
	Copies of the above reports and documents can be found in	
	TABS D and E.	

PAGE B-3 R1

UTSIDE OTORS	CONTAINMENT WITH CLASS B CHECKED NMB DATE 9/12/86 7/18/90
A. <u>DOCI</u>	JMENTATION
OTHI	ER (ANALYSIS, VENDOR DATA, ETC.) (Continued)
Othe	er calculations used are:
(26)	WBNNAL3-025 (B45 860328 236)
(27)	WBNNAL3-026 (B45 860238 237)
(28)	<u>NEB86052 (#4) (B45 860527 265)</u>
(29)	WBNTSR-012 (B26 890317 001)
(30)	WBNNAL3-004 (B45 860205 235)
(31)	B45 851121 218 Category and Operating Times, System 26, WBNOSG4-007 R3
(32)	B26 900706 211 Category and Operating Times, System 62, WBNOSG4-013 R13
(33)	B26 9007/3 2/2 Category and Operating Times, System 63, WBNOSG4-014 R12
	B26 900319 215 Category and Operating Times, System 67, WBNOSG4-016 R14
(35)	B26 900110 200
	B26 900717202 Category and Operating Times, System 72, WBNOSG4-019 R9
	Category and Operating Times, System 74, WBNOSG4-020 R8
(38)	Environmental Drawing No. 47E235-44 R1
(39)	Environmental Drawing No. 47E235-46 Rl
(40)	Environmental Drawing No. 47E235-48 R3
(40)	Environmental Drawing No. 47E235-50 R1
(42)	Environmental Drawing No. 47E235-52 Rl
(43)	Environmental Drawing No. 47E235-56 Rl
(44)	Environmental Drawing No. 47E235-57 R2
(45)	
	Environmental Drawing No. 47E235-58 R1
(46)	Environmental Drawing No. 47E235-59 R2 & DCA P-02351-18-0

1739R-19

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R5 .

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BINDER N	NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 1c OF 28
BINDER I	R <u>2</u> R <u>5</u> TITLE LIMITORQUE ACTUATORS COMPUTED/R1 RHM DATE 02/08/89 RHM KB
UTSIDE	CONTAINMENT WITH CLASS B CHECKED /R1 KBN DATE 02/16/89 KBN EEm
IOTORS	8/89 7/18/90
A. <u>DOCU</u>	MENTATION
OTHE	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)
(47)	Environmental Drawing No. 47E235-60 R1
(48)	Environmental Drawing No. 47E235-61 R1
(49)	Environmental Drawing No. 47E235-62 Rl
(50)	Environmental Drawing No. 47E235-63 R2 & DCA P-02351-19-0
(51)	Environmental Drawing No. 47E235-64 R2 & DCA P-02351-20-0,21-0
(52)	Environmental Drawing No. 47E235-65 R2 & DCA P-02351-22-0
(53)	Environmental Drawing No. 47E235-77 Rl
(54)	Environmental Drawing No. 47E235-79 Rl
(55)	Category and Operating Times, Unit 2 for Unit 1,
	WBNOSG4-40 R 7 B26 900327 203
	·

R5

Note: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

PAGE B-4A R5

BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 2 OF 28 R ! R
BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 9/12/86 Rotu
OUTSIDE CONTAINMENT WITH CLASS B CHECKED NMB DATE 9/12/86
MOTORS Z/16/51 9
B. CONCLUSION OF REVIEW (Check only one block)
X Equipment Qualified
Equipment Satisfies All Requirements Except Qualified
Life or Justification of Replacement Schedule
Equipment Qualification Not Established by Documentation
Equipment Not Qualified Based on Test Failures
OPEN ITEMS AND QUALIFICATION DEFICIENCIES
1) Degraded voltage for actuators 1-FCV-62-63, 1-FCV-62-90,
<u>1-FCV-62-91, 1-FCV-62-98, 1-LCV-62-132, 1-LCV-62-133,</u>
1-LCV-62-135, 1-LCV-62-136, 1-FCV-63-26, 1-FCV-72-2 and
1-FCV-72-39 must be justified. See Open Item No. 1.
2) 1-FCV-70-215 has a Rotork valve actuator. See Open Item No. 2.
3) Final response to NRC IE Bulletin 85-03. See Open Item No. 3. R1
4) Replace control cable internal to the actuator. See Open Item
No. 4.
5) Replace nylon crimped motor lead connector with Raychem
connector. See Open Item No. 5.
6) Disconnect limit switch and motor compartment heaters. See
Open Item No. 6.
7) Motor on valve operator 1-FCV-62-99 must be replaced. See
Open Item No. 7.
8) Field verification sheets do not adequately identify the
terminal blocks installed in the actuators. See Open Item No. 8. R1
r

PAGE B-5 R1

BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 2a OF 28 BINDER TITLE LIMITORQUE ACTUATORS COMPUTED / Right DATE 2-15-89 OUTSIDE CONTAINMENT WITH CLASS B CHECKED / LI KBN DATE Z/16/189 MOTORS OPEN ITEMS AND QUALIFICATION DEFICIENCIES (Continued) 9) Provisions are required to eliminate the possibility of condensate draining into the limit switch compartments of valve actuators. A T-drain is to be added to the low point of the limit switch compartment for those actuataors that are subjected to high humidity. The binder to be revised upon resolution of this open item. See Open Item #9. PAGE B-5A R1

BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 3 OF 28
R_3_R BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 Roman
OUTSIDE CONTAINMENT WITH CLASS B CHECKED B DATE 8/22/86 KBN MOTORS
C. <u>QUALIFICATION CRITERIA</u> Criteria Used to Demonstrate Qualification is in Accordance with the
Following (Indicate Which Criteria is Applicable):        X       Components are Qualified to the Criteria of 10CFR50.49       R3        And/or NUREG-0588 Category I (IEEE323-1974)      R3        Components are Qualified to the Criteria of NUREG-0588       Category II or the DOR Guidelines of 1E Bulletin No. 79-01B
(IEEE323-1971) (DOR Guidelines Applicable to only BFN)
JUSTIFICATION/COMMENTS
•
INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
The Limitorque Environmental Qualification program was conducted
per IEEE-382 (1972), "IEEE Guide for Type Test of Class 1
Electric Valve Operators for Nuclear Power Generating Stations"
and meets the requirements of IEEE-323 (1974) as they apply to
valve actuators (#B0058, Section 2.1).
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# PAGE B-6 R3

BINDER NO. WBNEQ-MOV-003 PLA	ANT_WBN	UNIT(S)	1	SHEET ⁴	0 ²⁸
BINDER TITLE LIMITORQUE	COMF	итер <u>Дин</u> :кер <u></u>		R	R
ACTUATORS OUTSIDE CONTAINMEN CLASS B MOTORS	T WITH CHEC		DATE <u>8/</u> 2	upste	
D. <u>QUALIFICATION METHODOLOG</u>	Y (Check only	one block)			
Test of Identica Conditions wit			litions or	Under Sim	ilar
<u>     X                               </u>	Items with Sup	porting Analy	sis		
Analysis in Comb Supports the A					
Experience with Conditions wit	Identical or S h Supporting A	Similar Equipm Analysis	nent Under	Similar	
JUSTIFICATION/COMMENTS	The Limitorque	gualificatio	on program	was	
conducted to encompass t	<u>he entire fami</u>	ly of actuato	ors - SMB,	SB,	
SBD, and SMB/HBC in all	<u>available unit</u>	<u>: sizes (SMB-0</u>	100 to SMB	-5)	
This was accomplished by	type testing	- see Tab C,	Section 1	•	
<u>Tab E, Attachment 1 iden</u>	<u>tifies the act</u>	uator plant ]	D number,	the	
Limitorque shop order nu	mber, the actu	ator serial r	umber, an	d the	
documentation which esta	<u>blishes tracea</u>	bility to the	applicab	<u>le test</u>	
report.			. <u> </u>		
			-		
	<del></del>	· <u></u>			
		# <del>************************************</del>			
			<u> </u>		
	PAGE	<u>B-7</u>			

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BINDER NO. WBNEQ-MOV-003 PLANT	WBN UNIT(S)	1 SHEET 5 0 ²⁸
BINDER TITLE LIMITORQUE	_ COMPUTED <u>Gui</u>	/ / .
ACTUATORS OUTSIDE CONTAINMENT WITH CLASS B MOTORS		_ DATE \$12286

#### E. EQUIPMENT DESCRIPTION

•.

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? <u>No</u>

(1)	Equipment Type	<u>Plant Device</u> Motor Operated <u>Valve Actuator</u>	Qualification <u>Document</u> Motor Operated <u>Valve Actuator</u>	Reference B0003, Sect. 3.0 B0003,
(2)	Manufacturer	Limitorque	Limitorque	Sect. 3.0
(3)	Model Number(s)	<u>See Tab A</u>	SMB-0	B0003, Sect. 3.0
(4)	Serial Number(s)	<u>See Tab E</u>		B0003, Sect. 3.0
	Order Number(s)	<u>See Tab E</u>	600461	B0003, Sect. 3.0
			<del></del>	<u> </u>
(5)	Identify Component- Unique checksheet attached:	None		
JUST	IFICATION/COMMENTS S	ee Tab C, Section	1.	
<u>(4_a</u>	nd 5) Tab E, Attachme			Field
	fication Sheet in Tab			
		PAGE B-8	,	
			•	

BINDER NO. WBNEQ-MOV-003 PLANT	WBN	UNIT(S	)1		SHEET_6	0F <u>28</u>
BINDER TITLE LIMITORQUE ACTUATORS	COMPUTED	JWH	DATE	<u>8/22</u>	R_1 R_ /86 RHM 2-15-89	
OUTSIDE CONTAINMENT WITH CLASS B MOTORS	CHECKED	<u>NMB</u>	DATE °	<u>8/22</u>	186 KBN ZIIL/129	

## F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

		Plant	
Interface	Identify Interface	Requirement? (Yes/No)	Reference Test Report
	Idemetity Incellace	<u>(185/NO)</u>	<u>Test Report</u>
Mounting Bolts	NA	<u>NA</u>	NA
External			
Process	NA	NA	NA
Connections			
Electrical	NA	NA ( <u>See Comment)</u>	NA
Connections		( <u>bee_commenter</u>	
Conduit Seals			B0058 Sect 3.2.3
conduit Seals	None	<u>No</u>	and_4.1.2  R1
Connector			B0058 Sect
Seals	None	<u>No</u>	3 <u>.2.3 &amp; 4.1.</u> 2
	Motor horizontal with limit switch		See TAB G.
Orientation	compartment up	No	Sect Al
Physics 1			
Physical Configuration	NA	NA	NA
-		- <u></u>	NG
Other	NA	NA	<u>NA</u>
JUSTIFICATION/CO	MMENTS <u>Report B0003</u>	makes no mentic	n of any
<u>specific install</u>	ation interface requi	rements: howeve	r. B0058
Sections 3.2.3 a	nd 4.1.2 concludes th	at sealing of t	he actuators
			· · · — — · · ·
<u>lie conduit sea</u>	ls, seals and gaskets	) are of no imp	ortance for the
qualification of	the actuators. See	TAB C. Section	3.0. See TAB
C. Section 7, co	ncerning orientation	of the actuator	See TAB C.
Section 8.2. con	cerning electrical co	nnection of the	actuator.
<u>For electrical c</u>	<u>onnections, a qualifi</u>	ed cable shall	be used.  R1

# PAGE B-9 R1

		<u>EQ-MQV-00</u> 3 PLANT <u>WBN</u>	UNIT(S)1	SHEET <u>7</u> OF <u>2</u> R R
DER TIT	LE <u> </u>	IMITORQUE COMPUTI	DATE	<u>9/9/26</u>
CTUATOR LASS B	<u>RS OUT</u> MOTOR	SIDE CONTAINMENT WITH CHECKER		9/12/86
• <u>TEST</u>	SEQU	ENCE		
(1)	acci	Sequence: Was the test seque dent environment in accordance		
	(yes	/no/NA)? (note below)	Yes/No/NA	Reference
	(a)	Equipment inspected for damag	e <u>No</u>	See Comments B0003, Fig.
	(b)	Baseline performance measurements taken	Yes	2A and $2B$
	(c)	Equipment aged:		20.000
		Thermal	Yes	B0003, <u>Sect. 4.1</u> B0003,
		Radiation	Yes	<u>Sect. 4.3</u> B0003,
		Wear	Yes	Sect. 4.2
	(d)	Vibration/seismic testing conducted	<u>Yes-Seismic</u>	B0003, Sect. 4.4
	(e)	Design basis event (DBE) exposure	Yes	B0003, <u>Sect. 4.5.1</u> B0003.
	(f)	Post-DBE exposure	Yes	Sect. 4.5.1
	(g)	Final inspection and disassembly	Yes	B0003, Sect. 4.5.3
(2)		the same piece of equipment us ribed in item (1) above (yes/n		e test sequence
(3)	beer	e the test equipment, test equi appropriately documented (yes erence B0003 <u>. Appendix I</u> ).	/no/NA)? <u>Y</u> es _	
JUSI	TIFICA	ATION/COMMENTS (a) There is no	evidence in the	report that
the	equip	pment was inspected prior to st	art of the test.	However,
pre	-inspe	ection is not a requirement of	IEEE 323 (1974).	(b) Baseline
peri	Eorman	nce measurements were taken at	time 0. They are	within nominal
and	are a	acceptable. (d) Low level vibr	ation is address	ed in Tab C,
Sect	tion 2	2.0 PAGE B7	·6	

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TLASS B 1	CLE LIMITORQUE COMPUTED COMPUTED COMPUTED CONTAINMENT WITH CHECKED	_ DATE <u>\$/21</u>	/86
I. <u>AGI</u>	<u>IG</u>		
· (1)	Was aging considered in the qualification pr	ogram	
	(Yes/no/NA)? Yes (Reference <u>B0058, Se</u>	$CE \cdot 3 \cdot 0$	
	JUSTIFICATION/COMMENTS <u>None</u>		
(2)	Were the following effects considered in the		
(2)	Aging Effect	Yes/No/NA	Reference
	Thermal aging	Yes	B0003, Sect. 4 B0058, Sect.
	Radiation exposure	Yes	B0058, Sect. B0003, Sect.
	Vibration (non-seismic) aging	Yes	
	Operational (electrical/mechanical/process)		B0058, Sect. B0058, Sect.
	stress aging	Yes	<u>B0003, Sect.</u>
	JUSTIFICATION/COMMENTS <u>None</u>		
(3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference	considered	in the aging
	JUSTIFICATION/COMMENTS <u>No known synergistic</u>	effects.	
	Thermal Aging:		
(4)	incimal oging.		program
(4)	(a) Was thermal aging considered in the qua (yes/no/NA)? Yes (Reference <u>B0003</u> B0058	<u>Sect.4.1</u>	
(4)	(a) Was thermal aging considered in the qua (yes/no/NA)? Yes (Reference <u>B0003</u>	<u>Sect.4.1</u>	
(4)	(a) Was thermal aging considered in the qua (yes/no/NA)? Yes (Reference <u>B0003</u> B0058	<u>Sect.4.1</u>	
(4)	(a) Was thermal aging considered in the qua (yes/no/NA)? Yes (Reference <u>B0003</u> B0058	<u>Sect.4.1</u>	

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BINDER TITLE <u>LI</u> <u>ACTUATORS OUTS</u> CLASS B MOTORS	MITORQUE IDE CONTAINMENT W	COMPUTED	<u> Дин</u> DATE 9/17 DATE 9/17	R R 145 146 146
H. <u>AGING</u> (C	ontinued)			
(Ъ)		e qualification	to thermal aging d program (yes/no/N ).	
	JUSTIFICATION/CO	MMENTS <u>See Tab</u>	C, Section 8.	·
(c)			identified in the Reference <u>B0058</u>	
	JUSTIFICATION/CO	MMENTS <u>See Tab</u>	C, Section 8.	
(d)	time and tempera	ture identified	justified and the in the qualificat e <u>B0003, Sect.4.1</u> <u>B0058, Sect.3.2</u>	ion program
		Plant Maximum	·	· · · ·
	Parameter	Normal	Test	Equivalent
	Temperature	<u>110°F</u>	See Comments	See Comments
	Time	40 years	See Comments	See_Comments
	JUSTIFICATION/CO	MMENTS <u>See Tab</u>	C, Section 8. Al	<u>1 materials</u>
	which are potent	ially susceptib	le to aging have q	ualified
	or expected life	of greater that	1 40 years.	
(e)			sed fo <del>r</del> accelerate e <u>B0058, Sect. 3.</u>	
	JUSTIFICATION/CO	MMENTS See Tab	C, Section 8.	
(f)	aging parameters of the technical	, are they prope data (yes/no/NA	for determining erly referenced to A)? <u>NA</u>	
	(Reference			
	JUSTIFICATION/CO	MMENTS <u>See Tab</u>	C, Section 8.	

	IMITORQUE COMPUTED COMPUTED COMPUTED COMPUTED CONTAINMENT WITH CHECKED DATE 8/22/86
CLASS B MOTORS	$\frac{1}{2}$
H. <u>AGING</u> (C	Continued)
(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 3.2.1.3</u> ).
	JUSTIFICATION/COMMENTS See Tab C, Section 8. Regression
	analysis provided for Class "B" insulated motor.
( h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>B0003, Sect. 4.1</u> ).
	JUSTIFICATION/COMMENTS None
(5) Radi	ation Aging Exposure:
(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>B0003, Sect.2.3</u> ).
	App. II, and B0058, Sect.3.4 JUSTIFICATION/COMMENTS <u>None</u>
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>NA</u> (Reference <u>B0058, Sect. 3.4</u> ).
	JUSTIFICATION/COMMENTS Limitorque concluded after several
	tests that "there was no noticeable detrimental effect of
	radiation on any component in any of the test sequence or
	radiation level employed".
(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 3.4</u> ).
	JUSTIFICATION/COMMENTS None
	· · · · · · · · · · · · · · · · · · ·

TVA 19537 (OE-3-86)

BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 11 OF 28 R / R BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 R971 2/8/89
OUTSIDE CONTAINMENT WITH CLASS B CHECKED DATE 8/22/86 Km/ MOTORS
H. <u>AGING</u> (Continued) -
(d) Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference:
B0003, Sect. 2.3, 4.3 and App. II ).
Plant normal ambient radiation dose (rd) $\frac{1.8 \times 10}{2.04 \times 10^8}$ - Motor only
Test exposure dose (rd) $2 \times 10^{12}$ - Other -See Comments
Test exposure dose rate (rd/hr) $1.0 \times 10^6$
Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
JUSTIFICATION/COMMENTS <u>See TAB C, Section 9.0</u>
(6) Vibration (non-seismic) Aging:
<ul> <li>(a) Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program* <u>Yes</u> (Reference: <u>B0058, Sect 2.</u>1).</li> </ul>
JUSTIFICATION/COMMENTS <u>Non-seismic (low level) vibrati</u> on was considered but determined to be of no consequence <u>based on experience.</u> See TAB C. Section 2.0
(b) Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: <u>B0058, Section 2.1</u> ).
JUSTIFICATION/COMMENTS See TAB C. Section 2.0 for
justification of omission of non-seismic vibration aging
* Qualification program refers to the test report and any supple- mental documentation including TVA analyses in TAB C of the Binder.

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BINDER 1	TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 Rom 2/8/89
OUTSIDE MOTORS	CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 KBN
H. AGIN	IG (Continued)
(7)	Operational Stress Aging:
	<ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation adressed in the qualification program (Yes/No/NA)? Yes (Reference: B<u>0003.Sect 4.1.5 and 4.2</u>)</li> </ul>
·	JUSTIFICATION/COMMENTS The actuator was cycled
	(mech_aging) 1993 times.
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference:
	B0003, Sect. 4.2, B0058, Sect. 3,3
	JUSTIFICATION/COMMENTS The actuator was required to
	provide its full output rating at the torqued seated
	position during cycling.
(8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>B0058, Sect. 3.2 and 7.0</u> )
	Qualified life (Document in QMDS) greater than 40 years
	JUSTIFICATION/COMMENTS None

BINDER NO. WBNEQ-MOV-003 PLANT___ WBN _ UNIT(S)__1___ SHEET_12aOF_28 RI R BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 KNW Z-15-89 OUTSIDE CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 KBA) MOTORS MOTORS ... H. AGING (Continued) (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes_ (Reference: B0058, Section 7.0 ). JUSTIFICATION/COMMENTS None PAGE B-15A R1

	ER NO. <u>WBNEQ-M</u>	OV-003 PLANT_	WBN	_ UNIT(S)	<u>1</u> S	HEET <u>13</u> 0F <u>2</u>
INDI	ER TITLE <u>LIMIT</u>		۳.		. R.	<u> </u>
יזיייסיי	IDE CONTAINMEN			ייארד כדאדא	יד 0/10/0	9/2//89
01 <u>3</u> 0T0I		T WITE CHASS E		NNDDAI	.E <u>9/12/0</u> 1	9/21/89
. <u>P</u>	MATERIALS ANAL	YSIS				
J	Identification	of Materials	Susceptibl	e to Signif	icant The	ermal
	and/or Radiation for Detailed Ma			(Use Secti	on C of 1	Binder
1	tor becaried m	acertars Anary	5157.			
	Matarial/Pro	perty/Function	Radiation		Activatio	
	(a) <u>Durez (Red</u>					
(	(b) <u>G.P. Pheno</u>	lic (Black)	2.09x10 ⁸	<u>B0212(6.7</u> )	1.63	_S <u>ee_Commen</u> t
	(c) <u>Motor Insu</u>		0	B0003(2.3)		
				WBNEQ-CABL		See Tab C,
(	(d) <u>Wiring Ins</u> u	lation	<u>2.0x10</u>	044	NA	_S <u>ect. 4.0</u>
(	(e)			<u></u>		
т					4 1	_
J	USTIFICATION/(	JOHTENIS Radi	ation three	noid does	<u>not appiy</u>	•
L	imitorque has	performed rad	<u>iation exp</u> o	sure per t	<u>he refere</u>	nced
L	imitorque test	reports. The	<u>e values li</u>	sted in the	<u>e thresho</u>	<u>ld_column</u>
<b>r</b>	<u>epresent the t</u>	esting narame	tere (a) s	lee Tab (° (	Section 0	0
-		County parame			Section_9	<u></u>
		<u></u>				
				. <u>.</u>		
	ctivation ener	gies are docum	mented in I	ab E as fo	llows:	
						001)
<u>a</u>	. Durez - Lim	<u>itorque telex</u>	September	25, 1985 (1	370850926	
<u>a</u>		<u>itorque telex</u>	September	25, 1985 (1	370850926	
а <u>b</u>	. Durez - Lim . G. P. Pheno . Motor insul	<u>lic - Limitoro</u> ation - Limitoro	<u>September</u> que letter prque lette	25, 1985 (1 September 1 r September	370850926 15, 1985( - 25, 198	<u>B7085091000</u> 4 5
а <u>b</u>	<u>. Durez - Lim</u> <u>. G. P. Pheno</u> <u>. Motor insul</u> (B708509260	nitorque telex plic - Limitoro ation - Limito 001). Motors m	September que letter prque lette may be upgr	25, 1985 (1 September 1 r September aded to ins	370850926 15, 1985( : 25, 198 side cont	B70850910004 5
а <u>b</u>	. Durez - Lim . G. P. Pheno . Motor insul (B708509260 type (Class	<u>lic - Limitoro</u> ation - Limitoro	September que letter orque lette may be upgr h), Qualifi	25, 1985 (1 September 1 r September aded to ins	370850926 15, 1985( : 25, 198 side cont	B70850910004 5
а <u>b</u>	. Durez - Lim . G. P. Pheno . Motor insul (B708509260 type (Class	nitorque telex olic - Limitoro ation - Limito 001). Motors m RH insulation	September que letter orque lette may be upgr h), Qualifi	25, 1985 (1 September 1 r September aded to ins	370850926 15, 1985( : 25, 198 side cont	B70850910004 5 ainment ors_is
a b c	. Durez - Lim . G. P. Pheno . Motor insul (B708509260 type (Class	nitorque telex elic - Limitoro ation - Limito 001). Motors m RH insulation n Binder MOV-0	September que letter orque lette may be upgr h), Qualifi 001.	25, 1985 (1 September 1 r September aded to ins cation of t	370850926 5, 1985( 25, 198 ide cont these mot	B70850910004 5 ainment ors is R.
a b c 	. Durez - Lim . G. P. Pheno . Motor insul (B708509260 type (Class addressed i ee Tab C. Sect	nitorque telex <u>elic - Limitoro</u> <u>ation - Limitoro</u> 01). Motors m <u>RH insulation</u> n Binder MOV-0 <u>ion 8.0 for ma</u>	September que letter orque lette may be upgr h). Qualifi 001. aterial ana	25, 1985 (1 September 1 r September aded to ins cation of t lysis. Lin	370850926 5, 1985( 25, 198 ide cont hese mot	B70850910004 5 ors_is s_telex
a b c  Se . da	<u>. Durez - Lim</u> <u>. G. P. Pheno</u> <u>. Motor insul</u> (B708509260 <u>type (Class</u> addressed i	hitorque telex plic - Limitoro ation - Limitoro 01). Motors m RH insulation n Binder MOV-0 ion 8.0 for ma 6, 1985 (B70 8	September que letter orque lette may be upgr 1), Qualifi 001. aterial ana (51107 021)	25, 1985 (1 September 1 r September aded to ins cation of t lysis. Lin , shows the	370850926 5, 1985( 25, 198 ide cont these mote hese mote titorque's correlat	B70850910004 5 ors_is s_telex tion

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BIND	ER N	O. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET14 OF28
BIND	ER TI	TLE LIMITORQUE COMPUTED ATE 22/16 R
		S OUTSIDE CONTAINMENT WITH CHECKED DATE 8/25/56
J.	SPE	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS Acceptance Criteria: Does the report/analysis identify the limiting
		values of performance characteristics which would constitute failure if not met (yes/no/NA)? <u>Yes</u> (Reference <u>B0058, Sect. 4.1.8</u> ).
		Identify Acceptance Criteria: The actuator must be capable of opening
	-	or closing a valve on demand. TVA Quality Assurance procedures and
		pre-operational test results provide assurance that the actuator will
		perform its intended function.
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? <u>Yes</u> (Reference <u>B0003</u> , <u>Sect.4.0</u> , Fig.1, )
		Identify baseline and functional testing: <u>See Tab C, Section 11.</u>
		2A, and 2B
		2A, and 2B
	(3)	2A, and 2B         Identify baseline and functional testing: See Tab C. Section 11.
	(3)	2A, and 2B         Identify baseline and functional testing: See Tab C, Section 11.         JUSTIFICATION/COMMENTS None         Does the qualification report/analysis describe loads (or load
	(3)	2A, and 2B         Identify baseline and functional testing: See Tab C, Section 11.         JUSTIFICATION/COMMENTS None         Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? No         (Reference NA).
	(3)	2A, and 2B         Identify baseline and functional testing: See Tab C, Section 11.
	(3)	2A, and 2B         Identify baseline and functional testing: See Tab C, Section 11.         JUSTIFICATION/COMMENTS None         Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? No.         (Reference NA).         JUSTIFICATION/COMMENTS BO003 does not describe mechanical loads         during DBE testing. Electrical characteristics and stroke time

BINDER NO	. <u>WBNEQ-MOV-003</u> F	LANT WBN UNIT(S)	1SHEET_15_OF_28 R / R
BINDER TI	TLE LIMITORQUE AC	TUATORS COMPUTED JWH DATE	
<u>OUTSIDE (</u> MOTORS	CONTAINMENT WITH C	LASS B CHECKED <u>NMB</u> DATE	8/22/86 KPN
PERF		CHARACTERISTICS NECESSARY TO TIONS CAN BE SATISFIED UNDER	
(4)	· · · · · · · · · · · · · · · · · · ·	oads during baseline testing ions (Yes/No/NA)? <u>Yes</u> (Re	
	B0003, Sect. 4.1	. 4.2 and 4.5 & Fig. 2A and	<u>2B</u> ).
	JUSTIFICATION/CC	MMENTS <u>None</u>	·
			·
(5)	Identify electri	cal characteristics necessar	v to ensure the
		mance specifications can be	
	(a) <u>Parameter</u>	Plant Normal Conditions	<u>Reference</u>
	Voltage	490 VAC	*600456 
	Load	Approx 20,000 lbs thrust	*600456 Table III
	Frequency	See Comment	<u>See Comment</u>
	Accuracy	NA	<u>NA</u>
	Other(s)		
	<u>NA</u> _		
	NA		
	JUSTIFICATI	ON/COMMENTS Although not sp	ecifically
	stated, we	have no reason to believe th	at_Limitorque
		ng other than a 60 Hz power	Rl
			× × × × · · · · · · · · · · · · · · · ·
* Rep fou	ort 600456 is App nd in WBNEQ-MOV-0	endix C of Report B0058 and 01, TAB D.	a copy can be
		•	

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BINDER NO	WBNEQ-MOV-003	PLANT WBN UNIT(S) 1	
BINDER TI	TLE_LIMITORQUE_A	CTUATORS COMPUTED _JWH DATE 8/	R_/_R /22/86_RAM 2/8/89
<u>OUTSIDE C</u> MOTORS	ONTAINMENT WITH	CLASS B CHECKED <u>NMB</u> DATE <u>8/</u>	.1.4.
PERF		CHARACTERISTICS NECESSARY TO EN ATIONS CAN BE SATISFIED UNDER AC	
(b)	Parameter	Specific Accident Conditions.	<u>Reference</u> R1
•	Voltage	See Comment	See Comment
	Load	See Comment	NA WBN FSAR
	Frequency	60 Hz ± 3.2%	<u>p 8.3–17</u>
	Accuracy	NA	<u>NA</u>
	Other(s)		
	JUSTIFICATION/C	OMMENTS Justification for lack	of reduced
	voltage starting	g tests under accident condition	s is presented
	in TAB C, Sect.	5.0. Actuators are sized to pr	oduce the
	required torque	for each valve under specified	applications
	and conditions.	· · · · · · · · · · · · · · · · · · ·	
(c)	Parameter	Demonstrated Conditions	Reference R1 B0003,
	Voltage	<u>490 – 500 VAC</u>	<u>Fig. 2B</u> B0003,
	Load	Thrust 20,000 lbs	_Sect. 4.1
	Frequency	See Comment	B0003, App. III, page 3A
	Accuracy	NA	NA
	Other(s)		
	address demonstr that the operato	OMMENTS Although the test repor rated frequency, we have no reas or was tested at other than 60Hz er dated 6/18/86 (B71 860623 004	on to believe . Also, per

19) the actuator motor is purchased to NEMA standards that require the motor to operate at plus or minus 5 percent of nominal frequency.

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· · · ·				· · · · · · · · · · · · · · · · · · ·				2/16/89
		DPERATING EN		awing No. 1	<u>pp 16A</u>	case liste <u>through l</u> ing enviro	<u>6M f</u>	or all
(1)	Norma	al Max		(2)	Abno	rmal Max		
·	(a)	Temperature	e (°F)	110	(a)	Temperatu	re ('	°F) <u>120</u>
	(b)	Pressure ( _]	psig)	0	(b)	Pressure	(psi	g) <u>0</u>
	(c)	Humidity (?	6)	80	(c)	Humidity	(%)	90
	(d)	Radiation	(rd)	1 <u>.8 x 10</u> 7	(d)	Radiation	(rd)	) <u>NA</u>
		<u>is.</u>						
(4)	condi <u>outsi</u> loads exist	e anticipate itions: <u>Abr</u> ide temp. ex s, or degrad t for up to 1% of the p	normal kcursi ded en eight	temperatum ons, tempon vironment ( hours per	res con rarily contro	uld occur a greater t l systems.	asa han c Thi	result of lesign heat is could
	condi outsi loads exist than Accid	itions: <u>Abr</u> ide temp. ex s, or degrac t for up to	normal <u>kcursi</u> ded en eight plant case	temperatur ons, tempor vironment o hours per life. for any com	res con rarily contro excur mbinat	uld occur greater t l systems. sion and w ion of spe	as a han o Thi ill o cifie ):	result of design heat is could occur less ed accident
(5)	condi outsi loads exist than Accid	itions: <u>Abr</u> ide temp. ex s. or degrad for up to 1% of the p lent (worst	normal <u>kcursi</u> ded en eight plant case ding p	temperatur ons, tempor vironment of hours per life. for any com eak, durati	res con rarily contro excur mbinat	uld occur greater t l systems. sion and w ion of spe nd profile	as a han c Thi ill c cifie ): I ype (	result of design heat is could occur less ed accident LOCA (See TAB A)
(5)	condi <u>outsi</u> <u>loads</u> <u>exist</u> <u>than</u> Accid param (a)	itions: <u>Abr</u> ide temp. ex s, or degrad t for up to 1% of the p lent (worst meter includ	normal <u>kcursi</u> <u>ded en</u> <u>eight</u> plant case iing p e (°F)	temperatur ons, tempor vironment of hours per life. for any com eak, durato 	res con rarily contro excur mbinat	uld occur greater t l systems. sion and w ion of spe nd profile Accident t	as a han c Thi ill c cifie ): I ype ( H ype (	result of lesign heat is could occur less ed accident LOCA (See TAB A) HELB (See TAB A)
(5)	condi outsi loads exist than Accid param (a) (b) (c)	itions: <u>Abr</u> ide temp. ex s, or degrad <u>t for up to</u> 1% of the p lent (worst meter includ Temperature Pressure (p Humidity (%	normal kcursi ded en eight plant case ding p e (°F) psig)	temperatur ons, tempor vironment of hours per life. for any com eak, durati 0 0 0	nbinat	uld occur greater t l systems. sion and w ion of spend nd profile Accident t Accident t	as a han c Thi ill c cific ): I ype ( H ype (	result of lesign heat is could occur less ed accident LOCA (See TAB A) HELB (See TAB A) HELB (See TAB A)
(5)	condi outsi loads exist than Accid param (a) (b) (c)	itions: <u>Abr</u> ide temp. ex s, or degrad <u>t for up to</u> <u>1% of the p</u> dent (worst meter includ Temperature Pressure (p	normal kcursi ded en eight plant case ding p e (°F) psig)	temperatur ons, tempor vironment of hours per life. for any com eak, durati 0 0 0	nbinat	uld occur greater t l systems. sion and w ion of spend nd profile Accident t Accident t	as a han c Thi ill c cific ): I ype ( H ype (	result of lesign heat is could occur less ed accident LOCA (See TAB A) HELB (See TAB A) HELB (See TAB A)
(5)	condi outsi loads exist than Accid param (a) (b) (c) (d)	itions: <u>Abr</u> ide temp. ex s, or degrad <u>t for up to</u> 1% of the p lent (worst meter includ Temperature Pressure (p Humidity (%	normal kcursi ded en eight plant case ding p e (°F) psig) %) (rd)	temperatur ons, tempor vironment of hours per life. for any com eak, durati 0 0 0	nbinat	uld occur greater t l systems. sion and w ion of spend nd profile Accident t Accident t	as a han c Thi ill c cifie ): I ype ( H ype ( H ype ( I ype (	result of lesign heat is could occur less ed accident LOCA (See TAB A) HELB (See TAB A) HELB (See TAB A) LOCA (See TAB A)

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BINDER TI	WBNEQ-MOV-003       PLANT       WBN       UNIT(S)       1       SHEET 16aOF         R       R       R       R       R         TTLE       LIMITORQUE       ACTUATORS       COMPUTED       JWH       DATE       8/22/86       R         NUNTA INMENT       WITH CLASS       R       CHECKED       NMR       DATE       8/22/86       R	
MOTORS	CONTAINMENT WITH CLASS B CHECKED <u>NMB</u> DATE <u>8/22/86 KON</u> Z/16B9	
	IRED OPERATING ENVIRONMENT	_   R
(1)	Normal Max (2) Abnormal Max	-
	(a) Temperature (°F) <u>110</u> (a) Temperature (°F) <u>120</u>	
	(b) Pressure (psig) (b) Pressure (psig) 0	
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>	
	(d) Radiation (rd) $\frac{1 \times 10^6}{1 \times 10^6}$ (d) Radiation (rd) <u>NA</u>	
(3)	Process Interfaces: <u>See page 16.</u>	
		•
(4)	State anticipated occurrence frequency and duration of abnorma conditions: <u>See page 16.</u>	1
	· · · · · · · · · · · · · · · · · · ·	
(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):	
	(a) Temperature (°F) <u>133.7</u> Accident type <u>LOCA</u>	
	(b) Pressure (psig) 0 Accident type	
	(c) Humidity (%) <u>61</u> Accident type <u>HELB</u>	
	(d) Radiation (rd) <u>1.2 x 10</u> Accident type <u>LOCA</u>	
	(e) Spray Type <u>NA</u> Accident type <u>NA</u>	

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	0. <u>WBNEQ-MOV-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>16b</u> OF R <u>/</u> R TLE <u>LIMITORQUE ACTUATORS</u> COMPUTED <u>JWH</u> DATE <u>8/22/86</u> Rybu Z/0/09
OUTSIDE C MOTORS	CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 KBN
K. <u>REQU</u>	IRED OPERATING ENVIRONMENT
Refe	rence Environmental Drawing No. <u>47E235-46 (737 A1)</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) (b) Pressure (psig) 0
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $2.1 \times 10^5$ (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>See page 16.</u>
	· ·
	•
(4)	State anticipated occurrence frequency and duration of abnormation conditions:
•	
(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
	(a) Temperature (°F) <u>128</u> Accident type <u>HELB</u>
	(b) Pressure (psig) 0 Accident type LOCA
	(c) Humidity (%) Accident type
	(d) Radiation (rd) $(1 \times 10^4)$ Accident type <u>LOCA</u>
	(e) Spray Type <u>NA</u> Accident type <u>NA</u>
	. <b>ý</b>

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K. <u>REQU</u>	<u>IRED (</u>	PERATING ENVI	RONMENT			-
Refe	rence	Environmental	Drawing No	47E2	235-48 (737	7 A5, A9)
(1)	Norma	al Max	(2)	Abnor	rmal Max	
	(a)	Temperature (	°F) <u>104</u>	(a)	Temperatur	re (°F) <u>110</u>
	(b)	Pressure (psi	g) <u>0</u>	(b)	Pressure (	[psig) <u>0</u>
	(c)	Humidity (%)	80	(c)	Humidity (	(%)90
	(d)	Radiation (rd	) $8.8 \times 10^5$	(d)	Radiation	(rd) <u>NA</u>
(3)	Proce	ess Interfaces	: <u>See page 16</u>	•		
(4)	State	anticipated of the second s	occurrence fre page 16.	quency	and durat	ion of abnorm
(4)	State	anticipated of the second s	occurrence fre page 16.	quency	and durat	ion of abnorn
(4)	condi	e anticipated o tions: <u>See</u> lent (worst cas meter including	page 16. se for any com	binati	on of spec	ified acciden
	condi	ltions: <u>See</u>	page 16. se for any com g peak, durati	binati on, an	on of spec d profile)	ified acciden
	condi Accid param	ltions: <u>See</u> lent (worst cas meter including	page 16. se for any com g peak, durati °F)110	binati on, an _ A	on of spec d profile) ccident ty	ified acciden
	Accid param (a) (b)	ltions: <u>See</u> lent (worst cas meter including Temperature (	page 16. se for any com g peak, durati °F)110	binati on, an _ A _ A	on of spec d profile) ccident ty ccident ty	ified acciden : pe <u>LOCA</u>
(5)	Accid param (a) (b) (c)	ltions: <u>See</u> lent (worst cas leter including Temperature ( Pressure (psig	page 16. se for any com g peak, durati °F)10 g)0 NA6	binati on, an _ A _ A _ A	on of spec d profile) ccident ty ccident ty ccident ty	ified acciden : pe <u>LOCA</u> pe <u>LOCA</u>

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OUTSIDE MOTORS	CONTA	INMENT WITH CLASS	<u>B</u> CHECKED	NMB	DATE §	<u>3/22/8</u> 6_	<u>KBN</u> ² / <b>16</b> /89
K. <u>RE</u>	QUIRED	OPERATING ENVIRON	MENT				
Re	ference	e Environmental Dr	rawing No. <u>4</u> —	7 <u>E235</u>		A11, A1 5)	L2, A15,
(1	) Norm	nal Max	(2)	Abno	rmal Max		
	(a)	Temperature (°F)	) <u>104</u>	(a)	Tempera	ture (°F	7) <u>110</u>
	(b)	Pressure (psig)	0	(Ъ)	Pressure	e (psig)	0
	(c)	Humidíty (%)	80	(c)	Humidity	7 (%)	90
	(d)	Radiation (rd)	$4.3 \times 10^{5}$	(d)	Radiatio	on (rd)	<u>NA</u>
(3	) Proc	ess Interfaces:	<u>See page 16</u>	•			
(4		e anticipated occ litions: <u>See page</u>	currence free 16.	quency	y and dur	ation o	of abnormal
(4)	cond  Acci	e anticipated occ litions: <u>See page</u>	for any comb	oinati	ion of sp	pecified	
	cond  Acci	itions: <u>See page</u>	for any comb eak, duratio	oinati on, ar	ion of sp	pecified e):	accident
	cond  Acci para	itions: <u>See page</u> , , , , , , , , , , , , , , , , , , ,	for any comb eak, duratio	oination, ar	ion of sp nd profil	ecified e): type _L	accident OCA
	cond  Acci para (a)	itions: <u>See page</u> dent (worst case meter including p Temperature (°F)	for any comb eak, duratic 110	oinati on, ar #	ion of sp nd profil Accident	ecified e): type <u>L</u> type <u>L</u>	accident OCA OCA
	cond  Acci para (a) (b)	itions: <u>See page</u> dent (worst case meter including p Temperature (°F) Pressure (psig)	for any comb eak, duratio 0	oinati on, ar _ # _ #	ion of sp nd profil Accident Accident	ecified e): type <u>L</u> type <u>L</u> type <u>L</u>	accident OCA OCA OCA

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	0. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 16eOF
	ITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 Robin 2/8/89
<u>OUTSIDE (</u> MOTORS	CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 Ken
K. <u>REQU</u>	UIRED OPERATING ENVIRONMENT
Refe	erence Environmental Drawing No. <u>47E235-52 (713 Al, A13, A14)</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) <u>0</u> (b) Pressure (psig) <u>0</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $1.8 \times 10^7$ (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>See page 16.</u>
	• · · ·
•	
(4)	
(4)	State anticipated occurrence frequency and duration of abnorma conditions: <u>See page 16.</u>
(4)	
	conditions: <u>See page 16.</u>
(4) (5)	conditions: <u>See page 16.</u>
	conditions: <u>See page 16.</u> Accident (worst case for any combination of specified accident
	conditions: <u>See page 16.</u> Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
	<pre>conditions: See page 16. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): (a) Temperature (°F) 128 Accident type HELB</pre>
	conditions:       See page 16.         Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):         (a)       Temperature (°F)128 Accident type
	conditions: See page 16. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): (a) Temperature (°F) 128 Accident type HELB (b) Pressure (psig) 0 Accident type HELB (c) Humidity (%) 100 Accident type HELB (d) Radiation (rd) $\langle 1.0 \times 10^4$ Accident type LOCA
	conditions: See page 16. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): (a) Temperature (°F) 128 Accident type HELB (b) Pressure (psig) 0 Accident type HELB (c) Humidity (%) 100 Accident type HELB (d) Radiation (rd) $<1.0 \times 10^4$ Accident type LOCA
	conditions: See page 16. Accident (worst case for any combination of specified accident parameter including peak, duration, and profile): (a) Temperature (°F) 128 Accident type HELB (b) Pressure (psig) 0 Accident type HELB (c) Humidity (%) 100 Accident type HELB (d) Radiation (rd) $\langle 1.0 \times 10^4$ Accident type LOCA

# PAGE B-25 R1

K. <u>RE</u>		OPERATING ENVIRON	MENT		-
<b>D</b>	~				
Ke:	terence	e Environmental Di	rawing No	<u>4/£2</u>	235-56 (713 A6, A19)
(1	) Norn	nal Max	(2)	Abno	ormal Max
	(a)	Temperature (°F)	) <u>104</u>	(a)	Temperature (°F) <u>110</u>
	(b)	Pressure (psig)	0	(b)	Pressure (psig)0
	(c)	2	80(	(c)	Humidity (%)90
	(d)	Radiation (rd)	2 <u>.2 x 10</u> °	(d)	Radiation (rd) <u>NA</u>
(3)	) Proc	ess Interfaces:	<u>See page 16</u>	•	
	•				
(4,	) Stat	e anticipated occ	urrence fre	quenc	y and duration of abnorma
(4)		e anticipated occ itions: <u>See pag</u>	currence fre ce 16.	quenc	y and duration of abnorma
(4,		e anticipated occ itions: <u>See pag</u>	urrence fre ce 16.	quenc	y and duration of abnorma
	cond	itions: <u>See pag</u>	ze 16.		
(4)	cond  Acci	itions: <u>See pag</u>	for any com	binat	ion of specified accident
	cond  Acci	itions: <u>See pag</u> dent (worst case meter including p	for any com peak, duration	binat on, a	ion of specified accident
	cond Acci para	itions: <u>See pag</u> dent (worst case meter including p Temperature (°F)	for any com peak, duration	binat on, a	ion of specified accident nd profile):
	Acci para (a) (b)	itions: <u>See pag</u> dent (worst case meter including p Temperature (°F)	for any com beak, duration 110 0 NA	binat on, a -	ion of specified accident nd profile): Accident type <u>LOCA</u>
	Cond Acci para (a) (b) (c)	itions: <u>See pag</u> dent (worst case meter including p Temperature (°F) Pressure (psig)	for any com beak, duration 110 0	binat on, a -	ion of specified accident nd profile): Accident type <u>LOCA</u> Accident type <u>LOCA</u>
	<pre>cond Acci para (a) (b) (c) (d)</pre>	itions: <u>See pag</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	for any com beak, duration 110 0 NA	binat on, a -	ion of specified accident nd profile): Accident type <u>LOCA</u> Accident type <u>LOCA</u> Accident type <u>LOCA</u>

LIMITORQUE ACTUAT( AINMENT WITH CLASS O OPERATING ENVIRON ce Environmental Dr mal Max Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces: te anticipated occ ditions: See page	<u>B</u> CHECKED <u>NMENT</u> rawing No. <u>4</u> (2) ) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 ⁶ <u>See page 16</u> <u>See page 16</u>	<u>NMB</u> D 7E235-58 Abnormal (a) Tem (b) Pre (c) Hum (d) Rad	ATE <u>8/22/86</u> (676, A16, Max perature (° ssure (psig idity (%) iation (rd)	2/89 7/12 5 KBN <u>EE</u> 2/16/89 7/ A17) (F) <u>110</u> (S) <u>0</u> <u>90</u> NA
D OPERATING ENVIRON ce Environmental Dr cmal Max Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces: .te anticipated occ	<u>NMENT</u> rawing No. <u>4</u> (2) ) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 ⁶ <u>See page 16</u> See page 16	7E235-58 Abnormal (a) Tem (b) Pre (c) Hum (d) Rad	(676, A16, Max perature (° ssure (psig idity (%) iation (rd)	2/16/89 7/ A17) (F)110 (c)0 90  
ce Environmental Dr mal Max Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces:	rawing No. <u>4</u> (2) ) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 <u>See page 16</u> See page 16	Abnormal (a) Tem (b) Pre (c) Hum (d) Rad	Max perature (° ssure (psig idity (%) iation (rd)	A17) (F) <u>110</u> (j) <u>0</u> <u>90</u> <u>NA</u>
ce Environmental Dr mal Max Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces:	rawing No. <u>4</u> (2) ) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 <u>See page 16</u> See page 16	Abnormal (a) Tem (b) Pre (c) Hum (d) Rad	Max perature (° ssure (psig idity (%) iation (rd)	2F) <u>110</u> 3) <u>0</u> <u>90</u> <u>NA</u>
Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces:	(2) ) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 <u>See page 16</u> Currence free	Abnormal (a) Tem (b) Pre (c) Hum (d) Rad	Max perature (° ssure (psig idity (%) iation (rd)	2F) <u>110</u> 3) <u>0</u> <u>90</u> <u>NA</u>
Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces:	) <u>104</u> <u>0</u> <u>80</u> 7.5 x 10 See page 16 See page 16	<pre>(a) Tem (b) Pre (c) Hum (d) Rad.</pre>	perature (° ssure (psig idity (%) iation (rd)	3) 90  
Pressure (psig) Humidity (%) Radiation (rd) cess Interfaces:	0 806 7.5 x 10 See page 16 See page 16	(b) Pre (c) Hum (d) Rad	ssure (psig idity (%) iation (rd)	3) 90  
Humidity (%) Radiation (rd) cess Interfaces:	<u>80</u> 7 <u>.5 x 10</u> <u>See page 16</u> currence free	(c) Hum (d) Rad	idity (%) iation (rd)	90 NA
Radiation (rd) cess Interfaces:	7 <u>.5 x 10</u> See page 16 Currence free	(d) Rad.	iation (rd)	<u>NA</u>
cess Interfaces:	7 <u>.5 x 10</u> See page 16	•		
te anticipated occ	currence free			
		quency and	d duration	of abnormal
· .	••••••••••			
		- · · · ·	···· =•· ·	
ident (worst case ameter including p			-	d accident
Temperature (°F)	210	Accid	ient type _	HELB
Pressure (psig)	0	Acció	ient type _	HELB
Humidity (%)		_ Accid	lent type _	HELB
Radiation (rd)	$5.0 \times 10^{6}$	_ Accid	ient type _	LOCA
Spray Type	NA	Accid	lent type _	NA
		**		·
	Pressure (psig) Humidity (%)	Pressure (psig)0 Humidity (%)100 Radiation (rd) $5.0 \times 10^6$	Pressure (psig) Accident definition (rd) $5.0 \times 10^6$ Accident	Pressure (psig) <u>0</u> Accident type _ Humidity (%) <u>100</u> Accident type _ Radiation (rd) <u>5.0 x 10</u> Accident type _

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<u>OUTSIDE C</u> MOTORS	TLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 RHM 2/8/89 - ONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 KBN Z/16/89
•	IRED OPERATING ENVIRONMENT
Reie	rence Environmental Drawing No. <u>47E235-60, -59 (692 A8, A24)</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) (b) Pressure (psig)0
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $7.5 \times 10^6$ (d) Radiation (rd) <u>NA</u>
(4)	
	conditions: <u>See page 16.</u>
(5)	
(5)	parameter including peak, duration, and profile):
(5)	parameter including peak, duration, and profile):
(5)	<pre>parameter including peak, duration, and profile): (a) Temperature (°F)209 Accident typeHELB</pre>
(5)	<pre>parameter including peak, duration, and profile): (a) Temperature (°F) 209 Accident type</pre>

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OUTSIDE	CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86
MOTORS	o 2/16B9
K. <u>REQ</u>	UIRED OPERATING ENVIRONMENT
Ref	erence Environmental Drawing No. <u>47E235-61, 59 (713,A28,A2</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
	(b) Pressure (psig) (b) Pressure (psig)
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>9</u> 0
	(d) Radiation (rd) 7 <u>.5 x 10⁶</u> (d) Radiation (rd) <u>N</u>
(3)	Process Interfaces: <u>See page 16.</u>
	· · · · · · · · · · · · · · · · · · ·
(4)	State anticipated occurrence frequency and duration of abnor
	conditions: <u>See page 16.</u>
(5)	Accident (worst case for any combination of specified accide parameter including peak, duration, and profile):
x	(a) Temperature (°F) <u>209</u> Accident type <u>HELB</u>
	(b) Pressure (psig) <u>0</u> Accident type <u>HELB</u>
	(c) Humidity (%) <u>100</u> Accident type <u>HELB</u>
	(d) Radiation (rd) <u>5.0 x 10</u> Accident type <u>LOCA</u>
·	(e) Spray Type <u>NA</u> Accident type <u>NA</u>

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BINDER TI	TLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 RHM 9
OUTSIDE C MOTORS	2/89 ONTAINMENT WITH CLASS B CHECKED NMB DATE <u>8/22/86 KBN</u> 2/16/89
	RED OPERATING ENVIRONMENT ence Environmental Drawing No. <u>47E235-62, -63, -64, -65 (692 A</u>
(1)	Normal Max (2) Abnormal Max
	(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
•	(b) Pressure (psig) <u>0</u> (b) Pressure (psig) <u>0</u>
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>
	(d) Radiation (rd) $5.6 \times 10^5$ (d) Radiation (rd) <u>NA</u>
(3)	Process Interfaces: <u>See page 16</u> ,
(4)	State anticipated occurrence frequency and duration of abnorm conditions: <u>See page 16.</u>
(5)	Accident (worst case for any combination of specified acciden parameter including peak, duration, and profile):
	(a) Temperature (°F) <u>144</u> Accident type <u>HELB</u>
	(b) Pressure (psig)O Accident type
	(c) Humidity (%) <u>100</u> Accident type <u>HELB</u>
	(d) Radiation (rd) $(1.0 \times 10)$ Accident type <u>LOCA</u>
	(e) Spray Type <u>NA</u> Accident type <u>NA</u>
••••••••••••••••••••••••••••••••••••••	PAGE B-30 RS

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BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 Rom	
OUTSIDE CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 KBN MOTORS Z/16/89	
K. <u>REQUIRED OPERATING ENVIRONMENT</u>	
Reference Environmental Drawing No. <u>47E235-77 (RSVR) (685 A7',A25'</u>	_) R
(1) Normal Max (2) Abnormal Max	
(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>	)
(b) Pressure (psig)0 (b) Pressure (psig)0	<u> </u>
(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>90</u>	<u>!</u>
(d) Radiation (rd) $1.8 \times 10^6$ (d) Radiation (rd) <u>NA</u>	<u> </u>
(3) Process Interfaces: <u>See page 16.</u>	
	_
(4) State anticipated occurrence frequency and duration of abnorm conditions: <u>See page 16.</u>	al -
(5) Accident (worst case for any combination of specified acciden parameter including peak, duration, and profile):	t
(a) Temperature (°F) <u>190</u> Accident type <u>LOCA</u>	_
(b) Pressure (psig) Accident typeLOCA	-
(c) Humidity (%) <u>90</u> Accident type <u>LOCA</u>	-
(d) Radiation (rd) $1.0 \times 10^7$ Accident type <u>LOCA</u>	-
(e) Spray Type <u>NA</u> Accident type <u>NA</u>	_

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BINDER NO	. WBNEQ-MOV-003 PLANT	WBN	UNIT(S) <u>1</u>	
BINDER TI	TLE_LIMITORQUE_ACTUATO	,	<u>JWH</u> DATE <u>8/2</u> .	R_I_R 2/86_RHM 2/8789
<u>OUTSIDE C</u> MOTORS	ONTAINMENT WITH CLASS	<u>B</u> CHECKED	<u>NMB</u> DATE <u>8/2</u>	
K. <u>REQU</u>	IRED OPERATING ENVIRON	MENT		
Refe	rence Environmental D		E235-79 (692 A9 2,A13,A19,A20,A	
(1)	Normal Max	(2)	Abnormal Max	
	(a) Temperature (°F)	) <u>104</u>	(a) Temperature	e (°F) <u>110</u>
	(b) Pressure (psig)	0_	(b) Pressure (	psig)0
	(c) Humidity (%)	80	(c) Humidity (	<b>3</b> ) <u>90</u>
	(d) Radiation (rd)	$\frac{4}{3.5 \times 10^4}$	(d) Radiation	(rd) <u>NA</u>
(3)	Process Interfaces:	<u>See page 16</u>	<u>.                                    </u>	· · · · · · · · · · · · · · · · · · ·
		<u> </u>		
			· · · · · · · · · · · · · · · · · · ·	
(4)	State anticipated occ conditions: <u>See pag</u>	currence freq	uency and durat:	ion of abnormal
	Conditions. <u>Dee pag</u>		· · · · · · · · · · · · · · · · · · ·	
(5)	Accident (worst case parameter including p	for any comb beak, duration	ination of spect	ified accident
	(a) Temperature (°F)	110	Accident typ	De LOCA
	(b) Pressure (psig)	0	Accident typ	De LOCA
	(c) Humidity (%)	NA	Accident typ	e <u>LOCA</u>
	(d) Radiation (rd)	$1.0 \times 10^{7}$	Accident typ	e <u>LOCA</u>
	(e) Spray Type	<u>NA</u>	Accident typ	be <u>NA</u>
	1			
		•		
		•		

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BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 16mOF 28
BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 R9474 2/8/89
OUTSIDE CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/22/86 ABD MOTORS
K. REQUIRED OPERATING ENVIRONMENT
Reference Environmental Drawing No. <u>47E235-56, -57 (713 A7')</u> RI
(1) Normal Max (2) Abnormal Max
(a) Temperature (°F) <u>104</u> (a) Temperature (°F) <u>110</u>
(b) Pressure (psig) <u>ATM(-)</u> (b) Pressure (psig) <u>ATM(-)</u>
(c) Humidity (%)80 (c) Humidity (%)90
(d) Radiation (rd) <u>5.8x10</u> (d) Radiation (rd) <u>NA</u>
(3) Process Interfaces: <u>See page 16.</u>
(4) State anticipated occurrence frequency and duration of abnormal conditions: <u>See page 16.</u>
(5) Accident (worst case for any combination of specified accident
(5) Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
(a) Temperature (°F) <u>190</u> Accident type <u>HELB</u>
(b) Pressure (psig) O Accident type
(c) Humidity (%) <u>100</u> Accident type <u>HELB</u>
(d) Radiation (rd) $5.0 \times 10^6$ Accident type <u>LOCA</u>
(e) Spray Type <u>NA</u> Accident type <u>NA</u>

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MOTORS	CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/23/86 Kbn 2/16/84
K. <u>REQU</u>	JIRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH,
	margin, etc.): <u>None</u>
. (6)	Is the equipment subject to moisture or liquid intrusion whi
	can affect the performance of the equipment under design bas accident conditions (Yes/No/NA)? <u>No</u> (Reference:
	TAB C, Section 7.0 and Open Item #9
(7)	
	TAB C. Section 12.0
	Identify initiation time and duration of submergence:
•	NA
	· · ·
(8)	the total accident dose (Yes/No/NA)? Yes
	(Reference: Environmental drawing 47E235-44, Note 37
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify: <u>NA</u>
	·
(9)	
	Type RIMS No.
	Radiation OIR NEB 86092 B46 860721 252

	TITLE LIMITORQUE ACTUATOR DE CONTAINMENT WITH B MOTORS	<u>s</u> сомрит снеске	15	R R <u>x/22/16</u> <del>1/22/56</del>
L. <u>SUM</u>	MARY COMPARISON OF TEST	CONDITIONS TO	) SPECIFIED CONDITI	LONS
· (1)	Comparison of worst-ca	ise maximum pa	rameters:	
	Parameter	Specified	Demonstrated	<u>Reference</u> B0003, Sect.
	Operating Time	100 days	<u>   16 days   </u>	<u>4.5 &amp; Fig. 1</u>
	Temperature (°F)	209	250	B0003,Fig.1
	Pressure (psig)	0	25	B0003,Fig.1
	Relative Humidity (%)	100	100	B0003, Sect. 2.5. <u>&amp; Fig. 1</u>
	*Chemical Spray	NA	NA	<u>NA</u>
	**Radiation (rd)	<u>1.8 x 10⁷</u>	$2 \times 10^7$ - Other 2.04 × 10 ^{-Motor}	B0003, Sect. 2.3 & App.II <u>See Comments</u>
	Submergence	NA	OnlyNA	NA
	<pre>*Includes spray concent **Enter 40-year integrat and specify type. JUSTIFICATION/COMMENTS K(1) and K(5) on page based on sheet 16E. S radiation testing for accident operability t</pre>	ed normal dos <u>Please note</u> <u>16 are not ad</u> <u>See Tab C. Sec</u> switches. Se	e plus integrated that the radiatic ditive and the wor tion 9.0 for discu e Tab C, Section 6	accident dose on levels in st case is assion of
		ee profiles a	and mornin an accord	int:
(2)	Comparison of worst-ca			
(2)	Comparison of worst-ca <u>Parameter</u>	Tes Envelo	et Profile opes Specified es/No/NA)	Reference
(2)	•	Tes Envelo	t Profile opes Specified	
(2)	Parameter	Tes Envelo	et Profile opes Specified es/No/NA)	Reference B0003,Fig.1 B0003,Fig.1
(2)	<u>Parameter</u> Temperature	Tes Envelo	et Profile opes Specified es/No/NA) Yes	Reference B0003.Fig.1
(2)	<u>Parameter</u> Temperature Pressure	Tes Envelo	et Profile opes Specified es/No/NA) Yes Yes	<u>Reference</u> <u>B0003,Fig.1</u> <u>B0003,Fig.1</u> B0003

TVA 19537 (OE-3-86)

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EQP073.84

·			
BINDER NO	. <u>WBNEQ-MOV-003</u> PLANT <u>WBN</u> UNIT(S)		
BINDER TI	TLE_LIMITORQUE ACTUATORS COMPUTED _JWH DA		R R
		• ** ·	2 8 89
OUTSIDE ( MOTORS	CONTAINMENT WITH CLASS B CHECKED DA	ATE <u>8/23/8</u> 6	The inc
MOTORS	·····	•	2116/89
	MARY COMPARISON OF TEST CONDITIONS TO SPECINATIONS	FIED CONDIT	LIONS -
(001			
(3)	Were margins applied to the test parameter addressed in the test program to assure the and uncertainties are accounted for? (Not Yes/No/NA).	hat normal	variation
		Manaia	
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/NA
	Temperature: +15 degrees F	15°F	Yes-B0003 <u>Fig. 1</u>
	Pressure: +10% but no more than 10 psig	10%	Yes-B0003 Fig. 1
	Radiation: +10% of accident dose		Yes-B0003
	Addiation: +10% of accident dose	10%	Sect 4.3
	Time: +10% (or 1 hour + operating time per NUREG-0588)		No - See <u>Comment</u>
			No - See
			Comments TAB C F
	Voltage: ±10% of rated value	+8.7%	Sect 5
	Frequency: ±5% of rated value		See Comments
	Environmental Transient: the initial transient and the peak temperature applied twice	<u>2 Dwells</u>	
	Vibration: +10% added to acceleration	NA	NA-TAB C Sect 2
	JUSTIFICATION/COMMENTS See above reference	ces for all	items
	except time margin. See TAB C. Section 6.	.0. See co	mments on
	frequency in TAB B. Section J(5). Althoug	the test	<u>margin is</u>
	only 8.7% Limitorque letter dated 6-19-86	<u>5 (871 8606</u>	23 004,
	TAB E, Item 20) states that Limitorque pur	chase actu	ator
	motors to Nema standards requiring the mot	ors to be	<u>capable</u>
	of operating at plus or minus 10% voltage	or plus or	minus 5%
	of nominal frequency.		
	•		

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, •	BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 SHEET 20 OF 28 R R R
	BINDER TITLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 RHM
	OUTSIDE CONTAINMENT WITH CLASS B CHECKED NMB DATE 8/25/86 KBN MOTORS
	M. <u>OPERABILITY TEST RESULTS</u>
	<pre>(1) Identify the safety function(s) of this equipment: (Reference: <u>B0058, Section 2.4</u></pre>
	).
	JUSTIFICATION/COMMENTS <u>The actuator must be capable of</u>
	providing the required torque and/or thrust to open or close
	the valve as required.
	(2) Did the equipment perform its intended function during the simulated design basis accident exposure (Yes/No/NA)? <u>Yes</u> (Reference: <u>B0003, Section 5.0</u>
	).
	JUSTIFICATION/COMMENTS None
	(3) Did the equipment perform its intended function during the simulated post-design basis accident exposure (Yes/No/NA)? Yes (Reference: <u>B0003, Section 5.0</u> )
	JUSTIFICATION/COMMENTS None
	(4) Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (Yes/No/NA)? (Reference:
	B0003, Figure 1, 2A and 2B).
	JUSTIFICATION/COMMENTS <u>See TAB C. Section 6.0 for</u>
	justification of post-accident actuator operability.
•	R1
	PAGE B-37 R1

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1K 11	TLE LIMITORQUE ACTUATORS COMPUTED JWH DATE 8/22/86 Rom
	ONTAINMENT WITH CLASS B CHECKED NMB DATE 8/25/86 KB2
<u>oper</u>	ABILITY TEST RESULTS (Continued)
(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (Yes/No/NA)? <u>Yes</u> (Reference: <u>B0003, Section 4.5.2</u>
	JUSTIFICATION/COMMENTS <u>Minor problems were experienced</u> ).
	during the LOCA test. These problems had no effect on
	overall actuator performance. See the referenced section
	of report B0003.
	•
	•
	OPER

BI	NDER NO. $\frac{WBNEQ-MOV-003}{PLANT}$ PLANT $\frac{WBN}{VBN}$ UNIT(S) $\frac{1}{VBN}$ SHEET $\frac{21}{VBN}$	
BI	NDER TITLE LIMITORQUE ACTUATORS COMPUTED ATE SZZM	R
N.	MAINTENANCE AND SURVEILLANCE Has the qualification program identified those surveillance, maintenanc	
	and inspection parameters which are essential to maintain qualification which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets).	
	JUSTIFICATION/COMMENTS See Tab G.	
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	PAGE B-38	

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BINDER N	O. WBNEQ-MOV-003 PLANT WBN	UNIT(S)	1	_ SHEET ²² _	
OUTSI	DE CONTAINMENT WITH	COMPUTED Aut	_ date 🖌 date 🔏	22/12	_ R 
		<u></u>		f 	
0. <u>SUM</u>	ARY OF REVIEW			<u>Yes/No/NA</u>	
(1)	Documented evidence of qualif (Have all assumptions, math all extrapolations of test analysis been justified and	ematical models, a data used in an	and	Yes	
(2)	Any exceptions (i.e., sound r taken to the specified qual adequately justified?		rary)	<u>NA</u>	
(3)	Choice of qualification method justified?	dology adequately		Yes	
(4)	If analysis was performed, con	nplete the followi	.ng:		
	(a) Were equipment performance identified?	e requirements		<u>NA</u>	
	(b) Were specific features and effects analyzed?	d failure modes an	ld	<u> </u>	
	(c) Were assumptions and mathe together with appropriation their use?			<u>NA</u>	
	(d) Were environmental parameter equipment performance io			NA	
(5)	Adequate similarity between ea specimen established?	quipment and test		Yes	
(6)	Aging degradation evaluated ad	dequately?		<u>Yes</u>	
	(a) Mechanical and/or cycle ag	ging addressed?		Yes	
	(b) Equipment aged to end of 1 application of DBE condi		or to	<u>Yes</u>	
	(c) Absence of preaging in tes	st/analysis justif	ied?	<u>Yes</u>	
	(d) Materials susceptible to a aging identified?	thermal/radiation		Yes	

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PAGE <u>B · 39</u>

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BINDER TITLE LIMITORQUE ACTUATORS COMPUTED ACTUATORS	8/22/26 R
CLASS B MOTORS CHECKED DATE	2/25/86
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	Yes
(a) Peak temperature adequate	<u>Yes</u>
(b) Peak pressure adequate	Yes
(c) Duration adequate	Yes
(d) Required profile enveloped adequately	Yes
(e) Steam exposure adequate	<u>Yes</u>
(9) Criteria regarding test sequence satisfied?	<u>Yes</u>
(10) Criteria regarding spray satisfied?	<u>NA</u>
(a) Was the spray testing done while under the extremes of pressure and temperature?	NA
(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>NA</u>
(11) Criteria regarding submergence satisfied?	<u>NA</u>
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes
(b) Was beta radiation considered?	Yes
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes

BINDER NO. WBNEQ-MOV-003 PLANT WBN UNIT(S) 1 BINDER TITLE LIMITORQUE ACTUATORS COMPUTED ACTUATORS DATE & OUTSIDE CONTAINMENT WITH CLASS B MOTORS CHECKED DATE 7	SHEET ²⁴ R /22/34 /25/64	Of ⁸ _ R 
0. <u>SUMMARY OF REVIEW</u> (Continued)	<u>Yes/No/NA</u>	
(15) Criteria regarding functional testing satisfied?	Yes	
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes	
(b) Was an initial base line test done to establish required performance characteristics?	Yes	
(c) Has the test/analysis demonstrated that performance performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	2 Yes	
(16) Criteria regarding instrument accuracy satisfied?	<u>NA</u>	
<pre>(17) Test duration margin (1 hour + function time)     satisfied?</pre>	<u>Yes</u>	
(a) Is the minimum specified operating time at least 1 hour?	Yes	
(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	NA	
(18) Criteria regarding synergistic effects satisfied?	Yes	
(19) Criteria regarding margins satisfied?	Yes	
(20) Maintenance and surveillance requirements adequately identified?	Yes	

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WBN BINDER NO. WBNEQ-MOV-003 PLANT_ ____UNIT(S)___1____ SHEET_25_OF_28_ BINDER TITLE LIMITORQUE ACTUATORS COMPUTED / R. Communication Date 2/8/89 ____ R_____ OUTSIDE CONTAINMENT WITH CLASS B CHECKED KEN DATE 2/16/89 MOTORS THIS PAGE INTENTIONALLY LEFT BLANK Pages <u>B-42</u> thru <u>B-45</u> were deleted per revision <u>1</u> .

			TAB A				
		Fauipm	ent Identif	ication Ma	trix		
		nderbw.					
No	otes:			-	toment 1	ocated in	
	and on dr	or Building. awing 45W860	-3 in TAB H	Ξ.			
2	. Category	and Operatin are not assi and operatin	g Times for	r penetrat:	ions, which e dictated 1 erved.	are passi by the	ve
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PENT-002

PRINT DATE: 06/25/90

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#### MANUFACTURER : CONAX CORPORATION PAGE 1 OF WATTS BAR NUCLEAR PLANT TAB A - EQUIPMENT IDENTIFICATION MATRIX

-----LOCATION------AZMITH ELEV(1) RM/RAD CAT OPER TIME EVENT SAFETY FUNCTION EQIS NUMBER UNIT DEVICE ID NO. DESCRIPTION MODEL NUMBER A/B 100/100D LOCA MAINTAIN PRESSURE BOUNDARY 737 • ANN WBN-1-PENT-293-0006 -A 1-PENT-293-0006 -A 015 A/B 100/100D MS/C (CAT B) AND PRIMARY CONTAINMENT ELEC PENETRATION 7429-10001-02 76K61-087064 A/B 100/100D FW/C ELECTRICAL INTEGRITY (CAT A) A/B 1M0/1M0 RH/C CV/C A/B 1M0/1M0 MAINTAIN PRESSURE BOUNDARY 7 37 1 ANN A/B 100/100D LOCA WBN-1-PENT-293-0007 -B 1-PENT-293-0007 -B 167 (CAT B) AND 7429-10001-02 76K61-087064 A/B 100/100D MS/C PRIMARY CONTAINMENT ELEC PENETRATION ELECTRICAL INTEGRITY (CAT A) A/B 100/100D FW/C A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C MAINTAIN PRESSURE BOUNDARY WBN-1-PENT-293-0008 -A 1-PENT-293-0008 -A 199 727 8 ANN A/B 100/100D LOCA A/B 100/100D MS/C CAT (B) AND PRIMARY CONTAINMENT ELEC PENETRATION 7429-10001-02 76K61-087064 A/B 100/100D FW/C ELECTRICAL INTEGRITY (CAT A) A/B 1M0/1M0 RH/C CV/C A/B 1M0/1M0 MAINTAIN PRESSURE BOUNDARY A/B-100/100D LOCA WBN-1-PENT-293-0009 '-B 1-PENT-293-0009 -B 333 738' 1" ANN A/B 100/100D MS/C (CAT B ) AND PRIMARY CONTAINMENT ELEC PENETRATION 7429-10001-02 76K61-087064 A/B 100/100D FW/C ELECTRICAL INTEGRITY (CAT A) RH/C A/B 1M0/1M0 CV/C A/B 1M0/1M0 MAINTAIN PRESSURE BOUNDARY WBN-1-PENT-293-0014 -A 1-PENT-293-0014 -A 097 737 6" ANN A/B 100/100D LOCA A/B 100/100D MS/C (CAT B) AND PRIMARY CONTAINMENT ELEC PENETRATION 7429-10002-04 76K61-087064 ELECTRICAL INTEGRITY (CAT A) FW/C A/B 100/100D A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C ΰ

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**BINDER NO. : WBNEQ-PENT-002** 

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## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID DESCRIPTION		OCATION ELEV(1) RM/RAD CONTRACT	<u>CAI OPER TIME</u> (2)	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-PENT-293-0015 -A 1-PENT-293-0015 PRIMARY CONTAINMENT ELEC PENETRATION 7	-A 101 7429-10002-03	737' 6" ANN 76K61-087064	A/B 100/100D A/B 100/100D A/B 100/100D A/B 1M0/1M0 A/B 1M0/1M0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND Electrical integrity (CAT A)
WBN-1-PENT-293-0016 -B 1-PENT-293-0016 PRIMARY CONTAINMENT ELEC PENETRATION 7	-B 112 7429-10002-03	737' 6" ANN 76K61-087064	A/B 100/100D A/B 100/100D A/B 100/100D A/B 1M0/1M0 A/B 1M0/1M0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND Electrical integrity (CAT A)
WBN-1-PENT-293-0017 -B 1-PENT-293-0017 PRIMARY CONTAINMENT ELEC PENETRATION 7	-B 120 429-10002-04	737¶ 7¶ ANN 76K61-087064	A/B 100/100D A/B 100/100D A/B 100/100D A/B 1M0/1M0 A/B 1M0/1M0	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTERGRITY (CAT A)
WBN-1-PENT-293-0021 -A 1-PENT-293-0021 PRIMARY CONTAINMENT ELEC PENETRATION 7	-A 238 /429-10002-02	718' 9" ANN 76K61-087064	A/B 100/100D A/B 100/100D A/B 100/100D A/B 1M0/1M0 A/B 1M0/1M0	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A)

R<u>3</u> 1775720 1775720 Hore 8-30-40 PREPARER/DATE___ DDD 7-26-86 WBK CHECKED/DATE 7-27-

PAGE A -Ś ない



BINDER NO. : WBNEQ-PENT MANUFACTURER : CONAX C. PAGE 3 OF 3

### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAI OPER TIME EVEN</u> (2)	SAFETY FUNCTION
WBN-1-PENT-293-0027 -A 1-PENT-293-0027 -A 019 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10002-05	727'11" ANN 76K61-087064	A/B 100/100D LOCA A/B 100/100D MS/C A/B 100/100D FW/C A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND Electrical integrity (CAT A)
WBN-1-PENT-293-0036 -B 1-PENT-293-0036 -B 150 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10002-05	737' 7" ANN 76K61-087064	A/B 100/100D LOCA A/B 100/100D MS/C A/B 100/100D FW/C A/B 100/100D FW/C A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A)
WBN-1-PENT-293-0044 -A 1-PENT-293-0044 -A 209 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10002-05	733" 6" ANN 76K61-087064	A/B 100/100D LOCA A/B 100/100D MS/C A/B 100/100D FW/C A/B 100/100D FW/C A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND Electrical integrity (CAT A)
WBN-1-PENT-293-0052 -B 1-PENT-293-0052 -B 345 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10001-05	738'10" ANN 76K61-087064	A/B 100/100D LOCA A/B 100/100D MS/C A/B 100/100D FW/C A/B 1M0/1M0 RH/C A/B 1M0/1M0 CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND Electrical integrity (Cat A)

RЭ 1/23/90 240/2 8-30-90 PREPARER/DATE DDD 7-26-86 WBK 7-27-86 CHECKED/DATE___

BINDER NO. <u>WBNEQ-PENT-00</u> 2 PLANT WBN UNIT(S) 1 SHEET 1 OF	29
R <u>1</u> R <u>3</u> BINDER TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>DDD</u> DATE <u>7/26/86 JFW</u>	Z)
1/24/89 7/2	740
PENETRATION, LV POWER & CONTROL CHECKED WBK DATE 8/8/86 WCG Ann 1/25/89 8-3-	90
A. DOCUMENTATION	
Equipment Description <u>Electrical Penetration, Low Voltage Power</u> and Control	
Vendor/Manufacturer <u>Conax Corporation</u>	
Equipment Model No.(s) 7429-10001 and 7429-10002	
QUALIFICATION REPORTS	
(1) Title/Number/Revision <u>"Design Qualifica-</u> RIMS <u>EEB 820115 315</u> <u>tion Report for Electrical Penetration</u> <u>Assemblies for Watts Bar Nuclear Plant</u> DATE <u>December 09, 198</u> <u>Units 1 &amp; 2"/IPS-752/Rev. A.</u>	1
(2) Title/Number/Revision <u>"Design Qualifica-</u> RIMS <u>EEB 811110 300</u> <u>tion Mtl Test Report for Materials Used in</u> <u>Conax Electrical Penetration Assemblies</u> DATE May 14, 1981 <u>and Electric Conductor Seal Assemblies"/</u> <u>IPS-325/Rev. D.</u>	
(3) Title/Number/Revision <u>"Design Qualifica-</u> RIMS <u>EEB 811110 304</u> <u>tion Test Report of a Low Volt Pwr &amp; Control</u> <u>Service Classification (BF-LVP/C) Electri-</u> DATE <u>February 11, 198</u> <u>cal Penetration Assembly"/IPS-585.3/Rev. A.</u>	1
1	R3
OTHER (ANALYSIS, VENDOR DATA, ETC.)	
(5) IPS-325, Rev. E, Design Qualification Material Test Report for Materials Used in Conax Electrical Penetration Assemblies and Electric Conductor Seal Assemblies	
(6) IPS-214, Rev. $C$ , Instruction and Maintenance Manual for Electric Penetration Assemblies for Watts Bar Nuclear Plant, Units 1 and 2	
(7) IPS-213, Rev. 0, Packaging, Shipping, and Storage Procedures I for Electric Penetration Assemblies for Watts Bar Nuclear Plant, Units 1 and 2	23
(8) IPS-250, Packaging, Shipping, and Storage Procedures for Spare Parts for Electrical Penetration Assemblies for Watts Bar Nuclear Plant, Units 1 and 2	

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WBEP-0063Q

	NO. <u>WBNEQ-PENT-00</u> 2 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1a</u> OF <u>29</u> R <u>1</u> R_2
BINDER 1	TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>DDD</u> DATE <u>7/26/86 JFW</u> <u>1/24/89</u> 1/24/89
PENETRAT	TION, LV POWER & CONTROL CHECKED WBK DATE <u>8/8/86</u> WCG <u>KZulu</u> 1/25/89
A. <u>DOCU</u>	JMENTATION (Continued)
(8)	IPS-250, Packaging, Shipping, and Storage Procedures for Spare Parts for Electrical Penetration Assemblies for Watts Bar Nuclear Plant, Units 1 and 2
(9)	Conax Drawing PL7429-10001-01, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(10)	Conax Drawing PL7429-10001-02, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(11)	Conax Drawing PL7429-10001-03, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(12)	Conax Drawing PL7429-10001-04, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(13)	Conax Drawing PL7429-10001-05, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(14)	Conax Drawing PL7429-10001-06, Rev. C, Sheets 1, 2, & 3 of 3, Parts List
(15)	Conax Drawing PL7429-10002-01, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(16)	Conax Drawing PL7429-10002-02, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(17)	Conax Drawing PL7429-10002-03, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(18)	Conax Drawing PL7429-10002-04, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(19)	Conax Drawing PL7429-10002-05, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(20)	Conax Drawing PL7429-10002-06, Rev. D, Sheets 1, 2, & 3 of 3, Parts List
(21)	Conax Drawing 7429-10001, Rev. E, Sheets 1 & 2 of 2, - LVP Electric Penetrations for Watts Bar Units 1 & 2 (Rev. E in binder for information only. Refer to DCRM for latest revision)

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	WBNEQ-PENT-002     PLANT     WBN     UNIT(S)     1     SHEET     1b     OF       R     2     R     3	
BINDER I	TITLE CONAX ELECTRICAL COMPUTED DDD DATE 7/26/86 RCF 12/13/89 8	129/9
PENETRAT	ION, LV POWER & CONTROL CHECKED WBK DATE 8/8/86 KFL 74 1/8/90 8-34	
A. DOCU	MENTATION (Continued)	
(23)	Conax Drawing 7429-24001, Sheet 1, Rev. 0 - Enclosure Sub-Assy	
(24)	Conax Drawing 7429-24002, Sheet 1, Rev. A - Enclosure Sub-Assy	
(25)	WBN Drawing 45N860-3, R7 - Conduit and Grounding, Floor El 702.78, Details - Sheet l	
(26)	WBN Drawing 45W860-10, R8 - Conduit and Grounding, Electrical Penetration Details	
(27)	Watts Bar Environmental Drawings 47E235-41 Rl, -42 R2, -44 Rl, and -45 Rl. Drawings -41Rl, -42R2 and -45Rl have been modified by DCN P-04104-C (B26 0908 819) and S-09715-A.	R.3
(28)	Reference deleted	R
(29)	Calculation deleted.	
(30)	Reference deleted	
(31)	Reference deleted	
(32)	WBNEQ-GEN-001 - Environmental Qualification Generic Binder	
(33)	WBNEQ-SPLC-001 - Environmental Qualification Binder for Raychem Heat Shrink Splices	
(34)	WB-DC-30-5, R3 (B26 880713 055)	
(35)	GENAPS3-023 (B04 900320 300)	
(36)	WBNEEB-MS-TI06-0002, R6 (B26 900629 422)	R3
(37)	WBNEEB-MS-TI08-0015, R3, (B26 900615 412)	
(38)	WBNEEB-MS-TI08-0028, R7, (B26 900615 408)	
NOTE	: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.	1

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BINDER	NO.WBN	ieo-pei	<u>1T-00</u> 2	PLANT	WBNAS	ž.1	UNIT(	S) 1	SH	EET	OF
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PENETR	ATION,	LV POV	<u>/ER &amp; (</u>	CONTROL	CHECK	ED <u>/I</u>	11War	DATE	1-25-59		•
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BINDER	NO.WBN	EQ-PENT-002	PLANT_	WBN	UNIT(	S)_1_	SHEET 10	of <u>29</u>	<u>)</u>  R1
BINDER	TITLE_	CONAX ELEC	TRICAL	COMPUTE		DATE	R <u>8/19/8</u> 6	<u>1</u> R JFW /23/86	3 17 14/25/90
PENETR	ATION,	LV POWER &	CONTROL	CHECKED	WBK	DATE	8/20/86	WCG	24012 8-30-90
q v a	ualific ery com nalysis	is the docu ation report prehensive and compar-	t for t summary ison to	he Watts report similar	Bar Penet and docume modular-t	ration nts qu ype lo	ns. It i ualificat ow voltag	.s a ion by se powe	7 er

qualified by type tests conducted in accordance with IEEE 317-1976

at levels equal to or more severe than TVA specified requirements R3 for Watts Bar. Most references in this binder are to IPS-752. IPS-325 documents qualification of Conax Electric Penetration Assemblies from the standpoint of material tests, as a minimum satisfying requirements of Section 6.3 of IEEE 317-1976. Appendix A of IPS-325 includes Conax's thermal evaluation program. IPS-325 is referenced in this binder for identification of materials susceptible to aging degradation and to support Arrhenius Aging Calculations. IPS-325 documents an ongoing test program. Revision D of IPS-325 is referenced in IPS-752 and is included in Binder TAB D, Section D-2. A later revision of IPS-325, Rev. E is included in Binder TAB E, Section E-4, and is referenced in several places in this binder. Contrary to the note on page B3 R3 IPS-325 revision levels are repeated throughout TAB B.

IPS-585.3 documents tests on the low voltage power and control penetration assembly referred to as test data base one in IPS-752. It is a more detailed test report than IPS-752 that includes raw data and therefore it is referenced in a few places in this binder.

R3

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BINDER NO.WBNEQ-PENT-002 PLANT WBN UNIT(S) 1 SHEET 2 OF 29
$R_{1} R_{3}$
BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/16/86 JFW 4/1/ 12/20/88 8//6/90
PENETRATION, LV POWER & CONTROL CHECKED OM DATE 9/23/86 WCG 7484
1/25/89 2.2.7
B. <u>CONCLUSION OF REVIEW</u> (Check only one block)
X Equipment Qualified
Equipment Satifies All Requirements Except Qualified
Life or Justification of Replacement Schedule
Equipment Qualification Not Established by Documentation
Equipment Not Qualified Based on Test Failures
Equipment Not Qualified based on fest faitures
OPEN ITEMS AND QUALIFICATION DEFICIENCIES
Open Item Number Punchlist Item Number
1 PENT-002-001
R3
COMMENTS/RECOMMENDATIONS These modular-type electrical penetrations
are used to convey both safety-related and non-safety related low
voltage power and control circuits (480V nominal or less) into
primary containment. These penetrations are qualified to maintain
pressure integrity and electrical integrity within prescribed limits
before, during, and after a LOCA, steam line, CVCS, RHR, or FW break
occuring any time within the 40-year plant design life, contingent
on satisfactory resolution of open items and qualification
deficiencies noted above.

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Sec. 1

BINDER NO.WBNEQ-PENT	-002 PLANT	WBN	JNIT(S) <u>1</u>	SHEET_	0F
BINDER TITLE CONAX	ELECTRICAL C	OMPUTED_/R1	He DATE /	- <u>23-89</u>	_ R
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BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER & CONTROL		TED <u>OOD</u>	_/	191

## C. QUALIFICATION CRITERIA

Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):

X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)

Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79-01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)

JUSTIFICATION/COMMENTS <u>Contract Date: 11/14/75</u>. <u>Although procured</u>, <u>delivered</u>, and installed prior to 2/22/83, these electrical penetrations meet NUREG-0588, Category I requirements.

INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET

IEEE 317-1976 - Standard for Electrical Penetration Assemblies in

Containment Structures for Nuclear Power Generating Stations.

ASME Boiler and Pressure Vessel Code Section III, Subsection NE, for

Class MC Components, 1974 Edition & Addenda Through Winter 1974.

IEEE 344-1975 - Recommended Practices for Seismic Qualification of

Class lE Equipment for Nuclear Power Generating Stations.

U. S. Nuclear Regulatory Commission Regulatory Guide 1.63, Revision

2, July 1978 - Electric Penetration Assemblies in Containment

Structures for Light-Water-Cooled Nuclear Power Plants.

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PEN	DER TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>COD</u> DATE <u>8/19/86</u>
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS <u>Conax Qualification Report IPS-752, Section</u>
	1.2. See binder TAB D, Section D-1 for copy of IPS-752.
	IPS-752, Section 4.3 states "The design and construction of the sub-
	ject penetrations of Para. 3.1 contains the identical leakage paths,
	leak mechanisms, feedthrough concepts, seals, insulation systems,
	and materials as test data bases one, two, three, and four and no
	differences exist between the test data bases and the Watts Bar
	design which would affect qualification."

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	BINDER NO. WBNEQ-PENT-002 PLANT	WBN UNIT(S) 1 SHEET 5 OF 29
1	BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER	COMPUTED DATE 7/26/86
	& CONTROL	CHECKED 4112 DATE 7/21/86

# E. EQUIPMENT DESCRIPTION

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? No_____

		<u>Plant Device</u>	Qualification <u>Document</u>	<u>Reference</u>
(1)	Equipment Type	Elec. Pen. LVP & C	Same	IPS-752, Sect. 4.1
(2)	Manufacturer	Conax Corporation	Same	IPS-752, Sect. 4.1
(3)	Model Number(s)	See TAB A	7508-10003	IPS-585.3, Sect. 4.2
(4)	Serial Number(s)	See TAB F	NA	IPS-585.3 Appx. A
(5)	Identify Component- Unique checksheet attached:	See TAB B, Sup	plement 3.	
JUST	IFICATION/COMMENTS	Conax Summary Qua	lification Report	t IPS-752
<u>docu</u>	mented qualification	by analysis and	comparison to sin	nilar
modu	lar-type low voltage	power and contro	l penetration as:	semblies
prev	iously qualified by t	ype tests conduc	ted at levels equ	ual to or
more	severe than TVA spec	ified requiremen	ts for Watts Bar	. Test data
base	one is the applicabl	<u>e test specimen ;</u>	for low voltage	power and
		PAGE <u>8-10</u>		

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BINDER TITLE CONAX ELECTRICAL COMPŬTED DDD DATE 8/19/86
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JUSTIFICATION/COMMENTS (Continued)
control classification penetrations. See IPS-752, Table 4.1, for a
detailed description of the tested penetration (test data base one).
IPS-585.3 is the type test report for test data base one described
in IPS-752. IPS-585.3 is much more detailed and therefore it is
referenced at some points in this binder. Some Watts Bar penetrations
include spliced-on outboard pigtail extension for size 8 AWG and larger
which are not part of test base one. However, the annulus does not
experience any steam accident environment. The splice insulations are
Raychem WCSF-N as shown in instruction manual IPS-214 (binder TAB H,
Section H-1) and are qualified in accordance with binder WBNEQ-SPLC-001.
See Sheets 5B and 5C for correlation of plant devices EQIS No.'s,
Model No,'s, Serial No.'s, and Types,
All WBN Primary Containment Penetrations are tabulated on
TVA Drawing 45N860-3 in binder TAB E, Section E-2. Penetrations
covered in this binder are low voltage power and control types and

are listed on 46N860-3 as being for node voltage levels 3A, 3B, 4A, and 4B.

Penetrations for node voltage levels 2A, 2B, 2D, 2E, 2F, and 2G are covered in binder WBNEQ-PENT-003.

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BINDER NO. <u>WBNEQ-PENT-C</u>	02 PLA	NT <u>WBN</u> U	NIT(S) <u>1</u>		
BINDER TITLE <u>CONAX EI</u>	ECTRIC	AL COMPUTED DDD	DATE <u>7/2</u>		
PENETRATION, LV POWER	& CONT	ROL CHECKED WBK	DATE <u>7/2</u>	7/86 Holl	
EQIS NO.		MODEL NO.	SERIAL NO.	° <u>TYPE</u>	
				÷	ļ
WBN-1-PENT-293-0006	-A	7429-10001-03	374	L.V. Power	
WBN-1-PENT-293-0007	-В	7429-10001-03	375	L.V. Power	
WBN-1-PENT-293-0008	-A	7429-10001-03	376	L.V. Power	
WBN-1-PENT-293-0009	-B	7429-10001-03	383	L.V. Power	
					F
WBN-1-PENT-293-0014	-A	7429–10002–04	363	L.V. Power	
WBN-1-PENT-293-0015	-A	7429-10002-03	370	L.V. Power	
WBN-1-PENT-293-0016	-B	7429-10002-03	371	L.V. Power	
WBN-1-PENT-293-0017	-A	7429-10002-04	364	L.V. Power	
WBN-1-PENT-293-0021	-A	7429-10002-02	365	L.V. Power	

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BINDER TITLE <u>CONAX EL</u>	ECTRIC	AL COMPUTED DDD	DATE <u>7/2</u>	R_3_R 6/86 <i>(1)FL</i> 19/15/90
PENETRATION, LV POWER	& CONI	ROL CHECKED WBK	DATE <u>7/2</u>	7/86 <del>2/20</del>
EQIS NO.		MODEL NO.	<u>SERIAL NO</u> .	<u>TYPE</u>
WBN-1-PENT-293-0027	-A	7429–10002–05	358	L.V. Control
WBN-1-PENT-293-0036	-B	7429–10002–05	359	L.V. Control
WBN-1-PENT-293-0044	-A	7429-10002-05	360.	L.V. Control
WBN-1-PENT-293-0052	-B	7429-10001-05	379	L.V. Control
		·		
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& CONTROL	CHECH	KED MAL	_ DATE	186

# F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the test report and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if No, provide justification.

	_	Plant D	Defense
Interface	Identify Interface	Requirement? (Yes/No)	Reference <u>Test Report</u>
Mounting Bolts	NA	NA	NA
External Process Connections	<u>NA</u>	NA	NA
Electrical Connections	NA-See Note 1 below	<u>NA</u>	NA
Conduit Seals	NA	NA	<u>NA</u>
Connector Seals	NA	NA	<u>NA</u>
Orientation	NA	NA	NA
Physical Configuration	<u>NA-See Note 2 below</u>	Yes	IPS-752, Table 4.1
Other	NA	NA	NA
JUSTIFICATION/COMM	ENTS <u>Note 1: In-line spli</u>	ice insulations	for connec-
tion of field cabl	e to penetration conductor	pigtails were p	rovided by
TVA and are not pa	rt of the penetration assem	bly qualification	on. See
binder WBNEQ-SPLC-	<u>001 for splice qualifications and the splice qualifications of the splice qualities of the splice qual</u>	01.	
Note 2: Header pl	ate, feedthrough tube mater	ial, feedthroug	h seal,
conductor sealants	, conductor insulation, cop	oper conductors,	installation
weld. There are n	o required external process	requirements, 1	no conduit
seals (penetration	s are seals), and orientati	on is not a cons	sideration
for penetrations.			

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BINDER TITLE CONAX ELECTRICAL COMPUTED DDD	DATE <u>7</u>	/26/86 4w
PENETRATION, LV POWER & CONTROL CHECKED WBK	DATE <u>7</u>	126/86 avait
0		1-25-59
G. <u>TEST SEQUENCE</u>		
(1) Test Sequence: Was the test sequence the accident environment in accordance paragraph 6.3.2 (Yes/No/NA)? (Note)	ce with IE	hed to simulate EE-323 (74),
	<u>Yes/No/NA</u>	<u>Reference</u>
<ul><li>(a) Equipment inspected for damage</li><li>(b) Baseline performance</li></ul>	No	<u>NA</u>
(c) Equipment aged:	Yes	<u>Sect. 5.0</u>
Thermal	Yes	Sect. 5.7.4
Radiation	Yes	<u>Sect. 5.7.5</u>
Wear	No	<u>NA</u>
(d) Vibration/seismic testing		0 E 10
conducted	Yes	<u>Sect. 5.12</u>
(e) Design basis event (DBE)	17	Cook 5 1/ 1
exposure	<u>Yes</u>	<u>Sect. 5.14.1</u>
(f) Post-DBE exposure	Yes	<u>Sect. 5.14.1</u>
(g) Final inspection and disassembly	No	NA
(2) Was the same piece of equipment used sequence described in item (1) above	throughou (Yes/No/N	t the test A)? <u>Yes</u>
(3) Have the test equipment, test equipm calibration data been appropriately (Reference: <u>IPS-585.3, p. 32</u>	ent accura document (	cies and Yes/No/NA)? <u>Yes</u> ).
JUSTIFICATION/COMMENTS		
G(1)(a) - Although Conax does not state inspection was done, they have completed test programs and there is no reason to spection was not done. However, an init not required by IEEE 317-1976.	numerous believe a	successful visual in-
G(1)(c) - Electrical penetrations are pa subject to wear as an aging mechanism. by IEEE 317-1976. The penetrations, how simulated operational stresses which inc (IPS-752, Section 5.7.3) and short-term tests (IPS-752, Sections 5.10.1 and 5.11 IEEE 317-1976.	Wear aging ever, were luded ther overload a	is not required subjected to mal cycling nd fault current   R
	) I	
PAGEBIS	(1	

BINDER NO.WBNEQ-PENT-002 PLANT WBN _____ UNIT(S) 1____ SHEET 7A OF 29 BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 7/26/86 PENETRATION, LV POWER & CONTROL CHECKED WBK DATE 7/27/86 JUSTIFICATION/COMMENTS G(1)(g)-Conax does not state that a final inspection and disassembly was done, but extensive final evaluation testing was performed (IPS-752. Section 5.14.2) in accordance with IEEE 317-1976, fully proving the post-accident integrity and operability of the assembly. It is reasonable to assume that a manufacfacturer of Conax's experience did make a visual inspection. However, a final visual inspection and disassembly are not required by IEEE 317-1976. G(1)(e) and G(2) - Test data base 1 was exposed to the sequence as listed above. However, the DBE exposure did not include any chemical Alghalgo spray. All of the penetrations listed herein are located such that they are not subject to chemical spray, Per environmental drawing 47E235-42 the only areas in lower compartment subject to chemical spray outside the crane wall is in Accumulator Room #3 between R3 Az 242° and 269° below elevation 733 and Accumulator Room #4 between Az 289° and 305°, below elevation 739.5. None of the penetrations listed herein are located in these areas.

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	R TITLE ETRATIONTROL	E CONAX ELECTRICAL		D date <u>8/19/</u> M date 8/20/	186 R 186
H.	AGIN	<u>IG</u>	<u></u>		
	(1)	Was aging considered in (Yes/no/NA)? <u>Yes</u> (Refe			
		JUST IFICATION/COMMENTS			
	(2)	Were the following effec	ts considered	in the aging pro	gram:
		Aging Effe	<u>ect</u>	<u>Yes/No/NA</u>	IPS-752 <u>Reference</u>
		Thermal aging		Yes	<u>Sect. 5.7.4</u>
		Radiation exposure		Yes	Sect. 5.7.5
		Vibration (non-seismic)	aging	No	NA
		Operational (electrical/ stress aging	mechanical/proc	ess) <u>Yes</u>	Sect. 5.7.3, 5.9.2, 5.10.1 5.11.1, 5.12. 5.13.1 & 5.15.1
		JUST IFICATION/COMMENTS	Vibration agins	<u>z not required b</u>	<u>y IEEE 317-197</u>
		(Penetrations are passiv	ve devices and v	vibrational_stre	<u>ss is not a si</u>
		<u>nificant aging degradati</u>	.on mechanism).		
	(3)	Were all known synergist significant effect on eq program (yes/no/NA)? <u>NA</u>	uipment perform	nance considered	
		JUST IFICATION/COMMENTS	No synergistic	effects known f	or these
		penetrations, based on a	<u>literature rev</u>	<u>view of applicab</u>	<u>le materials</u>
		data for materials used	in Conax L. V.	Power and Contr	<u>ol</u>
		Penetrations.			
	(4)	Thermal Aging:			
		(a) Was thermal aging co (yes/no/NA)? <u>Yes</u> ()			
					tests and

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PENETRATION,	LV POWER & CONTROL CHECKED WBK DATE 8/20/86 wcr -
H. <u>AGING</u> (Co	ntinued)
(4) (b)	Were the materials susceptible to thermal aging degradat identified in the qualification program (Yes/No/NA)? <u>Ye</u> (Reference: <u>IPS-325, Table 3.1 and IPS-752, Tables 3.2</u> and 3.3
(c)	JUSTIFICATION/COMMENTS Was the basis for thermal aging identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	IPS-752, Section 5.7.24.2
	JUSTIFICATION/COMMENTS Thermal aging based on conductor
	feed-through life. See analysis of feedthrough in
	IPS-325, Appx. A.
(d)	Was the aging acceleration rate justified and the parametof time and temperature identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>IPS-752, Section</u>
	5.7.24.2 Parameter Plant Maximum Normal Test Equivalent
	ParameterPlant Maximum NormalTestEquivalentTemperature110°F150°C120°CTime40 yrs.100 hrs. 40 yrs.
	JUSTIFICATION/COMMENTS See Sheet 9A
(e)	Was the Arrhenius methodolgy used for accelerated aging (Yes/No/NA)? Yes (Reference: <u>IPS-752, Section 5.7.24</u> .
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelera aging parameters, are they properly referenced to the sou of the technical data (Yes/No/NA)? Yes (Reference: IPS-325, Rev. E, Section 6.4.1 (Footnote at
	bottom of page) in binder TAB E. Section E-4

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BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 8/19/86	
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H.(4)(d) Aging:	
The thermal age conditioning curve shown in IPS-752, Figure 5.7.1,	
shows a 40-year life at 120°C. Note in IPS-752, Table 5.9.4, that	:
the full load current test ambient temperature (TIA) is greater than	
the normal ambient at Watts Bar, the test total operating temperature	
(TIF) is less than 90°C in every case, and the test current is greater	
than the Watts Bar required current (See *contract 76K61-87064,	R2
Section E4g.(1) in binder TAB E, Section E-1) in every case. There-	
fore, a greater than 40-year thermal life is conservatively	
established for the subject penetration assemblies. Conax document	
IPS-325 covers an ongoing test program, A newer revision of	
IPS-325/Rev. E shows the latest Conax calculation of activation	
energy for their feed-throughs is 3.916, which agrees closely with	1
the regression line presented in IPS-325, Figure 5.7.1. See in	
binder TAB E, Section E-4, IPS-325, Rev. E, page 26. See Material	
Aging Calculation Report WAC-343 in binder TAB C, Section C-1 for	R2
calculation of qualified life at 90°C.	
*NOTE - Contract reference is not required for qualification but is for information only. Refer to DCRM at WBN for latest revision of Design Specification WBNP-DS-1805-2697-00 applicable to this contract.	R2

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H.	AGING (C	Continued)
	(4) (g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-325, Rev. E, Appendix A</u> <u>in binder TAB E, Section E-4</u> ).
		JUSTIFICATION/COMMENTS Also, see IPS-752, Figure 5.7.1 and
		binder sheet 9A.
	(h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>No</u> (Reference <u>NA</u> ).
		JUSTIFICATION/COMMENTS Not required by IEEE 317-1976. Aging
		time and temperature was sufficient to account for penetration
		operating temperature which is ambient, plus temperature rise
		due to electrical loading.
	(5) Radi	ation Aging Exposure:
	(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference <u>IPS-752, Sect. 5.7.5</u> ).
		JUSTIFICATION/COMMENTS
	(b)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-325, Table 3.1 and IPS-752, Tables 3.2 and</u> <u>3.3</u> ).
		JUSTIFICATION/COMMENTS All materials were irradiated to the
		same level.
	(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>No</u> (Reference <u>NA</u> ).
		JUSTIFICATION/COMMENTS Dose applied exceeded Watts Bar 40-
		year plus accident dose to penetrations.

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	(d)	Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference: <u>IPS-752, Section 5.7.5</u>
·		Plant normal ambient radiation dose (rd) <u>2.0E+07</u>
		I.28E+08 ( $H_20$ ) orTest exposure dose (rd) $1.156E+08$ ( $air$ )1.09E+06 ( $H_20$ ) or
•		Test exposure dose rate (rd/hr) 0.98E+08 (air)
		Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
		JUSTIFICATION/COMMENTS Test exposure dose is the sum of
•		40-year normal dose plus accident dose. See Sheet 11A
		for dose conversion from water to air equivalent.
		ation (non-seismic) Aging:
•	(a)	Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u>
		JUSTIFICATION/COMMENTS Not required by IEEE 317-1976.
		(Penetrations are passive devices and vibrating stress is
		not a significant aging degradation mechanism).
	(b)	Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: <u>NA</u>
		JUSTIFICATION/COMMENTS See H(6)(a).

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Dose conversion from rads water to rads air for the incident Co-60 gamma ray flux used in the irradiation portion of the test program is proportional to the ratio of the mass absorption coefficient  $(\sqrt[a]{a})$  for gamma rays in air and water, assuming an average Co-60 gamma energy of 1.25 meV. The air equivalent dose is  $1.285 \times 10^8$  rads  $(\sqrt[a]{a})$  air/ $(\sqrt[a]{a})$  water or  $1.156 \times 10^8$ rads. Mass absorption coefficient values of  $0.0268 \text{ cm}^2/6\text{m}$  for air and 0.0298cm $^2/6\text{m}$  for water were used. (Reference: ANL-5800, reactor physics constants)

In the same manner the test exposure dose rate of 1.09 x 10⁶ rad/hr (water) 6 converts to 0.98 x 10 rad/hr (air).

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BINDER PENETR & CONT	ATION, I	DNAX ELECTRICAL COMPUTED <u>DDD</u> DATE 7/26/86
н. <u>А</u>	GING (C	Continued)
· · · (	7) Oper	rational Stress Aging:
	(a)	Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sect. 5.7.3, 5.9.2, 5.10.1, 5.11.1, 5.13.1, and 5.15.1</u> )
	,	JUSTIFICATION/COMMENTS <u>Thermal cycle test</u> , continuous current
		test, short time overload test, short circuit test,
		repeat continuous current test, and maximum duration of
		short circuit tests.
	(b)	Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sect. 5.7.3, 5.9.2,</u>
		<u>5.10.1, 5.11.1, 5.12.1, 5.13.1, &amp; 5.15.1</u> ).
		JUSTIFICATION/COMMENTS Stresses induced were in accordance
		with IEEE 317-1976.
(	8) Was t . quali	the qualified life of the equipment and its basis defined in the fication program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sect 1.4</u> )
	Quali	fied life (Document in QMDS) <u>40 years</u>
	JUSTI	FICATION/COMMENTS See Justification/Comments in H(9).
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<u>PENETRAT</u>	ion, LV Power & Control Checked WBK DATE <u>8/19/86</u> 
H. <u>AGI</u>	NG (Continued)
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: <u>NA</u>
	)
	JUSTIFICATION/COMMENTS IPS-752, Section 1.4 states
	"materials as used in Conax electric penetration are not
	susceptible to any significant degradation due to thermal
	aging and radiation and that no age or service related common
	failure modes exist that would preclude a qualified life of
	40 years."
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### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis)

<u>Material/Property/Function</u>	Radiation <u>Threshold</u>	<u>Reference</u>	Activation Energy	<u>Reference</u>		
(a) <u>Polysulfone/Sealant</u> Kapton Polyimide Film/	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>		
(b) <u>Conductor Insulation</u>	<u>NA</u>	<u> </u>	NA	NA		
(c)						
(d)				•		
(e)						
JUSTIFICATION/COMMENTS Penetr						
insulation materials are consi						
degradation implicitly when te	st programs	are develo	ped based on	<u>IEEE 317-</u>		
1976 guidelines. Testing was	done in acc	ordance wit	h IEEE Stand	ard 317-		
1976. Test program included t						
<u>materials</u> analysis by TVA is r	equired.					
Refer to TAB D, Section D-2, I	PS-325, for	Conax's di	scussion of	materials_		
susceptible to thermal and radiation degradation and aging.						

PAGE <u>B-25</u>

<ul> <li>not met (yes/no/NA)? Yes (Reference IPS-752, Sect. 1.5, 5.1.1.1, 5.4.1, 5.5.1 &amp; 5.14.2).</li> <li>Identify Acceptance Criteria: <u>Baseline acceptance criteria includes</u></li> <li><u>leak rate less than 1E-06 SCC/SEC helium, dielectric strength test at</u></li> <li>2.7 kV for 5 seconds with no failures, and insulation resistance</li> <li>greater than 1E+08 ohms. During DBA, function and operate at</li> <li>specified service levels without loss of mechanical or electrical</li> <li>integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen</li> <li>dielectric strength test with no failures, insulation resistance</li> <li>greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the</li> <li>performance characteristics for the equipment which should be verifie</li> <li>before, after, and periodically during the test to judge equipment</li> <li>performance (ves/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: <u>Baseline testing included</u></li> <li>gas leak rate, pneumatic pressure, dielectric strength, insulation</li> <li>resistance, and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation</li> <li>resistance was taken. Post-DBA tests included gas leak rate,</li> <li>dielectric strength, insulation resistance, and conductor continuity.</li> <li>JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>	SPE	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure is not met (yes/no/NA)? Yes (Reference IPS-752, Sect. 1.5, 5.1.1.1, 5.4.1, 5.5.1 & 5.14.2). Identify Acceptance Criteria: Baseline acceptance criteria includes leak rate less than IE-06 SCC/SEC helium, dielectric strength test at 2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at
<ul> <li>values of performance characteristics which would constitute failure not met (yes/no/NA)? Yes (Reference IPS-752, Sect. 1.5, 5.1.1.1, 5.4.1, 5.5.1 &amp; 5.14.2).</li> <li>Identify Acceptance Criteria: Baseline acceptance criteria includes leak rate less than 1E-06 SCC/SEC helium, dielectric strength test at 2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance Characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, and conductor continuity. During DBA test, penetration we energised and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate.</li> <li>(3) Does the qualification report/analysis describe loads (or load combination) applied during DBE test (yes/no/NA)? Yes</li> </ul>	(1)	<pre>values of performance characteristics which would constitute failure is not met (yes/no/NA)? Yes (Reference IPS-752, Sect. 1.5, 5.1.1.1, 5.4.1, 5.5.1 &amp; 5.14.2). Identify Acceptance Criteria: Baseline acceptance criteria includes leak rate less than 1E-06 SCC/SEC helium, dielectric strength test at 2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at</pre>
<ul> <li>leak rate less than 1E-06 SCC/SEC heljum, dielectric strength test at 2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, Dneumatic pressure, dielectric strength, insulation resistance and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor state for 10 second continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		<u>leak rate less than 1E-06 SCC/SEC helium, dielectric strength test at</u> 2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at
<ul> <li>2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 sec/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration w energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>	·	2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at
<ul> <li>2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration w energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>	·	2.7 kV for 5 seconds with no failures, and insulation resistance greater than 1E+08 ohms. During DBA, function and operate at
<ul> <li>greater than 1E+08 ohms. During DBA, function and operate at specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor second periodical gas leak rate.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		greater than 1E+08 ohms. During DBA, function and operate at
<ul> <li>specified service levels without loss of mechanical or electrical integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration w energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		
<ul> <li>integrity. After DBA, gas leak rate less than 1E-02 scc/sec nitrogen dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration w energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		BECOLLEGE DELTERS TERMAN AVAN A MARMANTE
<ul> <li>dielectric strength test with no failures, insulation resistance greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration w energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		internity After DRA and lock mate locg than 1E-02 eng/gec mitrogen
<ul> <li>greater than 1E+08 ohms.</li> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor Strength, insulation resistance, and conductor for the state, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		
<ul> <li>(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor resistance, and conductor continuity.</li> <li>JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		
<ul> <li>performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sect. 5.0, 5.14.1, 5.14.2, and 5.15.3.1).</li> <li>Identify baseline and functional testing: Baseline testing included gas leak rate, pneumatic pressure, dielectric strength, insulation resistance, and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor resistance, and conductor resistance.</li> <li>dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		
<ul> <li>gas leak rate, pneumatic pressure, dielectric strength, insulation</li> <li>resistance, and conductor continuity. During DBA test, penetration we energized and carrying load except for 10 intervals when insulation</li> <li>resistance was taken. Post-DBA tests included gas leak rate,</li> <li>dielectric strength, insulation resistance, and conductor continuity.</li> <li>JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752</u> , <u>Sect. 5.0</u> , 5.14.1,
<ul> <li>resistance, and conductor continuity. During DBA test, penetration were energized and carrying load except for 10 intervals when insulation resistance was taken. Post-DBA tests included gas leak rate, dielectric strength, insulation resistance, and conductor continuity. JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		Identify baseline and functional testing: <u>Baseline testing included</u>
<ul> <li><u>energized and carrying load except for 10 intervals when insulation</u></li> <li><u>resistance was taken. Post-DBA tests included gas leak rate,</u></li> <li><u>dielectric strength, insulation resistance, and conductor continuity.</u></li> <li>JUSTIFICATION/COMMENTS <u>Tests were in accordance with IEEE 317-1976.</u></li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		gas leak rate, pneumatic pressure, dielectric strength, insulation
<ul> <li>resistance was taken. Post-DBA tests included gas leak rate,</li> <li>dielectric strength, insulation resistance, and conductor continuity.</li> <li>JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.</li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes</li> </ul>		resistance, and conductor continuity. During DBA test, penetration wa
<ul> <li><u>dielectric strength, insulation resistance, and conductor continuity.</u></li> <li>JUSTIFICATION/COMMENTS <u>Tests were in accordance with IEEE 317-1976.</u></li> <li>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u></li> </ul>		energized and carrying load except for 10 intervals when insulation
JUSTIFICATION/COMMENTS <u>Tests were in accordance with IEEE 317-1976.</u> (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u>		resistance was taken. Post-DBA tests included gas leak rate,
JUSTIFICATION/COMMENTS <u>Tests were in accordance with IEEE 317-1976.</u> (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u>		dielectric strength, insulation resistance, and conductor continuity.
(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u>		JUSTIFICATION/COMMENTS Tests were in accordance with IEEE 317-1976.
(NETETENCE TID 1204 DECEN SALATATA UND SALATATA 1 DV(CP) 1000	(3)	Does the qualification report/analysis describe loads (or load

TVA 19537 (OE-3-86)

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BINDER NO. <u>WBNEQ-PENT-00</u> 2 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>16</u> OF <u>29</u> R 1 R 3								
BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/23/86 JFW 4FC								
<u>PENETRATI</u>	PENETRATION, LV POWER & CONTROL CHECKED OM DATE 9/23/86 WCG 7/000 1/25/89 8-30-90							
PERF		NCE SPECIFICA	CHARACTERISTICS NECESSARY TIONS CAN BE SATISFIED UND					
(4)	oper		oads during baseline testin ions (Yes/No/NA)? <u>No</u> (1 .5	-				
	JUST	TIFICATION/CO	MMENTS <u>Baseline testing co</u>	onsisted of insula-				
	<u>tior</u>	<u>ı resistance,</u>	conductor continuity, and	hipot tests which				
	prov	<u>vide an indic</u>	ation of the electrical cor	ndition of the				
	pene	etration, but	are not the actual voltage	and load carried				
	<u>by</u> t	<u>the penetrations</u>	<u>ons in service in the plant</u>	t. Tests were in				
	<u>acco</u>	ordance with	IEEE 317-1976.					
(5)			cal characteristics necessa mance specifications can be					
•	(a)	Parameter	<u>Plant Normal Conditions</u>	Reference				
		Voltage	480 VAC, max nom system volt	<u>(34)</u> R3				
		Load	Various	**				
		Frequence	NA	<u>NA</u>				
		Accuracy	NA	<u>NA</u>				
		Other(s)	NA	<u>NA</u>				
		JUSTIFICATIO	N/COMMENTS <u>Electrical pen</u>	etrations are not				
		frequency se	ensitive and have no accura	cy requirements. R3				
		**See TAB C,	Section C-1.					

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BINDER NO	. <u>WBNEQ-PENT-00</u> 2	PLANTWBNUNIT(S)1	
BINDER TI	TTE CONAX ELEC	TRICAL COMPUTED DDD DATE 9/23	R 1 R 3
	The <u>count here</u>	INIONE CONTOIND DATE <u>3723</u>	1/23/89 5/16/40
PENETRATI	ON, LV POWER &	CONTROL CHECKED OM DATE 9/23.	186 WCG HON
			1/25/89 8-39-91
		L CHARACTERISTICS NECESSARY TO ENSU	
	itinued)	CATIONS CAN BE SATISFIED UNDER ACCI	DENT CONDITIONS
(001			
(5) (b)	Parameter	Specific Accident Conditions	<u>Reference</u>
	Voltage	526.9 VAC max.	<u>(36)</u> R3
	Load	Various	**
			· · ·
	Frequency	NA	<u>NA</u>
	Accuracy	NA	<u>NA</u>
	Other(s)		
	·	<u>NA</u>	NA
	that 480 VAC c	COMMENTS **See J.(5)(a). Reference ircuits could reach a maximum potent ng unit shutdown.	tial of
(5) (c)	Parameter	Demonstrated Conditions	<u>Reference</u> IPS-752
			Sections
	Voltage	528 VAC during the DBA Simulation	
			IPS-752
			Section
	Load	Various	5.14.1.1
	Frequency	60 Hz	IPS-585.3
			<u>Sect. 3.2</u>
	Accuracy	NA	NA
	Other(s)		
	Insulation		IPS-752
•	<u>Resistanc</u> e	1E+06 minimum	Section 5.14.1.3
			<u>J.14.1.5</u> IPS-752
	Leakage		Section
	<u>Current</u>	0,12 milliamps maximum	<u>5.14.1.4</u>
JUST	IFICATION/COMMEN	TS	

The penetration maintained required loads throughout the DBA test. For low voltage power and control penetrations, a minimum insulation resistance of 1E+06 ohms and a maximum leakage current of 0.12 milliamps at the maximum application voltage

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BIND	ER NO. <u>WBNEQ-PENT-00</u> 2 PLANT WBN UNIT(S) 1 SHEET 17a OF 2
BIND	ER TITLE CONAX ELECTRICAL COMPUTED /R1 JFW DATE 1-23-89 // // // // // // // // // // // // //
PENE	TRATION, LV POWER & CONTROL CHECKED /R1 WCG DATE 1-25-89 HOH. 9:30 70
J.	EQUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITION (Continued)
(5)	(c)
	is also sufficient to support the electrical operability and cir- cuit integrity for category A and B devices served. See generic binder WBNEQ-GEN-001, Section III.C.4 for discussion of low voltage power and control cable applications.
	For nondivisional and other devices served that may not be quali- fied and could fail in an accident, electrical circuit protection has been provided to ensure penetration containment boundary integrity. All divisional circuits are also similarly protected. See references 37 and 38.
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BINDER NO	D.WBNEO-PENT-002 PLANT	WBN U	JNIT(S) 1	
BINDER T	ITLE CONAX ELECTRICAL	COMPUTEDDDI	) DATE <u>7/2</u>	
PENETRAT	ION, LV POWER & CONTRO	L CHECKED <u>WBK</u>	<u> </u>	12/13/8 <b>9 8/29/12</b> /86 <u>KFL</u> <del>//</del>
K. <u>Requ</u>	JIRED OPERATING ENVIRO	<u>nment</u>		
Refe	erence Environmental D	rawing No. <u>See</u>	Sheet 19a	
(1)	Normal Max	(2)	Abnormal Max	
	(a) Temperature (°F	) <u>120</u>	(a) Temperat	ure (°F) <u>130</u>
	(b) Pressure (psig)	0.3	(b) Pressure	(psig) <u>0.3</u>
	(c) Humidity (%)	80	(c) Humidity	(%) <u>100</u>
	(d) Radiation (rd)	<u>2.0E+07</u>	(d) Radiation	n (rd) <u>NA</u>
(3)	Process Interfaces:	None.		
. (4)				
	conditions: <u>Up_to_ei</u>			
	less than 1% of plant	life. 20°F di	<u>lfference in m</u>	aximum tem
	perature for this tim	e period is neg	ligible.	· · · · · · · · · · · · · · · · · · ·
(5)	Accident (worst case parameter including p	for any combina eak, duration, 327	and profile):	fied accident
	(a) Temperature (°F)	128° long - term	Accident typ	e <u>HELB</u>
	(b) Pressure (psig)	11.2	Accident typ	e <u>LOCA</u>
	(c) Humidity (%)	<u>100</u> 1.2E+07 gamma	Accident type	E LOCA/HELB
	(d) Radiation (rd)		Accident type	e LOCA
	(e) *Spray Type	<u>N/A</u>	Accident type	
				R3
	*See Tab B, Section (	3.		
<i></i>				

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BINDER N	NO. <u>WBNEQ-PENT-00</u> 2 PLANT WBN UNIT(S) 1 SHEET 19 OF 29 R 2 R 3
IDER 1	TITLE CONAX ELECTRICAL COMPUTED DDD DATE 8/19/86 RCF
PENETRAT	12/15/89 7/5/9 TION, LV POWER & CONTROL CHECKED WBK DATE 8/20/86 KFL Hon 12/28/89 8-30-50
K. <u>REÇ</u>	DUIRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>One end of each penetration is exposed to</u>
	annulus environment. Containment ends are in lower compart-
	ment (outermost small rooms), or lower compartment instrument R3 room. Parameters shown are worst case; see Sheet 19a.
(6)	Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>No</u> (Reference: <u>IPS-752</u> ,
	<u>Sect. 5,14,1</u> ).
(7)	Subject to submergence (Yes/No/NA)? <u>No</u> Reference: <u>See</u>
	note 5 on environmental drawing 47 E235-42 for maximum
	containment water level for flood elevation (EL 717.7 outside
	crane wall) where penetrations are located and field R3
	verification in binder TAB F for location.
	Identify initiation time and duration of submergence: <u>NA</u>
(8)	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>See Sheet 19a</u> ).
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify: <u>See</u>
	Sheet 19b
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See Section A
	PAGE B-30 R3

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PAGE B-30 R3

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BINDER NO.WBNEO-PENT-00	2 PLANT_WBN	<b>UNIT(S)</b> 1		F_29
BINDER TITLE CONAX ELE				3 AL
PENETRATION, LV POWER &			12/13/89	7/25/80 24.04
			01/09/90	8.30-40
	AREA/ENVIRONMENTAL	DWG SUMMARY		
	Lower*		Instrument	
	Compartment (47E235-42)**	Annulus (47E235-44)	Room (47E235-45)*	*
Max Normal Temperature, °F	120(1) (105)	110	75	
Max Abnormal Temperature, °F	130	120	120	
Max Normal Pressure, PSIG	0.3	ATM(-)	0.3	
Max Abnormal Pressure, PSIG	0.3	ATM(-)	0.3	
Max Normal R.H. %	80	80	60	
Max Abnormal R.H. %	100	90	90	R3
40-Yr Normal (gamma) Radiation, Rads	2.0E+07	1.0E+06	3.5E+05	
Peak Accident Temperature, °F	327	134	327	
Peak Accident Pressure, PSIG	11.2	ATM(-)	11.2	
Accident (gamma) Radiation, Rads (beta)	1.0E+07 4.7E6(2)	1.2E+07 included	1.0E+07 4.7E6(2)	
Total 40-Year	3.4727	1.3E+07	1.5E7	
Plus Accident Radiation, Rads	gamma plus beta	gamma plus beta	gamma	
*Fan rooms and accumul **These drawings have b	ator rooms (outerm	ost small rooms	).	
<ol> <li>Documented averag</li> <li>See Sheet 19b.</li> </ol>				
(1) SCC SHEET 175.				R3

BINDER NO.<u>WBNEQ-PENT-00</u>2 PLANT<u>WBN</u>UNIT(S)<u>1</u> SHEET___OF_ BINDER TITLE CONAX ELECTRICAL COMPUTED /R1 Jul DATE 1/24/89 PENETRATION, LV POWER & CONTROL CHECKED /R1 4000 ODATE 1/25/09 THIS PAGE INTENTIONALLY LEFT BLANK Page <u>B-32</u> was deleted per revision <u>1</u>.

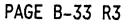
BINDER NO.M	BNEQ-PENT-002 PLANT	WBN	UNIT(S)_1	SHEET 19b of 29
BINDER TITI	E CONAX ELECTRICAL	_ COMPUTED_	DDD DATE	R_2_R_3 8/19/86_RCF 12/13/89 ^{-7/25} /82
PENETRATION	I, LV POWER & CONTRO	L CHECKED	WBK DATE	12/13/89 4-72 8/20/86_KFL

The accident beta radiation dose to the penetrations is determined as follows: The maximum containment accident beta dose is 4.7E+08 rads in accordance with environmental drawing 47E235-45. (Note: None of these penetrations are located in upper R3 compartments.)

The penetration terminal boxes, which enclose all radiation sensitive materials, are constructed of 18 gauge minimum sheet steel as shown on drawings 7429-24001 and 7429-24002 in TAB I. Per reference 35 the Reduction of Beta Dose by Sheet Steel, for 26 gauge (or thicker) box is less than one percent. Therefore the reduced beta dose is  $1.E-2 \times 4.7E8 = 4.7E6$ .

R3

R3



BINDER NO.WBNEQ-PENT-002 PLANT	WBN U	NIT(S)1	SHEET_20_0F_29
			R_2_R_3
BINDER TITLE CONAX ELECTRICAL	COMPUTED <u>DDI</u>	DATE <u>7/26</u>	<u>/86_RCF</u> 12-13-89
PENETRATION, LV POWER & CONTROL	CHECKED <u>WBR</u>	DATE <u>7/27</u>	1
L. SUMMARY COMPARISON OF TEST		SDECIETED COM	
			DITIONS
<ol> <li>Comparison of worst-ca</li> </ol>	se maximum pa	rameters:	IPS-752
Parameter	<u>Specified</u>	<u>Demonstrated</u>	Reference
Operating Time	<u>100 days</u>	<u>13.54 days</u>	<u>Fig. 5.14.1</u>
Temperature (°F)	327	370	<u>Fig. 5.14.1</u>
Pressure (psig)	11.2	75	<u>Fig. 5.14.1</u>
Relative Humidity (%)	100	100	Fig. 5.14.1
Chemical Spray*	<u>N/A</u>	<u>N/A</u>	See Tab B, <u>Section G</u>
	3.47E7 gamma plus	1.156E+08(air) or	) R
Radiation (rd)**	beta	<u>1.285E+08(H 0)</u> 2	<u>Sect. 5.7.5</u>
Submergence	None	None	<u>NA</u>
<pre>*Includes spray concent     pH. **Enter 40-year integrat</pre>			-
dose and specify type. A See fage B-31			R
(2) Comparison of worst-ca	se profiles a	nd margin asses	ssment:
	Test Pro		
<u>Parameter</u>	Envelopes Sp (Yes/No		<u>Reference</u>
Temperature	Yes		
Pressure	Yes		g. 5.14.1 g. 5.14.1
Relative Humidity	Yes		<u>g. 5.14.1</u>
Chemical Spray	NA		Ϋ́Α
Submergence	NA	<u></u> <u>N/</u>	
JUSTIFICATION/COMMENTS	None of the	penetrations 1	
are located below flood	<u>i level or su</u>	bject to chemic	al spray.

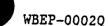
PAGE B-34 R2

BINDER NO. <u>WBNEQ-PENT-00</u> 2 PLAN	rwbn	_ UNIT(S)1	SHEET 20a OF 29
BINDER TITLE CONAX ELECTRICA	L_ COMPUTED_D	DD DATE 8/1	R_2_R_3 9/86_RCFA
			12/13/89 7/25/90
PENETRATION, LV POWER & CONTR	<u>OL</u> CHECKED <u>W</u>	<u>BK</u> DATE <u>8/2</u>	0/86 KFL 764 12/20/89 8-31-90

JUSTIFICATION/COMMENTS (Continued)

-Parameters shown are a composite resultant concentration. All of R3 these penetrations are enclosed in junction boxes and are not subject to chemical spray impingement. All penetrations, are protected from chemical spray by the concrete floor slab above them. These physical R3 barriers negate the effects of spray. Also see TAB B, sheet 7A, Justification/Comments for G(1)(e) and G(2). As is seen in TAB C, Section C-1, Report WAC-343, the test profile does not envelop the WBN accident profile for approximately the first 100 seconds. This exists due to starting at a lower temperature and the difficulty in getting the temperature to rise in the steam chamber as fast as the WBN accident profile does, a common problem in steam tests. Report WAC-343 does not include the first test temperature transient. This extra transient and the significantly higher test temperatures compensate for the slightly slower transient rise time. Also, noted in IPS-752, Section 5.14.10.1, testing without a terminal box is more severe than with the box due to thermal lag and dew point effects associated with the box. Thus, this small deviation in the profile for the first few seconds is not significant.





PAGE B-35 R3

		·		
BIND	er no	.WBNEQ-PENT-002 PLANT WBN UNIT(S)		T_21_0F_29
BIND	ER TI	TLE <u>CONAX ELECTRICAL</u> COMPUTED <u>DD</u> D	ATE <u>8/19/8</u> 6_	1751-514
PENE:	TRATI	ON, LV POWER & CONTROL CHECKED WBK DA	ATE <u>8/20/86</u>	2/13/89 7/23/92 <u>KFL //ore</u> 2/20/89 8-30-90
L.		ARY COMPARISON OF TEST CONDITIONS TO SPECIN tinued)		
	(3)	Were margins applied to the test parameter addressed in the test program to assure th and uncertainties are accounted for? (Not Yes/No/NA).	nat normal v	ariation
		Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/NA
		Temperature: +15 degrees F	<u>43°F</u>	Yes
		Pressure: +10% but no more than 10 psig	<u>63.8 psig</u>	Yes
		Radiation: +10% of accident dose	>_10%	Yes
		Time: +10% (or 1 hour + operating time per NUREG-0588)	See TAB C, <u>Sect. C-1</u>	
		480 VAC Voltage: 10% of rated value <u>during</u>		Yes R3
		Frequency: 5% of rated value	0 transient	<u>No</u>
		Environmental Transient: the initial transient and the peak temperature applied twice	applied twice	Yes
		Vibration: +10% added to acceleration	NA	<u>NA</u>
		JUSTIFICATION/COMMENTS Margins applied pe	<u>r IEEE 317-</u>	1976.
		Frequency margin not required by IEEE 317-	1976. Elec	trical
		penetrations function electrically as insu	lated condu	ctors,
		and they are not frequency sensitive in th	<u>e low frequ</u> e	ency range
		of power and control applications. Sheet	<u>l of Materia</u>	al Aging
		Calculation Report WAC-343 (see TAB C, Sec	tion C-1) sh	nows the R2
		test post-accident operating time equivale	nt is consid	77657 <b>8</b>
		the equivale		
		more than 10% over the Watts Bar required		

м.	ODET	CHECKED W// DATE 7/160			
<b>М</b> •	(1)	<pre>OPERABILITY TEST RESULTS (1) Identify the safety function(s) of this equipment:         (Reference IPS-752, Sect. 1.5).</pre>			
		JUSTIFICATION/COMMENTS Maintain pressure boundary and electrical			
		integrity.			
	(2)	2) Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference <u>IPS-752,</u>			
		<u>Sect. 5.14.1</u> ).			
		JUSTIFICATION/COMMENTS			
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sect. 5.14.1</u> ).			
		JUSTIFICATION/COMMENTS			
	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sect. 5.14.1 &amp; 5.14.2</u> ).			
		JUSTIFICATION/COMMENTS Test was for 13 1/2 days. See analysis			
		extending time to 100 days in IPS-752, Sect. 5.14.10.1C.			
		· · · · · · · · · · · · · · · · · · ·			
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BINDER NO. WBNEQ-PENT-002 PLANT_	WBN UNIT(S) 1 SHEET 23 OF	29
BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER	COMPUTED DE COMPUTED COMPUTED DATE 7/26/86	
& CONTROL	CHECKED 4/4/ DATE 1/4/08	

## M. **OPERABILITY TEST RESULTS** (Continued)

4

(5) Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-585.3</u>,____

Sect. 6.18.1.1, 6.21.1.1, and 6.24 ).

JUSTIFICATION/COMMENTS

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BINDER NO. WBNEQ-PENT-002 PLANT	WBN UNIT(S) 1 SHEET 24 OF 29
BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER	COMPUTED
& CONTROL	CHECKED DATE //2//00

#### N. MAINTENANCE AND SURVEILLANCE

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the Binder -Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS See TAB G - QMDS.

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BINDER TITLE CONAX ELECTRICAL COMPUTED ODD DATE 7	126/86
& CONTROL CHECKED MAK DATE	1/21/86
0. <u>SUMMARY OF REVIEW</u>	Yes/No/NA
(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	Yes
(2) Any exceptions (i.e., sound reasons to the contrary) adequately justified?	NA (No except- <u>ions taken)</u>
(3) Choice of qualification methodology adequately justified?	Yes
(4) If analysis was performed, complete the following:	
(a) Were equipment performance requirements identified?	NA
(b) Were specific features and failure modes and effects analyzed?	NA
(c) Were assumptions and mathematical models used together with appropriate justification for their use?	<u>NA</u>
(d) Were environmental parameters which affect equipment performance identified?	<u>NA</u>
(5) Adequate similarity between equipment and test specimen established?	Yes
(6) Aging degradation evaluated adequately?	Yes
(a) Mechanical and/or cycle aging addressed?	Yes
(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
(c) Absence of preaging in test/analysis justified?	NA (preaging <u>performed)</u>
(d) Materials susceptible to thermal/radiation aging identified?	Yes

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BINDER NO	. <u>WBNE</u>	Q-PENT-002 H	PLANT_	WBN	UNIT(	(S)	1 S	HEET 26	_0F_29
BINDER TI	TTLE C	ONAX ELECTRI	CAT.	COMPLITED	DDD	<u> በ</u> ለጥም	R 7/26/8		
DINDDR II		ONAX ELECIKI		COMPUTED_		DAIL	1/20/8	0 512 7/25/90	
PENETRATI	<u>ION, L</u>	V POWER & CC	<u>NTROL</u>	CHECKED	WBK	DATE	7/27/8	6 240n 8.30-70	
					<u> </u>				
O. SUMM	ARY O	F REVIEW (Co	ontinue	ed)					
				-		÷		Yes/No	D/NA
c.	(e)	Normally op normally en				e (e.g	• ,	Yes	
(7)	Qual	ified life o	or repl	lacement s	chedule	estab.	lished?	Yes	
(8)		eria regardi	ing tem	perature	pressure	expos	sure		
	sati	sfied?						<u>Yes</u>	
	(a)	Peak temper	ature	adequate	, ,			Yes	
	(b)	Peak pressu	ire ade	quate				Yes	<u> </u>
	(c)	Duration ad	lequate	2				Yes	
	(d)	Required pr	ofile	enveloped	adequat	ely		Yes	
	(e)	Steam expos	ure ad	lequate				Yes	
(9)	Crie	ria regardin	ig test	sequence :	satisfi	ed?		Yes	
(10)	Crit	eria reqardi	ng spr	ay satisf:	ied?			N/A	
	(a)	Was the spr extremes of	ay tes press	ting done ure and to	while u emperatu	nder t re?	:he	N/A	F
	(b)	Does the sp density, du meet or exc	ration	, and pH u	used in	tests		<u>_N/A (</u> TAB B, <u>L(2))</u>	Sect
(11)	Crit	eria regardi	ng sub	mergence s	atisfie	d?		N/A (P tratio <u>submer</u>	ns no
(12)	Crite	eria regardi:	ng rad	iation sat	isfied?			_Yes	
	(a)	Was dose ra	te con	sidered?				<u>Yes</u>	
		Was beta rad						Yes	
(13)	Crite satis	eria regardin sfied?	ng ope:	rability s	tatus/mo	ode		Yes	
(14)	Crite satis	eria regardin sfied?	ng tes	t failures	or anom	nalies		Yes	

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WBEP-0002Q

BINDER PENETR & CONT	ATION, LV POWER	
0. <u>su</u>	MMARY OF REVIEW (Continued)	Yes/No/NA
(15	) Criteria regarding functional testing satisfied?	_Yes
	(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
	(b) Was an initial base line test done to establish required performance characteristics?	Yes
	(c) Has the test/analysis demonstrated that performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	Yes
(16)	) Criteria regarding instrument accuracy satisfied?	NA
(17)	) Test duration margin (l hour + function time) satisfied?	Yes
	(a) Is the minimum specified operating time at least 1 hour?	Yes
	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	NA(penetrations qualified for <u>100 days)</u>
(18)	) Criteria regarding synergistic effects satisfied?	Yes
(19)	Criteria regarding margins satisfied?	Yes
(20)	Maintenance and surveillance requirements adequately identified?	Yes

PAGE<u>B.42</u>

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BINDER NO. WBNEQ-PENT-002 PLANT	<u>WBN</u> UNIT(S) <u>1</u> SHEET <u>27A</u> OF ²⁹
BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER	COMPUTED DOD DATE 7/26/86
& CONTROL	_ CHECKED

#### P. DISCUSSION

Conax Report IPS-752 is the qualification document for these penetrations. The penetrations contain the identical possible leakage paths, leak mechanisms, feedthrough concepts, seals, insulation system, and materials as the test data base penetration No. 1 described in IPS-752. Detailed raw test data for the tested assemblies is contained in IPS-585.3. IPS-752 is a summary document of the reports on the tested assemblies. It is a very thorough summary and is the document submitted by Conax Corporation as the key qualification report for the subject low voltage power and control penetration assemblies.

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PENH	R TITL ETRATI NTROL	E CONAX ELECTRICAL ON, LV POWER			DATE 7 <u>/24/86</u> DATE 7/11/86	R R 
				EMENT 3 EQUE CHECKLIST PENETRATIONS	Page 1 o	of 2
EQUI	PMENT	IDENTIFICATION				
(1)	to t	the penetrations id he plant penetration /no/NA)? <u>No</u>			ation	IPS-752
		Item	<u>Plant</u>	Report	Acceptable <u>Yes/No/NA</u>	Report <u>Section</u>
	(a)	Penetration type	LVP & C	LVP & C	Yes	Table 4.
	(b)	Mounting	<u>See p 29A</u>	See p 29A	Yes	<u>NA</u>
	(c)	External connection	in-line ns <u>splices</u>	NA	<u>NA</u>	NA
	Comm	ents: <u>TVA provided</u>	in-line spl	ices. Conax	test was of sim	<u>uilar</u>
	<u>item</u>	s with supporting a	aalysis, per	IPS-752, Sec	t. 1.0.	
(2)		the qualification a cteristics:	report ident	ify the follo	wing performanc	e
		ormance Characteris		Acceptable (Yes/No/NA)	IPS-752 Report <u>Section</u>	
	Perf		<u>tics</u>	(Tes/ NO/ NA)		
	<u>Perf</u> (a)	· · · · · · · · · · · · · · · · · · ·		Yes	5.7.24.2	
	(a)	· · · · · · · · · · · · · · · · · · ·			5.7.24.2 See Sheet 29A	<b>1</b>
	(a) (b)	Temperature rating	 :	Yes		<b>L</b>
	(a) (b)	Temperature rating Voltage rating Continuous current	rating 1	YesYes	See Sheet 29A	<u>.</u>
	(a) (b) (c) (d)	Temperature rating Voltage rating Continuous current Short-time overload	rating 1 1ration	Yes Yes	<u>See Sheet 29A</u> 5,9,5	<u>-</u>

PAGE*B-44* 

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CO	NTROL	CHECI	KED UMR	DATE 8/8/86
QUI	PMENI	IDENTIFICATION (Continued)		Page 2 of 2 IPS-752
~	<u>Perf</u>			Report Section
	(g)	Maximum gas leakage rate Y	es	5.1.1.1
	Comm	ents: <u>See page 29A</u>		
3)	Does	the qualification program addres	s the followi	ng tests:
		Item	Acceptabl <u>Yes/No/NA</u>	-
	(a)	Continuous current rating	Yes	5.9.2
	(Ъ)	Short-time overload current rating and duration	Yes	5.10.1
	(c)	Short circuit current rating and duration	Yes	5.11.1
	(d)	Rated maximum duration of rated short circuit current	Yes	5.15.1
	(e)	Pneumatic pressure rating	Yes	5.2.1
	(f)	Maximum gas leakage rate	Yes	5.1.1
	(g)	Conductor continuity	Yes	5.3.1
	(h)	Dielectric strength	Yes	5.4.1
	(i)	Impulse	NA	NA
	(j)	Insulation resistance	Yes	5.5.1
	(k)	Flame	Yes	6.3
	Commo	ents: Impulse tests not required	for low volta	ige penetrations

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	BINDER NO. WBNEQ-PENT-002 PLANT_	WB N	UNIT(S)	1	SHEET 29A OF 29
•	BINDER TITLE CONAX ELECTRICAL PENETRATION, LV POWER & CONTROL			• • •	· , ,

Additional Comments for Supplement 3

(1)(b) Watts Bar L. V. Power and Control Penetrations are mounted by welding the penetration assembly header plate to the annulus (outside containment) end of the containment nozzle. The containment nozzles are horizontal. The inboard ends are supported by a support plate resting in the inboard end of the nozzle and located by support rods attached to the header plate. Inside containment junction boxes for connection of penetration conductor pigtails to field cables are bolted to slip-on flanges welded to the inboard end of the containment nozzle. Outside containment junction boxes, where used, are bolted to the penetration header plate in the annulus.

The test penetration assembly was inserted horizontally into the environmental test chamber as shown in IPS-585.3, Appendix D, photographs 5.0 through 8.0. Whether it was bolted in or welded in or whether it incorporated an inboard support plate is not stated, but this is in no way material to the results of the DBA test. No junction boxes were used as stated in IPS-752, Section 5.14.1, which is conservative as discussed in IPS-752, Section 5.14.10.1A.

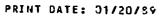
(2)(b) The voltage rating of the penetrations is implied but not specifically stated in the qualification report. The voltage rating was specified to be 600 volts in contract 76K61-87064. Dielectric strength tests before the DBA test at 2.7 kV and after the DBA tests at 660 volts are consistent with a voltage rating of 600 volts in accordance with IEEE 317-1976, Sections 4.2.1, 7.3.2, and 6.4.13. See IPS-752, Sections 5.4.1 and 5.14.2.2.

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BINDE	R NO. <u>WBNEQ-PENT-003</u> PLANT <u>WBN</u> UNIT(S) <u>I</u> ONDER R TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>/R1</u> <u>J44</u> DATE <u>2-16-37</u> RATION, INSTRUMENTATION CHECKED <u>/R1</u> <u>J44</u> DATE <u>2-17-24</u>	0
& INI	ICATION CRECKED	
		۰. ب
	<u>TAB_A</u>	
	NOTES	
	• Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building. Actual elevations are documented in TAB F and on drawing 45W860-3 in TAB E.	
:	and on drawing de- c. Category and Operating Times for penetrations, which are passive devices, are not assigned directly but are dictated by the category and operating times of devices served.	·
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LEN1-002







EATS WADEER ANTI TOKICE ID WOR WITH	-LOCATION ELEY(1) BM/BAD CONIRACI	CAI OPER_IIUE	EYENI	SAEETY_EUNCTION
WBN-1-PENT-293-0018 -B 1-PENT-293-0018 -B 093 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10003-05	737 <b>* 7"</b> ANN 76k61-087064	A/B 100/100D	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT 5) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0019 -E 1-PENT-293-0019 -E 017 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10003-03	733" 7" ANN 76861-087064	A/B 100/100D	NS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
HBN-1-PENT-293=0020 - 1-PENT-293-3020 116-30 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10003-10	76K61-087064	B 1000 B 1000 B 1N0	LOCA MS/C FW/C RH/C CV/C	HAINTAIN PRESSURE BOUNDARY (CAT B)
WBN-1-PENT-293-0022       073-30*         PRIMARY CONTAINMENT ELEC PENETRATION       7429-10003-10         U       COM       Space         WBN-1-PENT-293-0023       F         VBN-1-PENT-293-0023       F	718•10" ANN 76K61-087064	5 1000 B 1000 B 100	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B).
WBN-1-PENT-293-0023       -F       241-45+         PRIMARY CONTAINMENT ELEC PENETRATION       7429-10003-06         Image: Containment Electron for the second for the	76K61-087064	A/B 100/100D A/B 100/100D A/B 1M0/1M0	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A). I
A-2 R	PREPARER/DATE_ CHECKED/DATE	•	<u>/15/86</u> /18/86	





PRINT DATE: 01/20/39

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BINDER NO. : WBNEQ-PENT-OC3 MANUFACTURER : CONAX CORPORATION PAGE 2 OF 5

EGIS_NUMBER UNII_DEVICE_ID_NO Description Model_nu		LOCATION ELEV(1) BH/BAD CQNIRACI	<u>CAI</u> (2)	QPER_TIME	EVENT	SAEETY_EUNCIION
WBN-1=PENT-293-0025 1-PENT-293-0025 PRIMARY CONTAINMENT ELEC PENETRATION 7429-100	254-30° 03-01	770" 1" ANN 76861-057064	8 3	10 DD 10 OD 10 OD 10 OD 1 H O 1 H O	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BGUNDARY (Cat b).
WBN-1-PENT-293-0023 - 1-PENT-293-0028 PRIMARY CONTAINMENT ELEC PENETRATION 7429-100	027 03-02	737" 7" ANN 76k61-087064	8 8 8	1000 1000 1mo	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B).
WBN-1-PENT-293-0029 - 1-PENT-293-0029 PRIMARY CONTAINMENT ELEC PENETRATION 7429-100	030 03-04	737° 7″ ANN 76K01-087064	8 8 8	1000 1000 1M0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B).
WBN-1-PENT-293-0030 -B 1-PENT-293-0030 -B PRIMARY CONTAINMENT ELEC PENETRATION 7429-1000	021 )3-09	725•11" ANN 76 K61-087064	A/8 A/8 A/8	100/1000	HS/C FW/C RH/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0031 -G 1-PENT-293-0031 -G PRIMARY CONTAINMENT ELEC PENETRATION 7429-1600		1361-331384	A/B A/B A/B	100/1000	HS/C FW/C RH/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
H A-3	·	PREPARER/DATE_ Checked/date			9/15/ 9/18/	6-16407





SINDER NO. : WBNEC-PENT-003 MANUFACTURER : CONAX CORPORATION PAGE 3 OF 5

EQIS_NUMBER DESCRIPTION		NO. AZMITH. NOQEL NUMBER	LOCATION ELEY(1) BM/BAD CONTRACI	<u>CA</u> I (2)	QPER_IIME	EYENI	SAEETY_EUNCIION
WBH-1-PENT-293-0033 Primary Containment (	-A 1-PENT-293-0033 ELEC PENETRATION	5 -A 153 7429-10003-04	737º 7" ANN 76k61-087064	A/B A/B A/B	100/1000 100/1000	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0034 PRIMARY CONTAINMENT I	- 1-PENT-293-0034 ELEC PENETRATION	1 51 7429-100 03-02	73 <b>3' 7"</b> ANN 76k61-087064	B 8 6	1000 1000 1000 1000 1H0 1H0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT 8).
WBN-1-PENT-293-0037 Primary Containment E	-A 1-PENT-293-0037 ELEC PENETRATION	-A 155 7429-10003-07	736" 6" ANN 76861-087064	A/B A/B A/B	100/100D 100/100D 180/180	MS/C FW/C RH/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0038 Primary Containment e	-D 1-PENT-293-0038 ELEC PENETRATION	-0 159 7429-10003-03	727° 6″ 76861-087064	A/B A/B A/B	100/100D	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
NBN-1-PENT-293-0039 PRIMARY CONTAINMENT E	- 1-PENT-293-0039 LEC PENETRATION	195 7429-10003-02	737° 7″ ANN 76661-087064	B - 8	1000 1000 1000 1N0 1N0 1H0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT B).
E A-4			PREPARER/DATE_			9/15/8 9/18/8	11=9#401





BINDER NO. : WBNEQ-PENT-003 MANUFACTURER : CONAX CORPORATION PAGE 4 OF 5

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EGIS_NUNBER UNI DESCRIPTIONUNI	I_DEVICE_ID_NOLAININ MODEL_NUNEER	-LOCATION ELEY(1) RM/RAD CONIBACI	CAI OPER_IIME	EVENT	SAFEIY_FUNCTION
WBN-1-PENT-293-0040 -A 1-P Primary containment elec penetr	ENT-293-0040 -A 207 ATION 7429-10003-08	737° 7″ ANN 76861-087064	<b>YAR 100/1000</b>	MS/C	HAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0043 -D 1-PA Primary Containment Elec Penetra	NT-293-0043 -D 205 . NTION 7429-10003-05	733" ANN 76k61-087064	A/B 100/1000 A/B 100/1000 A/B 100/1000 A/B 100/100 A/B 1M0/1M0 A/B 1M0/1M0	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0045 -F 1-PE PRIMARY CONTAINMENT ELEC PENETRA	NT-293-0045 -F 197 TION 7429-10003-03	733° ANN 76861-087064	A/B 100/100D A/B 100/100D A/B 1H0/1H0	MS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WBN-1-PENT-293-0049 -G 1-PE PRIMARY CONTAINMENT ELEC PENETRA	NT-293-0049 -G 335 TION 7429-10003-03	76 K6 1-087064	A/B 100/1000 A/B 100/1000 A/B 100/100	HS/C	MAINTAIN PRESSURE BOUNDARY (CAT B) AND ELECTRICAL INTEGRITY (CAT A).
WEN-1-PENT-293-0050 - 1-PE PRIMARY CONTAINMENT ELEC PENETRA	NT-293-0050 339 TION 7429-10003-02	76861-087064	B 1000 B 100D B 1M0	LOCA MS/C FW/C RH/C CV/C	HAINTAIN PRESSURE BOUNDARY (CAT 8).
A-S R		PREPARER/DATE		9/15/8 9/18/8	







BINDER NO. : WBNEG-PENT-003 . MANUFACTURER : CONAX CORPORATION PAGE 5 OF 5

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EQIS_NUMBER UNII_DEVICE_ID_NO AIHIIH DESCRIPTION MQCEL_NUMBER	-LOCATION ELEV(1) BH/BAD CONIBACT	CAI OPERIIMI (2)	EYEN)	SAFETY_FUNCTION
WBN-1-PENT-293-0054 -E 1-PENT-293-0054 -E 306-30 PRIMARY CONTAINMENT ELEC PENETRATION 7429-10003-06	·	A/B 100/100D A/B 100/100D A/B 100/100D A/B 100/100D A/B 1H0/1H0 A/B 1H0/1H0	LOCA MS/C FW/C RH/C CV/C	MAINTAIN PRESSURE BOUNDARY (CAT 8) AND ELECTRICAL INTEGRITY (CAT) A).
	÷. •			

PAGE P-0  $\sim$ 

		R_1	R	R
PREPARER/DATE_DDI	9/15/86	894 × 1 754		
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		11-64 E-11-64		

PENETRA	TITLE <u>CONAX ELECTRICA</u> TION, INSTRUMENTATION	ALCOMPUTED_DDDDATE <u>9/15/86</u> On
	ATION	
A. <u>DOC</u>	UMENTATION	
Equ	ipment Description	Electrical Penetrations, Instrumentation
Ven	dor/Manufacturer	Indication <u>Conax_Corporation</u>
Equ	ipment Model No.(s)	7429-10003-01 through 7429-10003-10
OUA	LIFICATION REPORTS	
•		ion <u>Design Qualification</u> RIMS <u>EEB 820115</u>
	<u>Report for Electric</u> lies for Watts Bar	<u>cal Penetration Assemb-</u> Nuclear Plant Units
$\langle n \rangle$	1&2/IPS-752/Rev. A.	
(2)	Material Test Repor	ion <u>Design Qualification</u> RIMS <u>EEB 811110</u> rt for materials used in
and the second second	Electric Conductor Rev. D.	enetration Assemblies and Seal Assemblies/IPS-325/
(3)		DATE_5/14/81
(3)	<u>cation of Instrumen</u>	ion <u>Test Report Qualifi-</u> RIMS <u>EEB 811110</u> <u>ntation Service Classifi-</u> <u>netration/IPS-585.2</u> DATE <u>1/18/81</u>
(4)	llLle/Number/Revisi	On Test Report Auglifi- DIMS FER 011110
(4)	<u>cation of Conax Ins</u>	strumentation Classifica-
(4)	<u>cation of Conax Ins</u>	ion <u>Test Report Qualifi</u> RIMS <u>EEB 811110 3</u> strumentation Classifica- nrough Subassemblies/ DATE <u>1/16/81</u>
	cation of Conax Ins tion Coaxial Feedth IPS-585.4 Title/Number/Revisi	strumentation Classifica- nrough Subassemblies/ DATE_1/16/81 DATE_1/16/81 ton Design Qualification RIMS B26 860801 (
	cation of Conax Ins tion Coaxial Feedth IPS-585.4 Title/Number/Revisi Rpt for a 42 Conduc Volt. Service Class	strumentation Classifica- nrough Subassemblies/ DATE_1/16/81
	cation of Conax Ins tion Coaxial Feedth IPS-585.4 Title/Number/Revisi Rpt for a 42 Conduc Volt. Service Class Assembly Consistent of IEEE Standard 31	strumentation Classifica- nrough Subassemblies/ DATE 1/16/81 DATE 1/1
(5)	cation of Conax Ins tion Coaxial Feedth IPS-585.4 Title/Number/Revisi Rpt for a 42 Conduc Volt. Service Class Assembly Consistent of IEEE Standard 31	arough Subassemblies/         brough Subassemblies/         con Design Qualification         RIMS B26 860801 (Stress Stress
(5)	cation of Conax Ins tion Coaxial Feedth IPS-585.4 Title/Number/Revisi Rpt for a 42 Conduc Volt. Service Class Assembly Consistent of IEEE Standard 31 Guide 1.63. 7/78"/I. CR (ANALYSIS, VENDOR IPS-325, Rev. E. Do	DATE 1/16/81 DATE 1/16/81

PAGE B-1 R1

	0. <u>WBNEQ-PENT-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1a</u> OF <u>29</u> R <u>1</u> R <u>2</u> ITLE CONAX ELECTRICAL COMPUTED DDD DATE <u>9/15/86_JFW</u>
1	ION, INSTRUMENTATION 2/6/89 10-16-8
OTHE (7)	IFICATION REPORTS R (ANALYSIS, VENDOR DATA, ETC.) (Continued) IPS-214, Rev C, Instruction and maintenance manual for electric penetration assemblies for Watts Bar Nuclear Plant, Units 1 and 2. IPS-213. Packaging, shipping, and storage procedures for electric penetration assemblies for Watts Bar Nuclear Plant, Units 1 and 2.
*(10)	Conax Drawing 7429-10003, Rev. F, Sheets 1&2 of 2, Electrical Penetrations for Watts Bar. (Rev. E in binder for information only. Refer to DCRM for latest revision)
(11)	Conax Drawing 7429-24002, Sheet, Rev A - Enclosure SUB-ASSY.
(12)	Conax Drawing PL7429-10003-01, Rev. E, Sheets 1 & 2 of 2, Parts List.
(13)	Conax Drawing PL7429-10003-02, Rev. E, Sheets 1 & 2 of 2, Parts List.
(14)	Conax Drawing PL7429-10003-03, Rev. E, Sheets 1 & 2 of 2, Parts List.
(15)	Conax Drawing PL7429-10003-04, Rev. E, Sheets 1 & 2 of 2, Parts List.
(16)	Conax Drawing PL7429-10003-05, Rev. E, Sheets 1 & 2 of 2, Parts List.
(17)	Conax Drawing PL7429-10003-06, Rev. E, Sheets 1 & 2 of 2, Parts List.
(18)	Conax Drawing PL7429-10003-07, Rev. E, Sheets 1 & 2 of 2, Parts List.
(19)	Conax Drawing PL7429-10003-08, Rev. E, Sheets 1 & 2 of 2, Parts List.
(20)	Conax Drawing PL7429-10003-09, Rev. E, Sheets 1 & 2 of 2, Parts List.

	BINDER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET 15 OF 29 R 1 R 2
	BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/15/86 JFW 900 PENETRATION, INSTRUMENTATION 2/17/89/046-57
	& INDICATION         CHECKED         OM         DATE         9/18/86         CAG         HAR           2/17/89         2/17/89         10-47-59
-	QUALIFICATION REPORTS (continued)
	(21) Conax Drawing PL7429-10003-10, Rev. E, Sheets 1 & 2 of 2, Parts List.
	*(22) WBN Drawings 45A8601-1 to -54, Electric Penetration connection Drawings.
	(23) WBN Drawing 45N860-3 R9 - Conduit and Grounding - Floor E1702.78, Details - Sheet 1
	(24) 45W860-10, R8 - Conduit and Grounding - Electrical Penetration Details
	*(25) Watts Bar Environmental Drawings 47E235-41 R1, -42 R2, -44 R1, and -45 R1. Drawings -41 R1, -42 R2 and -45 R1 have been R2 modified by DCN P-04104-C (B26 0908819)
	(26) <u>TI-RPS-48 (R2)</u> - Integrated Accident Dose Inside Primary <u>Containment (B45 851105 235)</u> .
)	(28) <u>GENNAL3-002 Reduction of Beta Dose by Sheet Steel</u> (B45-860423-235).
	(29) GENNAL3-013 - Beta Dose Reduction from Finite Volume (B45-860624 235).
	(30) QIR NEB 86160-Beta Dose to Low Voltage Electrical Penetrations (B46 860917 257).
	(31) WBNEQ-IXT-001 - Environmental Qualification Binder for Acoustic Monitors.
	(32) WBNEQ-SPLC-001 - Environmental Qualification Binder for Raychem Heat Shrink Splices.
	*(33) WB-DC-30-5R3 - "Power, Control-and-Signal Cables for use in Category I Structures - (See TAB G).
	* Not Included in Binder.
)	Note: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.
L.	

BINDER NO. WBNEQ-PENT-003 PLAN	T <u>WBN</u> UNIT(S	)_1SHEET_1c_OF_29
BINDER TITLE CONAX ELECTRICAL	COMPUTED.DDD	R <u>1</u> R <u>2</u> DATE <u>9/15/86_JFW</u>
PENETRATION, INSTRUMENTATION & INDICATION	CHECKED OM	2/6/89 10-16-89 DATE <u>9/18/86 CAG</u> AUR
**************************************		2/17/89 10-17-89

QUALIFICATION REPORTS (continued)

IPS-752 is the document submitted by Conax Corporation as the key qualification report for the Watts Bar Penetrations. It is a very comprehensive summary report and documents qualificaitons by analysis and comparison to similar modular-type low voltage power and control penetration assemblies of a universal design previously qualified by type tests conducted in accordance with IEEE 317-1976 at levels equal to or more severe than TVA specified requirements for Watts Bar. Most references in this binder are to IPS-752.

IPS-325 documents qualification of Conax Electric Penetration Assemblies from the standpoint of material tests, as a minimum satisfying requirements of Section 6.3 of IEEE 317-1976. Appendix A of IPS-325 includes Conax's thermal evaluation program. IPS-325 is referenced in this binder for identification of materials susceptible to aging degradation and to support Arrhenius Aging Calculation. IPS-325 documents an ongoing test program. Revision D of IPS-325 is referenced in IPS-752 and is included in Binder TAB D, Section D-2. A later revision of IPS-325, Rev. E, is included in Binder TAB E, Section E-4, and is referenced in several places in this binder. Contrary to the note on sheet 1b, wherever IPS-325 is referenced in this binder the proper revision level is listed.

IPS-585.4 documents tests on a coax penetration assembly referred to as test data base 3 in IPS-752. It is a more detailed test report than IPS-752 that includes raw data and therefore requires reference in a few places in this binder. Only the RG-59 coax is applicable to Watts Bar as indicated in IPS-752, Table 4.3.

IPS-585.2 documents tests on an instrumentation penetration assembly referred to as test data base 4 in IPS-752. It also is more detailed than IPS-752, contains raw data, and requires reference in a few places in this binder. IPS-752, Table 4.4 indicates which portions of test data base 4 are applicable to Watts Bar.

IPS-353.10 document qualification tests of a low voltage penetration module consistent with the requirements of IEEE 317-1976. For this binder it provides environmental qualification documentation for R2 chemical spray, supporting IPS-752 in the same way that IPS-325, Rev.D, IPS-585.2, and IPS-585.4 do.

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BINDER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET OF R_____ R_____ BINDER TITLE CONAX ELECTRICAL COMPUTED /R1 Hal DATE 2-16-54 PENETRATION, INSTRUMENTATION _____ CHECKED /R1/14 DATE Z=17-19 _____ & INDICATION THIS PAGE INTENTIONALLY LEFT BLANK Page <u>B-5</u> was deleted per revision <u>1</u>

PENETRATI	TLE <u>CONAX ELECTRICAL</u> ON, INSTRUMENTATION ION	R_1_ R COMPUTED_DDD DATE <u>9/15/86_JFW</u> CHECKED_OM DATE <u>9/18/86_CAG</u> 2/17/
B. <u>CONCL</u>	USION OF REVIEW (Che	eck only one block)
X_	Equipment Qualif:	ied
<u></u>		ies All Requirements Except Qualified ication of Replacement Schedule
	Equipment Qualifi	ication Not Established by Documentatio
<u></u>	Equipment Not Qua	alified Based on Test Failures
OPEN	ITEMS AND QUALIFICAT	TON DEFICIENCIES
		Punchlist Item Number
	-	PENT-003-001
		PENT-003-002
<u> </u>		
		· · · · · · · · · · · · · · · · · · ·
COMME	NTS/RECOMMENDATIONS	These modular-type electrical penetrat
		These modular-type electrical penetrat
<u>are u</u>	sed to convey both sa	
<u>are u</u> volta	sed to convey both sa	afety related and non-safety related io
<u>are u</u> voltag tion o	sed to convey both sa ge indication, commun circuits into primary	afety related and non-safety related 100
are u voltag tion d qualif	sed to convey both sa ge indication, commun circuits into primary fied to maintain pres	afety related and non-safety related for nications, annunciation, and instrument. y containment. These penetrations are
are us voltag tion o qualif for th	sed to convey both sa ge indication, commun circuits into primary fied to maintain pres ne worst case postula	afety related and non-safety related for nications, annunciation, and instruments y containment. These penetrations are ssure integrity and electrical integrity ated environmental conditions at their
are us voltag tion o qualif for th locat;	sed to convey both sa ge indication, commun circuits into primary fied to maintain pres he worst case postula ton before, during an	afety related and non-safety related ion nications, annunciation, and instruments y containment. These penetrations are ssure integrity and electrical integrity ated environmental conditions at their and after a LOCA or steam line break
are us voltag tion o qualif for th locat: occurr	sed to convey both sa ge indication, commun circuits into primary fied to maintain pres ne worst case postula ion before, during an ring any time within	afety related and non-safety related ion nications, annunciation, and instruments y containment. These penetrations are ssure integrity and electrical integrity ated environmental conditions at their ated environmental conditions at their ated after a LOCA or steam line break the 40 year plant design life, pending
are un voltan tion o qualin for th locat: occurr	sed to convey both sa ge indication, commun circuits into primary fied to maintain pres ne worst case postula ion before, during an ring any time within	afety related and non-safety related ion nications, annunciation, and instruments y containment. These penetrations are ssure integrity and electrical integrity ated environmental conditions at their and after a LOCA or steam line break

PAGE B-6 R2

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BINDER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET___OF_ R R BINDER TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>/R1</u> <u>Gu</u> DATE <u>2-i6-39</u> PENETRATION, INSTRUMENTATION CHECKED /R1 and DATE Z-1469 & INDICATION THIS PAGE INTENTIONALLY LEFT BLANK Page <u>B-7</u> was deleted per revision <u>1</u>.

	NDICATION CHECKED OM DATE 9/18/86
с.	QUALIFICATION_CRITERIA
	Criteria Used to Demonstrate Qualification is in Accordance with t Following (Indicate Which Criteria is Applicable):
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79-01 (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS <u>Contract Date: Nov. 14, 1975. Although</u>
	procured, delivered, and installed prior to February 22, 1983,
	these electrical penetrations meet NUREG-0588, Category I
	Requirments.
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET IEEE 317-1976 - Standard for Electrical Penetration Assemblies in
	Containment Structures for Nuclear Power Generatin
	Nuclear Power Generation Station.
	ASME Boiler and Pressure Code, Section III, Subsection NE, for
	Class MC Components, 1974 Edition, and Addenda
	Class MC Components, 1974 Edition, and Addenda

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BIN	DER TITLE CONAX ELECTRICAL COMPUTED
	INDICATION IN STRUMENTATION CHECKED OM DATE 9. 18.86
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Simi Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS Conax Qualification Report IPS-752,
	Section 1.2. See binder TAB D, Section D-1 for copy of IPS-752.
	IPS-752, Section 4.3 states "The design and construction of the
	subject penetrations of para. 3.1 contains the identical leakage
	paths, leak mechanisms, feedthru concepts, seals, insulation systems,
	and materials as test data bases one, two, three, and four and no
	differences exist between the test data bases and the Watts Bar
	Design which would affect qualification." Test data bases 3 and 4
	are the applicable test items for this binder. See IPS-752,
	Table 3.3 for a general description of the WBN LVI type penetration
	and Tables 4.3 and 4.4 for a description of the test data bases.

TVA 19537 (OE-3-86)

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EOP162.63

-	BNUNIT(S)SHEET 5OF29
BINDER TITLE CONAX ELECTRICAL	COMPUTED DATE 9/15/86
PENETRATION, INSTRUMENTATION & INDICATION	CHECKED 04 DATE 9.18.86

### E. EQUIPMENT DESCRIPTION

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? ____No____

(1)	Equipment Type	<u>Plant Device</u> Elec. Pene. <u>Instr.&amp; Ind.</u> Conax	Qualification <u>Document</u> Elec. Pene. <u>Assemblies</u> Conax	Reference IPS-752 Sec. 4.1 IPS-752
(2)	Manufacturer	<u>Corporation</u>	Corporation Data Base	<u>Sec. 4.1</u> IPS-752
(3)	Model Number(s)	See TAB A	<u>Three</u> Data Base	Table 4.3 IPS-752
			Four	Table 4.4
	· ·			
(4)	Serial Number(s)	See TAB F	Not stated	NA
		2° - S Ranandrichteranananana		
(5)	Identify Component- Unique checksheet	nandhanananananananananana		
	attached:	See TAB B, Sup	plement 3	

## JUSTIFICATION / COMMENTS

IPS-752. Section 4.3 states "The design and construction of the subject penetrations of para. 3.1 contains the identical leakage paths, leak mechanisms, feedthru concepts, seals, insulation systems; and materials as test data bases one, two, three, and four and no differences exist between the test data bases and the Watts Bar Design which would affect qualification." Test data bases 3 and 4 are the applicable test items for this binder. See IPS-752, Table 3.3 for a general description of the WBN LVI type penetration; and Tables 4.3 and 4.4 for a description of the test data bases.  $PAGE \frac{\beta \cdot / 0}{-}$ 

BINDER NO. WBNEQ-PENT-003 PLANT	WBN UNIT(S) 1 SHEET 5a OF 29
BINDER TITLE CONAX ELECTRICAL COMP	UTED DDD DATE $9/16/86$ JFW $9/40$ 2/6/89 $0-6-84$
PENETRATION, INSTRUMENTATION & INDICATION CHEC	KED OM DATE 9/20/86 CAG 2/DR
	2/17/89 10-17-54

EQUIPMENT DESCRIPTION (Continued)

IPS-585.2 and IPS-585.4 are the type test reports for test data bases three and four described in IPS-752. IPS-585.2 and IPS-585.4 are much more detailed and therefore require reference at some points in this binder. Test data base 3 is the test item for RG-59 coax. Test data base 4 is the test item for RG-11 triax, 14 AWG, 16 AWG, and thermocouple types. Other conductor types in the test items (RG-114 for example) are not used at Watts Bar. See *Contract 76K61-87064 in R2 TAB E, Section E-1, for description of WBN penetrations. Although Conax does state a type for test data bases 3 or 4, they include the conductor types TVA used for instrumentation, indication, communication, and annunciation circuits in the electrical penetrations at WBN.

See sheet 5b for correlation of WBN plant device EQIS numbers, model numbers, serial numbers, and types. Test data bases do not have model or serial numbers. This is not significant since the test data bases include the same conductor types as the WBN penetrations and Conax states there are no significant differences that would affect qualification.

All WBN primary containment electrical penetrations are tabulated on TVA Drawing 45N860-3 in binder TAB E, Section E-2. Penetrations covered in this binder are instrumentation and indication types and are listed on 45N860-3 as being for node voltage levels 1, 1A, 1B, 2, 2A, 2B, 2D, 2E, 2F, and 2G. (Penetrations for-node-voltage_level-5-are covered-in-Binder WBNEQ=PENT-001 and those for node voltage levels 3, 3A, 3B, 4, 4A, and 4B are covered in Binder WBNEQ-PENT-002).

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*Note: Contract reference is not required for qualification but is for information only. Refer to DCRM at WBN for latest revision of Design Specification WBNP-DS-1805-2697-00 applicable to this contract.

BINDER TITLE CONAX ELECTRIC.			R <u>1</u> R	
		DDD DATE		
PENETRATION, INSTRUMENTATION & INDICATION	CHECKED	OM DATE	9/18/86 Ast	
			2-11-29	
EQUIPMENT DESCRIPTION (Co	atiousd)		· · ·	
•				
<u>EQIS NO.</u>	MODEL NO.	SERIAL NO.	TYPE	
WBN-1-PENT-293-0018-B	7429-10003-05	400	Instrumentation	R
WBN-1-PENT-293-0019-E	7429-10003-03	391	Instrumentation	
<u>WBN-1-PENT-293-0020</u>	7429-10003-10	404	Instr. & Indic.	
WBN-1-PENT-293-0022	7429-10003-10	405	Instr. & Indic.	
WBN-1-PENT-293-0023-F	7429-10003-06	393	Instrumentation	
WBN-1-PENT-293-0025	7429-10003-01	397	Instrumentation	
WBN-1-PENT-293-0028	7429-10003-02	385	Instrumentation	
WBN-1-PENT-293-0029	7429-10003-04	398	Instrumentation	
WBN-1-PENT-293-0030-B	7429-10003-09	402	Instr. & Post- Acc. Rad. Monit.	
<u>WBN-1-PENT-293-0031-G</u>	7429-10003-06	394	Instrumentation	
WBN-1-PENT-293-0033-A	7429-10003-04	399	Instrumentation	R
WBN-1-PENT-293-0034	7429-10003-02	386	Instrumentation	
WBN-1-PENT-293-0037-A	7429-10003-07		nstr. & Indic. & <u>Dst-Acc.Rad.Monit</u>	_
WBN-1-PENT-293-0038-D	7429-10003-03	392	Instrumentation	
WBN-1-PENT-293-0039	7429-10003-02	387	Instrumentation	
WBN-1-PENT-293-0040-A	7429-10003-08	403	Instr. & Indic.	
WBN-1-PENT-293-0043-D	7429-10003-06	395	Instrumentation	
WBN-1-PENT-293-0045-F	7429-10003-03	389	Instrumentation	
WBN-1-PENT-293-0049-G	7429-10003-03	390	Instrumentation	
WBN-1-PENT-293-0050	7429-10003-02	388	Instrumentation	
WBN-1-PENT-293-0054-E	_7429-10003-06	396	Instrumentation	



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BINDER NO. WBNEQ-PENT-003 PLANT				SHEET 6	
BINDER TITLE CONAX ELECTRICAL	СОМР	UTED DDD	DATE 🚀	R	_ R
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### F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the test report and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if No, provide justification. Plant

<u>, .</u>,

		Requirement?	Ref er ence
Interface	Identify Interface	(Yes/No)	Test Report
Mounting Bolts	NA	<u>NA</u>	<u>NA</u>
External Process Connections	NA	<u>NA</u>	<u>NA</u>
El ectrical Connections	<u>See Note 1</u>	Yes*	IPS-752, Table <u>4.3.&amp; 4.4</u>
Conduit Seals	<u>NA</u>	<u>NA</u>	<u>NA</u>
Connector Seals	<u>NA</u>	<u>NA</u>	NA
Orientation	NA	<u>NA</u>	<u>NA</u>
Physical Configuration	<u>NA</u>	NA	<u>NA</u>
Other	NA	<u>NA</u>	<u>NA</u>
JUSTIFICATION/COM	ENTS There are no require	ed_external_proc	ess require-
ments, no conduit	seals (penetrations are se	als), and orient	ation is not
a consideration f	or penetrations. The Watts	Bar penetration	s_are_welded_
into their nozzle	s. (Continued on sheet 6A)		

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BINDER TITLE CONAX ELECTRICAL	COMPUTED_DDD	DATE <u>9/16/86</u>
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& INDICATION	CHECKED OM	DATE <u>9/20/86 / f</u>
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INSTALLATION INTERFACES (Continued)

Note 1: Raychem WCSF-N in-line splice insulations for connection of field cables, other than coax and triax, to penetration conductor pigtails were provided by TVA and are not part of the penetration assembly qualification. For coax and triax connectors Conax furnished R1 jacks and plugs with Raychem WCSF-N sleeves. See TVA drawing 45W860-10, detail J10 in binder TAB E, Section E-3, and Conax manual IPS-214, sections 5.4.4 and 5.4.5 in binder TAB H, Section H-1 for installation instructions and details. See binder WBNEQ-SPLC-001 for Raychem WCSF-N splice insulation qualification. R1

*Interface is an installation requirement but needs no maintenance and is not listed in QMDS.

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### G. TEST SEQUENCE

(1) Test Sequence: Was the test sequence established to simulate the accident environment in accordance with IEEE-323 (74), paragraph 6.3.2 (yes/no/NA)? (note below)

			Yes/No/NA	IPS-752 Reference
	(a)	Equipment inspected for damage	No	NA
	(Ъ)	Baseline performance measurements taken	Yes	5.0
	(c)	Equipment aged:		
		Thermal	Yes	5.7.15, 5.7.21
		Radiation	Yes	5.7.16, 5.7.22
		Wear	No	<u>NA</u>
	(d)	Vibration/seismic testing conducted	Yes	5.12
	(e)	Design basis event (DBE) exposure	Yes	5.14.3, 5.14.5
	(f)	Post-DBE exposure	Yes	5.14.3, 5.14.5
	(g)	Final inspection and disassembly	<u>No</u>	<u>NA</u>
)	Was desc	the same piece of equipment used ribed in item (1) above (yes/no/	throughout the NA)? <u>Yes</u>	test sequence

(3) Have the test equipment, test equipment accuracies and calibration data been appropriately documented (yes/no/NA)? Yes
 (Reference IPS-585.2, page 32 and IPS-585.4, page 27).

JUSTIFICATION/COMMENTS G(1)(a) Although Conax does not state

that an initial visual inspection was done, they have completed

numerous successful test programs and there is no reason to

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(2)

BINDER NO. WBNEQ-PENT-003 PLANT	WBN UNIT(S)	L SHEET <u>7A</u> OF29
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believe a visual inspection was not done. However, an initial visual

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inspection is not required by IEEE 317-1976.

G(1)(c) Electrical penetrations are passive devices and are not subject to wear as an aging mechanism. Wear aging is not required by IEEE 317-1976.

<u>G(1)(g) Conax does not state that a final inspection and disassembly was</u> <u>done, but extensive evaluation testing was performed (IPS-752, Sect 5.14.4 and 5.14.6) in accordance with IEEE 317-1976, fully proving post-accident</u> <u>integrity and operability of the assembly. It is reasonable to assume that a</u> <u>manufacturer of Conax's experience did make a visual inspection. However, a</u> <u>final visual inspection and disassembly are not required by IEEE 317-1976.</u>

G(1)(e) and G(2) Test data bases 3 and 4 were exposed to the sequence aslisted above. However the DBA test for test data base 3 did not includeany chemical spray and the DBA test for test data base 4 included only ashort period of spray. Spray compatibility of Conax penetrations wasestablished in report IPS-353.10 as stated in IPS-752, Section 5.14.10.2.Report IPS-353.10 documents environmental qualification tests on another(not test data base 3 or 4) penetration assembly. This assembly receivedsequential thermal aging, thermal cycling, radiation exposure, and DBAaccident profile at levels approximately equal to test data bases 3 and 4and in excess of WBN requirements. Thermal aging was somewhat less andradiation exposure somewhat more than test data bases 3 and 4. See ConaxJustification/Comparison in IPS-752, Section 5.14.10.

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H. AGIN	G	
(1)	Was aging considered in the qualification (Yes/no/NA)? Yes (Reference IP)	
	JUSTIFICATION/COMMENTS	
(2)	Were the following effects considered	in the aging program:
	Aging_Effect	IPS-752 Yes/No/NA Reference
	Thermal aging	Yes 5.7.15, 5.7.21
	Radiation exposure	Yes 5.7.16, 5.7.22
	Vibration (non-seismic) aging	No
	Operational (electrical/mechanical/proc stress aging	cess) <u>Yes</u> <u>5.7.14, 5.7.20</u>
	JUSTIFICATION/COMMENTS Vibration agin	ng not required by IEEE 317-
	1976 (penetrations are passive devices	and vibrational stress is not
	a-significant aging degradation mechan	ism).
(3)	Were all known synergistic effects which significant effect on equipment perform program (yes/no/NA)? <u>NA</u> (Referen	nance considered in the aging
	JUSTIFICATION/COMMENTS <u>No synergistic</u>	c effects known for these
	penetrations, based on a literature rev	view of applicable materials
	data for materials used in Conax instru	umentation and indication
	penetrations.	
(4)	Thermal Aging:	
	(a) Was thermal aging considered in the (yes/no/NA)? <u>Yes</u> (Reference 5.7.21)	
	· · · · · · · · · · · · · · · · · · ·	

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H. AGING (C	Continued)			
(b)	identified in	ials susceptible to therm the qualification program S-325, Table 3.1 and IPS-	(yes/no/NA)	? Yes
	JUSTIFICATION/C	OMMENTS See IPS-325, Rev	. D, in bind	ler TAB D,
	Section D-2.	 		
(c)		for thermal aging identif o/NA)? <u>Yes</u> (Referen		
	5.7.24.2			<u>.</u>
	JUSTIFICATION/	COMMENTS Thermal aging	based on cor	<u>ductor</u>
	feedthru life.	See analysis of feedthr	us in IPS-32	5.
	Appendix A.			
(d)	time and tempe	acceleration rate justifi rature identified in the Yes (Reference IPS-7	qualificatio	n program
	Parameter	Plant Maximum Normal	Test ⁽¹⁾	Equivalent
	Temperature	$\frac{110^{\circ}F^{(2)}}{40 \text{ years}}$	<u>150°C</u> 100 hrs	
	Time			
		COMMENTS (1) Test data base	three was a	iged at 151.6
	JUSTIFICATION/			
	JUSTIFICATION/	COMMENTS (1) Test data base	9A. See she	
(e)	JUSTIFICATION/ for 102 hours. discussion of Was the Arrhen	COMMENTS (1) Test data base (2) Worst case, see sheet 1	9A. See she accelerated	eet 9A for
(e)	JUSTIFICATION/ for 102 hours. discussion of Was the Arrhen (yes/no/NA)?	COMMENTS ⁽¹⁾ Test data base ⁽²⁾ Worst case, see sheet 1 aging. uius methodology used for	9A. See she accelerated 52, Sec. 5.7	eet 9A for aging (.24.2).
(e) (f)	JUSTIFICATION/ for 102 hours. discussion of Was the Arrhen (yes/no/NA)? JUSTIFICATION/ If activation aging paramete of the technic (Reference IPS	COMMENTS ⁽¹⁾ Test data base ⁽²⁾ Worst case, see sheet 1 aging. hius methodology used for Yes (Reference <u>IPS-7</u>	9A. See she accelerated 52, Sec. 5.7 termining ac erenced to t	aging .24.2). ccelerated the source

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The thermal age conditioning curve shown in IPS-752, Figure 5.7.1 shows a 40 year life at 120°C. This is far greater than the plant maximum normal and maximum abnormal temperature for penetrations (120°F and 130°F, respectively), and therefore a far greater than 40 year qualified life is established for the subject penetrations. There is little or no temperature rise associated with the low power indication, communication, annuciation, and instrumentation circuits passing through these penetrations.

Conax document IPS-325 covers an ongoing test program. A newer revision of IPS-325 (Rev. E) shows the latest Conax calculation of activation energy is 3.916, which agrees closely with the regression line presented in IPS-752, Figure 5.7.1. See page 26 of IPS-325, Rev. E in binder TAB E, Section E-4.

See Material Aging Calculation Report WAC-344, page C-8, in binder R2 TAB C, Section C-1, for calculation of qualified life at 130°F (54.44°C). Worst case maximum normal ambient temperature is 120°F, however the qualified life is calculated at 130°F for conservatism.

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	ON AX_ELECTRICAL COMPUTED DATE 9/15/86F
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H. <u>AGING</u> (	Continued)
(g)	If a regression line was used for determining accelerated agin parameters, are test points or failure modes identified on the line (yes/no/NA)? Yes (Reference IPS-325, Rev. E, in Appendix A, binder TAB E, Section E-4). JUSTIFICATION/COMMENTS Also see IPS-752, figure 5.7.1. and
	binder Sheet 9A.
( h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>No</u> (Reference <u>NA</u>
	JUSTIFICATION/COMMENTS Not required by IEEE 317-1976.
	Aging times and temperatures were based on typical penetra-
	tion operating temperature, which is ambient plus temperature
	rise due to loading. However, there is little or no
	temperature rise for these penetrations which are used for
	low power instrumentation, communication, annunciation, and
	indication circuits.
(5) Radi	ation Aging Exposure:
(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sec</u> .
	5.7.16 and 5.7.22
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-325, Table 3.1 and IPS-752, Table 3.3</u> ).
	JUSTIFICATION/COMMENTS <u>All materials were irradiated to</u>
	the same level.
(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>No</u> (Reference <u>NA</u> ).
	40 year plus accident dose to penetrations. PAG

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& INDICATION CHECKED OM DATE 9/18/86
H. <u>AGING</u> (Continued)
(d) Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? Yes (Reference: IPS-752, Sec. 5.7.16 and 5.7.22).
Plant normal ambient radiation dose (rd) <u>2.0E+07 gamma 2.0E+07 gamma</u> Data Base Three Data Base Four
Test exposure dose (rd) <u>1.1E+08(H₂0)</u> <u>1.9E+08(H₂0)</u> R1
Test exposure dose rate (rd/hr) <u>5.4E+05 (H₂0)</u> <u>7.7E+05 (H₂0)</u>
Test exposure source type (e.g., Co-60 gamma) <u>Co-60 Gamma Co-60 Gamma</u>
JUSTIFICATION/COMMENTS <u>Test exposure dose is the sum</u>
of 40 year normal dose plus accident dose. See Sheet
<u>llA for dose conversion from water to air equivalent.</u>
(6) Vibration (non-seismic) Aging:
(a) Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u> ). R1
JUSTIFICATION/COMMENTS <u>Not required by IEEE 317-1976</u> (penetrations are passive devices and vibrational stress is not a significant aging degradation mechanism).
(b) Was the basis for vibration aging identified and justified in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: <u>NA</u> ).
JUSTIFICATION/COMMENTS <u>See H(6)(a)</u>
* Qualification program refers to the test report and any supple- R1 mental documentation including TVA analyses in TAB C of the Binder.

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Dose conversion from rads water to rads air for the incident Co-60 gamma
ray flux used in the irradiation portion of the test program is proportional
to the ratio of the mass absorption coefficient (Na/p) for gamma rays in
air_and_water, assuming_an_average_Co-60 gamma_energy_of 1.25 meV. The air
<u>equivalent dose for test data base 3 is 1.1 x 10 rads water x ($Ma/P$) water</u>
0.989 x 10 ⁸ rads air. Mass absorption coefficient values of 0.0268 cm ² /gm for
air and 0.0298 cm ² /gm for water were used. (Reference: ANL-5800, Reactor
Physics Constants). In the same manner the test exposure dose rate of
5.4 x 10 ⁵ rad/hr (water) for test data base 3 converts to 4.856 x 10 ⁵ rad/hr
(air).
For test data base four the test exposure of 1.9 x 10 ⁸ rads (water) converts

to 1.709 x  $10^8$  rads (air) and the dose rate of 7.7 x  $10^5$  rads/hr (water) converts to 6.925 x  $10^5$  rads (air).

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н. <u>А</u>	GIN	<u>i</u> G (0	Continued)
(	7)	0per	ational Stress Aging:
		(a)	Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sec. 5.7.13, 5.7.14, 5.7.18, and 5.7.20).</u>
			JUSTIFICATION/COMMENTS <u>Shipping and storage tests and thermal</u>
			cycle test.
		(b)	Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? Yes (Reference IPS-752, Sec. 5.7.13,
			5.7.14, 5.7.18, and 5.7.20).
			JUSTIFICATION/COMMENTS Stresses induced_were_in_accordance
			with IEEE 317-1976.
(		quali	he qualified life of the equipment and its basis defined in the fication program (yes/no/NA)? <u>Yes</u> rence <u>IPS-752, Sec. 1.4).</u>
		Quali	fied life (Document in QMDS) <u>40 years</u>
		JUSTI	FICATION/COMMENTSSee_Justification/Comments in H(9)
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	TION, INSTRUMENTATION TION CHECKED OM DATE <u>9/18/86</u> Z·17-94
H. <u>AGIN</u>	(Continued)
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>No</u> (Reference: <u>NA</u>
	).
	JUSTIFICATION/COMMENTS <u>IPS-752, Sec. 1.4 states "Materials</u>
	as used in Conax electric penetrations are not susceptible to
	any significant degradation due to thermal aging and radiation
	and that no age or service related common failure modes exist that would preclude a qualified life of 40 years."
	ende "ourd precidue a quarrired rire or 40 years."
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### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis)

	Radiation		Activation	
<u>Material/Property/Function</u>	Threshold	<u>Reference</u>	Energy	<u>Reference</u>
(a) <u>Polysulfone/sealant</u>	NA	NA	NA	NA
Kapton Polyimide film/ (b) <u>Conductor Insulation</u>	-			
(c)				
(d)				
(e)				
JUSTIFICATION/COMMENTS Penet	ration feed	thru sealan	t and conduc	tor
insulation materials are consi	dered susce	ptible to t	hermal and r	adiation
degradation implicitly when te	st programs	are develo	ped based on	IEEE
317-1976 guidelines. Testing	was done in	accordance	with IEEE 3	17-1976
and test program included test				
<u>materials analysis by TVA is r</u>	equired.		*****	
Refer to TAB D, Section D-2, I	PS-325 for	Conax's dis	cussion of m	aterials
susceptible to thermal and rad	iation degr	adation and	aging.	
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	WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET 15 OF
	LE <u>CONAX ELECTRICAL</u> COMPUTED DATE 9/14/86 R ION, INSTRUMENTATION CHECKED Our DATE 91.18.86
	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752</u> , Sections 1.5,
	5.1.3, 5.1.4, 5.5.3, 5.5.4, 5.14.4, and 5.14.6 ).
	Identify Acceptance Criteria: <u>Baseline gas leak rate less than 1E-06</u>
	SCC/SEC helium (1E-08 for test data base three). Insulation
	resistance greater than 1E+08 ohms for 16 AWG, 1E+12 ohms for coax and
	triax. During DBA, function and operate at specified service levels
	without loss of mechanical or electrical integrity. After DBA, gas
	leak rate less than 1E-02 SCC/SEC nitrogen, continuity and dielectric
	strength test with no failures.
(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference IPS-752, Sections
	5.1.3, 5.1.4, 5.2.1, 5.3.1, 5.4.3, 5.4.4, 5.5.3, 5.5.4, 5.14.3,
	5.14.4, 5.14.5, and 5.14.6).
	Identify baseline and functional testing: Baseline testing included
	gas leak rate, pneumatic pressure, dielectric strength, insulation
	resistance, and conductor continuity. During DBA test, penetrations
	were energized and leakage current monitored except for 11 intervals
	when insulation resistance was measured on triax. Post-DBA tests
	included leak rate, conductor continuity, dielectric strength, and an
	insulation resistance on the 16 AWG size conductors.

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PER		CHARACTERISTICS NECESSARY T ATIONS CAN BE SATISFIED UNDE	
(3)	combinations) ap	ication report/analysis desc oplied during DBE test (Yes/ S-752, Sec. 5.14.3.1 and 5.1	No/NA)? <u>Yes</u>
	JUSTIFICATION/CO	DMMENTS	
(4)	operating condit	.oads during baseline testin tions (Yes/No/NA)? <u>No</u> (R	
	<u>_1PS-752, Sectio</u>	ms 5.1 through 5.5	
	JUSTIFICATION/CO of insulation re indication of th but are not the	MMENTS Electrical baseline esistance and hipot tests wh a electrical condition of t actual voltage and load car service in the plant. Test	ich provide an he penetrations ried by the
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri	MMENTS Electrical baseline esistance and hipot tests wh a electrical condition of t actual voltage and load car service in the plant. Test	ich provide an he penetrations ried by the s were in accor- ry to ensure the
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri	MMENTS Electrical baseline esistance and hipot tests wh a electrical condition of t actual voltage and load car service in the plant. Test 317-1976.	ich provide an he penetrations ried by the s were in accor- ry to ensure the
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri equipment perfor	MMENTS Electrical baseline esistance and hipot tests wh he electrical condition of t actual voltage and load car service in the plant. Test 317-1976. cal characteristics necessa: mance specifications can be	ich provide an he penetrations ried by the s were in accor- ry to ensure the satisfied.
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri equipment perfor (a) <u>Parameter</u>	OMMENTS Electrical baseline esistance and hipot tests while electrical condition of t actual voltage and load car service in the plant. Test 317-1976. 	ich provide an he penetrations ried by the s were in accor- ry to ensure the satisfied. <u>Reference</u>
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri equipment perfor (a) <u>Parameter</u> Voltage	OMMENTS Electrical baseline esistance and hipot tests wh he electrical condition of t actual voltage and load car service in the plant. Test 317-1976.	ich provide an he penetrations ried by the s were in accor- ry to ensure the satisfied. <u>Reference</u> <u>Open Item</u>
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri equipment perfor (a) <u>Parameter</u> Voltage Load	OMMENTS Electrical baseline esistance and hipot tests while electrical condition of the actual voltage and load carries service in the plant. Test 317-1976. Incal characteristics necessary mance specifications can be <u>Plant Normal Conditions</u> <u>Various</u> <u>NA</u>	ich provide an he penetrations ried by the s were in accor- ry to ensure the satisfied. <u>Reference</u> <u>Open Item</u> <u>NA</u>
(5)	JUSTIFICATION/CO of insulation re indication of th but are not the penetrations in dance with IEEE Identify electri equipment perfor (a) <u>Parameter</u> Voltage Load Frequency	DMMENTS       Electrical baseline         esistance and hipot tests where       electrical condition of the set	ich provide an he penetrations ried by the s were in accor- ry to ensure the satisfied. <u>Reference</u> <u>Open Item</u> <u>NA</u> <u>NA</u>

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BINDER NO	. <u>WBNEQ-PENT-003</u>	PLANT UNIT(S)_1 SHEET 16a_OF_29
	TLE <u>CONAX ELECTR</u> ON, INSTRUMENTAT TION	
PERF		<u>CHARACTERISTICS NECESSARY TO ENSURE THE</u> ATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS  R1
(5)(b)	Parameter	Specific Accident ConditionsReference
	Voltage	Various Open Item
	Load	NA NA
	Frequency	<u>NA</u> <u>NA</u>
	Accuracy	<u>NA</u> <u>NA</u>
	Other(s)	

JUSTIFICATION/COMMENTS For instrumentation/indication penetrations the required electrical characteristics depend on the end device served. Category A and B divisional devices served by these penetrations can be categorized into 6 groups.

Group	Device Served
1	Switches
2	Transmitters
3	RTDs
4	Incore Thermocouples
5	Acoustic Monitors
6	GA Post-Accident Radiation Monitors (PAM)

Refer to TVA drawing 45N860-3 in binder TAB E, Section E-2, for a general descriptoin of each penetration's use. For a complete tabulation of devices and/or cables connected to each penetration, see TVA drawing series 45A860.

## **P**ENT-00**3**

BINDER NO. WBNEQ-PENT-003 PLANT	WBN UNIT(S)	<u>1</u> SHEET <u>16B</u> OF <u>29</u>
BINDER TITLE CONAX ELECTRICAL		_ DATE 9/15/86
PENETRATION, IN STRUMENTATION & INDICATION	CHECKED	DATE 9.18-86

Except for PAM circuits, category A divisional devices served by these penetrations operate at a maximum nominal system voltage of 120 VAC or 125 VDC. The PAM monitors are served by RG11 A/U triax modules added to penetrations 30 and 37. See notes 6 and 7 on TVA Drawing 45W 860-10 binder TAB E, Section E-3) and penetration circuit tabulation Drawing 45A860-3 and 45A860-37. The CA radiation monitor operates at 875 VDC bias voltage and requires a minimum insulation resistance of 1 x 10⁹ ohms. These instrumentation and indication penetrations are not assigned any rated current. Loads served carry 1 ampere or less, with most in the milliamp range. These small currents cause essentially no heat rise or other stress in the penetrations.

Electrical penetrations are not frequency sensitive and have no accuracy requirements themselves. Loop accuracy for the end devices served is addressed in the individual device binder.

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BINDER NO	. <u>WBNEQ-PENT-003</u>	PLANT <u>WBN</u> UNIT(S) 1	
	TLE <u>CONAX ELECTR</u> CON, INSTRUMENTAT	ICAL COMPUTED DDD DATE 9	R_1 R /15/86 gai 2.6-89
			/18/86 /3// L+7+84
PERF		CHARACTERISTICS NECESSARY TO EL ATIONS CAN BE SATISFIED UNDER A	
(5)(c)	<u>Parameter</u>	Demonstrated Conditions	<u>Reference</u>  R1 IPS-752, Sec.
	Voltage	300 VDC	5.14.3.1 and 5.14.5.1 IPS-752
	Load	50 mA for 16 AWG	Sec. 5.14.5.1
	Frequency	NA	<u>NA</u>
	Accuracy	NA	<u>NA</u>
	Other(s) Insulation Resi <u>for TRIAX</u>	stance <u>1.0E + 10 ohms minimu</u> m	IPS-585.2, App. A, <u>Sheet 1</u> R1 IPS-585.2,
	Insulation Resi <u>for 16 AW</u> G	stance <u> </u>	App. A, Sheet 3
	switches, trans monitors - See	OMMENTS Devices in Groups 1 th mitters, RTDs, thermocouples and Sheet 16) operate at 125 volts o st voltage represents a 140 perc	l acoustic or less. The
	served by these after a DBA. Con- test on the Tri. Sec. 5.4.4) and (IPS-752, Sec. 5 minutes (IPS- shows the basic and remains tha aging and a DBA	monitors are the only divisional penetrations Triax circuits that nax performed a baseline dielect ax module at 5.0kVAC for 1 minut a post-DBA test at 3.0 KVAC for 5.4.4) and a post-DBA test at 3. 752, sec. 5.14.6.3) with no breat insulation rating is well over t good after 40 years thermal and much more severe than the maxim During the DBA test, the insulat	at must operate cric strength ce (IPS-752, c 5 minutes 0 KVAC for akdown. This 1000 volts ad radiation num postulated
	was measured at from 1.0E+10 to exceeds the requ ment was made a the pressure over values. During 300 VDC with max	500 VAC on 11 occasions with va 4.0E+11 ohms (IPS-752, sec. 5.1 uirement of 1.0E+09 ohms. The f t 5 hours with the temperature of er 50 psig, in excess of the pea the DBA test, Conax energized t kimum measured leakage current of sec. 5.14.5.1). Assuming leakag	lues ranging 4.5.2), which irst measure- over 330°F and R1 k Watts Bar the triax with of 0.13 milli-

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BINDER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET 17a OF 29
R_1_ R
BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/16/86 000 PENETRATION, INSTRUMENTATION
<u>&amp; INDICATION</u> CHECKED OM DATE 9/18/86
<u> </u>
J. EQUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE
PERFORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS (Continued)
(continued)
JUSTIFICATION/COMMENTS (Continued)
proportional to voltage in this small range indicates a
leakage current maximum of 0.38 milliamps at 875 VDC, which R1
is acceptable. Since the triax module passed the post-DBA
tests at 3.0 KVAC center conductor to shield with no signs of insulation failure and the insulation resistance values
and leakage currents measured during the DBA indicate no
problem would be experienced at 875 volts, the triax module is qualified for this service. This is additionally proven by
other tests Conax has performed on the same triax modules
using 1000 volts during DBA testing. These tests are
documented in Conax Qualification Report IPS-1334 and Test Report IPS-1054, which Conax furnished TVA to qualify triax
penetrations for identical GA radiation monitors at Sequoyah
Nuclear Plant. Those triax modules were originally furnished
on Watts Bar Contract 76K61-87064 along with the rest of the penetrations covered in this binder and were transferred to
Sequoyah as discussed in Sequoyah Binder SQNEQ-PENE-005.
Devices in Groups 1 through 5 are all served by 16 AWG
copper conductors in these penetrations. Group 6 devices
are served by RG 11A/U Triax. Group 1 switches are very similar to low voltage power and control devices due to their
applications, such as 120 volts at 1 amp. A minimum insula-
tion resistance of 1.8E+05 ohms is acceptable for these
applications. Group 5 acoustic monitors do not have accuracy requirements that would be adversely affected by a penetration R1
insulation resistance of 1.8E+05 ohms minimum. See Binder
WBNEQ-IXT001.
For Groups 2, 3, 4, and 6, adequacy of penetration DBA
insulation resistance is covered by Open Item No. 3 in this
binder.
Penetration coax conductors, thermocouple conductors, and 14
AWG conductors do not serve any Category A or B divisional devices and therefore they have no DBA electrical
requirements.

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BINDER NO. <u>WBNEQ-PENT-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>R</u> BINDER TITLE <u>CONAX ELECTRICAL</u> COMPUTED <u>/R1 Jul</u> DATE <u>2-16-89</u> PENETRATION, INSTRUMENTATION & INDICATION CHECKED <u>/R1 Jul</u> DATE <u>2-16-89</u>	OF R
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	ITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/16/86 JFW 94 ION, INSTRUMENTATION 2/4/89	16-8
INDICA	TION         CHECKED         OM         DATE         9/18/86         CAG         3/2           2/17/89 %	
κ. <u>requ</u>	UIRED OPERATING ENVIRONMENT	
Refe	erence Environmental Drawing No. <u>See Sheet 19a</u>	
(1)	Normal Max (2) Abnormal Max	
	(a) Temperature (°F) <u>120</u> (a) Temperature (°F) <u>130</u>	R
	(b) Pressure (psig) <u>0.3</u> (b) Pressure (psig) <u>0.3</u>	
	(c) Humidity (%) <u>80</u> (c) Humidity (%) <u>100</u>	
	(d) Radiation (rd) <u>2.0E+07</u> (d) Radiation (rd) <u>NA</u>	
(3)	Process Interfaces: None	
	·	
(4)	State anticipated occurrence frequency and duration of abnormal conditions: <u>Up to 8 hours per excursion and occuring less</u>	1
	than 1% of plant life. 20°F difference in maximum temperature	e
	for this time period is negligible.	
(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):	
(5)	parameter including peak, duration, and profile): (a) Temperature (°F) <u>327</u> Accident type <u>HELB</u>	R
(5)	parameter including peak, duration, and profile):	R:
(5)	parameter including peak, duration, and profile):         (a) Temperature (°F) Accident type HELB         128° long term         (b) Pressure (psig) Accident type LOCA         (c) Humidity (%) Accident type LOCA/HELB	R
(5)	parameter including peak, duration, and profile): (a) Temperature (°F) <u>327</u> Accident type <u>HELB</u> 128° long term (b) Pressure (psig) <u>11.2</u> Accident type <u>LOCA</u> (c) Humidity (%) <u>100</u> Accident type <u>LOCA/HELB</u>	
(5)	parameter including peak, duration, and profile): (a) Temperature (°F) <u>327</u> Accident type <u>HELB</u> 128° long term (b) Pressure (psig) <u>11.2</u> Accident type <u>LOCA</u> (c) Humidity (%) <u>100</u> Accident type <u>LOCA/HELB</u>	R

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PENETRATI	TLE_CONAX_ELECTRICALCOMPUTED_DDDDATE9/16/86_JFW9/26/89ON, INSTRUMENTATION2/6/892/6/892/6/89TIONCHECKED_OMDATE9/18/86CAG1/122/17/890002/17/89				
K. <u>REQU</u>	VIRED OPERATING ENVIRONMENT (Continued)				
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>One end of each penetration is exposed to</u>				
	annulus environment. Containment ends are in lower compart-				
	ment (outermost small rooms), lower compartment instrument				
	room, or upper compartment. Parameters shown are worst				
	case; see Sheet 19a.				
(6)	) Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>No</u> (Reference:				
	IPS-752, Sections 5.14.3 and 5.14.5				
(7)	Subject to submergence (Yes/No/NA)? <u>No</u> (Reference:				
	See note 5 on environmental drawings for maximum containment water level for flood elevation (EL 717.7 outside crane wall where penetrations are located), and binder TAB A for penetration elevation. Also, see DWG. 45N860-3 in binder TAB E, Section E-2 and field verification in binder TAB F for location).				
	Identify initiation time and duration of submergence: <u>NA</u>				
(8)	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>See Sheet 19a</u> ).				
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:				
4 - 2	See Sheet 19a and QIR NEB 86160 (TAB E, Section E-11)				
(9)					
	Type RIMS No.				
	See Section A				
·	*				

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BINDER TITLE CONAX E PENETRATION, INSTRUM & INDICATION	IENTATION	MPUTED <u>DDD</u> IECKED <u>OM</u>		2/16/89%	911) 0-16-8 1012
	AREA/ENVIRC	NMENTAL DWG	SUMMARY		
		Lower* compartment 7E235-42)**	Annulus	Instrument Room <u>(47E235-45)</u> **	R
Max Normal Temperature, °F	110	120 ⁽¹⁾	110	75	R
Max Abnormal Temperature, °F	120	130	120	120	
Max Normal Pressure, PSIG	0.3	0.3	ATM(-)	0.3	
Max Abnormal Pressure, PSIG	0.3	0.3	ATM(-)	0.3	
Max Normal R.H. %	<b>80</b>	80	80	60	
Max Abnormal R.H. %	90	100	90	90	
40-Yr Normal (gamma Radiation, Rads	) 1.0E+06	2.0E+07	1.0E+06	3.5E+05	
Peak Accident Temperature, °F	161	327	134	327	
Peak Accident Pressure, PSIG	11.2	11.2	ATM(-)	11.2	
Accident (gamm Radiation, Rads (bet	a) 1.34E+07 ⁽³⁾ a) 3.7E+07 ⁽²⁾	1.0E+07 3.7E+07(2)	1.2E+07 included	1.0E+07 3.7E+07(2)	
Total 40-Year Plus Accident Radiation, Rads	5.14E+07 gamma plus beta	6.7E+07 gamma plus beta	1.3E+07 gamma plus beta	4.735E+07 gamma plus beta	
* Fan rooms and ac ** These drawings h				).	R
<ol> <li>Documented ave:</li> <li>See QIR release</li> <li>See Calculation</li> </ol>	e NEB 86160 (T	AB E, Section	n E-11)		

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BINDER NO. <u>WBNEQ-PENT-003</u> PLANT	r <u>wbn</u>							
BINDER TITLE CONAX ELECTRICAL PENETRATION, INSTRUMENTATION	COMPUTED <u>1</u>	<u>R_1</u> R <u>DDD</u> DATE <u>9/15/86</u> (7)w 2 ¹⁶ - 69						
& INDICATION	CHECKED (	DM DATE <u>9/18/86/24</u>						
L. SUMMARY COMPARISON OF TEST	CONDITIONS	TO SPECIFIED CONDITIONS						
(1) Comparison of worst-case maximum parameters:								
Parameter	Specified							
Operating Time	100 days	13 days, Fig. 5.14.2 <u>15 days</u> & <u>5.14.3</u> Fig. 5.14.2						
Temperature (°F)	327	$\frac{400,395}{\text{Fig. 5.14.2}}$						
Pressure (psig)	11.2							
Relative Humidity (%)	_100	<u>100,100</u> & <u>5.14.3</u> 6200 ppm boron						
0.19 mc 0.033 п	lar H ₃ BO ₃₃ Nolar NaOH ³	50 ppm Hydrazine R1						
Chemical Spray*	pH 8.3							
6.7	'E+07 gamma	gamma (air) 5.7.16 & R1						
Radiation (rd)**	<u>plus beta</u>	<u>gamma (air) 5.7.22</u>						
Submergence	None	<u>None</u> NA						
<pre>*Includes spray concent pH.</pre>	ration, flo	owrate, density, duration, and						
<pre>**Enter 40-year integrated normal dose plus integrated accident   dose and specify type.</pre>								
(2) Comparison of worst-case profiles and margin assessment:								
		Profile						
Parameter		Specified IPS-752 (No/NA) Reference						
Temperature	Yes	Fig. 5.14.2 & 5.14.3						
Pressure	Yes	Fig. 5.14.2 & 5.14.3						
Relative Humidity	<u>Yes, See S</u>	Fig. 5.14.2						
Chemical Spray	NA	Section 5.14.10.2						
Submergence	NA							
JUSTIFICATION/COMMENTS								
L(1) Chemical Spray - Specified containment spray is 30 days								
and the flow rate is 0.92 gpm/ft ² . Spray chemistry varies with								

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		17.1

BINDER NO. WBNEQ-PENT-003 PLAN	T <u>WBN</u> UNIT	S) <u>1</u> SHEET <u>20a</u> OF <u>29</u>
		R R
BINDER TITLE CONAX ELECTRICAL	COMPUTED DDD	DATE <u>9/15/86 900</u>
PENETRATION, INSTRUMENTATION		10-16-34
& INDICATION	CHECKED OM	DATE 9/18/86 Hor
		10-17-89

L. <u>SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS</u> (Continued)

# JUSTIFICATION/COMMENTS (Continued)

time. Parameters shown are a composite resultant concentration. All of these penetrations are enclosed in junction boxes and are not subject to direct chemical spray impingement. All penetrations except No. 25 (which is nondivisional) are additionally protected from chemical spray by the concrete floor slab above them. These physical barriers negate the effect of spray flow rate and difference in spray chemistry. Also see TAB B, sheet 7A, Justification/Comments for G(1)(e) and G(2).

L(1) Radiation - Worst case total radiation is in lower compartment. See Sheet 19a.

L(2) Temperature - As is seen in TAB C, Section C-1, Report WAC-344, the test profiles do not envelop the WBN accident profile for |R2 approximately the first 100 seconds. This exists due to starting at a lower temperature and the difficulty in getting the temperataure to rise in the steam chamber as fast as the WBN accident profile does, a common problem in steam tests. Report WAC-344 does not include the first test temperature transients. |R2 This extra transient and the significantly higher test temperatures compensate for the slightly slower transient rise times. Also, as noted in IPS-752, Section 5.14.10.1, testing without a terminal box is more severe than with the box due to thermal lag and dew point effects, associated with the box. Thus, this small deviation in the profiles for the first few seconds is not significant.

L(2) Relative Humidity - Conax test reports do not state the humidity in the environmental chamber during DBE testing. The relative humidity was not maintained at 100% throughout the entire tests conducted by Conax, but did occur at various times. Because the test profiles were a combination of both the LOCA and HELB conditions, saturated steam, obviously, could not be the test R2 medium throughout. However, portions of the tests were performed under saturated steam, while the HELB conditions were simulated by low humidity superheated steam. Both the temperatures and pressures used throughout the tests were well in excess of maximum Watts Bar values which is conservative for electrical penetrations.

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	BNEQ-PENT-003 PLAT CONAX ELECTRICAL	. '		*	R	ETR_	_OF
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BINDER NO. WBNEQ-PENT-003 PL	ANT <u>WBN</u> UNIT	(S) <u>1</u> SHEET <u>21</u> OF <u>29</u>
BINDER TITLE CONAX ELECTRICAL	COMPUTED DDD	R <u>1</u> R <u>2</u> DATE 9/15/86 IEW 990
BINDER TITLE CONAX ELECTRICAL PENETRATION, INSTRUMENTATION		
& INDICATION	CHECKED OM	DATE 9/18/86 CAG 1000
		2/17/89/0-18-89

- L. <u>SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS</u> (Continued)
  - (3) Were margins applied to the test parameters or otherwise addressed in the test program to assure that normal variation and uncertainties are accounted for? (Note margin applied, Yes/No/NA).

Suggested Margins per IEEE-323(74)	Applied	<u>Yes/No/NA</u>
Temperature: +15 degrees F	<u>&gt;15°F</u>	Yes
Pressure: +10% but no more than 10 psig	<u>_&gt;10_psig</u>	Yes
Radiation: +10% of accident dose	>10%	Yes
Time: +10% (or 1 hour + operating time per NUREG-0588)	<u>See_Note_</u> 1	Yes
Voltage: ±10% of rated value	<u>See Note 2</u>	Yes
Frequency: ±5% of rated value	<u> </u>	No
Environmental Transient: the initial transient and the peak temperature applied twice		Yes
Vibration: +10% added to acceleration	NA	<u>NA</u>
JUSTIFICATION/COMMENTS Electrical penetr	ations are n	not
frequency sensitive in this range and fre	quency_marg	in is not
required by IEEE 317-1976.	<u> </u>	
Note 1: Material Aging Calculation Repor	t WAC-344 in	<u>binder</u>  R2
TAB C shows the time margin (conservatism	factor) fai	<u>exceeds</u>
10%. Note 2: Voltage margin was 150% of	maximum pla	<u>int voltag</u> e
for size 16 AWG and 14 AWG conductors used	d for instru	mentation
and indication service. Margin was 0 for	coax and tr	iax
conductors. See discussion on sheet 17a.		

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	D. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET 22 OF TLE CONAX ELECTRICAL COMPUTED $2000$ DATE $9/16/86$ R R R
	TION, INSTRUMENTATION CHECKED DATE 9.20.86
M. OPER	ABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference <u>IEEE 317-1976</u> ).
	JUSTIFICATION/COMMENTS <u>Maintain pressure boundary and</u>
	electrical_integrity.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference IPS-752, Sec. 5.14.3, 5.14.4, 5.14.5, and 5.14.6 ).
	JUSTIFICATION/COMMENTS
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sec. 5.14.3, 5.14.4, 5.14.5, 5.14.6</u> ).
	JUSTIFICATION/COMMENTS
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>IPS-752, Sec. 5.14.10.1.C</u> ).
	JUSTIFICATION/COMMENTS <u>Tests were for 13 and 15 days.</u> See
	analysis_extending_time_to_100_days_in_IPS-752, Sec. 5.14.10.1.C.

TVA 19537 (OE-3-86)

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BINDER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1 SHEET 23 OF 29	]
BINDER TITLE CONAX ELECTRICAL COMPUTED DDD DATE 9/15/86 440 PENETRATION, INSTRUMENTATION 276-34	_
<u>&amp; INDICATION</u> CHECKED OM DATE <u>9/18/86</u>	-
M. <u>OPERABILITY TEST RESULTS</u> (Continued)	
(5) Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (Yes/No/NA)? <u>Yes</u> (Reference:	
).	

# JUSTIFICATION/COMMENTS

No anomalies were reported in IPS-752 for test data bases three and four. IPS-585.2, Sec. 5.2.6.6.1 does report shipping damage that was the probable cause of eventual problems with the 14 AWG feedthru in test data base four; see IPS-752, Sec. 5.3.3.1. This is reasonable since no problems were experienced with the 16 AWG feedthru of the same design and construction. Also 14 AWG feedthru was included in test data base one and was fully qualified as documented in IPS-752. At Watts Bar 14 AWG conductors do not serve any Category A or B divisional devices. See Sheets 17 through 17a. The minimum measured insulation resistance for 16 AWG during DBE was 1.8E x 05 ohm. Adequacy of this value for WBN applications is covered by open item No. 3 in this binder. RG-59 coax and thermocouple conductor types do not serve any Category A or B divisional devices and their DBA electrical characteristics do not need to be addressed.

R1

|R1

BIN	DER T	TLE CONAX ELECTRICAL COMPUTED DATE	
PEN	NETRA	TION, INSTRUMENTATION CHECKED DATE 9	.20.86
ۍ د	INDIC	ATION	
0	CIDA		· ·
0.	<u>50M</u>	MARY OF REVIEW	Yes/No/NA
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	(1)	Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an	<u>Yes</u>
•		analysis been justified and documented)?	•
	(2)	Any exceptions (i.e., sound reasons to the contrary)	NA (No excep-
•	( <b>-</b> )	taken to the specified qualification level adequately justified?	<u>tions take</u> nz
	(3)	Choice of qualification methodology adequately justified?	Yes
	(4)	If analysis was performed, complete the following:	
•		(a) Were equipment performance requirements identified?	<u>NA</u>
		(b) Were specific features and failure modes and effects analyzed?	<u>NA</u>
े है 	•	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	<u>NA</u>
		(d) Were environmental parameters which affect equipment performance identified?	NA
	(5)	Adequate similarity between equipment and test specimen established?	Yes
	(6)	Aging degradation evaluated adequately?	Yes
		(a) Mechanical and/or cycle aging addressed?	Yes
		(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
		(c) Absence of preaging in test/analysis justified?	NA (Preaging <u>performed)</u>
		(d) Materials susceptible to thermal/radiation	Yes

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	D. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1	SHEET 26OF
	TLE CONAX ELECTRICAL COMPUTED DDD DATE 9	<b>D D</b>
	TION, INSTRUMENTATION CHECKED Que DATE 9.1	
	· ·	
0. SUMM	ARY-OF-REVIEW (Continued)	Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	
(7)	Qualified life or replacement schedule established?	Yes
(8)	Criteria regarding temperature/pressure exposure satisfied?	<u></u>
e	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	¥eş
	(a) Was the spray testing done while under the	Yes
	extremes of pressure and temperature?	
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	NA (See TAB B <u>Sec. L(2))</u> NA (Penet. not
(11)	Criteria regarding submergence satisfied?	submerged)
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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TVA	19537	(QE-3-86)

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BINC	ER NO. WBNEQ-PENT-003 PLANT WBN UNIT(S) 1	SHEET 27	OF	29
BINC	ER TITLE CONAX ELECTRICAL COMPUTED DATE	P/18/86 R	R	_
	ETRATION, INSTRUMENTATION CHECKED DATE		. <u> </u>	
0.	SUMMARY OF REVIEW (Continued)	Yes/No/NA	·	
	(15) Criteria regarding functional testing satisfied?	Yes		
. ·	(a) Does the test plan/report specify an acceptance criteria for equipment performed?	<u>Yes</u>	•	
	(b) Was an initial base line test done to establish required performance characteristics?	Yes		
	(c) Has the test/analysis demonstrated that performance performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	ce <u>Yes</u>		
	(16) Criteria regarding instrument accuracy satisfied?	<u>NA</u>		
	(17) Test duration margin (1 hour + function time) satisfied?	Yes		
	(a) Is the minimum specified operating time at least 1 hour?	YesNA (Penet.		
	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	qualified for <u>100 days</u> )		
	(18) Criteria regarding synergistic effects satisfied?	Yes		
(	(19) Criteria regarding margins satisfied?	Yes		
(	20) Maintenance and surveillance requirements adequately identified?	Yes		
Ρ.	DISCUSSION			
	Conax Report IPS-752 is the qualification document for the	<u>se penetra-</u>		
	tions. The penetrations contain the identical possible le	akage paths,		
	leak mechanisms, feedthru concepts, seals, insulation syst	ems, and		
	materials as the test data base penetrations number three	and four		
•	described in IPS-752. Detailed raw test data for the test	ed		
	assemblies is contained in IPS-585.2 and IPS-585.4. IPS-7 PAGE B-46	52 is a		

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	BINDER NO. WBNEQ-PENT-003 PLANT_	WB N	UNIT(S)	1	SHEET 27A	OF _	29
ļ,	BINDER TITLECONAX_ELECTRICAL	СОМРИТ		DATE 9/1	-/ <i>F</i> c	R	
	PENETRATION, IN STRUMENTATION & INDICATION	CHECKE	D Oly	DATE 9.18	86		

P. DISCUSSION (Continued)

summary document of the reports on the tested assemblies. It is a very
thorough summary and is the document submitted by Conax Corporation
as the key-qualification report for the subject penetration
assemblies. The The Company of the C
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сандар водалистика на население общение провосо и и и и и и и и и и и и и и и и и и
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TVA 19537 (OE-3-86)

BINDER NO. WBNEQ-PENT-003 PLANT	WBN UNIT(S) 1 SHEET 28 OF 29
BINDER TITLE CONAX ELECTRICAL	COMPUTED DE DATE 9/15/96 R
PENETRATION, IN STRUMENTATION & INDICATION	CHECKED DATE 9.18.86

SUPPLEMENT 3 COMPONENT-UNIQUE CHECKLIST ELECTRICAL PENETRATIONS Page 1 of 2

# EQUIPMENT - IDENTIFICATION

(1) Are the penetrations identified in the qualification program identical to the plant penetrations which require qualification (yes/no/NA)? ______
TPS-752

• • •			Annantahl a	LF5-752,
Item	<u>Plant</u> Instrm.&	Report.	Acceptable Yes/No/NA	Report <u>Section</u> Tables
(a) Penetration type	Indication	<u>Indication</u> Welded	Yes	4.384.4 Tables
(b) Mounting	Welded	& Bolted	Yes	<u>4.38474</u> Tabl es
(c) External connections	or-9phices	or Splices	N H - Yeg	4.384.4

Comments: <u>Conax test was of similar items with supporting analysis</u>

(2) Does the qualification report identify the following performance characteristics:

Perf	ormance-Characteristics	Acceptable (Yes/No/NA)	IPS-752 Report <u>Section</u>
(a)	Temperature rating	Yes	<u>5.7.24.2</u> 5.4.3 &
(Ъ)	Voltage rating	Yes	5.4.4
(c)	Continuous current rating	NA	5.9.4
(d)	Short-time overload current rating & duration	NA	5.10.3
(e)	Rated short circuit current & duration	NA	5.11.3
(f)	Pressure rating	Yes	5.1 8 5.2

PAGE B-48

		<u>/BN</u> UNIT(S)		SHEET 29OF RR /86
BIND	ER TITLE <u>CONAX ELECTRICAL</u>		DATE <u>9//5</u>	186
	TRATION, INSTRUMENTATION DICATION	_ CHECKED	DATE 9.18.	86
<b>.</b>				
EQUI	PMENT IDENTIFICATION (Continued	, · · ·		
^				Page 2 of 2
			· · ·	IPS-752
	Performance-Characteristics	Acceptable (Yes/No/NA)		Report Section
	(g) Maximum gas leakage rate	Yes		-5.1.3 %
	Comments:	n an	айы: мүйөн ««йи». Шалыйыларылары	
	া কেন্দ্রীপালা হোলাকে বাংগানার আই না ও ও স্বাধ্য হানানা হোলা হালা হালা বা না নালান ও ত	તે આ ગોનથી તે છે. જે તે છે છે છે છે છે છે છે છે છે. તે છે		a ng ang sa
) Do	es the Qualification program ad	dress the following	na tests.	
., 20	es ene darrisación program da			IPS-7
		.•	Acceptable	Repor
	Item		VogliNghNA	Secti
			Yes/No/NA	
(a)	Continuous current rating			5.9.4
(a) (b)	Continuous current rating			
(b)	Continuous current rating Short-time overload		<u>- NA</u>	5.9.4
(b) (c)	Continuous current rating Short-time overload current rating and duration Short circuit current rating		<u>NA SANA</u>	<u>5.9.4</u> <u>5.10.3</u> <u>5.11.3</u>
(b) (c)	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current		<u>NA</u>	5.9.4 5.10.3 5.11.3 5.15.6
(b) (c) (d)	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current		<u>NA</u>	5.9.4 $5.10.3$ $5.11.3$ $5.15.6$ $5.12.5$
(b) (c) (d) (e)	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current Pneumatic pressure rating Maximum gas leakage rate		<u>NA</u>	5.9.4 5.10.3 5.11.3 5.15.6 5.2 5.2 5.2
(b) (c) (d) (e) (f)	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current Pneumatic pressure rating Maximum gas leakage rate		<u>NA</u>	5.9.4 5.10.3 5.11.3 5.15.6 5.2 5.2 5.2 5.2 5.3.5 5.3
<ul> <li>(b)</li> <li>(c)</li> <li>(d)</li> <li>(e)</li> <li>(f)</li> <li>(g)</li> </ul>	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current Pneumatic pressure rating Maximum gas leakage rate Conductor continuity		<u>NA</u>	5.9.4 5.10.3 5.11.3 5.15.6 5.15.6 5.2 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.
<ul> <li>(b)</li> <li>(c)</li> <li>(d)</li> <li>(e)</li> <li>(f)</li> <li>(g)</li> <li>(h)</li> <li>(i)</li> </ul>	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current Pneumatic pressure rating Maximum gas leakage rate Conductor continuity Dielectric strength		<u>NA</u> <u>NA</u> <u>NA</u> <u>Yes</u> <u>Yes</u> <u>Yes</u>	5.9.4 5.10.3 5.11.3 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.6 5.15.7 5.15.6 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7 5.15.7
<pre>(b) (c) (d) (d) (e) (f) (g) (h) (i) (j)</pre>	Continuous current rating Short-time overload current rating and duration Short circuit current rating and duration Rated maximum duration of rated short circuit current Pneumatic pressure rating Maximum gas leakage rate Conductor continuity Dielectric strength Impulse		NA NA	<u>5.9.4</u>

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# SUPPLEMENTAL INFORMATION TVA'S COMPLIANCE TO 10CFR50.49 - ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANTS VOLUME 5

# TABLE OF CONTENTS

BINDER NUMBER	REVISION	EQUIPMENT TYPE	VENDOR
WBNEQ-SOL-001	2	Solenoid Operated Valves Target Rock for NSSS Systems	Target Rock
, WBNEQ-SOL-002	2	Solenoid Operated Valves Target Rock for B.O.P. Systems	Target Rock
WBNEQ-SOL-003	5	Solenoid Operated Valves - ASCO Model 206-381	ASCO
WBNEQ-SOL-004	2	MSIV Air Manifold Assembly Solenoid Operated Valves	Gould Allied
WBNEQ-SOL-005	1	Solenoid Operated Valves - ASCO Model 206-380	ASCO
WBNEQ-SOL-006	4	Solenoid Operated Valves - ASCO Model NP8316	ASCO
WBNEQ-SOL-007	2	Solenoid Operated Valves - ASCO Model NP8320	ASCO
WBNEQ-SPLC-001	3	Heat Shrink Cable Splices (600 Raychem VAC or Less)	Raychem
WBNEQ-TB-001	5	Terminal Blocks	General Electric
WBNEQ-XMTR-001	5	Transmitter 764 Lots 7 & 4 (Westinghouse)	Barton
WBNEQ-XMTR-004	4	Transmitter 763 Lot 7	Barton

BINDER NO. WBNEQ-SOL -001 PLANT	<u>7BN</u> UNIT(S) <u>1</u> SHEET <u>1</u>
BINDER TITLE SOLENOID VALVES	_ COMPUTED DATE 7/7/86
TARGET ROCK - MODELS 79AB-001 AND 79AB-003	CHECKED

TABLE OF CONTENTS

TAB A

EQUIPMENT IDENTIFICATION

Section A-1 - Tab A, Equipment Identification Matrix

EQP357.41

PAGE A-1

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AINDER NO. : WBNEQ-SOM MANUFACTURER : TARGE PAGE 1 OF 1

7/7/86

7/10/86

B 3/21/89



TAB A -

PLANT

RJP

SRP

PREPARER/DATE

CHECKED/DATE

A 2 4 44 4

	EQIS_NUMBER DESCRIPTION	NNII DEXICE ID NOFT NAM	AZHIIH_	LOCATION ELEY(1) RM/RAD CONTRACI	<u>CA</u> I (2)	Q2EB_IIME	EXENI	SAEEIY_EUNCIION	
	WBN-1-FSV -068-0394 -A Reactor vessel head vent isi	1-FSV -068-0394 -A LN VALVE 79AB-001	050	741° 8° LC 71C62-54114-1	A A A A A	1000 1000 1000 140 140 140	L MS/C Fw/C RH/C CV/C	SOLENOID VLV MUST OPE To release noncondens From reactor vessel H	ABLES
	WBN-1-FSV -068-0395 -B Reactor vessel head vent isl	1-FSV -068-0395 -B N VALVE 79AB-001	045-30	742• 3" LC 71C62-54114-1	A A	1000 1000 1000 1H0 1H0	L HS/C FW/C RH/C CV/C	SOLENDID VLV MUST OPE To release noncondens From reactor yessel Hi	ABLES
	NBN-1-FSV -068-0396 -8 Reactor vessel head yent thr	1-FSV -068-0396 -8 Rottle valve 79A8-003	060	742° 8″ LC 71C62-54114-1	A A A	1000 1000 180	L HS/C FW/C RH/C CV/C	SOLENOID VLV MUST OPER To release noncondens From reactor vessel he	ABLES
<b>[</b>	WBN-1-FSV -068-0397 -A Reactor vessel head vent thr	1-FSV -068-0397 -A OTTLE VALVE 79AB-003	063	742" 3" LC 71 c62-54114-1	A A A	1000 1000 180	HS/C	SOLENOID VLV MUST OPER To release noncondensa From reactor vessel He	BLES

PAGE  $\vec{P}$ 

BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 1 OF 1	
R R	
BINDER TITLE SOLENOID VALVES COMPUTED /R1 AM DATE 2/23/29	_
	****
TARGET ROCK - MODELS 79AB-001 AND 79AB-003 CHECKED /R1 KBN DATE 3/21/89	

## TAB A

### NOTES

- 1. Floor/Actual Elevation All elevations shown are actual elevations as documented on field verification sheets found in TAB F.
- 2. See TAB B, Section A for Category and Operating Times Calculations used in this binder.
- 3. Contract Column Contract numbers shown in this TAB were obtained by tracing the serial number on each valve through TVA procurement records and did not depend on field verification data for contract numbers.

PAGE A-3 R1

	Q-SOL -001 PLANT	_ COMPUTED	PLA	DATE. 7/7/	186 R	
TARGET ROCK -	MODELS 79AB-001 AND 79AB-003	CHECKED	68	DATE 7/10/	fo	·
	TABLI	E OF CONTENTS	3			
		TAB B				
ĊHE	CKLIST FOR EVALUATION	1 OF ENVIRONM	IENTAL QUA	ALIFICATIO	N	
Section B-1 -	Qualification Check	list		·		
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EQP357.41						

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BINDER "	TTLE SOLENOTD VALVE	R_1_R CS COMPUTED_RJP DATE 7/15/86_07M
TARGET H	ROCK -	2/23/89
MODELS	<u>'9AB-001 AND 79AB-003</u>	CHECKED <u>SRP</u> DATE <u>7/15/86 (187)</u> ع/21/89
A. DOCI	MENTATION	
Equi	pment Description	Solenoid Valves
Vend	lor/Manufacturer	Target Rock
Equi	pment Model No.(s)	79AB-001
	من _	<u>79AB-003</u>
QUAI	IFICATION REPORTS	
(1)	Title/Number/Revisi	on <u>Equipment Qualifica-</u> RIMS_B45_851205_360
		CODP-HE-10A/Revision 2 DATE January 1985
(2)		on <u>Equipment Qualifica-</u> RIMS_B45 851205 364
		AP-8687.Supp.2-H10A/R2 DATE January 1985
(3)		on <u>Equipment Qualifica-</u> RIMS_B45 851205 359
		ODP-HE-10C/Revision 1 DATE January 1985
(4)		on Equipment Qualifica- RIMS B45 851205 362
		AP-8687.Supp.2-H10C/R1 DATE January 1985
	Throughout this bind	er, references are made to the above quali- ch may be identified as "(1)", "(2)", "(3)"
OTHE	R (ANALYSIS, VENDOR	DATA, ETC.)
(5)	Target Rock Test Re (TAB C, Section C-2	port No. 4207 (B71 860616 101) )
(6)	Target Rock Letter ( (TAB C, Section C-1)	No. TRC C5815 (B70 851121 004) )
(7)	Target Rock Letter 1 (TAB E, Section E-2	No. TRC C5702 (B71 860616 102)

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BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) SHEET la OF 24 BINDER TITLE SOLENOID VALVES COMPUTED /R1 AFM DATE 2/23/89 07M 8/24/90 TARGET ROCK -<u>/R1 KBN</u> DATE <u>3/21/89</u> MODELS 79AB-001 AND 79AB-003 CHECKED 8/24/90 A. DOCUMENTATION OTHER (ANALYSIS, VENDOR DATA, ETC.) (Continued) (8) Target Rock Drawing 79AB-001 (TAB I, Section I-1) (9) Target Rock Drawing 79AB-003 (TAB I, Section I-2) (10) Target Rock Letter dated May 21, 1986, Rims No. B71 860602 001 with attachments (TAB C, Section C-2) (11) WBNP Environmental Data Drawing 47E235-42 R2 R2 with DCAs P-04104-02-0, -03-0, -05-0 (12) Calculation TI-RPS-048 R2 (B45 851105 235), Integrated Accident Dose I/C (13) Calculation WBNNAL3-004 R0 (B45 860205 235), Accident Dose Inside Reactor Building (14) DNE Calculation WBNTSR-051 (B26 891129 202), Reduction of Beta Dose by Sheet Steel RZ (15) Category and Operating Times Calculation WBNOSG4-017 RHR/O (B18-900612 818 890828 251 Calculation WBNOSG4-045 R1 (B45 860902 219), Status and (16) Duty Cycles of Solenoid Valves (17) DNE Calculation WBN-EEB-MS-TI11-0004 R0 (B26 900202 407) RZ "125 VDC Voltage Analysis" Note: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

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WBEP-0100Q

, 1	BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 2 OF	24
	BINDER TITLE SOLENOID VALVES COMPUTED RJP DATE 9/12/86 AM	
	TARGET ROCK -	
	MODELS 79AB-001 AND 79AB-003 CHECKED RKW DATE 9/12/86 CAd- \$72490	
	MODELS 79AB-001 AND 79AB-003 CHECKED RKW DATE 9/12/86	- - - - -
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		-
	COMMENTS/RECOMMENDATIONS	-]
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		RZ
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	PAGE B-3 R2	I

	$\frac{\text{R} - \text{R}}{\text{R} - \text{R}} = \frac{\text{R} - \text{R}}{\text{R} - \frac{1}{2}} \text{COMPUTED} = \frac{R \cdot R}{\frac{1}{2}} \text{DATE} = \frac{7/7/86}{2} \frac{\text{R} - \frac{1}{2}}{\frac{1}{2}} \frac{\text{R}}{\frac{1}{2}} = \frac{1}{2}$
•.	QUALIFICATION CRITERIA
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate All Documents Which are Applicable):
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of lE Bulleting No. 79-01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	·
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET <u>IEEE 382-1972</u> "IEEE Trial Use Guide for Type Test of Class I Electric Valve Operators for Nuclear Power Genera- ting Stations"
	<u>IEEE 382-1972 "IEEE Trial Use Guide for Type Test of Class I</u> Electric Valve Operators for Nuclear Power Genera-
	IEEE 382-1972 "IEEE Trial Use Guide for Type Test of Class I Electric Valve Operators for Nuclear Power Genera- ting Stations" IEEE 323-1974 "IEEE standard for Qualifying Class IE Equipment for
	IEEE 382-1972       "IEEE Trial Use Guide for Type Test of Class I         Electric Valve Operators for Nuclear Power Generating Stations"         IEEE 323-1974       "IEEE standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations"         IEEE 344-1975       "Guide for Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating
	IEEE 382-1972       "IEEE Trial Use Guide for Type Test of Class I         Electric Valve Operators for Nuclear Power Generating Stations"         IEEE 323-1974       "IEEE standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations"         IEEE 344-1975       "Guide for Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating
	IEEE 382-1972       "IEEE Trial Use Guide for Type Test of Class I         Electric Valve Operators for Nuclear Power Generating Stations"         IEEE 323-1974       "IEEE standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations"         IEEE 344-1975       "Guide for Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating
	IEEE 382-1972       "IEEE Trial Use Guide for Type Test of Class I         Electric Valve Operators for Nuclear Power Generating Stations"         IEEE 323-1974       "IEEE standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations"         IEEE 344-1975       "Guide for Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating

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BI	IDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 4	
BIN T	IDER TITLE       SOLENOID VALVES       COMPUTED $R_{\perp}$ DATE $7/7/36_{e}$ R         IRGET ROCK       - MODELS 79AB-001       AND 79AB-003       CHECKED $5^{14}$ DATE $7/9/36_{e}$	_R _
D.	QUALIFICATION METHODOLOGY (Check only one block)	
~	X Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis	
	Test of Similar Items with Supporting Analysis	
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions	
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis	
	JUSTIFICATION/COMMENTS	
	•	
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AR	ER TIT Get R	LE SOLENOID VALVES OCK - MODELS 79AB-00 AND 79AB-003	1 CHECKED	DATE	
	EQUI	PMENT DESCRIPTION			
•		he equipment identif t equipment which rea			
			<u>Plant Device</u> Solenoid	Qualification <u>Document</u> Solenoid	<u>Reference</u> Ref. (2) & (4)
	(1)	Equipment Type	<u>Valve</u> Target	<u>Valve</u> Target	<u>Sect. 2.0</u> Ref. (2) & (4)
	(2)	Manufacturer	Rock	Rock	Sect. 2.0
	(3)	Model Number(s)	<u>79AB-001</u>	<u>79AB-001</u>	Ref. (2), <u>Sect. 2.0</u> Ref. (4)
			<u>79AB-003</u>	79AB-003*	<u>Sect. 2.0</u>
	(4)	Serial Number(s)	See TAB F	<u>    55</u> Design No. 1032110-4	<u>Sect. 2.0</u> Ref. (1) <u>Sect. 2.1</u>
			See TAB F	Design No. 1033110-1	Ref. (4) <u>Sect. 2.0</u>
	(5)	Identify Component- Unique checksheet attached:	None		<u></u>
	JUST	IFICATION/COMMENTS	In references (2)	and (4), Sectio	n_2.0,
	West:	inghouse lists solend	oid valve design	identification n	umbers that
		considered genericall			
		e solenoid valve desi			
		valve drawings contai		<u>listed in the a</u>	tore
	ment	ioned references are	as follows:		<u> </u>
		<u>Target Rock Mod</u>	lel No.	WNEED Tag No.	
		79АВ-001 79АВ-003		<b>1 IS88RA</b> 1 RS78RA	
Aus	ilian	trollers for the Mode ry Building in a mild oom No. Al.	el 79AB-003 modula l environment in t	ating valves are the Control Rod 1	located in the Drive Equipment

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BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 6 OF 24	4
R_1 R	
BINDER TITLE SOLENOID VALVES COMPUTED RJP DATE 7/07/86 GPM	
TARGET ROCK – Z/Z3/89	
MODELS 79AB-001 AND 79AB-003 CHECKED SRP DATE 7/10/86 KBN	
5/21/89	•

#### F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) R1. If yes, enter requirement in QMDS, if no, provide justification.

		Plant	•
		Requirement?	Reference
Interface	Identify Interface	<u>(Yes/No)</u>	<u>Test Report</u>
Mounting Bolts	NA		
External			
Process	NA		
Connections			
Electrical	27.4		
Connections	<u>NA</u>		
connections			Ref. (2),
			Sect 5.8
Conduit Seals			Ref. (4),
conduit Seals	Conax Seal Used	Yes	Sect 6.9
Connector			
Seals	NA		
DCarb	NA		
			Ref. (1),
			Sect. 1.2
Orientation	NA		Ref. (3),
V. 104 14 11 VI			<u>Sect. 1.2</u>
Physical			
Configuration	NA		
Other	NA		
JUSTIFICATION/CO	MMENTS Refer to OMDS	Section B.1 for	r Conax seal
to be used as re	quired by TVA Environm	ental Qualifica	tion Binder
	•		
No. WBNEO-CSC-00	1.		
			· · · · · · · · · · · · · · · · · · ·
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<b>)</b> .			

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BIND	68 I'V		SOLENOID VALVES - - MODELS 79AB-001 AND 79AB-003 CHECK	ITED <u>RJP</u> ED <u>SRP/Jac</u>	_ DATE <u>7/16</u> _ DATE  2 <u>/16</u>	R R /86 /86
G.	TEST	SEQU	JENCE			n
*	(1)	acci	z Sequence: Was the test sequence: Was the test sequence ident environment in accordance of the sequence of th	ce with IEEE	5-323 (74),	
				<u>Yes/No</u>		<u>Reference</u>
		(a)	Equipment inspected for dama	age <u>Yes</u>	<u>Se</u>	ef. $(2) \& (4)$
		(Ъ)	Baseline performance measurements taken	<u>    Yes</u>		ef. (2) & (4) ect. 5.3 & Tbl
		(c)	Equipment aged:			ef. (2), ect. 5.4.2
			Thermal	Yes_	Re Se	ef. (4), ect. <u>5.4</u>
					Re	ef. (2), ect. 5.5.1
		·	Radiation	<u>Yes</u>		ef. (4), ect. <u>5.5</u>
		· ·			Se	ef. (2), ect. 5.4.1 &
			Wear			ect. 5.4.2 ef. (4)
		<b>.</b>		<u>Yes</u>		ect. 5.4
		(d)	Vibration/seismic testing conducted	Yes_		f. (2) & (4), ct. 5.6
		(e)	Design basis event (DBE) exposure	<u>      Yes</u>	Se	f. (2) & (4), ctions 7 <u>&amp; 5.8</u>
		(f)	Post-DBE exposure	Yes	<u>Se</u>	f. (2) & (4)
		(g)	Final inspection and disassembly	Yes	Se Re	f. (2), ct. 6.5 f. (4),
	(2)		the same piece of equipment u	used through	out the tes	
			ribed in item (1) above (yes/			
	(3)	been	e the test equipment, test equ a appropriately documented (ye erence <u>Ref. (2) &amp; (4), Table</u>	es/no/NA)? <u>N</u>	racies and <u>o (See comm</u>	calibration da <u>ent on sheet 7</u>

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BINDER NO. WBNEQ-SOL-001 PLANT	WBN UNIT(S) 1 SHEET 7A OF	24
BINDER TITLE SOLENOID VALVES - TARGET ROCK - MODELS 79AB-001	COMPUTED DATE	
AND 79AB-003	CHECKED DATE	

COMMENT FOR SECTION G(2):

Model 79AB-001: 2 reed switches and cover-to-body gasket were repaired (Ref. (2), Section 6.5, Pg. 20). Silicone potting around reed switches had worked loose due to handling and gasket had been broken during disassembly. Switches were repotted and gasket was repaired with RTV and the entire solenoid valve was then subjected to the steam/spray exposure.

Model 79AB-003: Same valve was used. However, during the HELB simulation the LVDT failed and the terminal board shorted to ground. These failures were attributed to the fact that the caustic spray/steam combination had entered the unsealed conduit connection, since the LVDT did not show insulation degradation due to thermal aging, radiation aging or cyclic aging. This assumption was proven correct when a new, unaged LVDT was installed in the test valve and degraded in the same manner, and at an equivalent time into the HELB test, as the fully aged The second test showed that the degradation was not an aging. LVDT. related phenomenon, but rather a result of the HELB test environment entering the electrical compartment and attacking the insulation of the LVDT. After installation of new LVDT, terminal board, terminal board strip_marker, cover gasket, and Conax_conduit seal to prevent HELB test environment intrusion, the test was successfully completed (Ref. (4), Sect. 6.9).

BINDER NO. WBNEQ-SOL-001 PLA	NTWBN	UNIT(S)	1	SHEET ⁷ B OF 24
BINDER TITLE SOLENOID VALVES - TARGET ROCK - MODELS 79AB-00	сомг	UTED <u>R.H</u>	DATE	<u>7/15/86</u> R
AND 79AB-003	CHEC	KED	_ DATE	7/15/80

COMMENT FOR SECTION G(3):

A list of instrumentation used in testing is attached to qualification report Ref. (2) as Table I; however, accuracy and calibration are not mentioned. In Ref. (4), Table 1 lists equipment and calibration dates but accuracy is not addressed. Even though Westinghouse failed to provide the aforementioned information, it does not significantly impact the qualification status of the valves in this binder, due to the fact that the qualification tests would still envelop the WBN requirements even if an instrumentation inaccuracy as high as 5% was present during testing.

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<ul> <li>H. ACINC <ol> <li>Was aging considered in the qualification program (Yes/no/NA)? Yes (Reference Ref. (2), Sect. 4.1.2 &amp; Ref. (4), Sect. 5.4 ).</li> <li>Were the following effects considered in the aging program: <ol> <li>Aging Effect</li> <li>Yes/No/NA Reference</li> <li>Ref. (2), Sect. 4.1.2 &amp; Ref. (2), Sect. 4.1.2</li> <li>Ref. (2), Sect. 4.1.2</li> <li>Ref. (2), Sect. 4.1.3</li> <li>Ref. (2), Sect. 5.4</li> </ol> </li> <li>Vibration (non-seismic) aging</li> <li>Yes Sect. 5.4</li> <li>Stress aging</li> </ol></li></ul> (3) Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes (Reference Ref. (2), Section 5.1). JUSTIFICATION/COMMENTS Ref. (4) did not address synergistic effects. however, since similarity of Model 79AB-001 to Model 79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model valves would not have any synergistic effects. (4) Thermal Aging: <ul> <li>(a) Was thermal aging considered in the qualification program (Yes/no/Na)? Yes (Reference Ref. (2), Sect. 5.4.2 &amp; Ref. (4), Sect. 5.4 ).</li> </ul>			CLE SOLENOID VALVES - COMPUTED <u>RJP</u> DCK - MODELS 79AB-001 AND 79AB-003 CHECKED <u>LAB</u>	1	R R   36   16
<ul> <li>(Reference <u>Ref. (2), Sect. 4.1.2 &amp; Ref. (4), Sect. 5.4</u>).</li> <li>(2) Were the following effects considered in the aging program: <ul> <li><u>Aging Effect</u></li> <li><u>Yes/No/NA Reference</u></li> <li><u>Ref. (2), Sect. 4.1.2</u></li> <li><u>Ref. (4), Sect. 5.4</u></li> <li><u>Ref. (4), Sect. 5.4</u></li> <li><u>Ref. (4), Sect. 5.4</u></li> <li><u>Ref. (4), Sect. 4.1.3</u></li> <li><u>Ref. (4), Sect. 4.1.3</u></li> <li><u>Ref. (4), Sect. 5.4</u></li> <li><u>Ref. (2), Sect. 4.1.3</u></li> <li><u>Ref. (2), Sect. 5.4</u></li> <li><u>Ref. (2), Sect. 5.5</u></li> <li><u>Ref. (2), Sect. 5.4</u></li> <li><u>Sect. 5.6.1</u></li> <li><u>Ref. (2), Sect. 5.4</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Ref. (2), Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Sect. 5.4.1</u></li> <li><u>Ref. (4), Sect. 5.4.1</u></li> <li><u>Sect. 5.4</u></li></ul></li></ul>	H.	AGIN	NG		· ·
Aging Effect       Yes/No/NA       Reference Ref. (2), Sect. 4.1.2 Ref. (4),         Thermal aging       Yes       Sect. 5.4 Ref. (2), Sect. 4.1.3 Ref. (2), Sect. 4.1.3 Ref. (2), Sect. 4.1.3 Ref. (2), Sect. 5.4         Radiation exposure       Yes       Sect. 5.5 Ref. (2), & (4)         Vibration (non-seismic) aging       Yes       Sect. 5.6.1 Ref. (2), Sect. 5.4.1 Ref. (4), Sect. 5.4.1 Ref. (4),         Operational (electrical/mechanical/process)       Yes       Sect. 5.4.1 Ref. (4),         Stress aging       (3) Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes       (Reference Ref. (2), Section 5.1).         JUSTIFICATION/COMMENTS       Ref. (4) did not address synergistic       effects, however, since similarity of Model 79AB-001 to Model         79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model valves would not have any synergistic effects.         (4) Thermal Aging:       (a) Was thermal aging considered in the qualification program (Yes/no/Na)	à	(1)			
Ref. (2), Sect. 4.1.2 Ref. (4),         Thermal aging       Yes         Sect. 5.4 Ref. (2), Sect. 4.1.3 Ref. (4),         Radiation exposure       Yes         Yibration (non-seismic) aging       Yes         Yes       Sect. 5.6.1 Ref. (2), Sect. 5.4.1         Operational (electrical/mechanical/process)       Yes         Sect. 5.4.1         Ref. (4),         Stress aging         (3) Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes (Reference Ref. (2), Section 5.1).         JUSTIFICATION/COMMENTS         Ref. (4) did not address synergistic         effects, however, since similarity of Model 79AB-001 to Model         79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model         valves would not have any synergistic effects.         (4) Thermal Aging:         (a) Was thermal aging considered in the qualification program (Yes/no/N)		(2)	Were the following effects considered in the	aging prog	;ram:
Thermal aging       Yes       Sect. 5.4         Radiation exposure       Yes       Sect. 4.1.3         Radiation exposure       Yes       Sect. 5.5         Vibration (non-seismic) aging       Yes       Sect. 5.6.1         Vibration (non-seismic) aging       Yes       Sect. 5.6.1         Operational (electrical/mechanical/process)       Yes       Sect. 5.4.1         Ref. (4),       Sect. 5.4.1       Ref. (4),         Operational (electrical/mechanical/process)       Yes       Sect. 5.4.1         Ref. (4),       Sect. 5.4.1       Ref. (4),         Stress aging       (3)       Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes       (Reference Ref. (2), Section 5.1 ).         JUSTIFICATION/COMMENTS       Ref. (4) did not address synergistic       effects, however, since similarity of Model 79AB-001 to Model         79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C,       Section C-1, Attachment 6) it is safe to conclude that both model         valves would not have any synergistic effects.       (4)         (4)       Thermal Aging:       (a)         (a)       Was thermal aging considered in the qualification program (Yes/no/N			Aging Effect	Yes/No/NA	Ref. (2), Sect. 4.1.2
Radiation exposure       Yes       Sect. 5.5         Wibration (non-seismic) aging       Yes       Sect. 5.6.1         Vibration (non-seismic) aging       Yes       Sect. 5.6.1         Ref. (2), Sect. 5.4.1       Ref. (4), Sect. 5.4.1         Operational (electrical/mechanical/process)       Yes       Sect. 5.4.1         Stress aging       (3)       Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes       (Reference Ref. (2), Section 5.1 ).         JUSTIFICATION/COMMENTS       Ref. (4) did not address synergistic       effects, however, since similarity of Model 79AB-001 to Model         79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model       valves would not have any synergistic effects.         (4)       Thermal Aging:       (a)       Was thermal aging considered in the qualification program (Yes/no/N)			Thermal aging	Yes	Sect. 5.4 Ref. (2),
<ul> <li>Vibration (non-seismic) aging <u>Yes</u> Sect. 5.6.1 Ref. (2), Sect. 5.4.1 Ref. (4),</li> <li>Operational (electrical/mechanical/process) <u>Yes</u> Sect. 5.4</li> <li>(3) Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2)</u>, <u>Section 5.1</u>).</li> <li>JUSTIFICATION/COMMENTS <u>Ref. (4) did not address synergistic</u> <u>effects, however, since similarity of Model 79AB-001 to Model</u> <u>79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model <u>valves would not have any synergistic effects.</u></u></li> <li>(4) Thermal Aging:</li> <li>(a) Was thermal aging considered in the qualification program (Yes/no/R</li> </ul>			Radiation exposure	Yes	Sect. 5.5
<ul> <li>Operational (electrical/mechanical/process) Yes Sect. 5.4 stress aging</li> <li>(3) Were all known synergistic effects which are believed to have a significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes (Reference Ref. (2), Section 5.1). JUSTIFICATION/COMMENTS Ref. (4) did not address synergistic effects, however, since similarity of Model 79AB-001 to Model 79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C, Section C-1, Attachment 6) it is safe to conclude that both model valves would not have any synergistic effects.</li> <li>(4) Thermal Aging: <ul> <li>(a) Was thermal aging considered in the qualification program (Yes/no/N</li> </ul> </li> </ul>			Vibration (non-seismic) aging	Yes	Sect. 5.6.1 Ref. (2),
<ul> <li>significant effect on equipment performance considered in the aging program (yes/no/NA)? Yes (Reference <u>Ref. (2), Section 5.1</u>).</li> <li>JUSTIFICATION/COMMENTS <u>Ref. (4) did not address synergistic</u></li> <li><u>effects. however. since similarity of Model 79AB-001 to Model</u></li> <li><u>79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C. Section C-1. Attachment 6) it is safe to conclude that both model</u></li> <li><u>valves would not have any synergistic effects.</u></li> <li>(4) Thermal Aging:</li> <li>(a) Was thermal aging considered in the qualification program (Yes/no/N</li> </ul>	- 27			Yes	
JUSTIFICATION/COMMENTS <u>Ref. (4) did not address synergistic</u> <u>effects, however, since similarity of Model 79AB-001 to Model</u> <u>79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C,</u> <u>Section C-1, Attachment 6) it is safe to conclude that both model</u> <u>valves would not have any synergistic effects.</u> (4) Thermal Aging: (a) Was thermal aging considered in the qualification program (Yes/no/h		(3)	significant effect on equipment performance	considered	in the aging
<ul> <li><u>79AB-003 is documented by Target Rock Letter No. C5815 (see TAB C.</u></li> <li><u>Section C-1, Attachment 6) it is safe to conclude that both model</u></li> <li><u>valves would not have any synergistic effects.</u></li> <li>(4) Thermal Aging: <ul> <li>(a) Was thermal aging considered in the qualification program (Yes/no/N</li> </ul> </li> </ul>			JUSTIFICATION/COMMENTS Ref. (4) did not add	ress synerg	istic
Section C-1, Attachment 6) it is safe to conclude that both model valves would not have any synergistic effects. (4) Thermal Aging: (a) Was thermal aging considered in the qualification program (Yes/no/N			effects, however, since similarity of Model 7	79AB-001 to	Model
valves would not have any synergistic effects. (4) Thermal Aging: (a) Was thermal aging considered in the qualification program (Yes/no/N			79AB-003 is documented by Target Rock Letter	<u>No.</u> C5815	(see TAB C,
<ul><li>(4) Thermal Aging:</li><li>(a) Was thermal aging considered in the qualification program (Yes/no/N)</li></ul>			Section C-1, Attachment 6) it is safe to cond	lude that	both model
(a) Was thermal aging considered in the qualification program (Yes/no/N			valves would not have any synergistic effects	5.	
(a) Was thermal aging considered in the qualification program (Yes/no/M Yes (Reference <u>Ref. (2), Sect. 5.4.2 &amp; Ref. (4), Sect. 5.4</u> ).		(4)	Thermal Aging:		
			(a) Was thermal aging considered in the qual Yes (Reference <u>Ref. (2), Sect. 5.4.2 &amp; F</u>	ification p Ref. (4), Se	program (Yes/no/N ect. 5.4 ).
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TARGET ROCK -	LENOID VALVES - COMPUTED $\underline{R}$ DATE $\underline{7/7/36}$ $\underline{R}$
H. <u>AGING</u> (Ca	ontinued)
(Ъ)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes*/No**</u> (Reference: <u>*Ref. (2),Attachment 3</u> ).
	JUSTIFICATION/COMMENTS <b>**Ref.</b> (4), Sect. 5.4 and 7.3.5.
	Value of 0.5 eV was assumed for all valve components.
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2)</u> , <u>Sect. 5.4.2 &amp; Ref. (4)</u> , <u>Sect. 5.4</u> ).
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? Yes (Reference <u>Ref. (2), Sect. 5.4.2</u> Ref. (4), Sect. 5.4).
	<u>Parameter Plant Maximum Normal Test Equivalent</u>
	Temperature         120°F         325°F         120°F           Time         40 Years         485hrs         6.16 yrs.
	JUSTIFICATION/COMMENTS <u>References (2) and (4) state that the</u>
	thermal aging performed during the tests corresponded to 6.16
э	years at 120°F assuming an activation energy of 0.5eV. We
	prove a longer life in TAB C.
	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 5.4.2 &amp; Ref. (4), Sect. 5.4</u> ).
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>No</u> (Reference <u>Ref. (2), Att.</u> <u>3 &amp; Ref. (4), Sect. 5.4</u> ).

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	BINDER NO	WBNE	<u>EQ-SOL-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>10</u> OF <u>24</u>
	BINDER TIT TARGET F	LE SC LOCK -	DLENOID VALVES - COMPUTED $R R R R R R R R R R R R R R R R R R R$
	H. <u>AGI</u>	ING (C	Continued)
		(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>N/A</u> (Reference). JUSTIFICATION/COMMENTS
		(h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 5.4.2 &amp; Ref. (4),</u> <u>Sect. 5.4</u> ).
			JUSTIFICATION/COMMENTS <u>Both the Model 79AB-001 and Model</u>
			aging.
	(5)	Radi	ation Aging Exposure:
		(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 5.5.1 &amp; Ref. (4), Sect. 5.5</u> ).
			JUSTIFICATION/COMMENTS
		(Ъ)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>Yes*/No**</u> (Reference <u>*Ref. (2), Attachment 3</u> ).
			JUSTIFICATION/COMMENTS <u>**Ref. (4) radiation qualification by</u>
			test.
		(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect.</u> 5.5.1 & Ref. (4), Sect. 5.5 ).
			JUSTIFICATION/COMMENTS
*			PAGE 6-13

EQP357.21

BINDER NO. WBN	EQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 11 OF 24 R 1 R 2
BINDER TITLE TARGET ROCK -	SOLENOID VALVES COMPUTED RJP DATE 7/07/86 AFM Arm 2/23/89 8/24/90
	<u>1 AND 79AB-003</u> CHECKED <u>SRP</u> DATE <u>7/10/86 KBN</u> <u>(X74</u> 3/21/89 <del>\$/4/9</del>
H. <u>AGING</u> (Co	ntinued)
(d)	Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference:
	<u>Ref (2), Sect. 5.7 &amp; Ref (4), Sect. 5.5</u> ).
	Plant normal ambient radiation 7 dose (rd) 2x10 rads
· · · · ·	*185 Megarads (Mod 79AB-001) Test exposure dose (rd) *205.1 <u>Megarads (Mod 79AB-00</u> 3)
	Test exposure dose1.46 Mrad/Hr (Mod 79AB-001)rate (rd/hr).67&.75 Mrads/Hr (Mod 79AB-003)
	Test exposure source type (e.g., Co-60 gamma) <u>Co-60 GAMMA</u>
	JUSTIFICATION/COMMENTS The tested values of 185 Mrads
	and 205.1 Mrads exceed plant TID of 1.34x10 rads (see sheet 18A).
	Westinghouse, who designed and installed the head vent
	system, determined the radiation dose rates necessary 7
-	for qualification of these valves to be 1.75 x 10 rads
	GAMMA for a 40 year TID or a 10 year dose of 8.76 x 10 rads GAMMA combined with a 10 year neutron dose of
	$\frac{13}{3.15 \times 10} \frac{2}{N/cm}$ (reference (2), Att. 2, page 49). The
	test enveloped the requirement in that it consisted of
	both a 40 year TID of 1.85 x 10 rads GAMMA and a 10
	13 2 year Neutron dose of 3,52 x 10 N/cm .
	•

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WBEP-0100Q

TARGET ROCK -	SOLENOID VALVES COMPUTED RJP DATE 7/07/86 AFM ZZ3/83 - ZZ3/83 - D1 AND 79AB-003 CHECKED SRP DATE 7/10/86 KBA
	$\frac{11112}{3/2} = \frac{1112}{3/2} = 1$
H. <u>AGING</u> (c	continued)
(6) Vibr	ation (non-seismic) Aging:
(a)	Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program ¹ Yes (Reference:
	Ref. (2) & (4), Sect. 5.6.1
· .	JUSTIFICATION/COMMENTS
(b)	Was the basis for vibration aging identified and justifing the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (2), Sect. 3.1.6, 5.6.1, and Fig 1</u>
	Ref. (4), Sect. 3.1.5, 5.6.1, and Fig. 1
• .	JUSTIFICATION/COMMENTS <u>The vibration aging documented</u> in Ref. (2) & (4) is identical to that in IEEE 382-1980 Vibration aging testing provides a vibratory environ- ment which is representative of normal plant-induced vibration. Normal service flow vibration is not
· ·	significant for the valves in the binder because vessel head venting is performed only during an accident or after refueling.
(7) Opera	tional Stress Aging:
(a)	Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation adressed in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref. (2) &amp; (4), Sect.</u>
	5.4
	JUSTIFICATION/COMMENTS
	- -
1	tion program refers to the test report and any supple-
⁺ Qualifica	cumentation including TVA analyses in TAB C of the Binder

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	BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 12 OF 24
·	BINDER TITLE <u>SOLENOID VALVES</u> COMPUTED RJP DATE 7/15/86 AFM TARGET ROCK -
	MODELS 79AB-001 AND 79AB-003 CHECKED SRP DATE 7/15/86 Ker 3/z./89
	H. <u>AGING</u> (Continued)
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: <u>Rev. (2) &amp; (4)</u>
·	<u>Sects. 3.4 &amp; 5.4</u> ).
	JUSTIFICATION/COMMENTS
	(8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes (Reference: <u>Ref (2),Sect. 5.4.2 &amp; Ref. (4), Sect. 5.4</u> ).
	Qualified life (Document in QMDS) <u>40 years*</u>
	JUSTIFICATION/COMMENTS <u>*Providing the elastomers are changed</u>
	at intervals specified in the OMDS. Westinghouse conserva-
	tively qualified the valves for 6.16 years. We have extended
	elastomer life to 17.3 years using the rationale listed in
	TAB C.
	(9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref. (2), Sect. 6.5 &amp; Ref. (4), Sect. 6.9, p 23</u>
	).
	F
	JUSTIFICATION/COMMENTS The tests qualify the complete valves
	for 6.16 years based on a very conservative activation energy
	of 0.5 eV. We prove a longer qualified life in TAB C, of the
	binder. Also. Section 6.5 of Reference (2) and Section 6.9
	of Reference (4) require the cover gasket to be replaced every
	time it is disturbed or the cover is removed.
<b>y</b>	

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BINDER NO. WBNEO-SOL-001 PLANT	WBNUNIT(S)	1 SHEET 13 OF 24
	COMPUTED <u>RJP</u>	DATE 7/1/86
TARGET ROCK - MODELS 79AB-001 AND 79AB-003	CHECKED	DATE _7/10/91

# I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of EQC Binder for Detailed Materials Analysis)

		Radiation		Activation			
	Material/Property/Function	Threshold	Reference	Energy	Reference		
					Ref. (2),		
					Att. 3 Ref. (4),		
					Sect. 5.4		
	Class H Insulation/				TRC Letter		
(a)	Solenoid Assy. & LVDT	<u>NA</u>		See Below	C5815		
					Ref. (2),		
	Silicone Rubber (RTV)/				Att. 3		
(ħ)	Seal/Potting	NA		G	Ref. (4),		
(5)	Jeal/ Lotting	NA		See Below	Sect. 5.4 Ref. (2),		
•					Att. 3		
					Ref. (4),		
(c)	Silicone Rubber/Gasket	NA	<u></u>	See Below	Sect. 5.4		
					Ref. (2),		
		. •			Att. 3		
(d)	Silicone Rubber/O-Ring	NA		Coo Rolos	Ref. (4),		
(-)	Jazzeone Rabberro Ring			See Below	Sect. 5.4 Ref. (2),		
					Att. 3		
					Ref. (4),		
(e)	GP Phenolic/Term. Board	NA		See Below	Sect. 5.4		
រារ	STIFICATION/COMMENTS Althou	gh Referenc	e 4 does no	t provide a	detailed		
	2						
118	st of the materials of const	ruction, Ta	rget Rock L	etter No. TR	C C5815		
(se	ee Attachment 6, TAB C, Sect	ion C-1) st	ates that t	he materials	of		
201	struction are the same for	Models /9AB-	-001 and 79.	AB-003 excep	t for		
the LVDT which is contained only in the Model 79AB-003 valve. The							
LVDT in the Model 79AB-003 valve is constructed of Class H insulation							
		0 10 000000					
whi	ch is listed above. Also,	it should be	e noted that	t in the abo	ve		
ref	erences, Westinghouse assign	ned a conser	rvative valu	ue of 0.5 eV	to		
				chments 1 and			
		0					
	P	AGE <u>B-17</u>					

BINDEF	R TITL	WBNEQ-SOL-001       PLANT       WBN       UNIT(S)       1       SHEET       14       OF       24         E       SOLENOID       VALVES       COMPUTED       R.JP       DATE       7/7/36       R       R          DCK       MODELS       79AB-001       CHECKED       GM       DATE       7/10/16       R
J.		IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? Yes (Reference <u>Ref. (2) &amp; (4), Sect. 5.1</u> ).
	·	Identify Acceptance Criteria: <u>Valve model 79AB-001 must shift</u> <u>position under all postulated conditions at maximum and mininum</u> <u>differential pressure upon application of 90-140 VDC power and</u> <u>shift to closed position when power is removed. Valve model</u> <u>79AB-003 must position proportionally to a 4-20 mA signal</u> <u>corresponding to fully closed and open and with either a loss of</u> <u>power or a signal from the controller return to fully closed and</u> <u>remain closed at any value between the maximum and minimum pressure</u> <u>differential. Position indication must indicate valve states under</u> <u>all conditions.</u>
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2) &amp; (4), Sect. 5.3</u> ).
		Identify baseline and functional testing: <u>Hydrostatic proof tests</u> , <u>seat leakage test</u> , operational performance test, insulation and
·		solenoid resistance tests.
		JUSTIFICATION/COMMENTS
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference <u>Ref. (2). Sect. 4.1.6, 5.7, 5.8, &amp; 6.5 &amp; Ref. (4)</u> <u>Sect. 4.1.6, 5.7, 5.8, &amp; 6.9</u> ).
		JUSTIFICATION/COMMENTS The valves were connected to high pressure lines and cycled under pressure thoughout the DBE, thermal aging, cyclic aging, and vibration aging exposures.
	(4)	Do the applied loads during baseline testing reflect normal operating conditions (yes/no/NA)? Yes (Reference Ref. (2) & (4), Sect. 5.3)
		JUSTIFICATION/COMMENTS <u>Model 79AB-001: Voltage was varied from</u> 55-140 VDC. Valve was under process pressure of 2485 psig. <u>Model</u> 79AB-003: Valve was cycled via controller from fully closed (4mA input to controller) to fully opened (20 mA) while valve was under process pressure of 2500 psig.
		PAGE 6-18

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J.	PERFORMA (Continu (5) Ide	NCE SPECIFICA ed)	CHARACTERISTICS NECESSARY T TIONS CAN BE SATISFIED UNDE	CO ENSURE THE
4	equ	ntify electri		
•	(a)	-	cal characteristics necessa mance specifications can be	-
	(a)	Parameter	Plant Normal Conditions	<u>Reference</u>
		Voltage	<u>125 VDC</u> 1.0 Amps (Max)	45W600-68-2 T.R. Dwgs 79AB-
		Load	e Any Condition	001 & 79AB-003
		Frequency	NA	
·		Accuracy	NA	
	JUS	Other(s)  TIFICATION/CO	MMENTS	
	JUS 		MMENT S	
	JUS  (b)	TIFICATION/CO	MMENTS Specific Accident Conditions	
	· .	TIFICATION/CO	Specific	<u></u>
	· .	TIFICATION/CO	Specific Accident Conditions	See comments
	· .	TIFICATION/CO Parameter Voltage	Specific <u>Accident Conditions</u> 84.37 VDC Min.	
	· .	TIFICATION/CO Parameter Voltage Load	Specific <u>Accident Conditions</u> <u>84.37 VDC Min.</u> <u>See J(5)(a)</u>	See comments

		1PLANTWBN VALVES COMPUTED_RJI		R_1_R	
TARGET R	locx -	B-003 CHECKED SRI		7/10/86 KBU	8/24/9 8/24/9
PER		AL CHARACTERISTICS NE ICATIONS CAN BE SATIS			\$/24/9
(c)	Parameter	Demonstrated_Co	nditions	Ref.(1)&(3) Sect. 1.1.1	• •
	Voltage	90-140 VDC		Ref.(2) SECT. REF.(4) SECT. Ref. (1) SECT.	5.8
	Load	NA		Ref. (1)&(3 Sect. 1.1.3 Ref. (1)&(3	
	Frequency	NA		Sect. 1.1.2	•
	Accuracy Other(s)	NA			
		NA			
	DURING HELB STATED THAT THE APPLICATION	COMMENTS THE CONDIT TESTING. IN REFE THE VALVE WAS ACTU ON OF 90-140V DC.	RENCE (2) ATED DURIN IN REFERE	WESTINGHOUSE & THE TEST M WEE (4)	774
	THE HELB TES ALSO, DRAWIN DROP BETWE	STATED THAT THE IST UTILIZING A VOL NGNO, 79-AB-003 EN THE CONTROLLE	TAGE OF STIPULA	90 V DC. ES THAT VOLT	ASE 07
	VE TO THEL VALVE (488 VOLTAGE DRO,	VOLTS AT I AMP DISTANCE BETWEE FT. FOR I-FSV-68 P OF 3.33 VOLTS	N THE CO. -396), WE , PER TR	NTROLLER A. EXPECT A REET PYCK	18
	INTERFERE W AT WORST-CAS	CG52 (SEE SECTI 2 CONDITIONS AT S 11TH OPERATION OF T SE CONDITIONS WHE	QN, THIS THE VALVE RE VALVE	WILL NOT EXCEPT POS	
	OPEN ONLY S	DO PERCENT, SINCE ED, REDUCED FLOW	E VALVE CI	IS HIGHER	_
	OPERATION" F	SECTION C-2 "A OR JUSTIFICATION NUTAGE OURING A	OF OPERAT	ION UNDER	_
					_

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		B-001 AND 79AB-003 CHECKED SRP/AWT DAT	3/21/89 3/24/90
κ.	<u>REQU</u>	RED_OPERATING ENVIRONMENT	
	Refe	ence Environmental Drawing No. <u>47E235-42</u>	
	(1)	Normal Max (2) Abnormal M	ax
3		(a) Temperature (°F) <u>120</u> (a) Tempe	rature (°F) <u>130</u>
		(b) Pressure (psia) <u>14.7</u> (b) Press	ure (psia) <u>14.7</u>
		(c) Humidity (%) $\frac{80}{2 \times 10^7}$ (c) Humid	ity (%) <u>100</u>
			tion (rd) <u>N/A</u>
		temperature by the time it reaches the valv feet of one inch pipe, it is safe to conclu fluid temperature would have no detrimental	de that the process
	(4).	valves. State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u> exist for up to 8 hours per excursion.	
	(4)	State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u>	nt life and could specified accident
		State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u> <u>exist for up to 8 hours per excursion.</u> Accident (worst case for any combination of parameter including peak, duration, and pro	nt life and could specified accident
		State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u> <u>exist for up to 8 hours per excursion.</u> Accident (worst case for any combination of parameter including peak, duration, and pro (a) Temperature (°F) <u>327</u> Accide	nt life and could specified accident file):
		State anticipated occurrence frequency and conditions:       Will occur less than 1% of pla         exist for up to 8 hours per excursion.         Accident (worst case for any combination of parameter including peak, duration, and pro         (a) Temperature (°F) 327       Accide         (b) Pressure (psia) 25.6       Accide         (c) Humidity (%)       100       Accide	nt life and could specified accident file): nt type <u>LOCA/HELB</u>
		State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u> <u>exist for up to 8 hours per excursion.</u> Accident (worst case for any combination of parameter including peak, duration, and pro (a) Temperature (°F) <u>327</u> Accide (b) Pressure (psia) <u>25.6</u> Accide (c) Humidity (%) <u>100</u> Accide 7.4x10 ⁷ (BETA)*	nt life and could specified accident file): nt type <u>LOCA/HELB</u> nt type <u>LOCA/HELB</u>
		State anticipated occurrence frequency and conditions: <u>Will occur less than 1% of pla</u> exist for up to 8 hours per excursion. Accident (worst case for any combination of parameter including peak, duration, and pro (a) Temperature (°F) <u>327</u> Accide (b) Pressure (psia) <u>25.6</u> Accide (c) Humidity (%) <u>100</u> Accide 7.4x10 ⁷ (BETA)* (d) Radiation (rd) <u>4x10⁷(GAMMA</u> )* Accide 2000 ppm Boron	nt life and could specified accident file): nt type <u>LOCA/HELB</u> nt type <u>LOCA/HELB</u> nt type <u>LOCA/HELB</u>

BIND	ER NO. WENEQ-SOL-001 PLANT WEN UNIT(S) 1 SHEET 17 OF 24
TARG	R_1_R PER TITLE <u>SOLENOID VALVES</u> COMPUTED RJP DATE <u>9/05/86</u> ZZZES DET ROCK – LS 79AB-001 AND 79AB-003 CHECKED <u>SRP/AWT</u> DATE <u>9/08/86</u> Z/ZZES J/ZJ/24
к.	REQUIRED OPERATING ENVIRONMENT (Continued) Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>The duration of the containment spray is</u>
8	30 days. Containment spray flow rate is equal to 9500 Gal/
	Min or 0.92 GPM per square foot of containment cross
	(6) Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>Yes</u> (Reference:
	See comment on sheet 17A ).
	(7) Subject to submergence (Yes/No/NA)? <u>No</u> (Reference:
	Dwg. 47E235-42 ). R1
	Identify initiation time and duration of submergence:
	Following an accident inside primary containment, only those
	valves below elevation 722' are subject to submergence. All
	valves in this binder are above that elevation.
	(8) Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>TAB B. Section L(1)</u> ).
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:
	See TAB B, Section L(1)
	(9) Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See TAB B, Section A for a listing of all calculations used in this binder.

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	بسادهم البا	17.1

BINDER NO. WBNEQ-SOL-001 PLANT	WBN UNIT(S) <u>1</u> SHEET <u>17A</u> OF <u>24</u>
BINDER TITLE SOLENOID VALVES - TARGET ROCK - MODELS 79AB-001 AND 79AB-003	COMPUTED DATE R R
	11

COMMENTS FOR SECTION K(6):

All valves in this binder have Conax conduit seals installed. Refer to

QMDS Section B.1 (Binder TAB G) for Conax seal to be used as required by

TVA Environmental Qualification Binder No. WBNEQ-CSC-001.

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	DER NO. <u>WBNEQ-SOL-001</u>	PLANT WBN	UNIT(S) <u>1</u>	_ SHEET <u>18_OF 2</u> R_2 R
	DER TITLE SOLENOID VAL	VES COMPUTED RJ	<u>P</u> DATE <u>9/</u>	<u>05/86_4711</u> <i>8/24/90</i> ,
	GET ROCK - CLS 79AB-001 AND 79AB-00	03 CHECKED_SRP	AWT DATE 9/	08/86 CAT
		<u></u> 00	<u>/////////////////////////////////////</u>	8/24/90
L.	SUMMARY COMPARISON OF	TEST CONDITIONS	TO SPECIFIED C	ONDITIONS
		·····		
	(1) Comparison of wo	rst-case maximum	parameters:	
	Parameter	<b>Specified</b>	Demonstrated	<u>Reference</u> Ref. (2)&(4)
	Operating Time	100 Days	<u>30 Days</u>	<u>Sect. 5.8</u>
•				Ref. (2),
				Sect. 5.8 &
			435°F(79AB-00	Fig. 16 $(A)$
	Temperature (°F)	327°F	<u>500°F(79AB-00</u>	
		<u> </u>	57 psig	Ref. (1), Tbl
			(79AB-001)	p 16,
		25.6 psia	70 psig	Ref. (3),
	Pressure (psig)	<u>(11.2 psig)</u>	<u>(79AB-003)</u>	<u>Tbl. 1 p 14</u>
	Polativo Humidit	(9) 1009	100%	Ref. (1) & (3)
	Relative Humidit;	y (%) <u>100%</u>	100%	<u>Tbl. 1</u> Ref. (2),
				Sect. 3.3.1&5
		2000ppm Boron	2500ppm Boron	
		pH 8.3;2.92 p	$H 10.5_2.15$	Sects. 3.3.2.
	Chemical Spray*	GPM/Ft. 30 Days	GPM/Ft. 23 Hr	<u>s &amp; 5.8</u>
			1.85x10 ⁸	
		$1.34 \times 10^{8}$	(79AB-001)	Ref. (1)&(3) Tbl.l,Ref.(2)&(4
	Radiation (rd)**		(79AB-003)	<u>Att.1&amp;Sec. 5.</u>
			<u>(///mb_0003/</u>	Acconduct. J.
	Submergence	_N/A	None	N/A
	*Theludes oprov a	oncontration fl		
	*Includes spray c pH.	Succurración, fio	wrate, density	, duration, and
	**Enter 40-year in	tegrated normal d	ose plus integ	rated accident
	dose and specify	type. See comme	nt on sheet 18	A.
	(2) Comparison of wo	rst_ass profiles	and mornin as	
		rac-case brouttes	and margin as	sessment:
	(-) comparison of WO			
	(2) Comparison OI WO		rofile	
		Envelopes	Specified	Deferre
	Parameter	Envelopes	Specified No/NA)	Reference
		Envelopes (Yes/	Specified No/NA)	See (1)
	Parameter	Envelopes	Specified No/NA)	See (1) Above
	Parameter	Envelopes (Yes/	Specified No/NA)	See (1)
	<u>Parameter</u> Temperature Pressure	Envelopes (Yes/ Yes Yes	Specified No/NA)	See (1) Above See (1)
	<u>Parameter</u> Temperature	Envelopes (Yes/ Yes Yes	Specified No/NA)	See (1) Above See (1) Above See (1) Above
	<u>Parameter</u> Temperature Pressure Relative Humidity	Envelopes (Yes/ Yes Yes Yes	Specified No/NA)	See (1) Above See (1) Above See (1) Above See comment
	<u>Parameter</u> Temperature Pressure	Envelopes (Yes/ Yes Yes	Specified No/NA)	See (1) Above See (1) Above See (1) Above
	<u>Parameter</u> Temperature Pressure Relative Humidity	Envelopes (Yes/ Yes Yes Yes	Specified No/NA)	See (1) Above See (1) Above See (1) Above See comment

BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 18a OF 24 R_1 R_2 BINDER TITLE SOLENOID VALVES COMPUTED RJP DATE 7/17/86 AFM AFM TARGET ROCK - 2/23/89 8/24/90 MODELS 79AB-001 AND 79AB-003 CHECKED SRP/DLK DATE 7/17/86 KBN CX1. 3/2/1/89 5/24/90

COMMENTS FOR SECTION L(1) (RADIATION):

The 100-day accident radiation doses given by Environmental Data Drawing 47E235-42 are 4.7 x  $10^8$  rads BETA and 4 x  $10^7$  rads GAMMA. Post-DBA BETA Radiation must be addressed for all equipment located inside containment which is required for LOCA mitigation. The valves in this binder are within that scope. All non-metallic parts of these solenoid valves are enclosed by metal and the minimum metal thickness is the cover, which is .048" thick (18 ga) 300-series stainless steel. DNE Calculation WBNTSR-051 "Reduction of Beta Dose by Sheet Steel," RZ page 3, shows the beta reduction factor for 18-gauge steel is equal to .158. This reduces the total 100-day BETA dose to the valve internal parts to  $(4.7 \times 10^8) \times (1.58 \times 10^{-1}) = 7.4 \times 10^7$  rads TID BETA. RZ In the Lower Compartment, the total combined 100-day BETA and GAMMA accident radiation dose will equal  $(7.4 \times 10^7 \text{ BETA}) + (4 \times 10^7 \text{ GAMMA}) =$ 1.14x10⁸ rads. The combined 100-day accident radiation plus the 40 year dose (2x10⁷rads) equal a total radiation dose of 1.34x10⁸ rads (BETA/ GAMMA). These Target Rock valves are qualified to 1.85x10⁸ rads for the Model 79AB-001 valves and 2.05x10⁸ rads for the Model 79AB-003 valves, which envelop the requirement.

R2

PAGE B-25 R2

WBEP-0109Q

BINDER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 18B OF 24 BINDER TITLE SOLENOID VALVES - COMPUTED R DATE 9/5/86 R R R R R R R R R R R R R R R R R R R
COMMENTS FOR SECTION L(1) AND (2) (CHEMICAL SPRAY):
<u>Containment spray flow rate is equal to 9500 gal/min or 0.92 GPM per square foot</u>
of containment cross section. The chemical spray concentration is 2000 ppm
Boron with a pH of 8.3. The test valve was subjected to a spray solution of
2500 ppm Boron with a pH of 10.5. The spray rate was 0.15 GPM per square foot
of projected area of the test valve. The test solution is more corrosive than
the containment spray. Therefore, all valves listed in this binder fall within
the qualification provided by the test valve. Additionally, these valves have
gasketed covers and are not susceptible to spray. This was demonstrated by the
23 hour spray test. Since spray or leakage intrusion is not acknowledged to be
time dependent in enclosed devices, it can be concluded that the device is
<u>gualified for 30 days in spray based on the 23 hour test.</u>

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EQP357.21

BINT	ER NO. WENEO-SOL-OO1 PLANT WEN UNIT(S) 1 SHEET 19 OF
	R <u>I</u> R <u>Z</u>
	ER TITLE <u>SOLENOID VALVES</u> COMPUTED RJP DATE <u>9/05/86</u> <u>AFM</u> <u>AF</u> ET ROCK - <u>2/23/89</u> 8/24
MODE	LS 79AB-001 AND 79AB-003 CHECKED SRP/AWT DATE 9/08/86 KBD
	3/zi/Hq ⁸ /a
7	SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS
L.	(Continued)
	(3) Were margins applied to the test parameters or otherwise
	addressed in the test program to assure that normal variation
	and uncertainties are accounted for? (Note margin applied,
	Yes/No/NA).
	Margin
	<u>Suggested Margins per IEEE-323(74)</u> <u>Applied Yes/No/NA</u> (Mod. 79AB-001/Mod. 79AB-003)
	Temperature: +15 degrees FYesYesYes
	+45.8 psig/
	Pressure: +10% but no more than 10 psig + <u>58.8 psig</u> Yes
	Radiation: +10% of accident dose +45%/+62% Yes
	Time: +10% (or 1 hour + operating time See Comment
	per NUREG-0588) <u>Below No</u>
	+12% to -56%/ Voltage: ±10% of rated value +1 <u>2% to -28% Yes</u>
	Frequency: ±5% of rated value <u>NA/NA</u> <u>NA</u>
	Environmental Transient: the initial
	transient and the peak temperature +108°F/+173°F Yes
	applied twice Ref (2) &
(Sai	(4), Sect. smic) Vibration: +10% added to acceleration <u>5.6.3 Yes</u>
(ser	smic) vibration. +10% added to acceleration <u>Judia</u>
	JUSTIFICATION/COMMENTS see TAB C. Section C-2. which proves
	the 30-day test envelops the 100-day post-accident requirement
	Voltage variations were applied during testing ranging from
	55 VDC minimum to 140 VDC maximum (Model 79AB-001) and 90 VDC
	minimum to 140 VDC maximum (Model 79AB-003).
	-

## PAGE B-27 RZ

	BINK 	OER TI GET R	TLE SOLENOID VALVES - COMPUTED $R_{P}$ DATE $\frac{7/1/86}{1000}$ R _ R
·	м.	OPER	ABILITY TEST RESULTS
	4	(1)	Identify the safety function(s) of this equipment: (Reference <u>See TAB A</u> ).
			JUSTIFICATION/COMMENTS <u>Solenoids must operate to release non-</u>
			condensables from reactor vessel head.
		(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 6.5 &amp; Ref. (4), Sect. 7.2</u> ).
			JUSTIFICATION/COMMENTS
		(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 6.5 &amp; Ref. (4), Sect. 6.9</u> ).
	•		JUSTIFICATION/COMMENTS
	·	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? (Reference ).
			JUSTIFICATION/COMMENTS See TAB C, Section C-2, "Post-Accident
			Operability"
		(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>Ref. (2), Sect. 7.2 &amp; Ref. (4), Sect. 6.9</u> ).
	•		JUSTIFICATION/COMMENTS <u>We have reviewed and concur with the</u>
			disposition of anomalies in the test report. There is no impact
			on installed equipment.

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EQP357.21

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	DER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1 SHEET 21	
BING TA	DER TITLE SOLENOID VALVES - COMPUTED R. DATE $\frac{7}{7}\frac{8}{8}$ R R R R COMPUTED REF DATE $\frac{7}{7}\frac{8}{8}$ R R R R R R R R R R R R R R R R R R R	·
N.	MAINTENANCE AND SURVEILLANCE	
•	Has the qualification program identified those surveillance, maintenance and inspection parameters which are essential to maintain qualification which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the Binder - Qualification Maintenance Data Sheets).	and
	JUSTIFICATION/COMMENTS (Ref. (1) & (3), Section 1.4).	
	See QMDS (TAB G).	
	· · ·	
	PAGE 6-29	

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G

BIND	DER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1	SHEET <u>22</u> OF <u>24</u>
BIND TAR	SOLENOID VALVES -       COMPUTED       RSC       DATE         RGET ROCK - MODELS 79AB-001       AND 79AB-003       CHECKED       GH	<u>7/7/36</u> <u> </u>
0.	SUMMARY OF REVIEW	Yes/No/NA
	(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
	(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>N/A</u>
	(3) Choice of qualification methodology adequately justified?	Yes
	<ul><li>(4) If analysis was performed, complete the following:</li><li>(a) Were equipment performance requirements identified?</li></ul>	<u>N/A</u>
	(b) Were specific features and failure modes and effects analyzed?	<u> </u>
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	N/A
	(d) Were environmental parameters which affect equipment performance identified?	<u>N/A</u>
	(5) Adequate similarity between equipment and test specimen established?	Yes
	(6) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	<u></u>
	(c) Absence of preaging in test/analysis justified?	<u>N/A</u>
	(d) Materials susceptible to thermal/radiation aging identified?	<u>Yes</u>

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BINDER N	O. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1	SHEET 23 OF 24
BINDER T TARGET	ITLE SOLENOID VALVES - COMPUTED ROCK - MODELS 79AB-001 AND 79AB-003 CHECKED GP DATE	<u>  7/86</u> <u> </u>
0. <u>sum</u>	MARY OF REVIEW (Continued)	Yes/No/NA
•	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7)	Qualified life or replacement schedule established?	Yes
(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
-	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	Yes
	(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11)	Criteria regarding submergence satisfied?	<u>N/A</u>
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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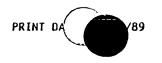
		BINC	DER NO. WBNEQ-SOL-001 PLANT WBN UNIT(S) 1	SHEETO	F
		BINC TA	DER JITLE SOLENOID VALVES - COMPUTED RUCK - MODELS 79AB-001 COMPUTED RUCK - MODELS 79AB-001 DATE 7/7/	<u> 86</u>	
		0.		Yes/No/NA	
		;	(15) Criteria regarding functional testing satisfied?	Yes	
-			(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes	•
			(b) Was an initial base line test done to establish required performance characteristics?	Yes	
			(c) Has the test/analysis demonstrated that performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?		
			(16) Criteria regarding instrument accuracy satisfied?	<u>N/A</u>	
			<pre>(17) Test duration margin (1 hour + function time)     satisfied?</pre>	Yes	
			(a) Is the minimum specified operating time at least 1 hour?	Yes	
			(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>N/A</u> .	
			(18) Criteria regarding synergistic effects satisfied?	Yes	
			(19) Criteria regarding margins satisfied?	Yes	
			(20) Maintenance and surveillance requirements adequately	Yes	
		Ρ.	DISCUSSION		
					·
				<u>.</u>	
			PAGE <u>B-32</u>		
	TVA	1959	1973 (JE-3-86)	<u> </u>	

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#### WATTS BAR NUCLEAR PEANT TABA - EQUIPMENT IDENTIFICATION MATRIX

	EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL NUM	AZMITH_	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENI	SAFETY FUNCTION
1	WBN-1-FCV -001-0007 -B SG1 BLOWDOWN FLOW SOL VALVE	1-FCV -001-0007 -B . 82AB-001	001 .	729' A01 82K22-832045				MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE STEAM GENERATOR
	WBN-1-FCV -001-0014 -A SG2 BLOWDOWN FLOW SOL VALVE	1-FCV -001-0014 -A 82AB-001	001	729' AD1 82K22-832045				MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE STEAM GENERATOR
	WBN-1-FCV -001-0025 -B SG3 BLOWDOWN FLOW SOL VALVE	1-FCV -001-0025 -B 82AB-001	350	729' A01 82K22-832045				MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE STEAM GENERATOR
	WBN-1-FCV -001-0032 -A SG4 BLOWDOWN FLOW SOL VALVE	1-FCV001-0032A 82AB-001		729' A01 82K22832045				MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE STEAM GENERATOR
	WBN-1-FCV -001-0181 -A SG1 BLOWDOWN ISLN VALVE INS1		349	734+10" FN1 82K22-832045	A/B A/B A/B	5MN/100D 15MN/1M0	MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE CONTAINMENT

	к <u>_/</u>	к	к	
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CHECKED/DATE R.K. WHITE 9/10/86	EC.M H12-157			· ···· .

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BINDER NO. : WBNEQ-SOL -002 MANUFACTURER : TARGET ROCK PAGE · 2 OF 6



#### WATTS BAR NUCLEAR ANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO.	AZMITH	OCATION ELEV(1) RM/RAD	CAL OPER TIME	EVENI	SAFETY FUNCTION
DESCRIPTION MODEL NUMB	IER	CONTRACT	(2)		
WBN-1-FCV -001-0182 -B 1-FCV -001-0182 -B SG2 BLOWDOWN ISLN VALVE INSIDE CONTMT 82AB-001	011	732' 4" FN1 82K22-832045	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE CONTAINMENT
WBN-1-FCV -001-0183 -A 1-FCV -001-0183 -A SG3 BLOWDOWN ISLN VALVE INSIDE CNTNMT 82AB-001	012	733'10" FN1 82K22-832045	A/B 5MN/100D A/B 15MN/1MO	L MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE CONTAINMENT
WBN-1-FCV -001-0184 -B 1-FCV -001-0184 -B SG4 BLOWDOWN ISLN VALVE INSIDE CNTNMT 82AB-001	347	735• 1" FN1 82K22-832045	A/B 5MN/100D A/B 15MN/1M0	MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENGERIZED TO ISOLATE CONTAINMENT
WBN-1-FSV -030-0134 -B 1-FSV -030-0134 -B CNTMNT ANNULUS DP ISLN VALVE 77J-001	291	740' 1" AC4 77K3-821270	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE CONTAINMENT
WBN-1-FSV -030-0135 -A 1-FSV -030-0135 -A CNTMNT ANNULUS DP ISLN VALVE 77J-001	288	745' 7" ANN 77K3-821270	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	MS/C	MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED TO ISOLATE CONTAINMENT

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#### WATTS BAR NUCLEAR PLANT TABA – EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL NU	AZMITH	LOCATION ELEV(1) RM/RAD CONTRACT	<u>Cai</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
WBN-1-FSV -043-0250 POST ACD SMPLG HOT L	–A 1–FSV –043–0250 –A EG NO.1 ISLN VALVE 82KK–001	285	730' ANN 82K29-830702	A A A A	100D 100D 100D 1HO 1HO	MS/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES.
WBN-1-FSV -043-0251 POST ACD SMPLG HOT L	-A 1-FSV -043-0251 -A EG NO.1 ISLN VALVE 82KK-001	289	728' 7" AC4 82K29-830702	A A A A	1000 1000 1000 1000 1M0 1M0	MS/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES.
WBN-1-FSV -043-0268 POST ACD SMPLG RHR HE	-A 1-FSV -043-0268 -A AT EXCH 1A ISLN VLV 82KK-001		713' A28 82K29-830702	A B B B B	1000 1M0 1M0 1M0 1M0 1M0	CV/A AF/A AB/A	CAT A - MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES. CAT B - VLV MUST REMAIN CLOSED.
WBN-1-FSV -043-0287 POST ACD SMPLG AIR I		304	731' 8" ANN 82K29-830702	A A A A A	100D 100D 100D 100D 1MO 1MO	MS/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES.
WBN-1-FSV -043-0288 POST ACD SMPLG CNTMNT	-A 1-FSV -043-0288 -A AIR ISLN VLV 82KK-002		726' 1" AC4 82K29-830702	A A A A	1000 1000 1000 1M0 1M0	MS/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES.

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PRINT DATE: 04/17/90

BINDER NO. : WBNEQ-SOL -002 Manufacturer : Target Rock Page 4 of 6

#### WATTS BAR NUCLEAR PLANT TABA- EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIM</u> (2)	E EVENT	SAFETY FUNCTION
WBN-1-FSV -043-0307 -A 1-FSV -043-0307 -A 300 Post ACD Smplg Air Isln Valve 82KK-002	733' ANN 82K29-830702	A 100D A 100D A 100D A 1M0 A 1M0 A 1M0	L Ms/C FW/C RH/C CV/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN SAMPLES.
WBN-1-FSV -043-0309 -B 1-FSV -043-0309 -B 252 Post ACD SMPLG Hot Leg No.3 ISLN VALVE 82KK-001	7291 64 ANN 82K29-830702	A 100D A 100D A 100D A 1M0 A 1M0 A 1M0	L Ms/C FW/C RH/C CV/C	MUST OPERATE DURING OR After accident to obtain Samples.
WBN-1-FSV -043-0310 -B 1-FSV -043-0310 -B 235 POST ACD SMPLG HOT LEG NO.3 ISLN VALVE 82KK-001	719' 5" AC3 82K29-830702	A 100D A 100D A 100D A 100D A 1M0 A 1M0		MUST OPERATE DURING OR After accident to obtain Samples.
WBN-1-FSV -043-0312 -B 1-FSV -043-0312 -B POST ACD SMPLG RHR HEAT EXCH 1B ISLN VLV 82KK-001	713" A28 82K29-830702	A 100D B 1M0 B 1M0 B 1M0 B 1M0 B 1M0	AF/A Ab/a	CAT A - MUST OPERATE DURING OR AFTER LOCA TO OBTAIN SAMPLES. CAT B - VLV MUST REMAIN CLOSED.
HBN-1-FSV -043-0318 -B 1-FSV -043-0318 -B 281 Post ACD SMPLG CNTMNT AIR ISLN VLV 82KK-002	733" 7" ANN 82K29-830702	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L Ms/C FW/C RH/C CV/C	MUST OPERATE DURING OR After accident to obtain Samples.

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BINDER ND. : WBNEQ-SOL ~002 Manufacturer : Target Rock Page 5 of 6

#### HATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. DESCRIPTION MODEL NUM	AZMITH	LOCATION ELEY(1) RM/RAD CONTRACT		OPER TIME	EVENI	SAFETY FUNCTION
WBN-1-FSV -043-0319 -B 1-FSV -043-0319 -B Post ACD SMPLG CNTMNT AIR ISLN VLV 82KK-002	289	7284 78 AC4 82K29-830702	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MUST OPERATE DURING OR After accident to obtain Samples.
WBN-1-FSV -043-0325 -B 1-FSV -043-0325 -B Post ACD SMPLG CNTMNT AIR ISLN VLV 82KK-002	282	723' ANN 82K29-830702	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MUST OPERATE DURING OR AFTER ACCIDENT TO OBTAIN Samples.
WBN-1-FSV -043-0341 -B 1-FSV -043-0341 -B Post ACD SMPLG DR Tocntmnt Sump ISLN VLV 82KK-004	2 <b>82</b>	724' ANN 82K29-830702	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MUST OPERATE DURING OR AFTER ACCIDENT TO EMPTY PAS WASTE HOLDUP TANK
UBN-1-FSV -043-0342 -A 1-FSV -043-0342 -A Post ACD SMPLG DR Tocntmnt Sump ISLN VLV 82KK-004	301	730* 8" ANN 82K29-830702	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C FH/C RH/C CV/C	MUST OPERATE DURING OR After accident to Empty Pas Waste Holdup Tank
WBN-1-PCV -068-0334 -B 1-PCV -068-0334 -B RCS PRZR PWR RELIEF VALVE 82UU-001		785'10" PRS 82K22-831934	A A A A A	100D 100D 100D 1M0 1M0	L MS/C FN/C RH/C CV/C	PRESSURIZER VENTNG PURPOSES.   <i>R2</i> MUST OPERATE UNTIL RCS IS SUFFICIENTLY DEPRESSURIZED THEN REMAIN CLOSED.

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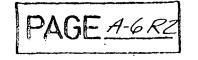
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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH. Model Number	LOCATION ELEV(1) RM/RAD CONTRACT	CAT OPER_TIN	IE EVENI	SAFETY FUNCTION
NBN-1-PCV -068-0340A -A RCS PRZR PHR RELIEF VALVE	1-PCV -068-0340A -A 097 82UU-001	785'10" PRS 82K22-831934	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L Ms/C FW/C RH/C CV/C	PRESSURIZER VENTNG PURPOSES.   R2 MUST OPERATE UNTIL RCS IS SUFFICIENTLY DEPRESSURIZED THEN REMAIN CLOSED.

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BINDER NO. WBNEQ-SOL-002 PLANT	r wen unit(	S) <u>1</u> SHEET <u>1</u> OF	· <u>1</u>
BINDER TITLE SOLENOID VALVES -	COMPUTED /R1 AFM	R_2_R DATE <u>4/25/89</u>	
TARGET ROCK	CHECKED /R1 EEM	DATE <u>8/24/89</u>	

#### <u>TAB A</u>

#### NOTES

- Floor/Actual Elevation Actual Elevations are documented on field verification sheets found in TAB F. All elevations shown are floor elevations except actual elevations are shown for those devices located inside the reactor building.
- 2. See TAB B, Section A for a complete listing of Category and Operating Times Calculations used in this binder.
- 3. Operating Time is dependent on MSLB size, refer to TAB C, Section C-2, Group III valves, for further information.
- 4. Contract Column Contract numbers shown in this TAB were obtained by tracing the serial number on each valve through TVA procurement records and did not depend on field verification data for contract numbers.

RZ



BINDER 1	TITLE SOLENOID VALVES - COMPUTED RJP DATE 8/27/86 AFM
TARGET R	4/25/89 ROCK CHECKED WBK DATE <u>8/27/86</u> EEM/AFM 8/24/89
A. DOCI	MENTATION 6/18/90
Equi	pment Description <u>Solenoid Valves</u>
Vend	lor/Manufacturer <u>Target Rock Corporation</u>
Equi	pment Model No.(s) <u>82AB-001, 77J-001, 82KK-001, 82KK-002,</u>
	<u>82KK-004, 82UU-001</u>
QUAI	IFICATION REPORTS
(1)	Title/Number/Revision Qualification Test RIMS_EEB831003510
	Report/2375/GDATE_5/3/83
(2)	Title/Number/Revision Qualification Exten_ RIMS_EEB830324501
	sion Analysis/3543DATE_1/10/83
(3)	Title/Number/Revision Qualification Exten- RIMS EEB830215500
	sion Analysis/3563 DATE 1/10/83
(4)	Title/Number/Revision <u>Qualification Exten-RIMS_EEB840130501</u>
	sion Analysis/3619/A DATE 12/13/83
(5)	Title/Number/Revision <u>Analysis Report/</u> RIMS <u>B71860611101</u>
	<u>557-1468/A</u> DATE <u>11/2/83</u>
(6)	Title/Number/Revision Qualification Extens_RIMS_B43 &0913 001
OTHE	<u>sion LetterNo. C5631 - Model 77J-001 valves</u> DATE <u>9/6/85</u> R (ANALYSIS, VENDOR DATA, ETC.)
C	Target Rock Test Report No. 4207 (B71 860616 101) (TAB E, Section E-3).
0	OE Calculation WBNOSG4-004 R10 (B45 861017 218) "Main Steam System (1) NUREG 0588 Category and Operating Times"
0,	OE Calculation WBNOSG4-008 R14 (B26 900110 206) "Containment Ventilation System (30) NUREG 0588 Category and Operating Time
<b>o</b> ,	OE Calculation WBNOSG4-011 R9 (B45 860623 218) "Sampling Syste

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BIL	NDER TI	TLE <u>SOLENOID VALVES -</u> COMPUTED <u>RJP</u> DATE <u>8/27/86</u> <u>AFM</u> 8/21/89 ⁽¹⁹⁾⁹⁹
<u>TAF</u>	RGET RC	<u>OCK</u> CHECKED WBK DATE <u>8/27/86</u> EEM <u>CA</u> 8/24/89 1/12/90
	DOCID	
А.		<u>TENTATION</u>
	OTHER	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)
	0	OE Calculation WBNOSG4-017 R9 (B26 890510 506) "Reactor Coolant System (68) NUREG 0588 Category and Operating Times"
\$		DNE Calculation WBNOSG4-045 R1 (B45 860902 219) "Status and Duty Cycles of 1E Solenoid Valves Located in Potentially Harsh Environments"
	9	OE Calculation WBNOSG4-003 R2 (B45 851112 218) "Safety Evaluation of Superheated Steam in the Valve Vaults caused by a Main Steam Line Break"
	0	OE Calculation WBNTSR-051 R0 (B26 891129 202) "Reduction of Beta Dose by Sheet Metal"
	•	WBNP Environmental Data Drawing 47E235-42 R2 With DCA's P04104-02-0, -03-0, -05-0
	0	WBNP Environmental Data Drawing 47E235-44 R1
	Q.	WBNP Environmental Data Drawing 47E235-59 R2 W/DCA-P02351-18-0
	0	WBNP Environmental Data Drawing 47E235-61 R1
	0	WBNP Environmental Data Drawing 47E235-76 R3
-	9	OE Calculation WBNNAL3-004 R0 (B45 860205 235) "Accident Dose Inside Reactor Building"
	o	Calculation WBNTSR-022 R0 (B26 891106 202) "Flowing Media Radiation Doses".
	O≻	DNE Calculation WBN-EEB-MS-TI06-0017 R0 (B26 900202 410) "120 VAC Vital Instrument Power Voltage Profile."
	0	DNE Calculation WBN-EEB-MS-TI11-0004 R0 (B26 900202 407) "125V DC Voltage Analysis."
	Note:	Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

WBEP-0136Q

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BINDER TITLE						1	8/21/89	7/11/90
TARGET ROCK			CHECKED	RKW	DATE 9	<u>)/16/8</u> 6	<u>EEM</u> 8/24/89	214
		·····					5/24/07	
B. <u>CONCLUSIC</u>	ON OF REVIEW	(Check	c only one	block)				
<u> </u>	Equipment (	ualified	i .					
)	Equipment S Life or J		All Requi		-		fied	
	Equipment (	ualifica	tion Not 1	Establis	shed by	Documer	itation	
	Equipment N	lot Quali	fied Based	d on Tes	st Failu	res		
					·			
OPEN ITEM	IS AND QUALI	FICATION	DEFICIEN	CIES				
(1) THE	QUALIFICATION	I TEST R	PEPORT D	OES NO.	T DEM	NSTRAT	E THA	7
	ALVES WILL			IG ACC	IDENT	COND	TIONS	5
	HE MIN. V	DITAGE	•					
	HE MIN. V	OLTAGE						
	nduit seal			Valve 1-	FSV-30-	134 is	require	ed.
				Valve 1-	FSV-30-	<u>134 is</u>	require	ed.
<u>(2) A co</u>	<u>nduit seal</u>	for Targ		Valve 1-	FSV-30-	<u>134 is</u>	require	<u>ed.</u>
<u>(2) A co</u>		for Targ		Valve 1-	FSV-30-	<u>134 is</u>	requir	<u>ed.</u>
<u>(2) A co</u>	<u>nduit seal</u>	for Targ		Valve 1-	FSV-30-	<u>134 is</u>	requir	<u>ed.</u>
(2) A co (3) Dele	<u>nduit seal</u>	for Targ		Valve 1-	FSV-30-	<u>134 is</u>	requir	<u>ed.</u>
(2) A co (3) Dele (4) Dele (6) VALVE	nduit seal ted by revi ted by revi	for Targ sion 2 sion 2	et Rock, N	83,184	MUST .	BE AN	4LYZE1	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 20 E 70	et Rock, N 2,/81,/82,/ 2 MOCES	183,184 5 ANO .	MUST ÆNELG	3E AN, 12ED 3	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,/82,/ 2 MOCES	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	
(2) A co (3) Dele (4) Dele (6) VALVE FOR F	nduit seal ted by revi ted by revi ted by revi ted by revi	for Targ sion 2 sion 2 /4,25,32 2006 70 HONG //4	et Rock, N 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1 2,/81,182,1	183,184 5 ANO 1 V-30-13	MUST ENELG 35 MUS	BE AND IZED S ST HAV	4LYZE 10-EN01	

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WBEP-0136Q

PAGE B-3 R2

	ER NO. WBNEQ-SOL-002 PLANT WBN UNIT(S) 1 SHEET 3 OF 26 ER TITLE SOLENOID VALVES - COMPUTED LSP DATE 8/27/86 R R R TARGET ROCK CHECKED WMK DATE 2/21/86
<b>C.</b>	QUALIFICATION CRITERIA         Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):         X       Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)         —       Components are Qualified to the Criteria of NUREG-0588 Category II (IEEE323-1974)         —       Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79-01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	Generating Stations"         IEEE 323-1974 "IEEE Standard for Qualifying Class IE Equipment for         Nuclear Power Generating Stations"         IEEE 344-1975 "Guide for Seismic Qualification for Class IE         Electrical Equipment for Nuclear Power Generating         Stations"

PAGE B-4

• 1

BINDER NO. WBNEQ-SOL-002 PLANT WBN UNIT(S) 1 SHEET 4 OF 26 BINDER TITLE SOLENOID VALVES - COMPUTED Rip DATE 3/27/86 AFM
D. QUALIFICATION METHODOLOGY (Check only one block)

	DER TITLE SOLENOID VALVES TARGET ROCK	COMPUTER	DATE <u>LL</u> DATE	SHEET <u>5</u> <u>8/21/84</u> <mark>RF <b>8/21/16</b></mark>
E.	EQUIPMENT DESCRIPTION			
÷	Is the equipment identif plant equipment which re			
	• • •	<u>Plant Device</u>	Qualification Document	Reference
	(1) Equipment Type	Solenoid Vlv	Solenoid Vlv	2375, Sec. 1.0 2375,
	(2) Manufacturer	Target Rock	Target Rock	<u>Sec. 1.0</u> 2375,
	<pre>(3) Model Number(s)</pre>	See TAB A	77CC-001	Sec. 1.0
			- <u></u>	
			<u></u>	
	(4) Serial Number(s)	See TAB F		
			····	
	(5) Identify Component- Unique checksheet attached:	None		
	JUSTIFICATION/COMMENTS	<u> </u>	· · · · · · · · · · · · · · · · · · ·	
			<u> </u>	

TARC	GET ROCK	CHECKED	WBK DATE	8/21/89 8/27/86_82.11
				Binibi
F.	INSTALLATION IN	TERFACES		
	documentation a interface a req	aces pertinent to EQ nd/or evaluation and uirement for our appl equirement in QMDS, i	reference the ication (Yes/N	source. Is the No)? (Note below.
	Interface	Identify Interface	Plant Requirement? (Yes/No)	Reference Test Report
	Mounting Bolts	None Specified	N/A	
	External Process Connections	None Specified	N/A	
	Electrical Connections	None Specified	<u>         N/A                           </u>	
	Conduit Seals	Rubber Cement Seali <u>Used at Conduit Co</u> n	•	2375 Section 4.1.15
	Connector			
	Seals	None Specified Solenoid Coil must	<u>N/A</u> be	
	Orientation	Tilted 45° below Horizontal for <u>1-PCV-68-334, 340A</u>	Yes	Target Rock Dwg. 82UU-001
				<u></u>
	Physical Configuration	None Specified	<u>N/A</u>	
	Other	<u>N/A</u>		
	during qualifica wires at the cor this sealing cor ing the switch of the test valve r subject to borat Conax conduit se	OMMENTS <u>Rubber cemen</u> ation testing to seal aduit connection. Du appound shrivelled and compartment to the bo remained operational red water spray will eal in accordance wit b. WBNEQ-CSC-001.	the test inst ring the cours pulled away, rated water sp throughout the be sealed with h TVA Environm	rumentation e of the test, completely open- ray. Although test, valves a qualified

				<b>`</b>	• · · · · · · · · · · · · · · · · · · ·
G.	TEST	SEQU	JENCE		· · ·
	(1)	acci	: Sequence: Was the test sequence dent environment in accordance w /no/NA)? (note below)	with IEEE-323	(74), paragraph 6.3.
				Yes/No/NA	<u>Reference</u> 2375
		(a)	Equipment inspected for damage	Yes	<u>Sec. 4.1.1</u> 2375
		(Ъ)	Baseline performance measurements taken	Yes	Sec. 4.1.1
		(c)	Equipment aged:		
			Thermal	Yes	2375 App.A <u>Sec. 4.1.1</u> 2375
			Radiation	Yes	Sec. 4.1.2 & 4.1.11
			Wear	Yes	2375,App.A _ <u>Sec. 4.2</u>
		(d)	Vibration/seismic testing conducted	Yes	2375, App.A 
		(e)	Design basis event (DBE)		2375, Sec.
			exposure	Yes	4.1.9 & App. A <u>Sec. 4.4</u>
		(f)	Post-DBE exposure	Yes	2375 Sec. 4.1.10 <u>&amp; App. A Sec. 4.4.8</u>
		(g)	Final inspection and disassembly	Yes	2375 Sec. 4.1.15 <u>&amp; App. E</u>
	(2)	Was desc	the same piece of equipment used ribed in item (1) above (yes/no,	d throughout /NA)? <u>Yes</u>	the test sequence
	(3)	been	the test equipment, test equipment, test equipment, test equipment, appropriately documented (yes/merence <u>2375, App.A, Sec.2.0</u> ).	ment accuracio no/NA)? <u>Yes</u>	es and calibration da
	JUST	IFICA	TION/COMMENTS		
	· .	"4	27.974		

TVA 19537 (OE-3-86)

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EQP012.55

		TARGET ROCK CHECKED	DATE 8/1/80
H.	AGINO	3	
	(1)	Was aging considered in the qualification pr (Yes/no/NA)? <u>Yes</u> (Reference <u>2375, App</u> JUSTIFICATION/COMMENTS	ogram . <u>A, Sec.4.1</u> ).
	(2)	Were the following effects considered in the	aging program:
		<u>Aging Effect</u> Thermal aging	Yes/No/NAReference2375 App.YesSec.4.1.1
		Radiation exposure	2375 <u>Yes</u> <u>Sec.4.1.2</u>
		Vibration (non-seismic) aging	<u>No</u>
		Operational (electrical/mechanical/process) stress aging	2375 App. 4.2
		JUSTIFICATION/COMMENTS See Item 1 under "Di	scussion" on sheet 25.
	(3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>No</u> (Reference	believed to have a considered in the aging ).
		JUSTIFICATION/COMMENTS See comment on shee	t 8A.
	(4)	Thermal Aging:	
		(a) Was thermal aging considered in the qua (yes/no/NA)? Yes (Reference 2375, App.	lification program A, Sec.4.1.1).
		JUSTIFICATION/COMMENTS	
			· · · · · · · · · · · · · · · · · · ·

BINDER	NO. WBNEO-SOL-002 PLAN	TWBN	UNIT(S)	1SHEET8A	_0F_ <u>26</u>
BINDER	TITLE SOLENOID VALVES -	COMPUTED R	<u>LIP</u> DATE	8/2//86 0000	
TARGET	ROCK	CHECKEDW	BK DATE	8/27/86 EEM	
				6/24/29	

COMMENT FOR H(3):

Target Rock did not address synergistic effects in Test Report 2375. However, it is apparent that Target Rock solenoid valves contain materials in which radiation-induced synergisms, even though mild, could occur. Silicone rubber (per NUREG/CR-2763) and ethylene propylene rubber (per NUREG/CR-2157) exhibit insignificant dose rate effects at doses up to 20 Mrad. The worst case 40-year TID for the valves in this binder is 20 Mrad. Therefore, synergistic effects will be negligible for normal service aging. Also, potential dose rate and test sequence synergisms will not impact qualification for accident conditions as demonstrated by 2375. In the event an accident occurs, dose rates will be comparable to test conditions. Therefore the test sequence of thermal aging followed by aging plus accident radiation is a reasonable simulation of actual plant requirements. Additional assurance is provided by the severity of the radiation test because the specimen was exposed to 135 Mrads, whereas a worst case actual dose of 124 Mrads is required. R1

PAGE B-10 R1

BINDER NO. <u>WBN</u>	EO-SOL-OO2 PLANT <u>WBN</u> UNIT(S) 1 SHEET 9 OF R 1 R
BINDER TITLE	SOLENOID VALVES - COMPUTED RJP DATE 8/27/86 77M 8/2/89
TARGET ROCK	CHECKED <u>WBK</u> DATE <u>8/27/86 کرنیم</u> کانجانان کانجان
H. <u>AGING</u> (Co	ntinued)
(b)	Were the materials susceptible to thermal aging degradati identified in the qualification program (yes/no/NA)? Yes (Reference: <u>2375, APP. F-IC, Para. 3</u> ).
	JUSTIFICATION/COMMENTS
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>YES</u> (Reference: <u>2375, App. F-I, Para. 3</u> )
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the paramet of time and temperature identified in the qualification program (yes/no/NA)? <u>YES</u> (Reference: <u>2375, App, A, Sec. 4.1.1</u> )
	ParameterPlant Maximum NormalTestEquivalentTemperature130°F (worst Case)350°F120°FTime40 years792 hours40 years
	JUSTIFICATION/COMMENTS See Qualified Life Calculations in TAB C.
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>YES</u> (Reference: <u>2375, App. F-I, Para. 3</u> )
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerat aging parameters, are they properly referenced to the sour of the technical data (yes/no/NA)? <u>YES</u> (Reference: <u>2375. App. F-IC, Para. 3</u> )
	JUSTIFICATION/COMMENTS

			E	-SOL-002 PLANT WBN UNIT(S) 1 SHEET 10 LENOID VALVES - COMPUTED R DATE $\frac{3/2}{36}$ R R R R R R R R R R R R R R R R R R R	۹
	н.	AGINO	<u> </u>	ontinued)	
	3		(g)	If a regression line was used for determining accelerated ag parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>N/A</u> (Reference	ne ).
				JUSTIFICATION/COMMENTS	
			(h)	Was the equipment operated during the thermal aging (yes/no/NA)? Yes (Reference 2375, App. A, Sec. 4.1.1	).
				JUSTIFICATION/COMMENTS The test valve was de-energized	-
				throughout thermal aging except when it was energized to	-
				cycle open once each day for the 33-day duration of the aging	5
)				test.	-
		(5)	Radi	ation Aging Exposure:	
			(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference 2375, App. F, Sec. 4.2 &	<u>k 6.5</u>
×				JUSTIFICATION/COMMENTS	-
			(b)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>No</u> (Reference 2375, App. F, Sec. 4.2 & 6.5 and App. C ).	-
				JUSTIFICATION/COMMENTS The entire valve assembly was	_
				irradiated without regard for specific components, thus	_
			-	demonstrating operability regardless of radiation threshold	<b>-</b> .
				values.	-
			(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? Yes (Reference 2375, App.F-I, Para. 2).	
	2			JUSTIFICATION/COMMENTS	_
	-				-
				PAGE B-12	

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	SOLENOID VALVES - COMPUTED RJP	4/25/89
TARGET ROCK	CHECKED <u>WBK</u>	DATE <u>8/27/86_<i>EE</i>*11</u> <i>8/34/29</i>
H. <u>AGING</u> (Co	ntinued)	
(d)	Is the radiation test exposure do acceptable (Yes/No/NA)? <u>Yes</u> App. F-I, Paragraph 2 & App. C	
	Plant normal ambient radiation dose (rd)	2.0 x 10 ⁷ rads (worst case)
	Test exposure dose (rd)	8 1.35 x 10 rads
	Test exposure dose rate (rd/hr)	.45 MRADS/HR - Post-DE <u>Not Specified-Pre Agi</u> n
	Test exposure source type (e.g., Co-60 gamma)	Co-60 gamma - Post-DBE <u>Not Specified-Pre Agi</u> n
	JUSTIFICATION/COMMENTS	
(6) Vibr	ation (non-seismic) Aging:	
(a)	Were the effects of non-seismic v normal and abnormal operation add qualification program ¹ <u>No</u>	iressed in the
	JUSTIFICATION/COMMENTS _See iten	n 1 under "Discussion"
	on sheet 25.	
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference:	
	JUSTIFICATION/COMMENTS See item	1 under "Discussion "
	on sheet 25.	·

## PAGE B-13 R1

TARGET ROCK	SOLENOID VALVES	COMPUTED CHECKED		_ DATE <u>8/27/86</u>
		ONEONED		
H. <u>AGING</u> (	Continued)			
(7) Ope	rational Stress A	ging:		
(a)	operational str operation adres (Yes/No/NA)? <u>Y</u>	esses induced sed in the qu <u>es_</u> (Referer	l durin Malific Nce: <u>2</u>	chanical, and process g normal and abnormal ation program 375, App. A, Sec. 4.2, ra. 4
(b)	aging identifie program (Yes/No	or stresses i d and justifi /NA)? <u>Yes</u>	ed in (Refe	during operational the qualification rence: <u>2375, App. A,</u>
	JUSTIFICATION/C			
in 1	the qualified li the qualification terence: <u>2375, A</u>	program (Yes	/No/NA	and its basis defined )? <u>Yes</u>
JUST	lified life (Docur TIFICATION/COMMENT Tal life is deterr TAB C)	IS <u>Parameter</u>	s are o	ears lefined (see Ref.) but life calculations
	ned in the qualif	fication prog	ram (Ye	oment or its components es/No/NA)? <u>Yes</u>
<u>(see</u> (9) Were defi	erence: <u>3543, 35</u>	<u>263 &amp; 3619</u>		)
<u>(see</u> (9) Were defi	erence: <u>3543, 3</u> !			)

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ľ	BINDER	NO.	WBNEQ-SOL-OC	2 PLAN	WBN	UNIT(	S)	L SHE	ET <u>13</u>	OF 26
	221022						-	R_	<u>2</u> R	
	BINDER	TITL	E <u>SOLENOID</u>	VALVES -	COMPUTED_	RJP	DATE	<u>9/09/8</u> 6	AM	
									15,90	
1	TARGET	ROCK			CHECKED	<u>RKW</u>	DATE	<u>9/09/8</u> 6	7/12/00	
L									11770	

#### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis) |RZ|

	Material/Property/Function	Radiation <u>Threshold</u>	<u>Reference</u>	Activation Energy	Reference	
	Silicone rubber/				557-1468,	RZ
(a)	sealing/potting			1.14	Sec. 5.2.13 557-1468,	
( <b>b</b> )	EPR/0-Ring			0.95	Sec. 5.2.5	
(c)	* RECTIFIER			0.98	557-1468, Tbl. III	1
(d) (e)	* COIL ASSEMBLY & REED S TERMINAL BOARD	WITCH		1.05	557-1468, Tbl. III 557-1468, TBL III	RZ

JUSTIFICATION/COMMENTS In Test Report 2375 Target Rock defined the most be state temperature sensitive material as silicone rubber with an assigned activiation energy of 0.61 eV. However, Target Rock later had National Technical Systems perform a materials analysis on a randomly selected solenoid valve to determine the arameters for the accelerated aging of the materials to a state of degradation equivalent to that incurred in normal service. We have listed above, and will use, the activation energies founded by NTS in the referenced report for all life calculations performed for the valves in this binder (see TAB C).

* THE ACTIVATION ENERGY LISTED IS THE LOWEST ACTIVATION ENERGY OF ANY MATERIAL IN THE COMPONENT.

	TARGET ROCK CHECKED WELL DATE				
	JIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE ECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS				
(1	) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure inot met (yes/no/NA)? Yes (Reference _2375, App. G, p. 18).				
	Identify Acceptance Criteria: <u>Valve must operate at minimum 60 Vac</u>				
	and maximum 144 Vac. Allowable seat leakage must not exceed 0.4cc/				
	12 min. Position indicators, when applicable, must satisfactorily				
	indicate when valve is cycled.				
(2)	) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verifie before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference 2375, App. G).				
	Identify baseline and functional testing:See (1) above				
	JUSTIFICATION/COMMENTS				
	·				
	Does the qualification report/analysis describe loads (or load				
(3)	combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>2375,App.A,Sec. 4.4</u> ).				
(3)	combinations) applied during DBE test (yes/no/NA)? Yes (Reference 2375, App.A, Sec. 4.4 ). JUSTIFICATION/COMMENTS The valve was connected to high pressure line				
(3)	(Reference 2375, App.A, Sec. 4.4 ).				
(3)	(Reference <u>2375, App.A, Sec. 4.4</u> ). JUSTIFICATION/COMMENTS The valve was connected to high pressure lin				

TVA 19537 (OE-3-86)

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TARGE				<u>.VES –</u> COMPUTED	WBK DATE 8	8/27/86_AFM 8/21/89 5 8/27/86_EEM(
						8/24/89 1
J.	EQUI	PMENI	ELECTRICAL	CHARACTERISTICS N	ECESSARY TO E	NSURE THE
		ORMAN tinue		ATIONS CAN BE SATI	SFIED UNDER A	CCIDENT CONDITI
	·					
	(4)			loads during basel: ions (Yes/No/NA)?		
n		App.	-	······································	(ACEC	)
		JUST	IFICATION/CO	MMENTS Voltage w	as varied fro	om 60-144 Vac.
		17 - 1				
		Vaiv	<u>e was under</u>	process pressure	<u>ot 2485 psig.</u>	
	(5)			cal characteristi	-	
		equi	pment perfor	mance specification	ons can be sa	tisfied.
		(a)	<u>Parameter</u>	Plant Normal Con		Reference
					Dwgs	45N600-1-3 45N600-30-10
						45W600-68-1
			Voltage	<u>125 Vdc - 120 V</u>	ac	45N600-43-4
	•		Load	C		Vendor Drawing
				See comments	• .	TAB I
·			Frequency	60 Hz for AC		
	÷	-	Accuracy	NA	<u> </u>	
			Other(s)			
			· .			
			JUSTIFICATI	ON/COMMENTS		
			<u>Model</u>	Voltage	Load (	Amps)
			77J-001	125 VDC	0.5	
			82AB-001	125 VDC	3.5	
			82KK-001	120 VAC	0.6	
			82KK-002	120 VAC	0.6	
			82UU-001 82KK-004	125 VDC	1.3	
			0211-004	120. VAC	0.6	
				· · · · · · · · · · · · · · · · · · ·		

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PERF	PMENT ELECTRI ORMANCE SPECI tinued) Parameter Voltage Load Frequency	CHECKED WBK DATE 8 CAL CHARACTERISTICS NECESSARY TO E FICATIONS CAN BE SATISFIED UNDER A Specific Accident Conditions 84.37 Voc MIN. 93.9 VAC MIN. See J (5)(a)	<u>IZ7/86 EEM</u> <u>ZAA</u> 8/24/89 7/12/9 <u>INSURE THE</u> <u>CCIDENT CONDITIONS</u> <u>Reference</u> <u>SEE COMMENTS</u>
PERF (Con	ORMANCE SPECI) tinued) <u>Parameter</u> Voltage Load Frequency	FICATIONS CAN BE SATISFIED UNDER A Specific Accident Conditions 84.37 VOC MIN. 93.9 VAC MIN.	CCIDENT CONDITIONS
·	Parameter Voltage Load Frequency	84.37 VOC MIN. 93.9 VAC MIN.	
(b)	Voltage Load Frequency	84.37 VOC MIN. 93.9 VAC MIN.	
	Load Frequency	93.9 VAC MIN.	SEE COMMENTS
	Frequency	<u>See J (5)(a)</u>	
		60 Hz for AC	
	Accuracy	NA .	·····
	Other(s)	-	
	JUSTIFICATION (AC_Voltage)	I/COMMENTS <u>DNE Calculation WBN-EE</u> and WBN-EEB-MS-TIll-0004 (DC Volt	B-MS-TI06-0017 age).
(c)	Parameter	Demonstrated Conditions	Reference
	Voltage	60-144 VAC (SEE COMMENTS)	<u>(1) App B</u>
	Load	365 mA @ 120 VAC	<u>(1) App B</u>
	Frequency	<u>60 Hz</u>	(1) App B
	Accuracy	NA	
	Other(s)		- <del></del>
		ÑA	
	Voltages rang However, the l using 120 VAC THAT THE VALV AT THE MUM	COMMENTS <u>The tested value succe</u> <u>E and post-DBE simulation function</u> ing from 60 VAC minimum to 144 VAC <u>DBE simulation test. the value was</u> only. THEREFORE, THE TEST COES <u>VE WILL OPERATE CURING ACCIDE</u> <u>VOLTAGE. THIS DISCREPANCY</u> SEE OPEN (TENT $\neq$ 1).	al testing at maximum. cycled

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	ET RC	CK		CHECKEDRKW	DATE <u>9/9/86</u> <u>محريم</u> (بوراندر)	
ĸ.	<u>REQU</u>	IRED	OPERATING ENVIRO	<u>NMENT</u> (Worst Cas Areas)	e for All Environmenta.	1
•	Refe	rence	e Environmental D	-	5-61, 47E235-44, 47E235 5-42	<u>5–7</u>
	(1)	Norm	nal Max	(2) Abn	ormal Max	
		(a)	Temperature (°F	') <u>130°F</u> (a)	Temperature (°F) <u>140</u>	°F
		(b)	Pressure (psig)	<u>14.4 ps</u> ia (b)	Pressure (psig) <u>14.7</u>	<u>4 p</u>
		(c)	Humidity (%)	<u>80%</u> (c)	Humidity (%) <u>100</u> %	6
		(d)	Radiation (rd)	2 x 10 ⁷ rads; <u>40 yr T</u> ID (d)	Radiation (rd) <u>N/A</u>	
	(3)		ess Interfaces: ess interface.		ddressing of appropriat	<u>e</u>
			•			
	(4)	cond	litions: <u>Will oc</u>	currence frequen cur less than 1% urs per excursion	cy and duration of abno of plant life and coul n.	orm Ld
	(4) (5)	cond exis Acci	litions: <u>Will oc</u> <u>t for up to 8 ho</u> .dent (worst case	<u>cur less than 1%</u> urs per excursion	of plant life and coul n. tion of specified accid	.d
		cond exis Acci	litions: <u>Will oc</u> <u>t for up to 8 ho</u> .dent (worst case	cur less than 1% urs per excursion for any combina peak, duration, a	of plant life and coul n. tion of specified accid	ld
		cond <u>exis</u> Acci para	litions: <u>Will oc</u> <u>t for up to 8 ho</u> dent (worst case meter including	cur less than 1% urs per excursion for any combina peak, duration, a ) <u>327°F</u>	of plant life and coul n. tion of specified accid and profile):	len IEL
		cond <u>exis</u> Acci para (a)	litions: <u>Will oc</u> at for up to 8 ho dent (worst case meter including Temperature (°F	cur less than 1% urs per excursion for any combina peak, duration, a ) <u>327°F</u>	of plant life and coul n. tion of specified accid and profile): Accident type LOCA/H	ld len IEL
		cond <u>exis</u> Acci para (a) (b) (c)	litions: <u>Will oc</u> at for up to 8 ho dent (worst case meter including Temperature (°F Pressure (psig) Humidity (%)	cur less than 1% urs per excursion for any combina peak, duration, a ) <u>327°F</u> <u>25.6 psia</u>	of plant life and coul n. tion of specified accid and profile): Accident type <u>LOCA/H</u> Accident type <u>LOCA/H</u>	len IEL
		cond <u>exis</u> Acci para (a) (b)	litions: <u>Will oc</u> at for up to 8 ho dent (worst case meter including Temperature (°F Pressure (psig)	cur less than 1% urs per excursion for any combinat peak, duration, a ) <u>327°F</u> <u>25.6 psia</u> <u>100%</u> 7.4 x 10 ⁷ rads (beta)*	of plant life and coul n. tion of specified accid and profile): Accident type <u>LOCA/H</u> Accident type <u>LOCA/H</u>	len IEL
		cond <u>exis</u> Acci para (a) (b) (c)	<pre>litions: Will oc it for up to 8 ho dent (worst case meter including Temperature (°F Pressure (psig) Humidity (%) Radiation (rd)</pre>	cur less than 1% urs per excursion for any combinat peak, duration, a ) <u>327°F</u> <u>25.6 psia</u> <u>100%</u> 7.4 x 10 ⁷ rads (beta)* 3.3 x 10 ⁷ rads	of plant life and coul n. tion of specified accid and profile): Accident type <u>LOCA/H</u> Accident type <u>LOCA/H</u> Accident type <u>LOCA/H</u>	len IELI

PAGE B-19 R1

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pH, is 30
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BINDER	NO. WBI	NEQ-SOL-002	PLANT	WBN	_ UNIT(S	5)1	SHI	EET <u>19</u>	OF 26
							R_	<u> </u>	2
BINDER	TITLE_	SOLENOID VAL	VES -	COMPUTED	RJP	DATE	<u>9/9/86</u>	AFM 8/24/89	am
									5/2/90
TARGET	ROCK	•		CHECKED	RKW	DATE	<u>9/9/86</u>		
								8/24/80	1/12/10

### L. SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS

#### (1) <u>Comparison of worst case maximum parameters</u>:

Parameter	<u>Specified</u>	Demonstrated	Reference
Operating Time	<u>100 days</u>	14 days	2375,App. A <u>Sec. 4.4.6</u> 2375,App. A
Temperature (°F)	<u>327°F</u> 25.6 psia	<u>385°F</u>	<u>Sec. 4.4.2</u> 2375, App. A
Pressure (psig)	(11.2 psig)	<u>  66 psig    </u>	Sec. 4.4.2
Relative Humidity (%)	100%	100%	2375,App. A <u>Sec. 4.4.2</u>
*Chemical Spray	2000 ppm Boron (H ₂ BO ₃ ) <u>pH 8.3</u>	6200 ppm Boron (H ₃ BO ₃ ) p <u>H 8.6-10.0</u>	2375,App. A <u>Sec. 4.4.2</u>
**Radiation (rd)	1.24x10 ⁸ rads (beta/gamma)	1.35x10 ⁸ rads gamma	<u>2375, App. C</u>
Submergence	NA	NA	***

*Includes spray concentration, flowrate, density, duration and pH.
**Enter 40-year integrated normal dose plus integrated accident dose
and specify type. See comments on Sheet 19A.

(2) <u>Comparison of worst case profiles and margin assessment:</u>

	Test Profile Envelopes Specified	
<u>Parameter</u>	(Yes/No/NA)	<u>Reference</u>
Temperature	YES	See (1) above
Pressure	YES	See (1) above
Relative Humidity	YES	See (1) above
		See Sec.
Chemical Spray	YES	Page 3
Submergence	<u>NA</u>	***

JUSTIFICATION/COMMENTS ***Equipment located inside containment inside the crane wall below elevation 722 (surge level) could become submerged following an accident. Outside the crane wall, the steady state flood level is 717.7'. None of the valves inside containment are located below these levels. All valves in the Auxiliary Building and south valve room are located above the max. flood levels of 713'3" in the auxiliary Bldg (Rm A28) and 731.5' for significant wetting in the south valve room. Therefore, no valves in this binder are subject to submergence.

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WBEP-0136Q

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BINDER	NO. WBNEQ-SOL-002 PLAN	C WBN	_ UNIT(S)	1SHE	ET <u>19A</u>	0F_26_
BINDER	TITLESOLENOID_VALVES	COMPUTED_	RJP DAI	R <u>.</u> TE <u>8/27/8</u> 0	<u>    1                                </u>	2 AFM
TARGET	ROCK	CHECKED		TE 8/27/80	8/24/89	5/16/90
	NOON		<u> </u>	.5 0/2//0	8/24/89	7/12/90

COMMENTS FOR SECTION L(1) (RADIATION):

The worst-case total radiation dose is in the reactor building lower compartment. The 100-day accident dose given by WBN Environmental Data Drawing 47E235-42 is  $4.7 \times 10^8$  rads BETA and  $4 \times 10^7$  rads GAMMA. The 40 year dose is  $2.0 \times 10^7$  rads. All of the solenoid valves in this binder that are located in the lower compartment are in a fan room, or an accumulator room, except the System 68 valves which are located above the pressurizer at elevation 789'. The 100-day accident GAMMA dose for the accumulator and fan rooms is  $1 \times 10^7$  rads given by drawing 47E235-42. OE Calculation WBNNAL3-004 recommends an accident dose of  $4.0 \times 10^7$  for equipment next to the sump water level (Elev. 722') and  $3.3 \times 10^7$  rads for equipment further above it. Since the System 68 valves are located at Elev. 789', the accident radiation dose for these valves is  $3.3 \times 10^7$  rads. Therefore, the worst-case radiation dose for the solenoid valves in this binder is  $4.7 \times 10^8$ rads BETA and  $3.3 \times 10^7$  rads GAMMA for the 100-day accident dose and  $2.0 \times 10^7$  rads GAMMA for the 40 year dose.

Gim RZ

6/12/90 RZ

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Post-DBA BETA Radiation must be addressed for all equipment located inside containment which is required for LOCA mitigation. The valves listed in TAB C, Section C-1 (I) & (II) are within that scope. All non-metallic parts of these solenoid valves are contained in a .048" thick (18ga) 300-series stainless steel metal enclosure. OE Calculation WBNTSR-051 "Reduction of Beta Dose by Sheet Steel, " page 3, shows the beta reduction factor for 18-gauge steel is equal to .158. This reduces the total 100-day BETA dose to the valve internal parts to  $(4.7 \times 10^8) \times (1.58 \times 10^{-1}) = 7.4 \times 10^7$  rads BETA.

# VALVES LOCATED IN A FAN ROOM OR ACCUMULATOR ROOM

The total combined 100-day BETA and GAMMA accident radiation dose for the non-metallic parts of these solenoid valves is  $(7.4 \times 10^7 \text{ BETA}) + (1.0 \times 10^7 \text{ GAMMA}) = 8.4 \times 10^7 \text{ rads}$ . The combined 100-day accident radiation plus the 40-year dose (2  $\times 10^7 \text{ rads}$ ) equal a total radiation dose of 1.04  $\times 10^8$  rads (BETA/GAMMA). The Target Rock valves contained in this binder are qualified to 1.35  $\times 10^8$  rads, which envelops the requirement with margin.





WBEP-0136Q

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BINDER	NO. WBNEQ-SOL-002 PLAN	T WBN	_ UNIT(S)1	SHEET 19B OF 26
BINDER	TITLESOLENOID_VALVES	_ COMPUTED	/R1 AFM DATE	R_2_R 8/24/89_GAM 5/2/99
TARGET	ROCK	CHECKED	<u>/R1:EEM</u> DATE	

### SYSTEM 68 VALVES LOCATED ABOVE PRESSURIZER

The total combined 100-day BETA and GAMMA accident -This sounds like the non-metallic parts of these solenoid valves is the goot on tayes. Tay I way theme it 7.4 x  $10^7$  rads BETA + 3.3 x  $10^7$  rads GAMMA = 1.07 : (BETA/GAMMA). The 40-year TID  $(2.0 \times 10^7) + 100-d_i$  $(1.07 \times 10^8) + 10\%$  margin  $(1.07 \times 10^7) = 1.38 \times 10^{\xi}$ changes hands. above the qualified value of 1.35 x  $10^8$  rads. In  $\sigma$ to me h radiation requirement to the qualification level, t be reduced. The qualified dose  $(1.35 \times 10^8) - 10\%$ has - accident dose  $(1.07 \times 10^8) = 1.73 \times 10^7$  rads. The TID cannot be greater than  $1.73 \times 10^7$  rads. Forty 1 por. A Katio  $(1.73 \times 10^7 \pm 2.0 \times 10^7) = 34.6$  years. Therefore, all non-metallic materials in the System 68 valves must be replaced every 34.6 years to meet the radiation requirements (See TAB G). The total radiation dose will be  $(1.73 \times 10^7) + (1.07 \times 10^8) = 1.24 \times 10^8$  rads.

### POST ACCIDENT AIR SAMPLING VALVES



Sampling valves 1-FSV-43-287, 288, 307, 318, 319, and 325 have discs made from organic compounds and, therefore, are subject to the effects of radiation from R2 the containment atmosphere. Calculation WBNTSR-022 gives the 100 day accident dose from all sources as  $6.62 \times 10^6$ . The 40-year dose for any of these values is  $2 \times 10^7$  rad TID. The combined total dose is  $2.662 \times 10^7$  rads. The Target Rock valves contained in this binder are qualified to 1.35 x  $10^8$ 

rads, which envelopes the requirement with margin. VALVES 1-F5V-43-287, 23- 307, 318, AND 325 ARE LOCATED IN THE ANNULUS, AND 1-F5V-43-28% 319 ARE LOCATED IN THE LOWER COMPARTMENT,

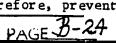


WBEP-01360

BINDER TI	TLE <u>SOLENOID VALVES</u> - COMPUTED <u>RJP</u> E		4- 25 89
EARGET RC	CHECKED <u>RKW</u> I	DATE <u>9/9/86</u>	<del>الا عالي عالي (</del> الحالة وزاق
	MARY COMPARISON OF TEST CONDITIONS TO SPECI	FIED CONDIT	IONS
(3)	Were margins applied to the test paramete addressed in the test program to assure t and uncertainties are accounted for? (No Yes/No/NA).	hat normal	variation
	<u>Suggested Margins per IEEE-323(74)</u>	Margin Applied	<u>Yes/No/NA</u>
	Temperature: +15 degrees F	<u>+58°F</u>	Yes
	Pressure: +10% but no more than 10 psig	<u>+54.8 psig</u>	Yes
	Radiation: +10% of accident dose	+10%	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)	See Below	No
	Voltage: ±10% of rated value	Later	
	Frequency: ±5% of rated value	N/A	N/A
	Environmental Transient: the initial transient and the peak temperature applied twice		Yes
	Vibration: +10% added to acceleration	2375, App A <u>Sec. 4.3.</u> 2	
	JUSTIFICATION/COMMENTS See TAB C, Sectio	ns C-1 and (	C-2, which
	proves the 14-day test envelops the 100-d	av post-acc:	ident
·	requirements. Voltage variations were app	lied during	testing
	ranging from 60V ac minimum to 144V ac ma	ximum.	
		·	

BINDI	ER TIT	WB NEQ-SOL-002       PLANT       WB N       UNIT(S)       1       SHEET       21       OF         SOLENOID VALVES       -       COMPUTED       PLANE       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R
М.	OPER	ABILITY TEST RESULTS
'n	(1)	Identify the safety function(s) of this equipment: (Reference <u>See TAB A</u> ).
		JUSTIFICATION/COMMENTSFunctions are varied. All are listed
		in TAB A.
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference <u>2375,Sec. 2.0 &amp; App. A, 5.3</u> ).
		JUSTIFICATION/COMMENTS
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? Yes (Reference 2375, Sec. 2.0 & App. A, 5.3). JUSTIFICATION/COMMENTS
	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? Yes (Reference 2375, Sec. 2.0 & App. A, 4.4).
		JUSTIFICATION/COMMENTS <u>See TAB C, Sections C-1 and C-2, "Post-</u> Accident Life"
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? Yes (Reference <u>2375,Sec.2.0/4.1.10</u> ).
		JUSTIFICATION/COMMENTS The test anomaly addressed in Sec. 4.1.10 relative to relay contacts, applies only to the model 77J-001 valves in this binder, since they are the only valves herein having relays. The relays failed to make contact due to surface corrosion but functioned properly after they were polished. Target Rock did not address the cause of the relay contact corrosion. However, after reviewing the test report it is reasonable to deduce that moisture entered the test valve during accident simulation via an unsealed conduit entry to cause the damage. The model 77J-

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		ER NO. WBNEQ-SOL-002 PLANT WBN UNIT(S) 1 SHEET 22 OF	
	BIND	TARGET ROCK CHECKED W// DATE	
	N.	MAINTENANCE AND SURVEILLANCE	<u></u>
	·	Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification an which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets).	nd
-		JUSTIFICATION/COMMENTS See QMDS	
		·	
		· · · · · · · · · · · · · · · · · · ·	
		······································	
		PAGE 8-25	

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	DER NO. WENEQ-SOL-002 PLANT WEN UNIT(S) 1	SHEET <u>23</u> OF _ E <u>\$/21/86</u> R R
	TARGET ROCK CHECKED	QI AKI
0.	SUMMARY OF REVIEW	Yes/No/NA
	(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	Yes
	(2) Any exceptions (i.e., sound reasons to the contrar taken to the specified qualification level adequately justified?	y) <u>N/A</u>
	(3) Choice of qualification methodology adequately justified?	Yes
	(4) If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	N/A
	(b) Were specific features and failure modes and effects analyzed?	<u>N/A</u>
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	<u>N/A</u>
	(d) Were environmental parameters which affect equipment performance identified?	<u>N/A</u>
	(5) Adequate similarity between equipment and test specimen established?	Yes
	(6) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior application of DBE conditions?	to <u>Yes</u>
	(c) Absence of preaging in test/analysis justified	? <u>N/A</u>
	(d) Materials susceptible to thermal/radiation aging identified?	Yes

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BINDER N	IO.WBNEQ-SOL-002 PLANT WBN UNIT(S) 1	SHEET 24OF 26
BINDER T	TTLE SOLENOID VALVES - COMPUTED 2 DATE 8	127/86 R R
	TARGET ROCK CHECKED	hullop
o. sum	MARY OF REVIEW (Continued)	
		Yes/No/NA
\$	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7)	Qualified life or replacement schedule established?	Yes.
. (8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	Yes
	(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11)	Criteria regarding submergence satisfied?	Yes
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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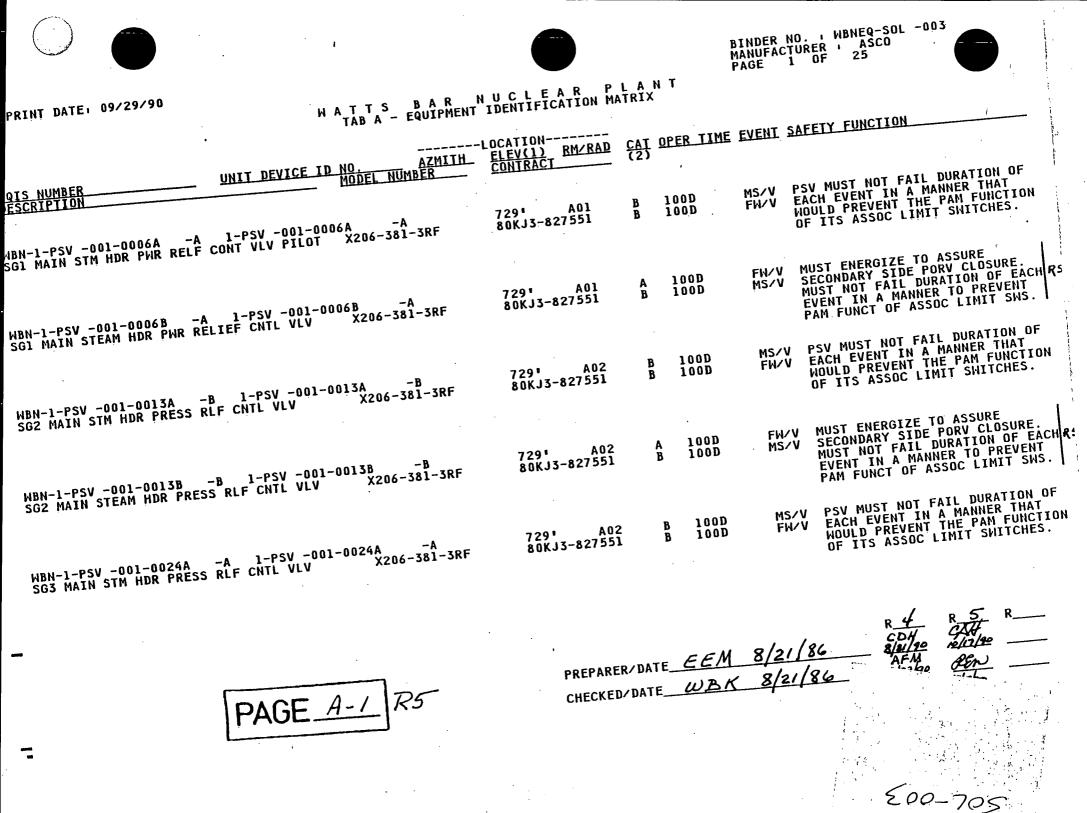
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BINDER NO.	BNEQ-SOL-002 PLANT WBN UNIT(S) 1	_ SHEET _25_ OF
	SOLENOID VALVES - COMPUTED LL DATE	R 2 R
- <u>85.75 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 -</u>	TARGET_ROCK CHECKED	
0. <u>SUMMAR</u>	Y OF REVIEW (Continued)	Yes/No/NA
(15) Cr:	iteria regarding functional testing satisfied?	Yes
(a)	) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
(Ъ	) Was an initial base line test done to establish required performance characteristics?	<u>    Yes</u>
(c)	) Has the test/analysis demonstrated that performance performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	Yes
(16) Cri	iteria regarding instrument accuracy satisfied?	Yes
	st duration margin (1 hour + function time) satisfied?	Yes
(a)	) Is the minimum specified operating time at least 1 hour?	Yes
(Ъ)	) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>N/ A</u>
(18) Cri	teria regarding symergistic effects satisfied?	YES azm 6/13/-
(19) Cri	teria regarding margins satisfied?	Yes
	ntenance and surveillance requirements adequately identified?	Yes
P. DISCUSS	SION	
<u>1.Non-s</u>	eismic vibration aging (sec. H.(6)), Non-seismic vil	pration
aging w	as not performed as required by IEEE 323-1974. This	does not
affect	the qualification of the tested or installed valves i	for the
followi	ng reasons:	
4 <b>, 23, 43, 44, 44, 44, 44</b> , 44, 44, 44		
•		

		DER NO. WBNEQ-SOL-002 PLANT WBN UNIT(S) 1 SHEET 26 OF 26 DER TITLE SOLENOID VALVES - COMPUTED R. DATE 8/27/86 TARGET ROCK CHECKED WWK DATE 8/27/86
	P.	DISCUSSION (Continued) (A) There were no test anomalies associated with the seismic portion of the qualification testing.
		(B) Non-seismic vibration aging is not a recognized problem for
		solenoid valves. Other solenoid valves, including some Target Rock models, have been subjected to this type testing with no discre- pancies noted.
		(C) Periodic maintenance and surveillance activities will detect any problems which would result from the effects of non-seismic vibration
	-	aging.
		2. Moisture or liquid intrusion (Sec.K (6)).
		The valves requiring protection from moisture or liquid intrusion
		have had Conax conduit seals installed and are identified in Section
		1 of the QMDS, which is located in TAB G of the binder.
		3. Chemical Sprav (Sec. L (1) & (2)).
		The containment spray flow rate is equal to 9500 gal/min or 0.92 gpm
		per square foot of containment cross section. The chemical spray
		concentration is 2000ppm boron with a pH of 8.35. The Target Rock
		test valve was subjected to a spray solution of 6200ppm boron and
		50ppm hydrazine with a pH of 8.6-10.0. The spray rate was 0.15 gpm
		per square foot of projected area of the test valve. The test
		solution is more corrosive than the containment spray. Therefore,
		all valves listed in this binder fall within the qualification
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PRINT DATE: 09/29/90

BINDER NO. : WBNEQ-SOL -003 MANUFACTURER : ASCO PAGE 2 OF 25

WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

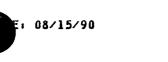
EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> <u>OPER TIME</u> (2)	EVENT	SAFETY FUNCTION
WBN-1-PSV -001-0024B -A 1-PSV -001-0024B -A SG3 MAIN STEAM HDR PRESS RLF CNTL VLV X206-381-3RF	729¶ A02 80KJ3-827551	A 100D B 100D	F₩⁄V MS⁄V	MUST ENERGIZE TO ASSURE SECONDARY SIDE PORV CLOSURE. MUST NOT FAIL DURATION OF EACH EVENT IN A MANNER TO PREVENT PAM FUNCT OF ASSOC LIMIT SHS.
WBN-1-PSV -001-0031A -B 1-PSV -001-0031A -B SG4 MAIN STM HDR PRESS RLF CNTL VLV X206-381-3RF	729' A01 80KJ3-827551	B 100D B 100D	MS∕V FW∕V	
WBN-1-PSV -001-0031B -B 1-PSV -001-0031B -B SG4 MAIN STEAM HDR PRESS RLF CNTL VLV X206-381-3RF	729' A01 80KJ3-827551	A 100D B 100D	FW/V MS/V	
HBN-1-FSV -001-0147 -A 1-FSV -001-0147 -A SG LOOP 1 WARMING VALVE X206-381-6RVF	729 <b>'</b> A01 84PK4-343461	A/B 5MN/100D B 100D	F₩⁄V MS⁄V	MUST DEENERGIZE TO CLOSE ASSOC FCV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL IN A MANNER TO PREVENT PAM FUNCT OF ASSOC LIMIT SHS.
WBN-1-FSV -001-0148 -B 1-FSV -001-0148 -B SG LOOP 2 WARMING VALVE X206-381-6RVF	729' A02 84PK4-343461	A/B 5MN/100D B 100D	F₩⁄V Ms⁄V	MUST DEENERGIZE TO CLOSE ASSOC FCV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL IN A MANNER TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.

PREPARER/DATE EEM 8/21/86 8/21/86 Ren Iginho WBK CHECKED/DATE___

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PAGE	3	0F	25	



WATTS BAR NULEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME EVEN</u> (2)	I SAFETY FUNCTION
HBN-1-FSV -001-0149 -A SG LOOP 3 HARMING VALVE	1-FSV -001-0149 -A X206-381-6RVF	729' A02 84PK4-343461	A/B 5MN/100D FW/V B 100D MS/V	
✓ WBN-1-FSV -001-0150 -B SG LOOP 4 WARMING VALVE	1-FSV -001-0150 -B X206-381-6RVF	729' A01 84PK4-343461	A/B 5MN/100D FW/V B 100D MS/V	MUST DEENERGIZE TO CLOSE ASSOC
/WBN-I-SV -003-0172 -A SG3 Level control sol vlv	1-LSV -003-0172 -A 206-381-3RVU	737 A05 80KJ3-827551	A/B 5MN/100D LOCA B 1 MO AF B 1 MO RH/A B 1 MO CV/A B 1 MO AB	TO PREVENT ASSOC LCV CLOSING. All other events: Must Not
₩BN-1-LSV -003-0173 -B SG2 LEVEL CONTROL SOL VLV	1-LSV -003-0173 -B 206-381-3RVU	737 <b>"</b> A05 80KJ3-827551	A/B 5MN/100D LOCA B 1 MO AF B 1 MO RH/A B 1 MO CV/A B 1 MO AB	TO PREVENT ASSOC LCV CLOSING. All other events: Must Not
✓ WBN-1-LSV -003-0174 -B TDAFWP STM GEN 1 LEVEL SOL \	1-LSV -003-0174 -B VALVE 206-381	729" AO1	B 100D MS/V A/B 5MN/100D FW/V	MS/V: MUST NOT FAIL IN MANNER THAT WOULD PREVENT PAM FUNCT OF ASSOC LIMIT SWS. FW/V: MUST DEENERGIZE AND REMAIN SO ASSOC LCV WILL MODULATE.

PREPARER/DATE <u>EEM 8/21/86</u> - 11BK 8/21/86 Alle Alle ATM B/28/90 CHECKED/DATE WB

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WATTS BAR NOTEEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH. Model Number	LOCATION Elev(1) Rm/RAD Contract	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
[/] NBN-1-LSV -003-0175 -A TDAFWP STM GEN 4 LEVEL SOL	1-LSV -003-0175 -A VALVE 206-381-3RVU	729• A01 80KJ3-827551	B A∠B		MS/V FW/V	MS/V: MUST NOT FAIL IN MANNER THAT WOULD PREVENT PAM FUNCT OF ASSOC LIMIT SWS. FW/V: MUST DEENERGIZE AND REMAIN SO ASSOC LCV WILL MODULATE.
/WBN-1-FSV -003-0185 -B SG1 MAIN FW CHECK VALVE BY	1-FSV -003-0185 -B PASS 206-381-2F	729' A01 78K3-822950	A∕B A∕B	(3)/100D 5mn/100D	MS/V FW/V	VLVS ARE ISOLATED ON A FW ISOLATION SIGNAL. VLVS MUST Deenergize to vent opr for MS/V event.
WBN-1-FSV -003-0186 -A SG2 MAIN FW CHECK VALVE BY	1-FSV -003-0186 -A PASS 206-381-2F	729 <b>!</b> A02 78K3-822950		(3)/100D 5mn/100D	MS/V FW/V	VLVS ARE ISOLATED ON A FW ISOLATION SIGNAL. VLVS MUST Deenergize to vent opr for MS/V event.
✓WBN-1-FSV -003-0187 -B SG3 MAIN FW CHECK VALVE BY	1-FSV -003-0187 -B PASS 206-381-2F	729 <b>'</b> A02 78K3-822950	A∕B A∕B	(3)/100D 5mn/100D	MS/V FW/V	VLVS ARE ISOLATED ON A FW ISOLATION SIGNAL. VLVS MUST DEENERGIZE TO VENT OPR FOR MS/V EVENT.
WBN-1-FSV -003-0188 -A SG4 MAIN FW CHECK VALVE BY	1-FSV -003-0188 -A Pass 206-381	729! A01		(3)/100D 5mn/100D	MS∕V F₩∕V	VLVS ARE ISOLATED ON A FW ISOLATION SIGNAL. VLVS MUST DEENERGIZE TO VENT OPR FOR MS/V EVENT.

PREPARER/DATE EEM 8/21/86 CHECKED/DATE WBK 8/21/86 CHECKED / DATE WBK 8/01 8/28/90

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BINDER NO. : WBNEQ-SOL-003 MANUFACTURER : ASCO PAGE 5 OF 25

## WATTS BAR NOLLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL N			RM/RAD	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-FSV -003-0236A -A Upper tap main fw SG1 ISLN	1-FSV -003-0236A - VALVE 206-381	••	729	A01			MS/V Fw/V	VLVS MUST CLOSE ON FW ISLN SIGNAL, THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
WBN-1-FSV -003-0236B -B Upper tap main FW SG1 ISLN	1-FSV -00 <b>3-0236B -</b> Valve 206-381	-	729	A01		(3)/100D 5MN/100D	MS/V FW/V	VLVS MUST CLOSE ON FW ISLN SIGNAL, THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
✓WBN-1-FSV -003-0239A -A UPPER TAP MAIN FW SG2 ISLN	1 130 000 0000	••	729 <b>'</b> 78K3-8229	A02 50	A∕B A∕B	(3)/100D 5mn/100D	MS/V FW/V	VLVS MUST CLOSE ON FW ISLN SIGNAL,THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
✓WBN-1-FSV -003-0239B -B UPPER TAP MAIN FH SG2 ISLN	1-FSV -003-0239B - VALVE 206-381	-	729•	A02		(3)/100D 5MN/100D	MS/V FW/V	VLVS MUST CLOSE ON FW ISLN SIGNAL,THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
√WBN-1-FSV -003-0242A -A UPPER TAP MAIŅ FW SG3 ISLN	1 101 000 00100	••	729'	A02		(3)/100D 5MN/100D	MS/V FW/V	VLVS MUST CLOSE ON FW ISLN SIGNAL,THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.

PREPARER DATE EEM 8/31/86 186 CHECKED/DATE WBK 8/2 8/28/90

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## WATTS BAR NOTEEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID		OCATION ELEV(1) CONTRACT	RM/RAD C		<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
∕WBN-1-FSV -003-0242B -B Upper tap main FW SG3 ISLN	1-FSV -003-0242 VALVE	B -B 206-381-2F	729' 78K3-8229				MS∕V F₩∕V	VLVS MUST CLOSE ON FW ISLN SIGNAL, THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
∕WBN-1-FSV -003-0245A -A Upper tap main FW SG4 ISLN	1-FSV003-0245 Valve	A -A 206-381	729'				MS/V FW/V	VLVS MUST CLOSE ON FW ISLN SIGNAL, THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
∕WBN-1-FSV -003-0245B -B Upper tap main FW SG4 ISLN	1-FSV -003-0245 VALVE	B -B 206-381-2F	729 <b>'</b> 78K3-8229				MS∕V F₩∕V	VLVS MUST CLOSE ON FW ISLN SIGNAL, THESE VLVS ALSO PERFORM CONTAINMENT ISLN FUNCTION. VLVS MUST DEENERGIZE FOR MS/V EVENT.
✓ WBN-1-FSV -030-0002 -A Purge Air Sup FAN A Isln va	1-FSV -030-0002 LVE	-A 206-381-3RF	737 <b>'</b> 84K6-8357		<b>\∕B</b>	5MN/100D	L	DAMPERS ARE ACTIVATED BY A CNTMT VENT ISLN SIGNAL AND REQUIRED TO CLOSE AND REMAIN CLOSED FOR THE DURATION OF THE EVENT.
✓WBN-1-FSV -030-0005 -A Purge Air Sup Fan B Isln va	1-FSV -030-0005 LVE	-A 206-381-3RF	737 <b>!</b> 84K6-8357		AZ.B	5MN/100D	L	DAMPERS ARE ACTIVATED BY A CNTMT VENT ISLN SIGNAL AND REQUIRED TO CLOSE AND REMAIN CLOSED FOR THE DURATION OF THE EVENT.

R___ PREPARER/DATE <u>EEM 8/31/86</u> CHECKED/DATE <u>WBK 8/31/86</u> <u>ATM</u> 8/28/90

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BINDER NO. 1 WBNEQ-SOL-007 MANUFACTURER 1 ASCO PAGE 7 OF 25

# WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMIT MODEL NUMBER	LOCATION H <u>ELEV(1)</u> <u>RM/RAD</u> CONTRACT	CAT OPER TIME	EVENT	SAFETY FUNCTION
✓WBN-1-FSV -030-0007 -A Upper compt purge ISLN Val	1-FSV -030-0007 -A 286 VE X206-381-3RF	795"8" ANN 30KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV'S ON A CNTMT VENT ISLN SIGNAL AND RESET.
WBN-1-FSV -030-0008 -B Upper compt purge ISLN val	1-FSV -030-0008 -B 289 VE X206-381-3RF	797°2" UC 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH CNTMT VENT ISO SIG PRESENT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -030-0009 -B Upper compt purge ISLN val	1-FSV -030-0009 -B 263 VE X206-381-3RF	800'9" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	L MS/C FN/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV'S ON A CNTMT VENT ISLN SIGNAL & RESET.
✓WBN-1-FSV -030-0010 -A Upper compt purge ISLN val	1-FSV -030-0010 -A 261 VE X206-381-3RF	797 <b>'</b> UC 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	FW/C , RH/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH CNTMT VENT ISO SIG PRESENT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -030-0012 -A Annulus purge valve solend	1-FSV -030-0012 -A 260 DID X206-381-2RU	795 <b>'8"</b> ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE ON A CNTMT VENT ISLN SIGNAL AND CANNOT FAIL CAUSING FCV TO REMAIN OPEN.

PREPARER/DATE <u>EEM 8/21/86</u> CHECKED/DATE <u>WBK 8/21/86</u> CHECKED/DATE WBK

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BINDER NO. : WBNEQ-SOL-003 MANUFACTURER : ASCO PAGE 8 OF 25



# WATTS BAR NUTEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION		TH_ ELEV(1) RM/RAD CONTRACT	<u>CAI OPER TIME</u> ( (2)	EVENT	SAFETY FUNCTION
∕WBN-1-FSV -030-0013 -A Interim Absce ISLN valve	1-FSV -030-0013 -A X206-381-2RU	713' A06 80KJ3-827551	A/B 5MN/100D I	-	MUST DEENERGIZE TO CLOSE ASSOCIATED FCV ON ABI SIGNAL. MUST REMAIN DEENERGIZED TO PREVENT VALVE OPENING AFTER SIGNAL IS RESET.
✓HBN-1-FSV -030-0014 -A Lower compt purge ISLN valv	1-FSV -030-0014 -A 305 E X206-381-3RF	738'10" ANN 80KJ3-827551	A/B 5MN/100D H A/B 15MN/1M0 H	AS/C W/C RH/C CV/C	MUST DEENERGIZE ON A CNTMT VENT ISLN SIGNAL AND CANNOT FAIL CAUSING FCV TO REMAIN OPEN.
WBN-1-FSV -030-0015 -B Lower compt purge ISLN valv	1-FSV -030-0015 -B 298 E X206-381-3RF	740 <b>'5"</b> AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B	AS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH CNTMT VENT ISO SIG PRESENT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
✓WBN-1-FSV -030-0016 -B Lower compt purge ISLN valv	1-FSV -030-0016 -B 239 E X206-381-3RF	732'10" ANN 80KJ3-827551	A/B 5MN/100D F A/B 5MN/100D F A/B 15MN/1M0 F	L 4S/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV ON A CNTMT VENT ISOLATION SIGNAL AND RESET.
WBN-1-FSV -030-0017 -A Lower compt purge ISLN VA	1-FSV -030-0017 -A 233 LLVE X206-381-3RF	741 <b>'3"</b> AC3 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 15MN/100D	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH CNTMT VENT ISO SIG PRESENT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.

PREPARER/DATE EEM 8/21/86 CHECKED/DATE_WBK 11 AM 8/28/50 86

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-----LOCATION-----

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EQIS NUMBER	UNIT DEVICE ID		ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER TIME	<u>EVENT</u>	SAFETY FUNCTION
✓WBN-1-FSV -030-0018 -B Interim Absce Isln Valve	1-FSV -030-0018	-B (206-381-2RU	713! 80KJ3-827	A06 551	A⁄B	5MN/100D	L	MUST DEENERGIZE AND REMAIN DEENERGIZED SO FCO DOES NOT OPEN WITH AN ABI SIGNAL PRESENT.
WBN-1-FSV -030-0019 -B Incore Instr RM Purge ISLN	1-FSV -030-0019 Valve )	-B 057 (206-381-3RF	730 <b>'</b> 80KJ3-827	ANN 551	A/B A/B A/B	5MN/100D 5MN/100D 5MN/100D 15MN/1N0 1HR/1N0	Ñs∕c	MUST DEENERGIZE ON A CNTMT VENT ISLN SIGNAL AND CANNOT FAIL CAUSING FCV TO REMAIN OPEN.
✓WBN-1-FSV -030-0020 -A Incore Instr RM Purge ISLN	1-FSV -030-0020 Valve >	-A 057 (206-381-3RF	727 <b>'</b> 11 <b>"</b> 80KJ3-827		A/B A/B A/B	5MN/100D 5MN/100D 5MN/100D 15MN/1M0 1HR/1M0	FW/C RH/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH CNTMT VENT ISO SIG PRESENT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -030-0028 -A Interim Absce ISLN valve	1-FSV -030-0028 )	-A (206-381-2RU	737 <b>*</b> 80KJ3-827		Ä∕B	5MN/100D	L	MUST DEENERGIZE ON AN ABI Signal and Remain Deenergized to prevent valve Opening After Reset.
WBN-1-FSV -030-0029 -B Interim Absce ISLN Valve	1-FSV -030-0029	-B (206-381-2RU	737 <b>'</b> 80KJ3-827		A/B	5MN/100D	L	MUST DEENERGIZE ON AN ABI Signal and Remain Deenergized to prevent valve Opening After Reset.

PREPARER/DATE <u>EEM 8/21/86</u> CHECKED/DATE <u>WBK 8/21/86</u> CHECKED/DATE_

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### WATTS BAR NULLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME EV</u> (2)	NT SAFETY FUNCTION
WBN-1-FSV -030-0037 -B 1-FSV -030-0037 -B 285 Lower compt purge solenoid x206-381-3RF	714'6" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS. A/B 5MN/100D FH. A/B 15MN/1M0 RH. A/B 1HR/1M0 CV.	C DEENERGIZED ON A CNTMT C VENT ISLN SIGNAL AND RESET. C
₩BN-1-FSV -030-0040 -A 1-FSV -030-0040 -A 286 Lower compt purge solenoid x206-381-3RF	721 <b>11"</b> AC4 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS. A/B 5MN/100D FW A/B 15MN/1M0 RH A/B 15MN/1M0 CV.	C VENT ISO SIG PRESENT & RESET. C MUST NOT FAIL SO AS TO PREVENT
WBN-1-FSV -030-0050 -B 1-FSV -030-0050 -B 292 UPPER CNTMT EXHAUST ISLN VALVE X206-381-3RF	718'9" AC4 80KJ3-827551	A/B 5MN/100D FW	MUST DEENERGIZE AND REMAIN TO C CLOSE ASSO FCV'S ON CNTMT VENT C ISO SIG & PREVENT OPENINT ON C SIG RESET. MUST NOT FAIL SO AS C TO PREVENT PAM FUNC ASSO LS'S.
WBN-1-FSV -030-0051 -A 1-FSV -030-0051 -A 290 Upper CNTMT EXHAUST ISLN VALVE X206-381-3RF	745'10" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS. A/B 5MN/100D FN. A/B 15MN/1M0 RH A/B 1HR/1M0 CV.	C ON A CNTMT VENT ISLN SIGNAL
WBN-1-FSV -030-0052 -A 1-FSV -030-0052 -A 252 UPPER CNTMT EXHAUST ISLN VALVE X206-381-3RF	754' UC 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS A/B 5MN/100D FW A/B 15MN/1M0 RH A/B 1HR/1M0 CV	C VENT ISO SIG PRESENT & RESET. C MUST NOT FAIL SO AS TO PREVENT

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EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME EVEN</u> (2)	I SAFETY FUNCTION
WBN-1-FSV -030-0053 -B 1-FSV -030-0053 -B 252 UPPER CNTMT EXHAUST ISLN VALVE X206-381-3RF	747'11" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	ON A CNTMT VENT ISLN SIGNAL
WBN-1-FSV -030-0054 -A 1-FSV -030-0054 -A 039 Annulus Exhaust Isln valve solenoid x206-381-2RU	729' ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	FAIL CAUSING FCV TO REMAIN Open.
WBN-1-FSV -030-0056 -A 1-FSV -030-0056 -A 038 Lower CNTMT Exhaust Isln valve x206-381-3RF	737 <b>'</b> 10" AC1 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	VENT ISO SIG PRESENT & RESET. Must not fail so as to prevent
WBN-1-FSV -030-0057 -B 1-FSV -030-0057 -B 033 Lower CNTMT Exhaust Isln valve x206-381-3RF	732'8" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	FAIL CAUSING FCV TO REMAIN
WBN-1-FSV -030-0058 -B 1-FSV -030-0058 -B 118 Incore Instr RM Exhaust Isln Valve X206-381-3RF	738'9" IIR 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	ISOL SIG AND PREVENT REOPENING MUST NOT FAIL SO AS TO PREVENT

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PAGE 12 OF 25 EAR PLANT ICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION NODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME EVEN</u> (2)	SAFETY FUNCTION
WBN-1-FSV -030-0059 -A 1-FSV -030-0059 -A 116 Incore Instr RM Exhaust ISLN VALVE X206-381-3RF	740'11" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	MUST DEENERGIZE ON A CNTMT VENT ISLN SIGNAL AND CANNOT FAIL CAUSING FCV TO REMAIN OPEN.
WBN-1-FSV -030-0060 -A 1-FSV -030-0060 -A Interim Alsce Isln Valve X206-381-2RU	757 <b>*</b> A16 80KJ3-827551	A/B 5MN/100D L	MUST DEENERGIZE ON AN ABI Signal and Remain deenergized To prevent valve opening After signal is reset.
WBN-1-FSV -030-0061 -A 1-FSV -030-0061 -A Purge Air Exh Unit a suction valve 206-381-3RF	713* A06 84K6-835731	A/B 5MN/100D L	DAMPERS ARE ACTIVATED BY CNTMN VENT ISLN SIGNAL AND ARE REQUIRED TO CLOSE AND REMAIN CLOSED FOR DURATION OF EVENT.
WBN-1-FSV -030-0062 -A 1-FSV -030-0062 -A Purge Air EXH Unit B Suction Valve 206-381-3RF	713' A06 84K6-835731	A/B 5MN/100D L	DAMPERS ARE ACTIVATED BY CNTMN VENT ISLN SIGNAL AND ARE Required to close and remain Closed for duration of event.
WBN-1-FSV -030-0069 -B 1-FSV -030-0069 -B Interim Absce ISLN valve x206-381-2RU	757' A16 80KJ3-827551	A∕B 5MN/100D L	MUST DEENERGIZE ON ABI SIGNAL AND REMAIN DEENERGIZED TO PREVENT VLV OPENING AFTER SIGNAL IS RESET.

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## WATTS BAR NOLLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAI OPER TIME EVEN</u> (2)	IT SAFETY FUNCTION
WBN-1-FSV -030-0296 -A Interim Isln Damper CDWE	1-FSV -030-0296 -A 206-381	729! A04	A/B 5MN/100D L	VLVS MUST CLOSE AND REMAIN CLOSED AFTER ABI.
WBN-1-FSV -030-0297 -B Interim Isln Damper Cdwe	1-FSV -030-0297 -B 206-381	729! A04	A/B 5MN/100D L	VLVS MUST CLOSE AND REMAIN CLOSED AFTER ABI.
WBN-1-FSV -030-0298 -B Interim Isln Damper CDWE	1-FSV -030-0298 -B 206-381	729° A04	A/B 5MN/100D L	VLVS MUST CLOSE AND REMAIN CLOSED AFTER ABI.
WBN-1-FSV -030-0299 -A Interim Isln Damper CDNE	1-FSV -030-0299 -A 206-381	729! A04	A/B 5MN/100D L	VLVS MUST CLOSE AND REMAIN CLOSED AFTER ABI.
WBN-1-FSV -031-0305 -B Incore Inst RM Chill A CWR	1-FSV -031-0305 -B 060 ISLN VALVE X206-381-2RU	736*8" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	PHASE A ISOLATION SIGNAL IS Present or on reset.

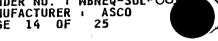
PREPARER/DATE EEM 8/21/86 CPR CHECKED/DATE WBK 8/21/86 CHM <u>litm</u> 8/28/90

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION ELEV(1) BM/RAD CONTRACT	<u>CAT OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-FSV -031-0306 -A Incore Inst RM Chill A CWR	1-FSV -031-0306 -A 063 ISLN VALVE X206-381-3RF	738' IIR 80KJ3-827551	A/B 5MN/100D / A/B 5MN/100D / A/B 15MN/1M0 /	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -031-0308 -A Incore Inst RM Chill A CWS	1-FSV -031-0308 -A 060 ISLN VALVE X206-381-2RU	739' IIR 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -031-0309 -B Incore Inst RM Chill A CWS	1-FSV -031-0309 -B 060 ISLN VALVE X206-381-2RU	738'8" ANN 80KJ3-827551	A/B 5MN/100D A/B 15MN/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE FCV AND REMAIN DEENERGIZED WHEN PHASE A ISOLATION SIGNAL IS PRESENT OR ON RESET.
MBN-1-FSV -031-0326 -A Incore Inst RM Chill B CHR	1-FSV -031-0326 -A 100 ISLN VALVE X206-381-2RU	733'2" ANN 80KJ3-827551	A/B 5MN/100D A/B 15MN/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE FCV AND REMAIN DEENERGIZED WHEN PHASE A ISOLATION SIGNAL IS PRESENT OR ON RESET.
WBN-1-FSV -031-0327 -B Incore Inst RM Chill B CWR	1-FSV -031-0327 -B 103 ISLN VALVE X206-381-2RU	733•7™ IIR 80KJ3-827551	A/B 5MN/100D A/B 15MN/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.

PREPARER/DATE <u>EEM 8/21/86</u> CHECKED/DATE <u>W8/5 8/21/86</u> A7M 8/28/90

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EQIS NUMBER		IITHELEV(1)RM/RAD CONTRACT	<u>CAT OPER TIME</u> (2)	EVENT	SAFETY FUNCTION
HBN-1-FSV -031-0329 -B Incore Inst RM Chill B CWR	1-FSV -031-0329 -B 102 ISLN VALVE X206-381-2RU	2 733'2" IIR 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0	MS/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
	1-FSV -031-0330 -A 109 ISLN VALVE X206-381-2RU		A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE FCV AND REMAIN DEENERGIZED WHEN PHASE A ISOLATION SIGNAL IS PRESENT OR ON RESET.
HBN-1-FSV -J43-0002 -B Pressurizer gas cntmt ISLN	1-FSV -043-0002 -B 282 VALVE 206-381-3RF	720 <b>! 5"</b> AC4 75C63-085629-2	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO		MUST DEENERGIZE AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN IN SPITE OF A PHASE A CNTMT ISOLATION SIGNAL.
WBN-1-FSV -043-0003 -A Pressurizer gas cntmt isln	1-FSV -043-0003 -A 293 VALVE X206-381-3RF	721!10" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE ON A PHASE A ISOLATION SIGNAL AND REMAIN Deenergized so that the FCV DOES NOT OPEN.
WBN-1-FSV -043-0011 -B Pressurizer Liquid Cntmt is	1-FSV -043-0011 -B 289 SLN VALVE 206-381-3RU	723 <b>'8"</b> AC4 84PJ5-835888	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	L MS/C FN/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN IN SPITE OF A PHASE A CNTMT ISOLATION SIGNAL.

PREPARER/DATE EEM 8/21/86 WBK 86 CHECKED/DATE_ 8/28/90

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BINDER NO. : WBNEQ-SOL-003 MANUFACTURER : ASCO PAGE 16 OF 25

## HATTS BAR NULLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

	-LOCATION ELEV(1) RM/RAD	CAT OPER TIME EVENT	SAFETY FUNCTION
EQIS NUMBER UNIT DEVICE ID NO, AZMITH DESCRIPTION MODEL NUMBER	CONTRACT	(2)	
WBN-1-FSV -043-0012 -A 1-FSV -043-0012 -A 289 PRESSURIZER LIQUID CNTMT ISLN VALVE X206-381-3RF	720' ANN 80Kj3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	MUST DEENERGIZE ON A PHASE A ISOLATION SIGNAL AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN.
WBN-1-FSV -043-0022 -B 1-FSV -043-0022 -B 291 RCS HOT LEG HDR CNTMT ISLN VALVE 206-381-3RU	721'3" AC4 84PJ5-835888	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN IN SPITE OF A PHASE A CNTMT ISOLATION SIGNAL.
WBN-1-FSV -043-0023 -A 1-FSV -043-0023 -A 314 RCS HOT LEG HDR CNTMT ISLN VALVE X206-381-3RF	729'10" ANN 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	MUST DEENERGIZE ON A PHASE A ISOLATION SIGNAL AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN.
WBN-1-FSV -043-0034 -B 1-FSV -043-0034 -B 295 ACCUM TK HDR CNTMT ISLN VALVE 206-381-3RU	735"11" AC4 84PJ5-835888	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1MO RH/C A/B 1HR/1MO CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN IN SPITE OF A PHASE A CNTMT ISOLATION SIGNAL.
WBN-1-FSV -043-0035 -A 1-FSV -043-0035 -A 285 ACCUM TK HDR CNTMT ISLN VALVE 206-381-3RU	717'10" ANN 84PJ5-835888	A/B 5MN/100D L A/B 5MN/100D MS/C A/B 5MN/100D FW/C A/B 15MN/1M0 RH/C A/B 1HR/1M0 CV/C	MUST DEENERGIZE ON A PHASE A ISOLATION SIGNAL AND REMAIN DEENERGIZED SO THAT THE FCV DOES NOT OPEN.

PREPARER/DATE <u>EEM 8/21/86</u> CHECKED/DATE <u>WB15 8/01/86</u> <u>AFM</u> 8/28/90

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WATTS BAR NUMERAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH	LOCATION ELEV(1) RM/RAD CONTRACT	CAT OPER TIME EVENT SAFETY FUNCTION
DESCRIPTION MODEL NUMBER WBN-1-FSV -043-0054D -B 1-FSV -043-0054D -B 298 STEAM GEN 1 SAMPLE CNTMT ISLN VALVE X206-381-3RF	721'9" AC4 80KJ3-827551	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0055 -A 1-FSV -043-0055 -A 291 Steam gen 1 bldn sample Isln valve 206-381-3RU	7184 ANN 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0056D -B 1-FSV -043-0056D -B 287 Steam gen 2 CNTMT ISLN VALVE 206-381-3RU	719*10" AC4 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0058 -A 1-FSV -043-0058 -A 288 STEAM GEN 2 BLDN SAMPLE ISLN VALVE 206-381-3RU	717 <b>"9"</b> ANN 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/G ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0059D -B 1-FSV -043-0059D -B 285 Steam gen 3 CNTMT ISLN VALVE 206-381	718"11" AC4	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C

PREPARER/DATE EEM 8/21/86 8/21/86 CHECKED/DATE WBK 8/21/86 9/20/50

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## WATTS BAR NULLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

	-LOCATION ELEV(1) RM/RAD CONTRACT	CAT OPER TIME EVENT SAFETY FUNCTION (2)
WBN-1-FSV -043-0061 -A 1-FSV -043-0061 -A 285 STEAM GEN 3 BLOWDOWN SAMPLE ISLN VALVE 206-381-3RU	723' ANN 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0063D -B 1-FSV -043-0063D -B 285 STEAM GEN 4 CNTMT ISLN VALVE 206-381-3RU	718'7" AC4 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBK-1-FSV -043-0064 -A 1-FSV -043-0064 -A 286 STEAM GEN 4 BLOWDOWN SAMPLE ISLN VALVE 206-381-3RU	721'5" ANN 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C
WBN-1-FSV -043-0075 -B 1-FSV -043-0075 -B 318 DNSTR EXCESS LETDOWN HTX ISLN VALVE 206-381-3RU	721'2" AC4 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE AND REMAIN A/B 5MN/100D MS/C DEENERGIZED SO THAT THE FCV A/B 5MN/100D FW/C DOES NOT OPEN IN SPITE OF A/B 15MN/1MO RH/C PHASE A CNTMT ISOLATION A/B 1HR/1MO CV/C SIGNAL.
WBN-1-FSV -043-0077 -A 1-FSV -043-0077 -A 313 DNSTR EXCESS LETDOWN HTX ISLN VALVE 206-381-3RU	721' ANN 84PJ5-835888	A/B 5MN/100D L MUST DEENERGIZE ON A PHASE A A/B 5MN/100D MS/C ISOLATION SIGNAL AND REMAIN A/B 5MN/100D FW/C DEENERGIZED SO THAT THE FCV A/B 15MN/1MO RH/C DOES NOT OPEN. A/B 1HR/1MO CV/C

PREPARER/DATE EEM 8/21/86 54/20 CHECKED/DATE WBK 8/21/86 0014 R 17911 8/28/90

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. Model Num	AZMITH	OCATION <u>ELEV(1)</u> <u>RM/RAD</u> CONTRACT	<u>CAI</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
HBN-1-FSV -043-0201 -A Loca H2 CNTMT Monitor ISLN	1-FSV -043-0201 -A Sol VLV x206-381-	226 2RU	723'3" AC3 80KJ3-827551	A A A A	100D 100D 100D 1M0 1M0		MUST FUNCTION TO ALLOW SAMPLING OF CNTMT ATMOSPHERE DURING THESE EVENTS.
WBN-1-FSV -043-0202 -A Loca H2 CNTNT MONITOR ISLN		230 2RU	723' AC3 80KJ3-827551	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MUST FUNCTION TO ALLOW Sampling of CNTMT Atmosphere during these Events.
WBN-1-FSV -043-0207 -B Loca H2 CNTMT Monitor ISLN	1-FSV -043-0207 -B SOL VLV X206-381-	300 2RU	728' AC4 80KJ3-827551	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MUST FUNCTION TO ALLOW SAMPLING OF CNTMT ATMOSPHERE DURING THESE Events.
WBN-1-FSV -043-0208 -B Loca H2 CNTMT Monitor ISLN		287 •2RU	727'8" AC4 80KJ3-827551	A A A A	100D 100D 100D 1MO 1MO	L MS/C FW/C RH/C CV/C	MUST FUNCTION TO ALLOW SAMPLING OF CNTMT ATMOSPHERE DURING THESE Events.
WBN-2-FSV -065-0007 -B Egts train a unit 2 suction	2-FSV -065-0007 -B N VALVE 206-381-3	IRF	757 <b>'</b> A16 85K8-836669	B	100D	L	FOR A UNIT 1 LOCA, THIS FSV Must not fail in a manner that Could open the associated FCV.

PREPARER/DATE EEM 8/21/86 CHECKED/DATE WBK 8/21/86 <u>AM</u> 8/28/90

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WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

	EQIS NUMBER	UNIT DEVICE ID NO AZMIIH	LOCATION	CAT	OPER TIME	EVENI	SAFETY FUNCTION
	DESCRIPTION	MODEL_NUMBER	CONTRACT	(2)			
	WBN-1-FSV -065-0008 -B Egts train a unit 1 suction	1-FSV -065-0008 -B Valve 206-381-3RU	757' A16 84PJ5-835888	A	100D	L	THESE REDUNDANT ISOLATION SOLENOIDS ARE MANUALLY OPERATED AND MAY BE REQUIRED ANYTIME DURING LOCA.
2	WBN-1-FSV -065-0010 -A Egts train a unit 1 suction	1-FSV -065-0010 -A VALVE 206-381-3RF	757 <b>'</b> A16 84K6-835731	A	100D	L	MUST ENERGIZE TO OPEN Associated FCV and Remain Energized for duration of Event.
	WBN-1-FSV -065-0026 -A UNIT 1 Shield Bldg Exhaust A	1-FSV -065-0026 -A A valve 206-381-3RF	757 <b>"</b> A16 84K6-835731	A	100D	L	DAMPERS MUST OPEN ON A CNTMT ISLN SIGNAL SO EGTS CAN DISCHARGE.
	WBN-1-FSV -065-0027 -B UNIT 1 SHIELD BLDG EXHAUST I	1-FSV -065-0027 -B 3 VALVE 206-381-3RF	757 <b>'</b> A16 84K6-835731	A	100D	L	DAMPERS MUST OPEN ON A CNTMT ISLN SIGNAL SO EGTS Can Discharge.
	WBN-0-FSV -065-0028A -B Egts train a decay cool valv	0-FSV -065-0028A -B /E A 206-381-3RU	757 <b>'</b> A16 84PJ5-835888	A	100D	L	AUTOMATICALLY ACTIVATES TO Open dampers which remove Decay heat whenever train Is isolated.

PREPARER/DATE EEM 8/21/86 9/28/50 WBK 86 CHECKED/DATE_

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	EQIS NUMBER	UNIT DEVICE ID N		OCATION Elev(1) Contract	RM/RAD CA	ι Γ	OPER TIME	EVENI	SAFETY FUNCTION
	WBN-O-FSV -065-0028B -B Egts train a decay cool val	0-FSV -065-0028B VE B 2	-B 06-381-3RU	757 <b>!</b> 84PJ5-835	A16 A 888	1	LOOD	L	AUTOMATICALLY ACTIVATES TO OPEN DAMPERS WHICH REMOVE Decay heat whenever train is Isolated.
-	WBN-1-FSV -065-0030 -B Egts train B unit 1 suction	1-FSV -065-0030 VALVE 2	-B 06-381-3RF	757 <b>'</b> 84K6-8357	A16 A 31	1		۲ _.	MUST ENERGIZE TO OPEN ASSOCIATED FCV AND REMAIN ENERGIZED FOR DURATION OF EVENT.
-	WBN-O-FSV -065-0047A -A Egts train B decay cool val	0-FSV -065-0047A Ve a 2	-A 206-381-3RU	757 <b>°</b> 84PJ5-835	A16 A 888	1	100D	L	AUTOMATICALLY ACTIVATES TO Open Dampers which remove Decay heat whenever train Is isolated.
	WBN-O-FSV -065-0047B -A Egts train B decay cool val	0-FSV -065-00478 Ve cont 2	-A 206-381-3RU	757 <b>'</b> 84PJ5-835	A16 A 888	]	100D	L	AUTOMATICALLY ACTIVATES TO OPEN DAMPERS WHICH REMOVE DECAY HEAT WHENEVER TRAIN IS ISOLATED.
	WBN-2-FSV -065-0050 -A Egts train B unit 2 suction	2-FSV -065-0050 Valve 2	-A 206-381-3RF	757 <b>*</b> 85K8-8366	A16 B 69	]	100D	L	FOR A UNIT 1 LOCA, THIS FSV Must not fail in a manner that Could open the associated FCV.

_____ R_____ PREPARER/DATE <u>EEM 8/31/86</u> CHECKED/DATE <u>WBK 8/31/86</u>

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PRINT DATE: 09/29/90

BINDER NO. : WBNEQ-SOL -003 MANUFACTURER : ASCO PAGE 22 OF 25

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### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

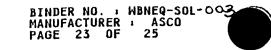
EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION L <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAT OPER TIME</u>	EVENT SAFETY FUNCTION
WBN-1-FSV -065-0051 -A 1-FSV -065-0051 -A Egts train B Unit 1 Suction Valve 206-381-3RU	757' A16 84PJ5-835888	A 100D	L THESE REDUNDANT ISLN SOLENOIDS ARE MANUALLY OPERATED & MAY BE REQUIRED ANYTIME DURING LOCA.
WBN-1-FSV -065-0052 -A 1-FSV -065-0052 -A CNTMT ANNULUS VAC FANS ISLN DMPR X206-381-3RF	757' A16 80KJ3-827551	A/B 5MN/100D	L DAMPERS MUST CLOSE ON A CNTMT ISLN SIGNAL TO ISOLATE THE ANNULUS VACUUM FANS.
WBN-1-FSV -065-0053 -B 1-FSV -065-0053 -B CNTMT ANNULUS VAC FANS ISLN DMPR X206-381-3RF	757' A16 80KJ3-827551	A/B 5MN/100D	L DAMPERS MUST CLOSE ON A CNTMT ISLN SIGNAL TO ISOLATE THE ANNULUS VACUUM FANS.
WBN-1-FSV -068-0307 -A 1-FSV -068-0307 -A 313 RCS FLDW CNTL VALVE WDS GA TO PRT 206-381-3RF	718' ANN 75C63-85629-2	A/B 15MN/1MO	
WBN-1-FSV -070-0085 -B 1-FSV -070-0085 -B Excess Letdown HTX Outlet Valve x206-381-2RU	713' A28 80KJ3-827551	B 1MO B 1MO	L MUST REMAIN DEENERZD DURATION CV/A ALL EVENTS AS LISTED TO ENSURE RH/A FCV CONT ISOL FOR LOCA AND LS AF/A PAM FUNCTION ALL OTHER EVENTS. AB/A

PREPARER/DATE EEM 8/21/86 CHECKED/DATE WBK 8/21/86 00

PAGE A-22 RS

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## WATTS BAR NULLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAT</u> OPER TIME (2)	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-FSV -077-0127 -E Reac Bldg Sump Disch Floh	В 1-FSV -077-0127 -В 296 Sol Valve X206-381	720º10º AC4	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCTION OF ASSOC LIMIT SWS.
WBN-1-FSV -077-0128 -4 Reac bldg sump disch flof	A 1-FSV -077-0128 -A N SOL VALVE X206-381-3RF	713' A28 80KJ3-827551	B 1MO B 1MO B 1MO B 1MO B 1MO A/B 5MN/100D	RH/A CV/A AF AB L	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -090-0107 -/ CNTMT BLDG LWR COMPT MON	A 1-FSV -090-0107 -A 294 ISLN VALVE X206-381-3RF	741'11" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN Deenergized to close FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0108 -1 Cntmt bldg lwr compt mon	3 1-FSV -090-0108 -B 297 ISLN VALVE X206-381-3RF	737*9* AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0109 -1 CNTMT BLDG LNR COMPT MON	3 1-FSV -090-0109 -B 298 ISLN VALVE X206-381	737"7" AC4	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/100D A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.

PREPARER/DATE <u>EEM 8/31/86</u> CHECKED/DATE <u>WBK 8/31/86</u> <u>AAM</u> 8/28/90

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## WATTS BAR NUSEEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACI	<u>CAI OPER TIME</u> (2)	EVENT	SAFETY FUNCTION
WBN-1-FSV -090-0110 -B 1-FSV -090-0110 -B 296 CNTMT BLDG LWR COMPT MON ISLN VALVE X206-381-3RF	738414 AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/100 A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0111 -A 1-FSV -090-0111 -A 293 CNTMT BLDG LWR COMPT MON ISLN VALVE X206-381-3RF	741'11" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 9MN/100D A/B 15MN/100D A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0113 -A 1-FSV -090-0113 -A 292 CNTMT BLDG UPPER COMPT MON ISLN VALVE X206-381-3RF	740"5" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0114 -B 1-FSV -090-0114 -B 295 CNTMT BLDG UPPER COMPT MON ISLN VALVE X206-381-3RF	73799" AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/100D A/B 15MN/1MO A/B 1HR/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.
WBN-1-FSV -090-0115 -B 1-FSV -090-0115 -B 294 CNTMT BLDG UPPER COMPT MON ISLN VALVE X206-381-3RF	737 <b>'9"</b> AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV WITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.

PREPARER/DATE EEM 8/21/86 CHECKED/DATE WBK 8/21/86 <u>AFM1</u> 8/28/90

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BINDER NO. : WBNEQ-SOL-003 MANUFACTURER : ASCO PAGE 25 OF 25

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LÒCATION <u>Elev(1)</u> <u>RM/RAD</u> <u>Contract</u>	<u>CAI OPER TIME</u> (2)	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-FSV -090-0116 -B 1-FSV -090-0116 -B 291 CNTMT BLDG UPPER COMPT MON ISLN VALVE X206-381	737 88 AC4	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	ELLIC	MUST DEENERGIZE AND REMAIN Deenergized to close FCV With CNTMT VENT ISOLATION Signal present or reset.
WBN-1-FSV -090-0117 -A 1-FSV -090-0117 -A 290 CNTMT BLDG UPPER COMPT MON ISLN VALVE X206-381-3RF	741'7" ANN 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN DEENERGIZED TO CLOSE FCV NITH CNTMT VENT ISOLATION SIGNAL PRESENT OR RESET.

PREPARER/DATE EEM 8/21/86 CHECKED/DATE WBK 8/21/86 CHECKED/DATE WBK <u>Atm</u> 8/28/90

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BINDER NO. WBNEQ-SOL-003 PLAN	T WBN UNIT(S) 1 SHEET 1 OF 1
	R_4 / R
BINDER TITLE ASCO SOLENOID	COMPUTED /R2 CDH. DATE 4/30/90
VALVES, MODEL 206-381 - SERIES	61-1/1
(DC CONSTRUCTION)	CHECKED /R2 AFM DATE 4/30/90 AFM
	8/28/90

## <u>tab a</u>

## NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- 2. See Page B-3 for source of Category and Operating Time assignments.
- 3. See TAB C-4, page C-90 for a discussion on post-accident conditions for these valves.
- 4. Contract numbers shown in this TAB were obtained by tracing the serial number on each valve through TVA procurement records and did not depend on field verification data for contract numbers.

		:
BINDER N	O. <u>WBNEQ-SOL-003</u> PLANT WBN UNIT(S) 1 SHEET 1 OF R 2 R	F <u>26</u>
	ITLE ASCO SOLENOID COMPUTED EEM DATE 8/21/86 (X/ MODEL 206-381 - SERIES 4/30/90	
	TRUCTION) CHECKED WBK DATE 8/21/86 ATM 43090	· .
A. DOCU	MENTATION (See Note on Page B-3)	R2
Equi	pment Description <u>Solenoid Valves</u>	-
Vend	or/Manufacturer <u>Automatic Switch Company (ASCO)</u>	-
Equi	pment Model No.(s) <u>206-381-2RU</u> <u>206-281-3RVU</u>	-
	<u>206–381–3RU</u> 206–381–6RVF	-
	206-381-3RF 206-381-2F	-
QUALI	FICATION REPORTS (See TAB C, "Discussion")(See Note on Page B-3	3)   R2
(1)	Title/Number/Revision <u>"Report on Qualifi-</u> RIMS <u>B45 850514 428</u> cation of Automatic Switch Co. (ASCO) Catalog NP-1 Solenoid Vlvs for Safety-Related Applications in Nuclear Power Generating <u>Stations", AOR-67368, Rev. 1</u> DATE 8/19/83	<u>B</u> R2
(2)	Title/Number/Revision "Equipment Qualifi- RIMS NEB 840925 35]	1
	cation Research-Test Program & Failure Analysis of Class 1E Solenoid V1vs",	-
	<u>F-C5569-309/315, Appendix C.</u> DATE Nov. 1983	-
(3)	Title/Number/Revision <u>"Aging and Qualifi-</u> RIMS B74 890623 502 cation Research on Solenoid Operated Valves," NUREG/CR-5141	2
	RV DATE August 1988	-
	Title/Number/Revision <u>"ASCO Engineering</u> RIMS <u>B25</u> 870612 00; Report No. 177"	3
	DATE 12/11/79	-   ·
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)	
Refe	r to Sheets 1A & 1B	
Note	: Throughout this TAB, references are made to the ASCO qualifition report listed above. This report is identified as (2) in these references. Although the COCs in TAB E certify compliance to ASCO test report AQS21678/TR, Rev. A, NRC Information Notice 85-08, para. 4.b (see TAB J-4) considers all ASCO NP-1 valves (except NP8316 series) qualified to (1) above. Therefore, we are using (1) above for qualification of the valves in this binder.	
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PAGE B-1 R2

	ASCO SOLENOID 206-381 - SERIES ON)	GOMPOIED <u>BEM</u>	DATE 9	11 6 41 0		- ·	
-					4/30/90	)	•
		CHECKED WBK/HDR	DATE 9	9/24/8	36 <i>40</i> 04	<del>,</del>	
	·····						
A. <u>DOCUMENTAT</u>	ION			•			
OTHER (AN	ALYSIS, VENDOR DAT	TA, ETC.) (Continu	1ed)				R2
 	Description	<u>1</u>		F	RIMs No.	<b></b>	
	Test Report No. 1 alants for Class 1	7523-1, Test Progr 1E Devices	ram	EEB	840731	501	
• • •	Laboratories Lette ber 10, 1985.	er dated		B45	851213	008	
	Letter dated Apri lve Mounting Ories			B43	850502	015	
(8) ASCO	Letters dated May	8, 1986 and May 1	16.	B71	860512	001	&
1986;		il Heat Rise Versu			860520		
Locat	÷ •	of 1E Solenoid Va Harsh Environment		B45	860902	219	
	tion of Beta Dose SR-051 R0).	by Sheet Steel		B26	891129	202	
(11) Delet	ed by Revision 2.						R2
	Dose Reduction Fr SR-057 R0).	om Finite Volume		B26	891221	201	
		lectrical Equipmer Room (WBNNAL3-031		B45	880826	235	
(14) LOCA Compa	Temperature Profi rtments (QIR NEB8)	le in the Dead-End 6170).	ied	B45	860922	253	
valve		uperheated steam i a main steam line	e break		851112	218	
(16) Solen	oid Valve Voltage	WBNEED-MS-7 Study (WBPE-VAR (	<b>I // - 000</b> 4 3602002-		900202	407	4
	rated Accident Dos inment (TI-RPS-48	se inside Primary R2).		B45	851105	235	

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BINDER	NO. WBNEO	-SOL-003 PLAN	T WBN	UNIT(	S) 1 3	SHEET 15 OF 26	
						R <u>3</u> R <u>4</u>	
		<u>CO SOLENOID</u> 6-381 - SERIES	COMPUTED	EEM	DATE	5/11/90 ×	123/90
	NSTRUCTION		CHECKED W	RK/HDR	DATE	<u>9/24/86_AFM_</u>	
						5/17/90 8	
	CUMENTATIO HER (ANAL)		ጥል ወጥሮ ነ	(Compiend	6 <b>4</b> \		
01	ICA (ANAL)	YSIS, VENDOR DA	LA, E10.)	(Continu	ea)		
		Туре		······		RIMS No.	•
	Category	and Operating T	imes				
(18)	System 1	(WBNOSG4-004	R11)			B18,900612 253	R4
(19)	System 3	(WBNOSG4-005	R10)		10	B45 900314 202	•
(20)	System 30	(WBNOSG4-008	R15)		<b>M</b> * *	B26 900309 231	
(21)	System 31	(WBNOSG4-009	R7)			B26 900309 233	
		(WBNOSG4-011				B26 900309 228	<b>R</b> 4
		(WBNOSG4-015				B26 900309 226	1
		(WBNOSG4-017				B26 890510 506	
	-	(WBNOSG4-018				B26 900110 200	
		(WBNOSG4-021				B18 900612 251	R4
		(WBN05G4-021				B45 870227 426	144
		(WBNOSG4-020 (WBNOSG4-040				B45 870227 428 B26 890321 016	
	•		·			220 070321 010	
(29)		onmental Drawin 4-01-0 per DCN				<b>))</b>	
(30)		onmental Drawin 4-03-0 and DCA- 08 819)				L04–C	
(31)	TVA Envir	onmental Drawin	g 47E235-4	4 R1			
(32)		onmental Drawin 4-06-0 per DCN			908 819	))	
(33)	TVA Enviro	onmental Drawin	g 47E235-4	8 R3			
(34)	TVA Enviro	onmental Drawin	g 47E235-5	6 R1			
(35)	TVA Enviro	onmental Drawin	g 47E235-6	1 R1			
(36)	TVA Enviro	onmental Drawin	g 47E235-7	6 R3		<b>'</b>	
(37)	TVA Enviro	onmental Drawin	g 47E235-7	8 R3			
(38)	Attenuation in Primary	on Factors for 1 7 Containment (1	Postaccide GENAPS3-02	nt Beta 1 3 RO)	Dose	B04 900320 300	
(39)	Dose Grid	Around the EGT	S Filter (	WBNISR-0	L8 RO)	B26 891106 203	
Not	equipm Inform above, This 1	listing include:	ion. The nt System epeated in s only tho:	revision (RIMS) nu other se se docume	levels mbers, ections ents wh	and Records & as listed of the binder. ich are	
	essent consid	ial to qualific lered a complete	cation and e listing ( PAGE B-	of binder	igly sh refer	ould not be ences.	

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PAGE B-3 R4

	DER NO. <u>WBNEQ-SOL-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>2</u> OF R <u>3</u> R <u>4</u>								
VAL	DER TITLE ASCO SOLENOID COMPUTED EEM DATE 9/24/86 CDH C TES, MODEL 206-381 - SERIES 5/17/90 \$								
<u>(DC</u>	CONSTRUCTION) CHECKED WBK/HDR DATE 9/24/86 AFM 0 5/17/90 3/								
B.	CONCLUSION OF REVIEW (Check only one block)								
	<u>X</u> Equipment Qualified								
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule								
	Equipment Qualification Not Established by Documentation								
	Equipment Not Qualified								
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES								
	(1) Deleted by revision 2.								
	(2) Deleted by revision 2.								
	(3) Deleted by revision 2.								
	(4) Deleted by revision 2.								
	(5) Solenoid valves with missing nameplates must be replaced								
	with qualified models and must be field verified.								
	(6) Replace four solenoid valves which must be environmentally								
	qualified to perform their intended safety-related functions.								
	(7) Deleted by revision 2.								
	(8) Conduit seal must be installed on several valves to meet								
	PAM requirements.								
	(9) WBN position on possibility of multiple ground faults								
	existing in DC distribution systems must be established.								
		R							
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	DER TITLE ASCO SOLENOID VES, MODEL 206-381-SERIES CONSTRUCTION) CHECKED MAK DATE 8/21/86						
с.	QUALIFICATION CRITERIA						
•.	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate All Documents Which are Applicable):						
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE 323-1974)						
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE 323-1971) (DOR Guidelines Applicable to only BFN)						
	JUSTIFICATION/COMMENTS						
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET IEEE 323-1974, IEEE 344-1975, IEEE 382-1980, and IEEE 627-1980						

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BIN	IDER NOWBNEQ-SOL-003 PLANT WBN UNIT(S)
BIN VAL ( DC	IDER TITLE ASCO SOLENOID       COMPUTED £6 m DATE 5/31/86         TES, MODEL 206-381-SERIES       COMPUTED £6 m DATE 5/31/86         CONSTRUCTION)       CHECKED WW DATE 5/2/80
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS See TAB C
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VALV	ES, M	TLE <u>ASCO SOLENOI</u> IODEL 206-381 - SE RUCTION)		· · ·	4/30/90
Ε.	Is t	PMENT DESCRIPTION he equipment iden	tified in the o		
		tical to the plan /No/NA)?No		ich requires qua	lification
			<u>Plant Device</u>	Qualification	Reference
	(1)	Equipment Type	<u>Solenoid Vlv</u>	Solenoid Vlv	Page 1 0f (1)
	(2)	Manufacturer	ASCO	ASCO	Page 1 of (1) Page 1 & 5
	(3)	Model Number(s)		<u>206–381–6RF</u> K206–380–3RVF	<u>of (1)</u> Table 3.2
			<u>206–381–3RU</u>	(Viton) NP832070E	of (1) App. I
			206-381-RU 206-381-3RF	<u>(Coil only)</u>	0f (1)
			<u>206–381–3RVU</u>		
			206-381-6RVF		
	(4)	Serial Number(s)	See TAB F	<u>Test Valve #3</u> Test Valve #2	Table 3.2 
				(Viton)	of (1)
	(5)	Identify Componen	nt- None		
		Unique checksheet attached:		· ·	
	JUST	IFICATION/COMMENTS	S <u>"X" Prefix t</u>	o model numbers	listed in TAB A
	<u>indi</u>	cated A 1/2" NPT of	conduit connect	ion in place of	standard 3/4"
	NPT	connection. Diffe	erences between	installed model	s and tested
		ls are orifice siz			
•		ally open, univers			
	<u>of o</u>	peration do not af	fect qualifica	tion. Both elas	tomeric

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	documentation an	aces pertinent to EQ i	dentified in	the qualification	
	documentation an			the qualification	nl
			eference the	source. Is the	
		irement for our appli			기
	If yes, enter re	equirement in QMDS, if	no, provide	justification.	
			Plant		
			Requirement?	Reference	
	<u>Interface</u>	<u>Identify Interface</u>	<u>(Yes/No)</u>	<u>Test Report</u>	
		None Specified;See			
	Mounting Bolts	TAB C,"Interfaces"	<u>No</u>	<u>NA</u>	
	_			See Below and	
	External	None Specified;See	_	Ref(1) Section	
	Process	TAB C. "Interfaces"	<u>        Yes                            </u>	<u>9.5.3 p D-98</u>	
	Connections				
	Electrical	None Specified;See TAB_C,"Interfaces"	Yes	NA	
	Connections	TAD C, INCELLACES	163		1
				Section 5.3	1
	Conduit Seals	See TAB C-9	Yes	of (1)	
•	Connector		•	•	
	Seals	N/A	<u>No</u>	<u>NA</u>	
				App. A, pg A2	,
	Orientation	Vertical & Upright	-	of (1) & ASCO	
	oriencación	<u>±45°</u> Conduit/Junction	<u> </u>	<u>Letter (TAB E-9)</u>	)
		Box must be oriented			
		such that moisture	•	Ref (1)	1
	Physical	does not drain into	•	Sec. 5.3 and	
	Configuration	coil housing	<u>        No                            </u>	P-1 this TAB	
	·. *			1	•
-	Other	See below	Yes		

(1)). See TAB C-15 for TVA's position on this. TAB G lists valves requiring elbows. See TAB C for a description of the TVA interfaces. The process fluid for these valves is oil-free instrument air. See TAB J-2 for discussion.

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	CONST		206-381 - SERIES DN)	CHECKED k	7 <u>BK</u> D.	ATE <u>8/22/86</u> 5/1/90
G.	TEST	SEQU	ENCE			
	(1)	the	Sequence: Was th accident environme graph 6.3.2 (Yes/N	ent in acc	ordance wi	
					<u>Yes/No/NA</u>	Reference
		(a)	Equipment inspect for damage	ed	Yes	Sect. 4, pg. 8 of (1)
		(b)	Baseline performa measurements take		Yes	Sect. 4, pgs. 8,23,24 of(1)
•		(c)	Equipment aged:			
	·		Thermal		Yes	Sect. 4.1.1, pg. 8 of (1) Sect. 4.1.4,
			Radiation		<u>Yes</u>	pg. 15 of (1) Sect. 4.1.2,
			Wear	•	<u>Yes</u>	pg. 12 of (1) Sect. 4.1.5, pg. 15
		(d)	Vibration/seismic conducted	testing	Yes	Sect. 4.1.6, pg. 17 of (1)
•		(e)	Design basis ever exposure	nt (DBE)	<u>Yes</u>	Sect. 4.2, pgs. 19-23 of (1)
		(f)	Post-DBE exposure	9	Yes	Sect. 4.2.3, pgs. 22 & 23 of (1)
		(g)	Final inspection disassembly	and	Yes	Sect. 4.4, pg. 24 of (1)
	(2)		the same piece of ence described in			
	(3)	cali	the test equipmen bration data been (Reference: <u>App</u>	appropria	tely docum	ented (Yes/No/NA)?
	JUS	TIFIC	ATION/COMMENTS <u>Te</u>	est Valve	#2 was uti	lized to qualify the
	<u>Vit</u>	on el	astomers. Referen	ence to t	his valve	is in regard to Viton
	<u>ela</u>	stome:	rs qualification of	nly unles	s otherwis	e noted.

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e.

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	D. <u>WBNEQ-SOL-003</u> PLAN	T <u>WBN</u> UND	IT(S) <u>1</u> DATE <u>8/2</u>	SHEET <u>8</u> R <u>2</u> R
VALVES, N	MODEL 206-381 - SERIES	CHECKED_WBK	DATE <u>8/2</u>	4/30/40
H. AGIN	IG			
(1)	Was aging considered (Yes/No/NA)? <u>Yes</u>			
4	pg. AlO of (1), and T.	AB C		
	JUSTIFICATION/COMMENT	S <u>Aging was dor</u>	ne using nit	rogen as t
	process fluid in lieu	of instrument a	air. See TA	<u>B C-11.</u>
(2)	Were the following ef	fects considered	i in the agi	ng program
	Aging Effect		Yes/No/NA	
	Thermal aging		Yes	App. A, S <u>9.4.1 of</u>
1	Radiation exposure	· ·	Yes	App. A, S <u>9.4.4 of</u>
	Vibration (non-seismi	c) aging	Yes	App. A, S <u>9.4.5 of</u>
	Operational (electric process) stress agin		Yes	App. A, S <u>9.4.2 and</u> 9.4.3 of
	JUSTIFICATION/COMMENT	S	<u></u>	9.4.3 01
				· · · · · · · · · · · · · · · · · · ·
4-5	Were all known synerg significant effect on	equipment perfo	ormance cons	idered in
(3)	aging program (Yes/No.	/MA): <u>185</u>		
(3)	aging program (Yes/No.	S <u>See Discussic</u>	on, P-4.	
	aging program (Yes/No.	· · · · · · · · · · · · · · · · · · ·	on, P-4.	
	aging program (Yes/No. JUSTIFICATION/COMMENT:	S <u>See Discussio</u> g considered in	on, P-4. the qualifi	cation pro
	aging program (Yes/No. JUSTIFICATION/COMMENT: Thermal Aging: (a) Was thermal aging	S <u>See Discussio</u> g considered in s (Reference:	on, P-4. the qualifi	cation pro ect. 9.4.1
	aging program (Yes/No. JUSTIFICATION/COMMENT: Thermal Aging: (a) Was thermal aging (Yes/No/NA)? <u>Yes</u>	S <u>See Discussion</u> g considered in <u>s</u> (Reference: nd TAB C	n, P-4. the qualifi <u>App. A, S</u>	cation pro ect. 9.4.1

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	$\begin{array}{c} R = 2  R \\ \underline{ASCO \ SOLENOID}  COMPUTED \underline{EEM}  DATE \ \underline{8/21/86}  \underbrace{\overline{X}} \\ 4/3  \underline{4} \\ 3/9  \underline{7} \\ 4/3  $
(DC_CONSTRUCT	<u>ION) - CHECKED WBK</u> DATE <u>8/22/86</u> <u>AM</u> 5/1/90
H. AGING (Co	ntinued)
(b)	
(2)	identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>App. B of (1)</u> ).
	JUSTIFICATION/COMMENTS
	······································
(c)	Was the basis for thermal aging identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Sect. 4.1.1 &amp; App. A. sect. 9.4.1 of (1)</u> ).
	· · · · · · · · · · · · · · · · · · ·
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the paramete of time and temperature identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>App. A</u> ,
	<u>Sect. 9.4.1 of (1)</u> ).
	<u>Parameter Plant Maximum Normal Test Equivalent</u>
	Temperature130° F (worst case)250°F140°FTime40 years18-1/4 days8 years
	JUSTIFICATION/COMMENTS The above equivalent time is based
• •	on the activation energy of the EPDM Elastomers (0.94eV)
	and does not consider heat rise due to the coil being
	energized. See TAB C-13 for heat rise analysis.
(e)	Was the Arrhenius methodolgy used for accelerated aging (Yes/No/NA)? Yes (Reference: Pg. 9 & App. A.
•	<u>Section 9.4.1 of (1) &amp; TAB C</u> ).
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerate aging parameters, are they properly referenced to the source of the technical data (Yes/No/NA)? Yes (Reference: App. B of (1)).
	/·····////////////////////////////////

BINDER NO. WE	BNEQ-SOL-003 PLANT WBN UNIT(S) 1 SHEET 10 0
BINDER TTTLE	ASCO SOLENOID COMPUTED EEM DATE 8/21/86
VALVES, MODEI	206-381 - SERIES (199/90
(DC CONSTRUCT	TION) CHECKED WBK DATE 8/21/86 AM
H. AGING (Co	ontinued)
(g)	If a regression line was used for determining accelerate
	aging parameters, are test points or failure modes
	identified on the line (Yes/No/NA)? <u>N/A</u> (Reference:
	JUSTIFICATION/COMMENTS
(h)	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>Yes</u> (Reference: <u>Sect. 4.1.1, pg. 11 of</u>
	(1)
	JUSTIFICATION/COMMENTS
	······································
(5) Rad	lation Aging Exposure:
(a)	Was radiation aging exposure considered in the qualifica program (Yes/No/NA)? <u>Yes</u> (Reference: <u>App, A, </u>
	<u>Sect. 9.4.4 &amp; 9.5.2 of (1)</u>
	JUSTIFICATION/COMMENTS
(b)	Were the materials susceptible to radiation degradation
	identified in the qualification program (Yes/No/NA)? <u>No</u> (Reference:
	JUSTIFICATION/COMMENTS ASCO's intent was not to subject
	the test specimen to radiation exposure in accordance
	with the limiting material. Their intent was to demon-
	strate operability regardless of the radiation threshold
	values by testing the entire assembly.
(c)	
	the qualification program (Yes/No/NA)? Yes (Reference: Sect. 4.1.4 & 4.2.2 & App. A, Sect. 9.4.4 &

BINDER NO. WBN	EQ-SOL-003 PLANT WBN UNIT	r(S) <u>1</u> SHEET <u>11</u> OF <u>26</u> R 2 R
	206-381 - SERIES	DATE <u>8/26/86</u> <i>4/30/90</i> DATE <u>8/26/86</u> <i>5/1/90</i>
H. AGING (Co	ntinued)	······
(5) (d)	Is the radiation test exposure do acceptable (Yes/No/NA)? <u>Yes</u> ( <u>Sect. 4.1.4 of (2)</u>	
	Plant normal ambient radiation dose (rd)	7 <u>2x10 (worst case)</u> 7 R2
	Test exposure dose (rd)	2.3x10, gamma
	Test exposure dose rate (rd/hr)	0.71 Mrad/hr
	Test exposure source type (e.g., Co-60 gamma)	<u>Co-60, gamma</u>
	JUSTIFICATION/COMMENTS Test val combined aging and accident dose exceeds the worst case combined p Valves with Viton elastomers must Rads combined normal and accident shift position after exposure.	of 2.05x10 ⁸ Rads, which plant dose of 6x10 ⁷ Rads. t be limited to 2x10 ⁷
(6) Vibr	ation (non-seismic) Aging:	
(a)	Were the effects of non-seismic v normal and abnormal operation add qualification program ¹ Yes App. A. Sect. 9.4.5, pg. Al3; and	ressed in the (Reference: R2
	JUSTIFICATION/COMMENTS <u>No failur</u> buted to vibration aging was iden	<u>re which could be attri-</u> ntified.
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Sect. 4.1.5; App. A.</u>	S/No/NA)? Yes
	JUSTIFICATION/COMMENTS	
(7) Operat	tional Stress Aging:	
	Were the effects of electrical, me operational stresses induced durin operation addressed in the qualifi (Yes/No/NA)? <u>Yes</u> (Reference: _ Sect. 4.1.2, 4.1.3, & 4.1.5 of (1)	g normal and abnormal
l Qualificat mental doc	tion program refers to the test re cumentation including TVA analyses	port and any supple- In TAB C of the Binder.

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ALVES	, MODEL	ASCO SOLENOID COMPUTED EEM DATE 8/21/86 CAA 206-381 - SERIES ION) CHECKED WBK DATE 8/21/86 Adm
		5/1/90
H. <u>AG</u>	<u>ing</u> (C	ontinued)
(7)	) (a)	JUSTIFICATION/COMMENTS _Effects resulting from these
		stresses were not discernable from other effects.
		However, the valves successfully passed the baseline
		tests following thermal aging, wear aging, pressurization
		aging, and radiation aging.
	(b)	Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: App. A. Sects. 9.4.2, 9.4.3 & 9.4.5 of (1) ).
	·• ·	<u>ADD. A. Jects. 7.4.2, 7.4.3 &amp; 7.4.5 OI (1)</u>
/ o [·]	Was	JUSTIFICATION/COMMENTS
(8)	in t	JUSTIFICATION/COMMENTS
(8)	in t	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u>
(8)	in t (Ref	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u>
(8)	in t (Ref  Qual	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ). ified life (Document in QMDS) <u>See TABS C and G</u>
(8)	in t (Ref Qual JUST	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> 
(8)	in t (Ref Qual JUST	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ). ified life (Document in QMDS) <u>See TABS C and G</u>
(8)	in t (Ref Qual JUST in m	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> 
	in t (Ref Qual JUST <u>in m</u> <u>TAB</u> ) Were defi	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ). ified life (Document in QMDS) <u>See TABS C and G</u> IFICATION/COMMENTS <u>The qualified life is different,</u> ost cases, from the value given in the test report.
	in t (Ref Qual JUST <u>in m</u> <u>TAB</u> ) Were defi (Ref	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ified life (Document in QMDS) <u>See TABS C and G</u> IFICATION/COMMENTS <u>The qualified life is different</u> , <u>ost cases, from the value given in the test report</u> . <u>C provides rationale</u> . replacement intervals for the equipment or its components ned in the qualification program (Yes/No/NA)? <u>Yes</u>
	in t (Ref Qual JUST <u>in m</u> <u>TAB</u> ) Were defi (Ref JUST	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ). ified life (Document in QMDS) <u>See TABS C and G</u> IFICATION/COMMENTS <u>The qualified life is different</u> , <u>ost cases, from the value given in the test report</u> . <u>C provides rationale</u> , replacement intervals for the equipment or its components ned in the qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>App. C of (1)</u> ). IFICATION/COMMENTS <u>Replacement intervals and qualified</u>
	in t (Ref Qual JUST <u>in m</u> <u>TAB</u> ) Were defi (Ref JUST 	the qualified life of the equipment and its basis defined he qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>Sect. 4.1.1 of (1)</u> ). ified life (Document in QMDS) <u>See TABS C and G</u> IFICATION/COMMENTS <u>The qualified life is different</u> , <u>ost cases, from the value given in the test report</u> . <u>C provides rationale</u> , replacement intervals for the equipment or its components ned in the qualification program (Yes/No/NA)? <u>Yes</u> erence: <u>App. C of (1)</u> ).

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BINDER	NO. <u>WBI</u>	<u>NEQ-SOL-OC</u>	<u>13                                    </u>	C <u>WBN</u>	UNIT(S)_ ·		EET <u>13</u> 0F <u>2</u> 2 B-
BINDER	TITLE_	ASCO SOLF	NOID	COMPUTED	EEM DA	TE <u>8/23/8</u>	6 <u>CA</u>
VALVES,	, MODEL	206-381 -	- SERIES				4/30/90
(DC COI	ISTRUCT	<u>ION)</u>		CHECKED <u>W</u>	<u>BK</u> D <i>A</i>	TE <u>8/23/8</u>	6 <u>77190</u>
		• ••••••••		· · · ·			2)//00
I. <u>MATI</u>	<u>ERIALS</u>	ANALYSIS					
Ider	ntifica	tion of Ma	aterials (	Susceptibl	e to Signia	ficant The	rmal
					(Use Section	lon C of B	inder
for	Detail	ed Materia	ils Analys	sis).			
				Radiation		Activatio	n
Ma	<u>aterial</u>	<u>/Property/</u>	Function	<u>Threshold</u>	<u>Reference</u>	Energy	<u>Reference</u>
	(0.11)	T 165 1					App. B,
(2)	• •	IsoMica t i-Temp Epc		NIA -	NA	1 00	pg. B5- <u>B7 of (1)</u>
(4)		) Ethylene					App.B,pg.
(b)	•	ymer			<u>NA</u>	0.94	<u>B3 of (1)</u>
(-)	17:	(500)		37 4	37.4	1.04	App.B,pg.
(c)	VICON	(Seats)		NA	<u>NA</u>	1.04	<u>   B4 of (1)</u>
(d)	*DC 55	<u>0 Lubricar</u>	<u>1t · · ·</u>	NA	NA	NA	NA
(e)			•				
(-)							
					with the lo		
ener	<u>rgy is</u>	<u>Iso-Mica</u> b	onded wit	th hi-temp	erature epo	xy. Its	activation
ene	rgy is	<u>1.00 eV.</u>	The mate:	rials of c	<u>oil constru</u>	nction alo	ng with
the	Ir acti	vation ene	ergies are	<u>e identifi</u>	<u>ed in Apper</u>	<u>ndix B, pa</u>	ge B5
thro	<u>ough B7</u>	of (1).	Radiation	<u>1 values a</u>	re not requ	<u>ired beca</u>	use no
	looia e	, 					
ana.	LYSIS W	<u>as periorn</u>	iea. Ine	<u>aevices</u> w	ere qualifi	<u>ed by tes</u>	t
		• <u> </u>					
*A]t	hough 1	not stated	in refer	ence 1 D	<u>550 lubri</u>		
test	ed value	<u>ves as ver</u>	ified by	ASCO lett	er dated Ja	nuary 5,	19881
(see	TAB F.	-12).					
<u></u>	<u></u>						1
				······			
						<u> </u>	
		-				•	
•							
•				······································			

	TLE ASCO SOLENOID COMPUTED EEM DATE 8/21/86 CAR ODEL 206-381 - SERIES
(DC CONST	
	PMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE ORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITI
(1)	Acceptance Criteria: Does the report/analysis identify the
	limiting values of performance characteristics which would constitute failure if not met (Yes/No/NA)? Yes
•.	(Reference: App. A, Sect. 6.1, 6.2, and 6.3 of (1) ) Identify Acceptance Criteria: Coil only taken from (1) -
	Must operate at any voltage between 90VDC and 140VDC. Battery operated DC valves must operate on demand at any
	voltage between 28% below and 12% above the specified nominal DC voltage. Insulation resistance must measure
	greater than or equal to 1 megohm at 500VDC. Leakage current must be less than 0.5 milliamps at 1250 VAC for 1 minute. For seats and discs, as taken from (1) - Valves
	must operate at the minimum and maximum operating pressure differential. Valves must not have a pressure increase at
	a cylinder port which is required to be vented or a pressure decrease at a cylinder port which is required to be
	pressurized in excess of 10% of the maximum operating pressure differential. Valves must shift to energized
	position upon application of power within limits specified above and shift to deenergized position when power is removed, with inlet press. applied at any value between
	max. and min. pressure differential.
(2)	Performance Characteristics: Does the report/analysis provid the performance characteristics for the equipment which shoul be verified before after a start in the equipment which shoul
	be verified before, after, and periodically during the test t judge equipment performance (Yes/No/NA)? Yes (Reference: <u>Ref. App. A. Sects. 6.1. 6.2. 7.1. 7.2. and</u>
	Table 4.4 of (1) )
	Identify baseline and functional testing: <u>Recording coil</u> excitation, coil dielectric, seat leakage at 125 psig and
	10 psig in both the energized and deenergized state, noise test, external leakage at 125 psi, operational test from
	<u>125 psig to 0 psig, insulation resistance and number of</u> active coil turns during initial baseline and following DBA simulation.
	JUSTIFICATION/COMMENTS

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7413700	ITLE ASCO SOLENO		
	MODEL 206-381 - S TRUCTION) ·	-	4/30/90 ATE <u>8/21/86 4711</u>
	· · · · · · · · · · · · · · · · · · ·		5/1/90
		CHARACTERISTICS NECESSARY	
<u>PER</u> (Con	<u>FORMANCE SPECIFIC</u> ntinued)	CATIONS CAN BE SATISFIED UNI	DER ACCIDENT CONDIT:
	JUSTIFICATION/0	С ммс элт с	
	SUBILITIATION C		
•-			
(3)		fication report/analysis des	scribe loads (or loa
	(Reference: App	applied during DBE test (Yes bendix A. Sect 9.5.3 & Fig 9	3/No/NA)? <u>Yes</u> .2. page A26 of (1)
	JUSTIFICATION/C		<u>,</u>
	JUSTIFICATION/C		· · · · · · · · · · · · · · · · · · ·
(4)	Do the applied	loads during baseline testi	ing reflect normal
	operating condi	tions (Yes/No/NA)? <u>Yes</u> (	Reference:
	Table 4.3 and T	Table 4.4 of (1)	
	Table 4.3 and 1 JUSTIFICATION/C	·	
		·	
(5)	JUSTIFICATION/C	COMMENTS	ary to ensure the
(5)	JUSTIFICATION/C	COMMENTS	ary to ensure the
(5)	JUSTIFICATION/C	COMMENTS	sary to ensure the satisfied.
(5)	JUSTIFICATION/C Identify electr equipment perfo	COMMENTS rical characteristics necess ormance specifications can b	sary to ensure the satisfied.
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u>	COMMENTS	Sary to ensure the oe satisfied. <u>Reference</u> <u>See Below</u>
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u> Voltage	COMMENTS	Sary to ensure the oe satisfied. <u>Reference</u> <u>See Below</u>
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u> Voltage Load	COMMENTS	sary to ensure the satisfied.
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u> Voltage Load Frequency Accuracy	COMMENTS	Sary to ensure the oe satisfied. <u>Reference</u> <u>See Below</u>
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u> Voltage Load Frequency	COMMENTS	Sary to ensure the oe satisfied. <u>Reference</u> <u>See Below</u>
(5)	JUSTIFICATION/C Identify electr equipment perfo (a) <u>Parameter</u> Voltage Load Frequency Accuracy Other(s)	COMMENTS	Sary to ensure the oe satisfied. <u>Reference</u> <u>See Below</u> <u>Contracts, TAB</u>
(5)	JUSTIFICATION/C Identify electr equipment perfor (a) <u>Parameter</u> Voltage Load Frequency Accuracy Other(s) JUSTIFICAT	COMMENTS	ms drawings

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	R TI	TLE ASCO SOLE	NOID COMPUTED EEM DATE	<u> </u>
	-	ODEL 206-381 - RUCTION)	- SERIES CHECKED <u>WBK</u> DATE	4/30/90 5/ 3/21/86 <u>AFM</u> ( 5/1/90 8/
			CAL CHARACTERISTICS NECESSARY TO DEFICATIONS CAN BE SATISFIED UNDER A	ENSURE THE
		tinued)	TCATIONS CAN BE SATISFIED UNDER A	ACCIDENT CONDITI
	( <b>b</b> )	Parameter	Specific Accident Conditions 90 VDC Min.	<u>Reference</u>
		Voltage	(See comment)	
		Load	Not specified	
		Frequency	NA	NA
		Accuracy	NA	NA
		Other(s)		
			•	
		JUSTIFICATION	VCOMMENTS TVA Calculation WBN H	EB-MS-TI11-0004
			oltage available to each valve du	•
			orcare available to each valve de	fring accident
		<u>conditions</u> ,	(See comment after J.(5)(c)).	
	(c)	<u>conditions.</u> Parameter	(See comment after J.(5)(c)). Demonstrated Conditions	Reference
	(c)			Fig. 9.2 P. A26 of (1)
,	(c)	<u>Parameter</u> Voltage	<u>Demonstrated Conditions</u> 90 VDC	Fig. 9.2
	(c)	Parameter	Demonstrated Conditions	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>IX</b> , AL
,	(c)	<u>Parameter</u> Voltage	<u>Demonstrated Conditions</u> 90 VDC	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>IX, AL</b> pg. AI-2 of
,	(c)	<u>Parameter</u> Voltage Load	Demonstrated Conditions 90 VDC 35.1 Watts	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>IX, AL</b> pg. AI-2 of
	<b>(c)</b>	Parameter Voltage Load Frequency	Demonstrated Conditions 90 VDC 35.1 Watts NA	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>IX, AL</b> pg. AI-2 of
	<b>(c)</b>	Parameter Voltage Load Frequency Accuracy	Demonstrated Conditions 90 VDC 35.1 Watts NA	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>IX, AL</b> pg. AI-2 of
	<b>(c)</b>	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA /COMMENTSRef. (1), App. A. Se	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>NS, AL</b> pg. AI-2 of (1)
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V		Fig. 9.2 <u>P. A26 of (1)</u> App. <b>N</b> , AL pg. AI-2 of (1) <u>ection 6.1.1</u> , any voltage
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V between 90-14 was successfu	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA VCOMMENTS Ref. (1), App. A, Se DC valves to operate on demand at 0VDC. Per Figure 9.2 of Ref. (1) 11y tested at 90VDC. A primary c	Fig. 9.2 P. A26 of (1) App. IX, AL pg. AI-2 of (1)
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V between 90-144 was successfu solenoid valy	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA NA /COMMENTS Ref. (1), App. A, Se DC valves to operate on demand at 0VDC. Per Figure 9.2 of Ref. (1) 11y tested at 90VDC. A primary co es is that of voltage available a	Fig. 9.2 P. A26 of (1) App. IX, AL pg. AI-2 of (1) ction 6.1.1. any voltage the test valve oncern with t the coil
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V between 90-14 was successfu solenoid valv terminals. T	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA NA VCOMMENTS Ref. (1). App. A. Se DC valves to operate on demand at 0VDC. Per Figure 9.2 of Ref. (1) 11y tested at 90VDC. A primary c es is that of voltage available a VA calculation WBN EEB-MS-TI11-00	Fig. 9.2 <u>P. A26 of (1)</u> App. <b>N. AL</b> pg. AI-2 of (1) <u>ection 6.1.1</u> , <u>any voltage</u> <u>the test valve</u> <u>oncern with</u> <u>t the coil</u> 04 shows that
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V between 90-14 was successfu solenoid valv terminals. T the valves in environmental.	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA VCOMMENTS Ref. (1), App. A, Se DC valves to operate on demand at 0VDC. Per Figure 9.2 of Ref. (1) 11y tested at 90VDC. A primary c es is that of voltage available a VA calculation WBN EEB-MS-TI11-00 this binder are supplied voltage ly qualified minimum rating as re	Fig. 9.2 P. A26 of (1) App. IX, AL pg. AI-2 of (1)
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION requires 125V between 90-14 was successfu solenoid valv terminals. T the valves in environmental.	Demonstrated Conditions 90 VDC 35.1 Watts NA NA NA NA VCOMMENTS Ref. (1). App. A. Se DC valves to operate on demand at 0VDC. Per Figure 9.2 of Ref. (1) 11y tested at 90VDC. A primary c es is that of voltage available a VA calculation WBN EEB-MS-TI11-00	Fig. 9.2 P. A26 of (1) App. TS, AL pg. AI-2 of (1) ction 6.1.1, any voltage the test valve oncern with t the coil 04 shows that within their guired to

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	ES, M	ODEL	206-381 -	SERIES	COMPUTED <u>E</u> CHECKED <u>WB</u>			4/3 8/21/86_A	0/90 \$
ĸ.	REQU	IRED	OPERATING	ENVIRON	<u>MENT</u> (Wors Areas		e for Al		
	Refe	rence	Environme	ntal Dr	awing No. <u>4</u>	•	-42 and	47E235-76	
	(1)	Norm	al Max		(2)	Abno	rmal Max		
		(a)	Temperatu	re (°F)	<u>130°F</u>	(a)	Tempera	ture (°F)	<u>140°F</u>
		(b)	Pressure	(psig)	<u>14.7 ps</u> ia	(b)	Pressur	e (psig)	<u>14.7 p</u>
		(c)	Humidity	(%)	80%	(c)	Humidity	у (%)	100%
					2x10 ⁷ rads TID				
		(đ)	Radiation	(rd)		(d)	Radiati	on (rd)	NA
			<u>r. Theref</u> he ambient		e bounding	tempe		<u> </u>	
	(4)	<u>is t</u> Stat cond	<u>he ambient</u> e anticipa	ted occ	urrence fre	quenc	y and du	ration of	abnorm
	(4)	<u>is</u> t Stat cond <u>of</u> p Acci	<u>he ambient</u> e anticipa itions: <u>U</u> lant life. dent (wors	ted occ p to ei t case	urrence fre	quenc er ex binat	y and du cursion	ration of and less pecified	abnorm than 1%
		<u>is</u> t Stat cond <u>of p</u> Acci para	<u>he ambient</u> e anticipa itions: <u>U</u> lant life, dent (wors meter incl	ted occ <u>p to ei</u> t case uding p	for any com	quenc er ex binat on, a	y and du cursion ion of synd profi	ration of and less pecified	abnorm than 1% acciden
•		<u>is t</u> Stat cond <u>of p</u> Acci para (a)	he ambient e anticipa itions: <u>U</u> lant life, dent (wors meter incl Temperatu	ted occ <u>p to ei</u> t case uding p re (°F)	urrence fre <u>ght hours p</u> for any com eak, durati	quenc er ex binat on, a	y and du cursion ion of synd profi	ration of and less pecified le):	abnorm than 1% acciden A/HELB
•		<u>is t</u> Stat cond <u>of p</u> Acci para (a) (b)	he ambient e anticipa itions: <u>U</u> lant life, dent (wors meter incl Temperatu	t case uding p re (°F) (psig)	for any com eak, durati <u>327°F*</u> 11.2 psig	quenc er ex binat on, a	y and du cursion ion of synd profi Accident Accident	ration of and less pecified le): type <u>LOC</u>	abnorm than 1% acciden A/HELB
		<u>is t</u> Stat cond <u>of p</u> Acci para (a) (b) (c)	<u>he ambient</u> e anticipa itions: <u>U</u> lant life. dent (wors meter incl Temperatu Pressure	t case uding p re (°F) (psig) (%) 4	for any com eak, durati <u>327°F*</u> 11.2 psig <u>25.6 psia</u> <u>100%</u> .7x10 ⁸ rads (beta) .8x10 ⁷ rads	quenc er ex binat on, a	y and du cursion ion of synd profi Accident Accident Accident	ration of and less pecified le): type <u>LOC</u>	abnorm than 1% acciden A/HELB A/HELB
•		is t Stat cond of p Acci para (a) (b) (c) (d)	<u>he ambient</u> e anticipa itions: <u>U</u> lant life. dent (wors meter incl Temperatu Pressure Humidity	t case uding p re (°F) (psig) (%) 4 (%) 4 (rd) 0. (1) 0.	for any com eak, durati <u>327°F*</u> 11.2 psig <u>25.6 psia</u> <u>100%</u> .7x10 ⁸ rads (beta) .8x10 ⁷ rads	quenc er ex binat on, a - - H ₃ BO ₃ ron) VaOH	y and du cursion ion of synd profi Accident Accident Accident	ration of and less pecified le): type <u>LOC</u> type <u>LOC</u> type <u>LOC</u>	abnorm than 1% acciden A/HELB A/HELB

(DC CONST	10DEL 206-381 - SERIES 4/39/90 TRUCTION) CHECKED_WBK/HDR_DATE 9/24/86_Afm 5/1/90
K. <u>REQU</u>	JIRED OPERATING ENVIRONMENT (Continued)
·	Comments (duration/peak/profile/spray composition and pH, margin, etc.): The duration of the containment spray is 30
	days. Containment spray flow rate is equal to 9500 gal/min
N.	or 0.92 GPM per square foot of containment cross section.
(6)	Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design bas accident conditions (Yes/No/NA)? <u>Yes</u> (Reference:
	See Sect. P. (1) "Discussion"
(7)	Subject to submergence (Yes/No/NA)? <u>Yes</u> (Reference:
	•
	Identify initiation time and duration of submergence:
	See sheet 19A of this tab for discussion on valves subject
	to submergence.
(8)	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>Environmental Drawing 47E235-41, -42, -44, -45</u> )
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:
· · ·	See Section P(3) this TAB
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See TAB B, Sect. A

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WBNEQ-SOL-003

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. Page <u>B-21</u> was deleted per revision <u>2</u>.



				R_2R
	R TITLE ASCO SOLENOID	COMPUTED EI	EM DATE	<u>8/21/86 C&amp;</u>
	S, MODEL 206-381 - SERIES		·· ··	8/21/86_ATM
	DNSTRUCTION)	CHECKED WBI	. DAIL	5/1/90
L. 5	SUMMARY COMPARISON OF TEST	CONDITIONS	TO SPECIFIED	CONDITIONS
(	(1) Comparison of worst-c	ase maximum	parameters:	
	Parameter	<u>Specified</u>	Demonstrated	Reference
		1		Fig. 4.2, pg.
	Operating Time	<u>100 days</u>	<u>30 days</u>	<u>26 of (1)</u> Fig. 4.2, pg.
	Temperature (°F)	<u>327°F</u>	450°F	<u>26 of (1)</u> Fig. 4.2, pg.
	Pressure (psig)	25.6 psia <u>11.2 psig</u>	<u>86 psig</u>	<u>26 of (1)</u>
	Relative Humidity (%)	2 100%	100%	Fig. 4.2, pg. <u>26 of (1)</u>
		2000 Boron		App. A,
		(H ₃ BO ₃ )	Boron	pg. A20 & A21
	Chemical Spray*	pH 8.3	pH 10.5	<u>of (1)</u> Sect. 4.1.4,
		•	$2.01 \times 10^8$	4.2.2, 5.2,
	6.	42x10 ⁷ rads	rads ³	Table 5.1,
	Radiation (rd)**		gamma	App. D of (1)
	Submergence	Yes	No	See Sheet 19A
· .	*Includes spray concen pH.	-	-	
• •		ted normal . 2.52 x 1 10 ⁶ 40-yea on P.(3) of	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for	egrated accident enuated dose) + 2 X 10 ⁷ 5 beta radiation
• •	pH. **Enter 40-year integra dose and specify type 3.8 X 10 ⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to	ted normal 2.52 x 10 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec ton elastom	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum
· .	<ul> <li>pH.</li> <li>**Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose.</li> <li>¹ Within 30 days the t</li> <li>² At 27.78 hours the h normal at 30 days.</li> <li>³ Valves containing vi</li> </ul>	ted normal . 2.52 x 1 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec. ton elastom ads gamma.	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation nation of beta to maximum normal by to the maximum qualified to a
· .	<ul> <li>pH.</li> <li>**Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose.</li> <li>1 Within 30 days the t</li> <li>2 At 27.78 hours the h normal at 30 days.</li> <li>3 Valves containing vi maximum of 2 x 10⁷ r</li> </ul>	ted normal 2.52 x 1 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec. ton elastom ads gamma. ase profiles Test 1	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation nation of beta to maximum normal by to the maximum qualified to a
	<ul> <li>pH.</li> <li>**Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose.</li> <li>1 Within 30 days the t</li> <li>2 At 27.78 hours the h normal at 30 days.</li> <li>3 Valves containing vi maximum of 2 x 10⁷ r</li> <li>(2) Comparison of worst-c</li> </ul>	ted normal . 2.52 x 1 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec ton elastom ads gamma. ase profiles Test 1 Envelopes	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile Specified	egrated accident enuated dose) + X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum qualified to a assessment:
· ·	<ul> <li>pH.</li> <li>**Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose.</li> <li>1 Within 30 days the t</li> <li>2 At 27.78 hours the h normal at 30 days.</li> <li>3 Valves containing vi maximum of 2 x 10⁷ r</li> </ul>	ted normal . 2.52 x 1 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec ton elastom ads gamma. ase profiles Test 1 Envelopes	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation nation of beta to maximum normal by to the maximum qualified to a
· .	<ul> <li>pH.</li> <li>**Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose.</li> <li>¹ Within 30 days the t ² At 27.78 hours the h normal at 30 days.</li> <li>³ Valves containing vi maximum of 2 x 10⁷ r</li> <li>(2) Comparison of worst-c</li> <li><u>Parameter</u> Temperature</li> </ul>	ted normal . 2.52 x 1 10 ⁶ 40-yea on P.(3) of each room emperature umidity dec ton elastom ads gamma. ase profiles Test 1 Envelopes (Yes,	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linear ers are only s and margin Profile Specified (No/NA)	egrated accident enuated dose) + X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum qualified to a assessment:
· ·	<pre>pH. **Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose. ¹ Within 30 days the t ² At 27.78 hours the h normal at 30 days. ³ Valves containing vi maximum of 2 x 10⁷ r (2) Comparison of worst-c <u>Parameter</u> Temperature Pressure</pre>	ted normal . 2.52 x 10 10 ⁶ 40-yea: on P.(3) of each room emperature umidity dec: ton elastom ads gamma. ase profile: Test 1 Envelopes <u>(Yes</u> )	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile Specified <u>(No/NA)</u> es es	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation ation of beta co maximum normal y to the maximum qualified to a assessment: <u>Reference</u> <u>See (1) above</u>
	<pre>pH. **Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose. 1 Within 30 days the t ² At 27.78 hours the h normal at 30 days. ³ Valves containing vi maximum of 2 x 10⁷ r (2) Comparison of worst-c <u>Parameter</u> Temperature Pressure Relative Humidity</pre>	ted normal . 2.52 x 10 10 ⁶ 40-yea: on P.(3) of each room emperature umidity dec: ton elastom ads gamma. ase profile: Test 1 Envelopes (Yes) Yes	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile Specified (No/NA) es es	egrated accident enuated dose) + X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum qualified to a assessment: <u>Reference</u> <u>See (1) above</u> <u>See (1) above</u>
· ·	<pre>pH. **Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose. ¹ Within 30 days the t ² At 27.78 hours the h normal at 30 days. ³ Valves containing vi maximum of 2 x 10⁷ r (2) Comparison of worst-c <u>Parameter</u> Temperature Pressure</pre>	ted normal . 2.52 x 10 10 ⁶ 40-yea: on P.(3) of each room emperature umidity dec: ton elastom ads gamma. ase profile: Test 1 Envelopes (Yes) Yes	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile Specified (No/NA) es es es	egrated accident enuated dose) + 2 X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum qualified to a assessment: <u>Reference</u> <u>See (1) above</u> <u>See (1) above</u> <u>See Sect. P.(2)</u>
	<pre>pH. **Enter 40-year integra dose and specify type 3.8 X 10⁷ Gamma + 1 X Rads TID. (See Secti discussion and TID to dose. 1 Within 30 days the t ² At 27.78 hours the h normal at 30 days. ³ Valves containing vi maximum of 2 x 10⁷ r (2) Comparison of worst-c <u>Parameter</u> Temperature Pressure Relative Humidity</pre>	ted normal . 2.52 x 10 10 ⁶ 40-yea: on P.(3) of each room emperature umidity dec: ton elastom ads gamma. ase profile: Test 1 Envelopes (Yes) Yes	dose plus int 0 ⁷ Beta (Atte r dose = 6.42 this TAB for after attentu will return t lines linearl ers are only s and margin Profile Specified (No/NA) es es es	egrated accident enuated dose) + X 10 ⁷ beta radiation nation of beta o maximum normal y to the maximum qualified to a assessment: <u>Reference</u> <u>See (1) above</u> <u>See (1) above</u>

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	R NO. <u>WBNEQ</u>		- <u>`</u>	T <u>WBN</u> COMPUTE	•		<u>1</u> SHEE 1 E <u>8/21/2</u>	R	0F <u>26</u>
,	CS, MODEL 200 CONSTRUCTION		ERIES	CHECKED	WBK	DAT	E <u>8/21/3</u>	4/30/ 86 5/1/3	90 111 90
L.	<u>SUMMARY CON</u> (Continued)		<u>of tes</u>	T CONDIT	IONS TO	SPECIF	IED CON	DITION	<u>IS</u>
	JUSTIFICAT	ION/COMME	NTS						
	Equipment elevation accident. is 717'9". the crane v valves in Environment levels for and 730.87 in the Valv (Group D Va	722' (sur Outside No valve Wall and the the Valve the Valve ' for the Ve Vault 1	ge lev the cr es lis none a Vault Drawin e Vaul North	el) coul ane wall ted in t re locat Rooms c g 47E235 t Rooms Room.	d become , the st his bind ed below ould be -76 list to be 73 The value	e subme teady s ler are v these subjec ts the s 30.84' ves in	rged foi tate flo located levels ted to s maximum for the this bin	llowin ood le i insi . Som submer flood South nder 1	ng an evel de rgence. N Room ocated
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VALVES, M	ODEL 206-381 - SERIES	ATE <u>8/21/8</u> 6	4/30/90
(DC CONST	RUCTION) CHECKED WBK DA	ATE <u>8/2¹/8</u> 6	5/1/90 -
	ARY COMPARISON OF TEST CONDITIONS TO SPECI tinued)	FIED CONDIT	TIONS
(3)	Were margins applied to the test parameter addressed in the test program to assure the and uncertainties are accounted for? (No Yes/No/NA).	hat normal	variation
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	<u>Yes/No/N</u>
	Temperature: +15 degrees F	<u>&gt;15°F</u>	Yes
	Pressure: +10% but no more than 10 psig	>10%	Yes
	Radiation: +10% of accident dose	>10%	Yes
·	Time: +10% (or 1 hour + operating time per NUREG-0588)	*	No
	Voltage: ±10% of rated value	+12 to -28%	Yes
	Frequency: $\pm 5\%$ of rated value	<u>N/A</u>	N/A
	Environmental Transient: the initial transient and the peak temperature applied twice	Yes See Sect. 4.2.1	Yes
	Vibration: +10% added to acceleration	of (1)	Yes
	JUSTIFICATION/COMMENTS See Appendix E of	(1) for de	tailed
	information on margins.		<u></u>
	*The post accident life calculation in TAB	<u>C proves t</u>	hat the
	<u>30-day test envelops the 100-day post acc</u>	<u>ident requi</u>	rement.
		<u></u>	
		•	<del></del>

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м.	OPER	ABILITY TEST RESULTS
	(1)	Identify the safety function(s) of this equipment: (Reference: <u>See TAB A</u> ).
		JUSTIFICATION/COMMENTS Functions are varied. All are
۰.		listed in TAB A.
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (Yes/No/NA)? <u>Yes</u> (Reference: <u>Sect. 5, Table 5.1, pg. 59, App. J, and pg. 33</u>
		<u>of (1)</u> ).
		JUSTIFICATION/COMMENTS The test valve is assumed to be normally energized and required to deenergize on receipt of accident signal, then to remain operable for 30 days post- DBA. The specific DBA functions of the TVA valves are described in TAB C.
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (Yes/No/NA)? Yes (Reference: Sect. 4.2.3, App. J of (1)).
		JUSTIFICATION/COMMENTS
	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (Yes/No/NA)? Yes (Reference: <u>Table 5.1, Pg. 59</u>
		and App. J. Table 1 of (1) ).
		JUSTIFICATION/COMMENTS <u>See TAB C for the analysis of the</u> test DBA versus the plant specific DBA. The test valve demonstrated operability in accordance with the requirements defined in M(2) above.
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (Yes/No/NA)? <u>Yes</u> (Reference: <u>Sects. 5.2 and 5.3, pgs. 56 and 57 of (1)</u>
		and page 33 of (1)).
		JUSTIFICATION/COMMENTS We have reviewed and concur with the disposition of anomalies in the test report. There is no impact on installed equipment.

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BIND VAL V (DC	ER TITLE <u>ASCO SOLENOID</u> COMPUTED <u><i>EEM</i></u> DATE <u><i>B</i></u> <u>R</u>
N .	MAINTENANCE AND SURVEILLANCE Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets). JUSTIFICATION/COMMENTS See TABS C and G

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BIND VAL V	ER NO. WBNEQ-SOL-003 PLANT WBN UNIT(S) 1 ER TITLE ASCO SOLENOID COMPUTED <u>&amp; &amp; MODEL NO. 206-381-SERIES</u> CONSTRUCTION) CHECKED WARK DATE	
0.	SUMMARY OF REVIEW	
		Yes/No/NA
	(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	Yes
	(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>N/A</u>
	(3) Choice of qualification methodology adequately justified?	Yes
	(4) If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	N/A
	(b) Were specific features and failure modes and effects analyzed?	N/A
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	N/A
	(d) Were environmental parameters which affect equipment performance identified?	N/A
	(5) Adequate similarity between equipment and test specimen established?	Yes
	(6) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
	(c) Absence of preaging in test/analysis justified?	N/A
	(d) Materials susceptible to thermal/radiation aging identified?	Yes
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VAL VES,	TITLE       ASCO       SOLENOID       COMPUTED       E8/2         MODEL       NO.       206-381-SERIES       CHECKED       DATE       8/2         STRUCTION)       CHECKED       DATE       8/2	·
0. <u>su</u>	MMARY OF REVIEW (Continued)	Yes/No/NA
•.	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7	) Qualified life or replacement schedule established?	Yes
(8	) Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	Yes
	(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11)	Criteria regarding submergence satisfied?	Yes
( 12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

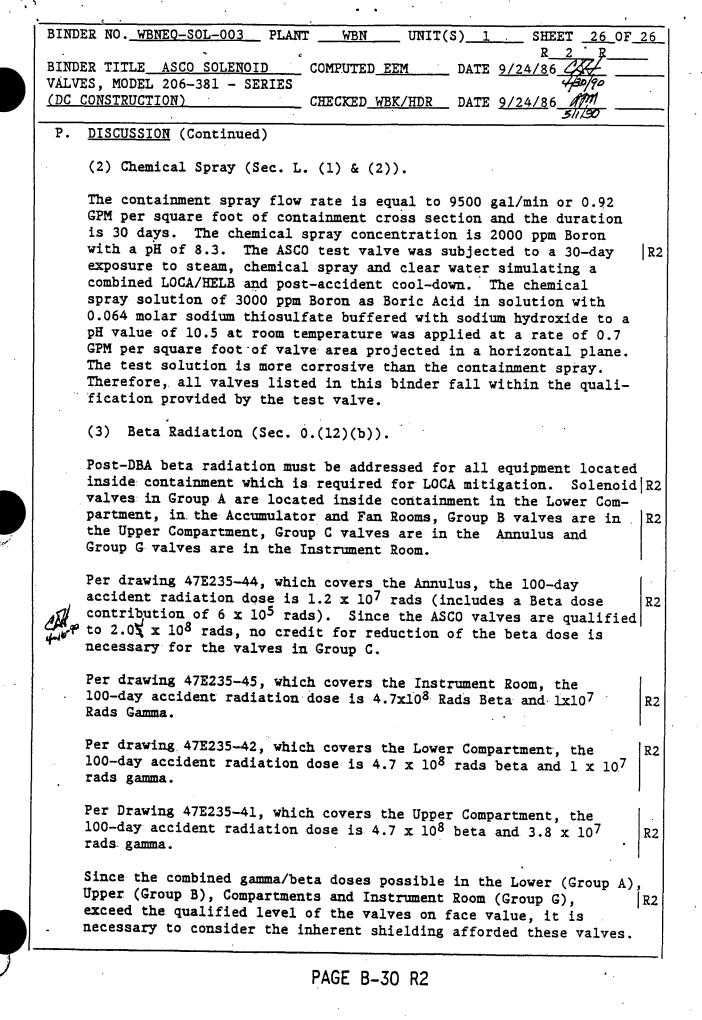
PAGE B-28

BINDER TITLE AS CO SOLENOID ALVES, MODEL NO. 206-381-SERIES DC CONSTRUCTION) CHECKED	
	<del>9-11</del> 20
0. <u>SUMMARY_OF_REVIEW</u> (Continued)	Yes/No/NA
(15) Criteria regarding functional testing satisfied?	<u>Yes</u>
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
(b) Was an initial base line test done to establish required performance characteristics?	Yes
(c) Has the test/analysis demonstrated that performance specifications and characteristics (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	<u>Yes</u>
(16) Criteria regarding instrument accuracy satisfied?	<u>N/A</u>
(17) Test duration margin (1 hour + function time) satisfied?	Yes
(a) Is the minimum specified operating time at least l hour?	<u>Yes</u>
(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	
(18) Criteria regarding synergistic effects satisfied?	Yes
(19) Criteria regarding margins satisfied?	Yes
(20) Maintenance and surveillance requirements adequately identified?	<u>Yes</u>
P. <u>DISCUSSION</u>	
(1) Moisture or liquid intrusion (Sect. K.(6)).	
The valves requiring protection from moisture or liquid i	ntrusion
have had Conax conduit seals installed and are identified	in Section
<u>l of the QMDS, which is located in TAB G of the binder.</u>	See TAB C-9,

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	BINDER NO. WBNEQ-SOL-003 PLANT WBN UNIT(S) 1 SHEET 26a OF 26
)	BINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 8/21/86 CDH (A) VALVES, MODEL 206-381 - SERIES
	(DC CONSTRUCTION) CHECKED WBK DATE 8/21/86 AFM AM
	P. <u>DISCUSSION</u> (Continued)
	(3) Beta Radiation (Sec. 0.(12)(b)). (Continued)
	All non-metallic parts of the valves are totally enclosed by metal with the exception of the 18" wire pigtails. The minimum thickness of metal is assumed to be the coil housing, which is $3/32$ " (0.09375) steel, per ASCO's Tom Hays telecon with TVA's Dean Helton on January 7, 1986. OE Calculation WBNTSR-051 "Reduction of Beta R4 Dose by Sheet Steel," page 3.1, shows the beta reduction factor for 14 gauge (0.0747)" steel is equal to 0.0536. This reduces the total 100-day Beta dose to the valve internal parts to (4.7 x 10 ⁸ ) x (5.36 x 10 ⁻² ) = 2.52 x 10 ⁷ rads TID beta.
	In the Instrument Room, the total combined 100-day Beta and accident radiation dose will equal (2.52x10 ⁷ Beta)+(1X10 ⁷ Gamma)= 3.52x10 ⁷ Rads. The combined 100-day accident radiation plus the 40-year dose(3.5x10 ⁵ ) equals a total radiation dose of 3.55x10 ⁷ Rads TID.
)	In the Lower Compartment, the total combined 100-day beta and accident radiation dose will equal $(2.52 \times 10^7 \text{ beta}) + (1.0 \times 10^7 \text{ gamma}) = 3.52 \times 10^7 \text{ rads}$ . The combined 100-day accident radiation plus the 40-year dose $(2 \times 10^7)$ equals a total radiation dose of 5.52 x 10 ⁷ rads TID.
	In the Upper Compartment, the total combined 100-day Beta dose and Gamma accident radiation dose will equal (2.52 x $10^7$ Beta) + 3.8 x $10^7$ Gamma = 6.32 x $10^7$ rads. The combined 100-day accident radiation plus the 40-year dose (1 x $10^6$ ) equals a total radiation dose of 6.42 x $10^7$ rads TID.
	The 2.01 x $10^8$ rads the valves are qualified to clearly  R4 envelops the above requirements plus 10% Margin.
	The pigtail leads to valves No. 1-FSV-43-201, -202, -207, and -208 (subgroup A-2) terminate in a splice inside a piece of 1" solid conduit which attaches to a Conax connector. Inasmuch as these valves must be operable for 100 days after an accident, the pig- tails must be qualified for the full 100-day radiation dose. Since a calculation on the reduction of beta dose afforded by solid conduit has not been made at this time, we will relate the wall thickness of the conduit to the aforementioned "Reduction of Beta

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Dose by Sheet Steel" calculation for this calculation. One-inch rigid conduit has a wall thickness of 0.135". Page 3.1 of the sheet steel calculation shows the beta reduction factor for 1/8inch sheet steel is equal to 0.0090. This reduces the total 100day beta dose to  $(4.7 \times 10^8) \times (9.03 \times 10^{-3}) = 4.24 \times 10^6$  rads.

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	BINDER NO. WBNEQ-SOL-003 PLANT WBN UNIT(S) 1 SHEET 26b OF 26
	BINDER TITLE       ASCO SOLENOID       COMPUTED EEM       DATE       8/21/86 CDH       CXA         VALVES, MODEL 206-381 - SERIES       4/30/90       2/3/40         (DC CONSTRUCTION)       CHECKED WBK       DATE       8/21/86 AFM       A/M         5/1/90       8/28/50
	P. <u>DISCUSSION</u> (Continued)
	(3) Radiation (Sec. 0.(12)(b) (Continued)
	Thus, the total combined 100-day beta and gamma accident radiation dose (4.24 x 10 ⁶ beta) + (1.0 x 10 ⁷ gamma) = 1.42 x 10 ⁷ rads, plus the 40-year dose (2.0 x 10 ⁷ rads) equals a total radiation dose of 3.42 x 10 ⁷ rads. The 2.01 x 10 ⁸ rads the valves are qualified to $ R4$ clearly envelops the requirement.
	The pigtail leads of all other values in Groups A and B are covered by 1/2 or 3/4 inch diameter flexible stainless steel conduit. Since these values are required to operate for only 5 minutes into a LOCA, the pigtails are not required to be qualified for the full 100-day beta dose. OE Calculation TI-RPS-48 "Integrated Accident Dose Inside Primary Containment," Table VI-14, page 7.24, shows the total beta dose at 2 hours into the accident to equal 4.12 x 10 ⁷ rads TID. The toal combined beta and gamma radiation dose will equal $(4.12 \times 10^7 \text{ beta}) + (3.8 \times 10^7 \text{ gamma}) = 7.92 \times 10^7 \text{ rads TID}.$ Accident radiation plus the larger upper compartment 40-year dose $(1.0 \times 10^6 \text{ rads})$ equals a tetal radiation dose of 0.00 m lo ⁷
	(1.0 x 10 ⁶ rads) equals a total radiation dose of 8.02 x 10 ⁷ rads TID. The ASCO valves are qualified for 2.01 x 10 ⁸ rads. $\mathbb{R}^4$
	WEWTSR-057 OE Calculation GENNAL3-013, "Beta Dose Reduction from Finite Volume" provides reduction factors for beta radiation doses based on the free space or "box volume" found inside each device. The free space volume for the 206-381 series solenoid valves was calculated to be 692cm ³ . This was done by calculating the volume of a cylinder with dimensions corresponding to the extreme outside dimensions shown on drawing JVA-206-381 (TAB I) for the coil
	housing. The cylindrical volume of the conduit entry nipple was added to this and the combined volume was treated as if none of the space was occupied by internal components (space occupied by coil, wiring, etc. was not subtracted). As can be seen from the drawing, this free space volume calculation is extremely conser- vative.
	Using the 692 cm ³ free space volume value and corresponding beta dose reduction factor (per <del>GENNAL3-013</del> ), the effective beta radia- tion dose for the values in this binder may be calculated:
	692 cm ³ < 1000 cm ³ ; use 1.44 x $10^{-6}$ reduction factor
	Effective Beta Dose = $(4.7 \times 10^8 \text{ rads})(1.44 \times 10^{-6}) = 676.8 \text{ rads}$

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BIN	DER NO. <u>WBNEQ-SOL-003</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>26c</u> OF <u>26</u> R <u>2</u> R <u>4</u> DER TITLE ASCO SOLENOID COMPUTED EEM DATE 9/05/86 CDH
VAL	VES, MODEL 206-381 - SERIES 4/30/90 8/
	CONSTRUCTION) CHECKED WBK/HDR DATE 9/05/86 AFM AFM AFM AFM S/1/90 8/2
Ρ.	DISCUSSION (Continued)
	(3) Radiation (Sec. 0.(12)(b) (Continued)
	The beta dose due to free space volume inside the valve is insig- nificant (676.8 rads $< 3 \times 10^7$ rads).
•	Recently issued DNE calculation GENAPS3-023, Attenuation Factors for postaccident beta dose in primay ontainment, in summary states:
	"With the thickness of standard plate given as 18.75 mils for 26 guage sheet metal, all radiosensitive material contained in an enclosure formed of 26 guage or thicker iron will receive a beta dose of no more than one percent of
	the free-field beta dose. The dose from airborne activity within the enclosure may be neglected due to the small volume."
	The thinest metal on these valves is the coil housing, which is $3/32$ " (0.09375) steel. Thus, the worst beta dose would be 4.7 X $10^6$ , which is much less than the 2.52 X $10^7$ from calculation WBNTSR-051 which we have used in this discussion.
	(4) Synergistic Effects (Sec. H(3))
	Ethylene Propylene Terpolymer (EPDM) elastomer is used in the construction of ASCO solenoid valves as gaskets and diaphragms. EPDM is the only material having a potential for radiation induced synergisms based on a review of technical information provided in NUREG/CR-2157 and NUREG/CR-2553. Data in NUREG/CR-2157 suggests
	doses of 10 to 20 MRADs. A review of the location and environ- ments of ASCO solenoid valves listed in TAB C-1 indicates that the maximum normal radiation dose will be seen by valves in subgroup A-2. These valves are qualified for AO users without
	replacement of elastomer parts and will therefore be exposed to a maximum normal dose of 20 MRADs. Since all elastomer parts are totally enclosed in metal, the radiation dose to these parts will be less than 20 MRADs. Synergistic effects will be negligible for normal service aging.
	Potential dose rate and test sequence synergisms will not impact qualification for accident condition
	qualification for accident conditions as demonstrated by Test Report AQR-67368. The test sequence of thermal aging followed by radiation aging plus accident radiation at high dose rates (0.71 MRADs/HR-Aging, 0.9 MRADs/HR-Accident) is a reasonable simulation

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BINDER NO.WB BINDER TITLE ASSEMBLY	NEQ-SOL -004 MSIV AIR /SOLENOID VA	PLANT_WB MANIFOLD LVES-GOULD		JNIT(S) <u>1</u> D <i>RHL</i> D <i>MR</i> L D	SHEET R ATE 6/11/86 ATE 6/14/86	R	
~		TAB	A				
	EQUIPM	ENT IDENTIF	ICATION MAT	RIX			
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#### WATTS BAR NUCLAR PLANT TABA - EQUIPHENT IDENTIFICATION MATRIX

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EQIS_NUMBER DESCRIPTION		UNII_DEVICE_ID_NO HODEL_	AIHIIH_	OCATION ELEY(1) BH/BAD CONIBACI	<u>CAI</u> (2)	QEEB_IIUE	EYENI	SAEEIX_EUNCIION
NBN-1-FSV -001- SG 1 MAIN STM H	-0004A -A Hor Isln Valv	1-FSV -001-0004A /ē 321x-2		729• AD1 76838-83090	A/B A/B	155/1000 5mn/1000	MS∕V Fw∕V	SOLENOIDS MUST FUNCTION TO SHUT THE HSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
WBN-1-FSV -001- SG 1 MAIN STM H	-00048 -B HDR ISLN VALN	1-FSV -001-00048 /E 321x-2	-B 1	729• A01 76K38-83080	A/ B A/ B	155/100D 5nn/100D	FW/Y	SOLENDIDS MUST FUNCTION TO SHUT THE HSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
WBN-1-FSV -001- SG 1 MAIN SŢN H	-00040 -A 10r Isln Valv	1-FSV -001-00040 /E 321x-2		729° A01 76K38-83080	A / B A / B	155/100D 5mn/100D	FW/V	SOLENOIDS MUST FUNCTION TO SHUT THE HSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
IBN-1-FSV -001- G 1 Main Stm H	-0004E -A Idr Isln Valv	1-FSV -001-0004E /E 321x-2		729" AD1 76K38-83080	A/B A/B	155/1000 5mn/1000	FW/V	SOLENOIDS MUST FUNCTION TO SHUT THE MSIV®S PREVENTING THE NON-FAULTED SG®S FROM BLOWING DOWN
BN-1-FSV -001- G 1 HAIN STH H	-0004F -A Idr Isln Valv	1-FSV -001-0004F E TEST 321X-2		7 2 9 • A D 1 76 K 3 8 - 830 80 	A/C A/C	155/1000 5mn/1000	FW/V	MUST DEENERGIZE TO OPEN MSI VENT PATH. RE-ENERGIZATION WILL NOT ADVERSELY AFFECT MSIV.
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WBN- Sg 1	1-FSV -001-0004G -B Main Stn Hdr Isln Valv	1-FSV -001-00046 -8 E 321 X-21	• •	729 A01 76838-83080	A/B 155/100D A/B 5mn/1000	HS/V FW/V	SOLENOIDS MUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted Sg's From Blowing Down
•••	· ·			·	• • •		an a
	1-FSV -001-0004H -B Hain STH HDR Isln Valv			7 2 9 • A 0 1 7 6 K 3 8 - 8 3 0 8 0	A/B 155/100D A/B 5mn/100D	HS/V FW/V	SOLENOIDS HUST FUNCTION TO SHUT THE MSIV®S PREVENTING THE NON-FAULTED SG®S FROM BLOWING DOWN
			· .			•	
WBN- SG 1	1-FSV -OD1-OOD4J -B Main STM Hor Isln Valv	1-FSV -001-0004J -B E TEST 321X-21		7299 A01 76k38-93080	A/C 155/100D A/C 5HN/100D	HS/V FW/V	HUST DEENERGIZE TO OPEN MSIV VENT PATH. RE-ENERGIZATION WILL NOT ADVERSELY AFFECT MSIV.
⊌BN− SG 2	1-FSV -001-0011A -A Main Sth Hdr Isln Valv	1-FSV -001-0011A -A E 321X-21		729" AD2 76K38-83080	A/B 155/1000 A/B 5mn/1000	HS∕V FW∕V	SOLENOIDS MUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted Sg's From Blowing Down
	•	•		·	· · · · ·		
WBN- Sg 2	1-FSV-001-0011B -B MAIN STN HDR ISLN VALV	1-FSV -001-00118 -B E 321X-21		7 29• AO2 76K3 8-83080	A/B 155/100D A/B 5mn/100D	HS/V Fw/V	SOLENOIDS HUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
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PAGE A-3RI				PREPARER/DATE	R. H. Loveda	iy 6/	R_IRR 11/86 2/7/82
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### WATTS BAR NUTEAR PLAN TABA - EQUIPMENT IDENTIFICATION MATRIX PLANT

EQIS_NUMBER UNIT_DEVICE_ID_NO DESCRIPTION HODEL_NUMB	AZHIIH_ ELEY(1) RM/BAD EB CQNIRACI	CAI QPER_IINE (2)	EYENI	SAEETY_EUNCTION
HBN-1-FSV -001-0011D -A 1-FSV -001-0011D -A SG 2 HAIN STH HDR ISLN VALVE 321X-21	729• A02 76k38-83080	A/B 155/100D A/B 5mn/100D	MS/V FW/V	SOLENOIDS MUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
WBN-1-FSV -001-0011E -A 1-FSV -001-0011E -A SG 2 HAIN STH HDR ISLN VALVE 321X-21	7 29• A02 76 k3 8− 830 80	A/B 155/100D A/B 5HN/100D		SOLENOIDS MUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted Sg's from Blowing down
WBN-1-FSV -001-0011F -A 1-FSV -001-0011F -A SG 2 MAIN STH HDR ISLN VALVE TEST 321X-21	729" AD2 76K38-83080		HS/V F₩/V	MUST DEENERGIZE TO OPEN MSIV Vent Path. Re-energization Will Not Adversely Affect Msiv.
WBN-1-FSV -001-0011G -B 1-FSV -001-0011G -B SG 2 NAIN STH HOR ISLN VALVE 321X-21	7 29 ° AO2 76 K3 8-83080	•	HS/V FW/V	SOLENOIDS MUST FUNCTION TO Shut the MSIV®S preventing The Non-Faulted SG®S from Blowing down
WEN-1~FSV -001-0011H -B 1-FSV -001-0011H -B SG 2 Main STH HDR ISLN VALVE 321X-21	729• AO2 76K38-83080 1	4/8 155/1000 A/8 5mn/1000		

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#### WATTS BAR NUCLEAR PLANT TAB A - EQUIPHENT IDENTIFICATION MATRIX

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ICRIPII	QN	. <u>هم چې چې چې خه من کر مراحم مو</u> مو او	HODEL NUMBER	CONTRACT	(2)			· · ·
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I-1-FSV 2 MAIN	-001-0011J STM HDR ISLN	-ð 1-FSV Valve test	-001-0011J -8 321x-21	729" AD2   76 k38-8 3080	A/C A/C	155/1000 5mn/1000		MUST DEENERGIZE TO OPEN HSIV VENT PATH. RE-ENERGIZATION WILL NOT ADVERSELY AFFECT MSIV.
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-1-FSV 3 Main	-001-0022A STM HDR ISLN	-A 1-FSV Valve	-001-0022A -A 321x-21	7 29 * AO2 76 k3 8-830 80	A/ B A/ B	155/1000 5mn/1000	HS/V FW/V	SOLENOIDS HUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
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-1-FSV	-001-0022B	-B 1-FSV	-001-00228 -B	729 402	A/R	155/100p	MC/V	SOLENOIDS MUST FUNCTION TO
3 MAIN	STM HOR ISLN	VALVE	321x-21	729" A02 76k38-83080	A/B	5MN/1000	FW/V .	SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
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-1-FSV 3 Main	-001-0022D STM HDR ISLN	-A 1-FSV Valve	-001-00220 -A 321x-21	729• AO2 76k38-83080	A/B A/B	155/1000 5mn/1000		SOLENOIDS NUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
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-1-FSV 3 MAIN	-001-0022E STM HDR ISLN	-A 1-FSV Valve		7 29• AO2 76 k3 8-83080	A/B A/B	155/100d 5mn/100d	FW/V	SOLENOIDS MUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN
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#### WATTS BAR NUCLEAR PLANT TAB A - EQUIPMENT IDENTIFICATION MATRIX

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N-1-FSV -001-0022F -A 3 HAIN STM HDR ISLN VALV	1-FSV -001-0022F VE TEST 321X-2	-A 1	729• A02   76k38-83080	A/C	155/1000	MS∕V F₩/V	MUST DEENERGIZE TO OPEN MSIV Vent Path. Re-energization Will Not Adversely Affect	<b>.</b>
		<i>.</i> .					MSIV.	
	• • •		النبير بروهند اليار التي ال	• •••	- 1	·		É
TI-FSV -001-0022G -B 3 HAIN STH HDR ISLN VALV	1-Fsv -001-0022G /E 321X-2	-B 174	7 2 9 • A 0 2 7 6 K 3 8 - 8 3 0 8 0	A/B A/B	155/1000 5mn/1000		SOLENGIDS HUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted SG's from	•. ¢
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N-1-FSV -001-0022H -B 3 Main STM HDR ISLN Valv	1-FSV -001-0022H /E 321X-2	-8 174 i	729° A02 76K38-33080	A/B A/B	155/1000 5kn/1000	FW/V	SOLENOIDS HUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted SG'S from Blowing down	ć
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H-1-FSV -001-0022J -B 3 HAIN STH HDR ISLN VALV	1-FSV -001-0022J E TEST 321X-21	-8 174 I	7 2 9 * A 0 2 7 6 K 3 3 - 8 3 0 8 0	A/C A/C	15 S /1 0 0 D 5 m n / 1 0 0 d	FW/Y	MUST DEENERGIZE TO OPEN MSIV Vent Path. Re-Energization Will Not Adversely Affect	Ç
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I-1-FSV -001-0029A -A 4 Main Stm Hor Isln Valv	E 321x-21	- <b>A</b>	7 29" A01 76 K3 8-830 80	A/B A/B	155/100d 5mn/100d	FW/V	SOLENOIDS HUST FUNCTION TO SHUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM	
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#### WATTS BAR NUCLEAR PLANT TAB A - EQUIPMENT IDENTIFICATION MATRIX

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SENUMBER	UNII_DEVICE_LD	NO. AINIIH. HODEL NUMBER	ELEV(1) BM/RAD	<u>CAI</u> (2)	QPER_IIME	EXENI	SAEETY_EUNCTION	·
· · ·	· . · ·	· .						
I-1-FSV -001-00298 -8 4 Main Sth Hdr Isln Vai	1-FSV -001-002 LVE	9B -B 321x-21	729" A01   76k38-83080	A/8 A/8	155/1000 5mn/1000	HS/V FW/V	SOLENOIDS MUST FUNCTION TO Shut the MSIV'S preventing the Non-Faulted SG's from Blowing down	· · · · · · · · · · · · · · · · · · ·
· · · ·		، ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰	· · · · · ·			• .	المروحية المراجع المراجع المراجع المراجع	· ·,
HI-FSV-001-0029D -A 4 Main Sth Hdr Isln Van	1-FSV -001-0029 LVE	90 -A 321x-21	7 29 A01 76 K3 8-83080	A/B A/B	155/100D 5mn/100D	HS∕V Fw/V	SOLENOIDS MUST FUNCTION TO Shut the MSIV'S preventing The Non-Faulted Sg's from Blowing down	
	· .							18 - 14 1
-1-FSV -D01-0029E -A 4 Hain Sth Hdr Isln Val	1-FSV -001-0029 VE		729° A01 76k38-83080	A/8 A/8 :	155/100d 5mn/100d	HS/V FW/V	SOLENOIDS MUST FUNCTION TO Shut the MSIV's preventing The Non-Faulted SG's from Blowing down	
		· · · ·	• • /	•	e e e	4 A Sec.		an gan a si si si
⊢1+FSV -001-0029F -A 4 Main Sth Hor Isln Val	1-FSV -001-0029 VE TEST		729• A01 76K38~83080	A/C A/C	155/100d 5mn/100d	HS∕V Fw/V	MUST DEENERGIZE TO OPEN MS Vent Path. Re-energization Will Not Adversely Affect MSIV.	,
								n na harra n Na harra na h
-1-FSV -001-0029G -B 4 Main Stm Hdr Isln Val	1-FSV -001-0029 .VE	G −в 321х-21	7 29• A01 76 K38~ B3080	A/B 1 A/B 1	155/1000 5mn/1000	MS∕V Fw∕V	SOLENOIDS MUST FUNCTION TO SMUT THE MSIV'S PREVENTING THE NON-FAULTED SG'S FROM BLOWING DOWN	
							CONTRO DONN	
2 V					·.			;
AG	•							
m				<b>.</b>		<i>c</i> 1 <b>.</b> .	R R R	
<b>A</b>		· · · ·	PREPARERIDATE		,			
IRI .			CHECKED/DATE_	<u>W. B</u> .	<u>K1m</u>	6/12	2/86 <u>68</u> 	
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PRINT DATE:			W A T T S ȚAB A —	B A R Equipment	N U C L E A R I IDENTIFICATION	P L A N T Matrix	HANU PAGE	IFACTURER 7 OF	WBNEQ-SOL -004 Gould Allied 7		с. ,
IS_NUMBER SCRIPTION	UNII_(	DEVICE_I	D_NQ_ MQQEL_NUM	AZHITH_	LOCATION ELEV(1) BM/BAD CONIBACI	CAT OPER	•		ENNEIION		
N-1-FSV -001-0029H -B 4 Main STM HDR Isln yalv	1-FSV E	-001-00;	321X-21		729• A01   76x38-83080	A/B 155/ A/B 5mn/	1000 NS/V 1000 FW/V	SHUT THE	OS MUST FUNCTION TO MSIV'S PREVENTING FAULTED SG'S FROM DOWN		
N-1-FSV -001-0029J -B 4 MAIN STM HOR ISLN VALVI	1-Fsv	-001-007	e- 1.9		7 29 • A01 76 K3 8~ 830 80	A/C 155/	100 <u>0</u> нs/v	NUST DEE VENT PAT	NERGIZE TO OPEN MSIV H. RE-ENERGIZATION Adversely affect	· · · ·	C.
		·						· .			K.
• •				<b>.</b> .	• •						
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PA		· .					• •				ξ.
PAGE A-BRI					PREPARER/DATE CHECKED/DATE				1 R R 7/89 60 7/89	. :	·
		A				1	. I		: 4. • • • •		

BINDER	R NO. <u>WBNEQ-SOL-00</u> 4 PLANT R TITLE <u>MSIV AIR MANIFOL</u> BLY SOLENOID VALVES - ALLIED	<u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1</u> OF RR D_COMPUTED <u>/R1(11/11/11</u> DATE <u>2/17/89</u> CHECKED_/R1 KBN_DATE 2/27/89
	 T.	AB A NOTES
1.	field verification shee	- Actual elevations are documented on ts found in TAB F. All elevations shown cept for those devices located inside
2.	See TAB B, Section A fo used in this binder.	r Category and Operating Times calculation
3.	obtained by tracing the	act numbers shown in this TAB were serial number on each valve through and did not depend on field verification rs.
	_	
	· · ·	
		· · · ·
•		

PAGE A-9 R1

BINDER NO. WBNEQ-SOL-004 PLANT	ITWBNUNIT(S)SHEETOF 30	
BINDER TITLE MSIV AIR MANIFOLD ASSEMBLY/SOLENOID VALVES- GOULD ALLIED	CONPUTED DATE Q 17 86	 
	CHECKED / //// DATE 0//2/8/	_

### TAB B

## CHECKLIST FOR EVALUATION OF ENVIRONMENTAL QUALIFICATION INCLUDING SUMMARY AND CONCLUSION

NOTE: It is recommended that Section D - Justification/Comments (sheets 5 through 7) be closely reviewd for a clearer understanding of rationale applied towards qualification of the subject main steam isolation valves (MSIV) Air Manifold Assembly/Solenoid Valves.

PAGE B-

		TLE <u>MSIV AIR MANI</u> SOLENOID VALVES ~	FOLD COMPUTED RHL	DATE <u>6/11/86_AFM</u> 2/17/89
GOUI	D ALL	IED	CHECKED <u>WBK</u>	DATE <u>6/12/86_KBN</u> 2/27/89_5
A.	DOCUM	ENTATION		
	Equip	ment Description	Atwood & Morrill	Assembly/Solenoid Valves (Valve Actuator) er (Air Manifold Assembly
,	Vendo	r/Manufacturer	<u>Gould Allied (Sol</u>	enoid Valves)
	Equip	ment Model No.(s)	<u>321X-21</u>	
	QUALI	FICATION REPORTS		
	(1)	Qualification Test	Report/Procedure N	
		201-39500/Rev. 0		DATE_ <u>5-18-79</u>
	(2)	Title/Number/Revis	ion <u>Wyle NEQ Test</u>	RIMS_B71_860514_10
		Report/17514-1/Rev	. A	DATE_ <u>3-14-85</u>
	NOTE :	qualification re	binder, references ports which may be n these references.	are made to the above identified as "(1)" or
	OTHEN	R (ANALYSIS, VENDO	R DATA, ETC.)	
	(3)	Category and Opera (B18 900612 253)	ting Times Calculat	ions, WBNOSG4-004 R11
	(4)	WBNP Environmental	Data Drawing 47E23	5-76 R3.
	(5)	Calculation WBNAPS in the North and S	•	2 235), Flooding Levels
	(6)	Calculation WBNOSG Cycles of Solenoid	•	2 219), Status and Duty
		Calculation WBNOSG in Valve Vaults (M	-	2 218) Superheated Steam
	(8)	Deleted by Revisio	n 2.	

WBEP-0086Q

BINDER TIT ASSEMBLY S	<u>WBNEQ-SOL-004 PLANT WBN</u> UNIT(S) 1 SHEET 2a OF R R LE <u>MSIV AIR MANIFOLD</u> COMPUTED /R1 AFM DATE 2/17/89 OLENOID VALVES - ED CHECKED /R1 KBV DATE 2/21/89
A. DOCUME	NTATION
OTHER	(ANALYSIS, VENDOR DATA, ETC.) (Continued)
	alculation (B25 850920 800), Sequoyah Nuclear Plant - olenoid Valves Normal Status.
	· · · · · · · · · · · · · · · · · · ·
	-
Note:	Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be

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INDER TITLE <u>MSIV AI</u> SSEMBLY SOLENOID VAL		PUTED <u>RHL</u>	DATE <u>9/8/</u>	R <u>1</u> R 86 <i>GFM</i>
OULD ALLIED		CKED <u>RKW</u>	DATE <u>9/9/</u>	86 <u>KBN</u>
B. <u>CONCLUSION OF REV</u>	IEW (Check on	ly one blo	ck)	
<u>X</u> Equipmen	nt Qualified			
	nt Satifies All or Justificatio			
Equipmen	it Qualificatio	n Not Estal	lished by Doc	umentation
Equipmen	it Not Qualifie	d Based on	Test Failures	
OPEN ITEMS AND QU	ALIFICATION DE	FICIENCIES		
		······.	<u></u>	<del>,</del>
		<u></u>	<u>, , , , , , , , , , , , , , , , , , , </u>	
		<u> </u>		
		<u> </u>	 	
·				
COMMENTS/RECOMMEN	DATIONS Equip	ment qualif	ication is bas	ed primaril
on similarity to	<u>test devices n</u>	oted in Atv	vood & Morrill	test
	20500	nnlemental	justification	provided
procedure No. 201	-39500 with su			
procedure No. 201 in Wyle Test Repo			explanation	ee Section
	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		
<u>in Wyle Test Repo</u>	<u>rt 17514-1. F</u>	or detailed		

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	QUALIFICATION_CRITERIA	
C.	Criteria Used to Demonstrate Qualification is in Accordance with the	
	Following (Indicate All Documents Which are Applicable):	
	Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
	X Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
	JUSTIFICATION/COMMENTS	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	IEEE-323-1974: "IEEE Standard for Qualifying Class 1E Equipment	
	for Nuclear Power Generating Stations".	·
	IEEE-344-1975: "IEEE Recommended Practices for Seismic Qualifica-	
	tion of Class 1E Equipment for Nuclear Power Generating Stations".	
	IEEE-382-1972: "IEEE Trial Use Guide for Type Test of Class IE	
	Electric Valve Operators for Nuclear Power Generating Stations"	

GOU	ER TITLE MSIV AIR MANIFOLD COMPUTED RHL DATE 6/11/96 R R R LD ALLIED CHECKED
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions of Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS
	WBN Main Steam Isolation Valve (MSIV) actuators provided by Atwood and Morrill (A&M) have Chicago Fluid Power air manifold assemblies with Gould Allied solenoid valves model No. 321X-21 which are 125V DC, Class
	C insulation. Environmental qualification of the subject items is based primarily on similarity to Hartsville Nuclear Plant (HTN) MSIV actuators tested for A&M Procedure No. 201-39500 (see Tab D/D1). HTN MSIV actuators provided by A&M have Chicago Fluid Power air manifold assemblies with Airmatic-Allied solenoid valves model No. 321X-22* which are 115V AC, Class C insulation. Justification for similarity to the above is noted in Tab C/Cl and C2. A detailed comparison of air manifold assemblies by means of respective instruction manuals (see Tab H [WBN] and E/E8 [HTN]) indicates that at a minimum materials are similar, and in most cases identical.
sub	C insulation. Environmental qualification of the subject items is based primarily on similarity to Hartsville Nuclear Plant (HTN) MSIV actuators tested for A&M Procedure No. 201-39500 (see Tab D/D1). HTN MSIV actuators provided by A&M have Chicago Fluid Power air manifold assemblies with Airmatic-Allied solenoid valves model No. 321X-22* which are 115V AC, Class C insulation. Justification for similarity to the above is noted in Tab C/Cl and C2. A detailed comparison of air manifold assemblies by means of respective instruction manuals (see Tab H [WBN] and E/E8 [HTN]) indicates that at a minimum materials
sub	C insulation. Environmental qualification of the subject items is based primarily on similarity to Hartsville Nuclear Plant (HTN) MSIV actuators tested for A&M Procedure No. 201-39500 (see Tab D/D1). HTN MSIV actuators provided by A&M have Chicago Fluid Power air manifold assemblies with Airmatic-Allied solenoid valves model No. 321X-22* which are 115V AC, Class C insulation. Justification for similarity to the above is noted in Tab C/Cl and C2. A detailed comparison of air manifold assemblies by means of respective instruction manuals (see Tab H [WBN] and E/E8 [HTN]) indicates that at a minimum materials are similar, and in most cases identical. Id Allied officially changed titles to Airmatic-Allied (w/both being a sidiary to Snap-tite, Incorporated) on March 17, 1978, and relocated

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ASSEMBLI/SOLENOID VALVES-	$\frac{1}{2} \qquad \text{SHEET}  \frac{6}{6}  \text{OF}  \frac{30}{2} \\ \text{DATE}  \frac{6/11/86}{11/86}  \frac{R}{2}  \frac{R}{2}  \frac{R}{2} \\ \text{DATE}  \frac{6/12/86}{11/86}  \frac{R}{2}  \frac{R}$
---------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

D. JUSTIFICATION/COMMENTS (Continued)

When A&M test data is applied to WBN environmental parameters (normal life, DBE & Post-DBE), all WBN requirements are enveloped. However, due to a very restricted thermal aging program, limiting materials (i.e., 0-rings) have a qualified life of less than one year when Arrehenius equation is applied. Therefore an additional test report, WYLE NEQ 17514-1 (see Tab D/D2) is included which addresses similar air manifold assemblies that were subjected to a more extensive thermal aging program (as well as enveloping all other WBN environmental parameters). The WYLE test report is applicable to Browns Ferry Nuclear Plant (BFN) MSIV air manifold assemblies manufactured by Automatic Valve Corporation with Airmatic-Allied solenoid valves model. No. V320X-XX. Three types of these solenoids were tested: 250V DC-Class H, 120V AC - Class H, and 120V AC - Class C. Similarity is justified to the 120V AC, Class C solenoid (test solenoid No. 3/test specimen No. 9A3), with exception of demonstrated voltage, and lubricant application to static seals which is justified by similarity to 250V DC Class H (test solenoid No. 1/test specimen No. 9D1), per Tab C/C2, C3, and C4 and Tab D/D2: WYLE test report 17514-1, page No. xvii, comment No. 10 & 11. Air manifold assemblies consist of mechanical valves. A detailed comparison of air manifold assemblies (less solenoid valves) indicates that materials are similar (with majority of parts being metallic) and the most limiting material is identical (0-rings: Fluorocarbon Rubber/Viton E60C per Tab D/D2: Section XVII, Table I-Aging Matrix, and Tab H: Chicago Fluid Power Service Manual DM52377 Reference Drawings). In addition WBN solenoid terminal strips (G.E. CR151B, see Tab B/Section I: item 5, page No. 17 and 18) are more compatible to WYLE-tested terminal strips (see Tab D/D2: page No. xviii, comment No. 14) than those tested by A&M.

Therefore, qualification for the items of this binder are based primarily on A&M test report No. 201-39500 with supplemental references to WYLE test report No. 17514-1 as necessary (i.e., thermal aging results, terminal strip similarity, vibration aging, and additional justification).

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Additional References: Material aging calculation reports (see Tab C/C4A - C4C).

	ITLE <u>MSIV AIR MANII</u> SOLENOID VALVES -	<u>FOLD</u> COMPUTED	<u>RHL</u> DA1	CE <u>6/25/8</u>	<u>36 (1710)</u> ZI17/89
OULD AL		CHECKED	<u>WBK</u> DAT	E <u>6/25/8</u>	36 <u>KBN</u>
e. <u>equ</u> i	IPMENT DESCRIPTION				
ider	the equipment identi ntical to the plant g/No/NA)? <u>No</u>				
	·	<u>Plant Device</u> Air Manifold Assembly/Sole		<u>ent</u> (1	Reference ) Intro.: 1 (2) ppXV
(1)	Equipment Type	V <u>alve</u> Chicago Fluid	Same	<u> </u>	(1) Intro.
(2)	Manufacturer	Gould Allied		Valve matic- (	<u>p 1</u> (2)ppXVII -10,-11,-1
(3)	Model Number(s) -	321X-21	<u>    321X–2</u>	<u>2</u> (	1): Tab <u>C/C1</u> 2) pp XVI-
			<u> </u>		8, -9
(4)	Serial Number(s)	NA	NA		<u>(1) NA</u>
			Specimen		<u>(2) p xxi</u>
		·	<u>9A3 (9D1</u> 0-ring w <u>Super-0-</u>	/Parker	
(5)	Identify Component Unique checksheet attached:	- <u>NA</u>			
JUST	IFICATION/COMMENTS				
					<u> </u>
					·
					•

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BINDER TITLE <u>MSIV A</u> ASSEMBLY SOLENOID VA GOULD ALLIED	IR MANIFOLD COMPUTED LVESCHECKED		R_1_R /11/86_ <i>47M</i> Z/17/89 /12/86_K&N  Z/27/89
documentation a interface a req	TERFACES aces pertinent to EQ io nd/or evaluation and ro uirement for our applic equirement in QMDS, if	eference the so cation (Yes/No no, provide j	ource. Is the Ri )? (Note below.)
Interface	Identify Interface	Plant Requirement? <u>(Yes/No/NA)</u>	Reference RI Test Report
Mounting Bolts	None Specified	NA	(1) NA (1) Section
External Process Connections	None Required	NA	3.2,p5 (2) Section XVII, <u>para. 1.3.4</u> (1) Section 3.2, p 5
Electrical Connections	See Below	Yes	(2) Section I, <u>para. 2.2.1</u>
Conduit Seals	None Required/ See below	Yes	-(2) p xviii, <u>Comment 12</u>
Connector Seals	See Below	Yes	<pre>(2) p xviii, <u>Comment 12</u> (1) Section 3.2, p 5</pre>
Orientation	See Below	Yes	<pre>(2) Section XVII, <u>para.3.5.3.</u>1 (1) NA</pre>
Physical Configuration	<u>See Below</u> Supply Air Pressure:	Yes	(2) p I-13, Fig. I-2
Other	90-100 psig	Yes	(1) <u>Section 3.</u> 2
JUSTIFICATION/CO	OMMENTS <u>See Page 8A</u>		R1

# PAGE B-8 R1

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BINDER NO. WBNEQ-SOL-004 PLANT_	WBN	UNIT(S)	1 SHEET	8a OF 30
BINDER TITLE <u>MSIV AIR MANIFOLD</u> ASSEMBLY SOLENOID VALVES -	COMPUTED /R	LAFM DATE	R <u>2</u> 2/17/89	₹ <u></u>
	CHECKED /R			
			9/1	9/50

## F. INSTALLATION INTERFACES (continued)

JUSTIFICATION/COMMENTS: The three test solenoids were electrically connected (flexible conduit with 1" NPT conduit fitting) through a NEMA 4 junction box which houses a terminal strip ((2) pg. No. I-12, Figure I-1). Solenoid assembly was mounted at a 45° angle (with conduit hub directed downward) to simulate worst case in-service mounting. A 1/4" hole at the lowest point of the junction box eliminates conduit seal requirements. WBN MSIV solenoids are housed within a NEMA 4 junction box with terminal strips housed in an adjoining junction block (See TAB H, Drawing No. CFP-305C). Although not required, WBN electrical connections include Conax RZ conduit seals* (see TAB F and Binder WBNEQ-CSC-001). Solenoid assembly is mounted at a 45° angle (with conduit hub directed upward). Weep hole requirements are met per TAB G, Section A, item 3. Wyle BFN test set-up was a worst case installation, therefore, WBN installation based on being similar and less severe is acceptable.

*Not a requirement, see TAB C/C5.

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WBEP-0086Q

	LD AL	LE MSIV AIR MANIFOLD COMPU SOLENOID VALVES- LIED CHECK	KED	те 6/12/86
G.	TEST	SEQUENCE	<u> </u>	
	(1)	Test Sequence: Was the test sequence accident environment in accordance (yes/no/NA)? (note below)		
			<u>Yes/No/NA</u>	Reference
		(a) Equipment inspected for dama	age <u>Yes</u>	(2)Sect. I, para. 1.1:(1) No*
		(b) Baseline performance		(1)Sect. 3.2, 4.0,6.0 9.0,10.0;
		measurements taken	Yes	(2)Sect. I, para 1.4
		(c) Equipment aged:		
				(1)Sect. 3.5, 6.0;
		Thermal	<u>Yes</u>	(2) Sect. VI, para 2.0 (1) Sect. 3.4, 5.0; (2) Sect. JL para 1.0
		Radiation	Yes	(2) Sect. II, para 1.0 Sect. IV, para 1.0
		Wear	Yes	(1)Sect. 3.3,4.0; (2)Sect. VII, para 1.
		(d) Vibration/seismic testing conducted	<u>Yes</u>	(1)Sect. 3.6,3.7,3.8 7.0,8.0, & 9.0; (2)Sect. XI
		(e) Design basis event (DBE) exposure	Yes	(1)Sect. 3.9, 10.0; (2)Sect. XIV, XV
		(f) Post-DBE exposure	Yes	(1)Sect. 3.9, 10.0; (2)Sect. XIV, XV
				<pre>(1)Results, p 3; (2)Sect. XVII,</pre>
		(g) Final inspection and disassembly	Yes	para. 3.6 & 3.7, 
	(2)	Was the same piece of equipment u described in item (1) above (yes/ 2 and 4, p. 10.)	used throughout ( 'no/NA)? <u>Yes (w/c</u>	the test sequence exception_of_items_
	(3)	Have the test equipment, test equipment, test equipment, test equipment, test equipment (yet (Reference (1)Section 1.0; (2)See appendices of sections referenced	es/no/NA)? <u>Yes</u> Instrumentation	
	JUST	IFICATION/COMMENTS <u>*(1)IEEE-323-19</u>	74, paragraph 6.	.3.2_states_
	"Ins	pection may be performed to assure	that a test uni	<u>it has not been</u>
	damas	<u>zed_due_to_handling"; therefore</u>	, this is consti	ituted_as_a

	BINDER TITLE MSIV AIR MANIFOLD COMPUTED RHL DATE 6/25/86 R R R R R R R R R R R R R R R R R R R				
G.	TEST SEQUENCE (Continued)				
	(2) Wear aging was the first phase of the test sequence. Upon completion of				
	the 39th test interval and prior to start-up of the 40th test interval				
	(simulating the 40th-year of service), all non-metallics were replaced, and				
	three solenoid valves were replaced due to noise emanating from air control				
	panel assembly. Since normal hands-on maintenance was allowed between each				
•	interval, the replacement of seals and solenoids is considered to be normal				
	maintenance procedures. No piece replacements of equipment were required for				
	the duration of all remaining phases of the test sequence.				
	(3) In reference to G(1) Test Sequence: Section XVII of Wyle test report				
	17514-1 ((2) p. 10) established qualification sequence.				
	(4) 40-Year life could not be achieved due to problems experienced during				
	Post-Radiation functional test. New solenoid test sets (specimens 9A and 9D)				
	with revised 10-year and 5-year equivalent radiation exposure plus accident				
	dose were subjected to baseline functional and radiation testing ((2) Notice				
	of Anomaly No. 3 and 3, Rev. A; page No. iii of Wyle test report 17514-1).				
	120V AC Class C solenoid valve (test specimen 9A3) was used throughout the				
	test sequence and is qualified for a 10-year life (see note).				

Note: Qualified life figures referenced above are based on meeting BFN environmental parameters; for equivalency to WBN requirements see TAB C/C4A-C4C.

. PAGE 13-10

BIND	ER NO.	SOLENOID VALVES-	SHEET <u>11</u> OF R R R R R R
H.	AGIN	<u>G</u>	
·	(1)	Was aging considered in the qualification progra (Yes/no/NA)? <u>Yes</u> (Reference <u>(1) Section 3.1</u> ).	
		JUSTIFICATION/COMMENTS	
	(2)	Were the following effects considered in the agi	ng program:
		<u>Aging Effect</u> <u>Yes</u>	<u>/No/NA</u> <u>Reference</u> (1)Sect. 3.5,6 (2)Sect. XVII;
		Thermal aging	para. 3.4 & Ap Yes <u>I &amp; II</u> (1)Sect. 3.4,
		Radiation exposure	Yes 5.0 (2)Sect XVII,
		Vibration (non-seismic) aging	para. 3.4.12 Yes <u>&amp; 3.5.1.2.2</u> (1) Sect. 3.3,
		Operational (electrical/mechanical/process)	Yes 4.0
		JUSTIFICATION/COMMENTS <u>A&amp;M_report_yielded limit</u>	ing thermal aging
		data: therefore, more extensive WYLE thermal agi	ng results were
		used. In addition, WYLE vibration aging is used	since A&M test
		results did not include these effects.	
	(3)	Were all known synergistic effects which are bel significant effect on equipment performance cons program (yes/no/NA)? <u>NA</u> (Reference	idered in the aging
		JUSTIFICATION/COMMENTS No known synergistic eff ported for the materials applicable to the subje the exception of silicone rubber (lead wire insu Dose rate synergisms have been reported as minor and were observed to have no significant impact	ct devices with lation) as noted: in NUREG/CR-2763
	(4)	Thermal Aging:	
		<ul> <li>(a) Was thermal aging considered in the qualifi</li> <li>(yes/no/NA)? Yes (Reference (2)Sect. XVII: App. I &amp; II</li> </ul>	cation program para. 3.4 and
	·	JUST IF I CATION / COMMENTS	

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	R R R R R R R R R R R R R R R R R R R
H. AGIN	NG (Continued)
	(b) Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>See Below</u> ).
	JUSTIFICATION/COMMENTS
	(2) Section XVII/para. 3.4.4.1-3.4.4.7, 3.4.1, 3.4.2, Table I
	(aging matrix), and II.
	(c) Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>See Below</u> ).
	JUSTIFICATION/COMMENTS (2) Section XVII/Appendix I.
	(d) Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>See Below</u> ).
	ParameterPlant Maximum NormalTestEquivalent125°C+38°C125°C+38°CRiseSee Tab C/130°F+58°C120°C+38°CC4A-C4C
	Temperature <u>Coil Heat Rise</u> (C4B: Coil 2407H(120°C) Heat Rise) 95H Material
	Time <u>40 Years</u> (125°C) Aging Rpt
	JUSTIFICATION/COMMENTS (2) Section XVII/Appendix I and II
	(e) Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>See Sect. H(4)(d) above</u> ).
	<pre>(e) Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>See Sect. H(4)(d) above</u>). JUSTIFICATION/COMMENTS</pre>
	(yes/no/NA)? <u>Yes</u> (Reference <u>See Sect. H(4)(d) above</u> ).
	<ul> <li>(yes/no/NA)? Yes (Reference See Sect. H(4)(d) above).</li> <li>JUSTIFICATION/COMMENTS</li> <li>(f) If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? Yes</li> </ul>

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	CHECKED WBK DATE 6/12/86
H. <u>AGING</u> (Co	ontinued)
(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>NA</u> (Reference).
	JUSTIFICATION/COMMENTS
(h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>(1) Sect. 3.5, 2nd para;</u> (2) Sect. XVII/para. 3.4.6
	JUSTIFICATION/COMMENTS See TAB C/C6
(5) Radi	ation Aging Exposure:
(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>(1)Sect. 3.4 &amp; 5.0</u> ).
	JUSTIFICATION/COMMENTS
(Ъ)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>No</u> (Reference).
	JUSTIFICATION/COMMENTS For justification, refer to TAB B:
	Section_I
(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>(1)Sect. 3.4, 1st para.</u> ).
	JUSTIFICATION/COMMENTS

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ASSEMBLY SOLEN	MSIV AIR MANIFOLD COMPUTED RHL OID VALVES - CHECKED WBK	<i>2/17/8<del>3</del></i> DATE <u>6/12/8</u> 6 <u>*87)</u>
H. AGING (Co		2/27/89
H. AGING (CO	ncinded)	
(d)	Is the radiation test exposure do acceptable (Yes/No/NA)? <u>Yes</u> (	
	(1) Sect.3.4, 5.0 Appendix A (pg.	. 50)).
	Plant normal ambient radiation dose (rd)	*1.8x10 ³ <u>(Total 40-yr integrat</u> ed
	Test exposure dose (rd)	1.74x10 ⁷
	Test exposure dose rate (rd/hr)	0.5 Mrd/hr
	Test exposure source type (e.g., Co-60 gamma)	<u>Cobalt 60 gamma</u>
_	JUSTIFICATION/COMMENTS * <u>See WBNP</u> Drawing 47E235-76.	Environmental Data
(6) Vibr	ation (non-seismic) Aging:	
(a)	Were the effects of non-seismic v normal and abnormal operation add qualification program ¹ Yes See below	ressed in the
	JUSTIFICATION/COMMENTS (2)Section 3.5.1.2.2	n XVII/para. 3.4.12 and
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>See below</u>	/No/NA)? <u>Yes</u> ).
		n XVII/para. 2.1.3.1.1, . and 3.5.1.2.2
(7) Opera	tional Stress Aging:	
	Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? <u>Yes</u> (Reference: _	g normal and abnormal
	(1) Sect. 3.3. 3.5. 3.9. 4.0. 5.0.	<u>6.0, &amp; 10.0</u> ).
	JUSTIFICATION/COMMENTS	· · ·
	tion program refers to the test re	

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BINDER T	O. <u>WBNEQ-SOL-00</u> 4 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>15</u> OF R <u>1</u> R TITLE <u>MSIV AIR MANIFOLD</u> COMPUTED <u>RHL</u> DATE <u>6/11/86</u> <u>ATM</u>
	SOLENOID VALVES – LIED CHECKED WBK DATE 6/12/86 KBA ² /27/89
H. <u>AGIN</u>	G (Continued) (b) Was the basis for stresses induced during operational
	aging identified and justified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference:
	(1) Sect. 3.3 and 3.5)
	JUSTIFICATION/COMMENTS
(8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>(2) Page xxi &amp; Section XVII, App. II/para. 1.1.3</u> )
	Qualified life (Document in QMDS) <u>12 years (normally energized</u>
	solenoids), 40 years (exerciser solenoids, air manifold assemb
	mechanical valves, and terminal strips only) - see TAB G. JUSTIFICATION/COMMENTS See TAB C/C4A-C4C for WBN equivalency
	to BFN WYLE test results.
(9)	
	)
	JUSTIFICATION/COMMENTS See TAB C/C4A-C4C for WBN
	equivalency to BFN WYLE test results.
	· · · · · · · · · · · · · · · · · · ·

	DER TITLE MSIV AIR MANIFOLD EMBLY/SOLENOID VALVES- ILD ALLIED			ate <i>6/11/86</i> _ ate <i>6/14</i> 86 _	
I.,	MATERIALS ANALYSIS	·			
:	Identification of Materials Sus Radiation Degradation and Aging Materials Analysis)				
	<u>Material/Property/Function</u> Ryton R-4/Mechanical/		<u>Reference</u>	Activation <u>Energy</u>	<u>Reference</u>
	(a) <u>Bobbin</u> Silicone Rubber/Mechanical/	$5 \times 10^8$	See Below		See Below
	<pre>(b) Insulation (c) Viton/Mechanical/Seal</pre>	$\frac{1 \times 10^{6}}{5 \times 10^{6}}$	<u>See Below</u> <u>See Below</u>		<u>See Below</u> See Below
	Prye-ML/Electrical/ (d) <u>Insulation</u> Phenolic/Electrical/	<u>1.5x10⁸</u>	See Below	······································	See Below
	(e) <u>Terminal Strip</u> Silicone/Electrical/ (f) Varnish	$\frac{3.8 \times 10^5}{1 \times 10^8}$		<u>1.06</u>	<u>See Below</u>
	(g) <u>Polymide/Mechanical/</u> Winding Cover	1.5x10 ⁸		<u>1.73</u>	
	JUSTIFICATION/COMMENTS <u>Referen</u>	<u>nce: Digit</u>	al Engineer:	ing System 1	.000
	"Materials Aging & Radiation Ef			<u>ab_C/C4A-C4C</u>	for
(1)	<u>detailed materials analysis cal</u> <u>Gasket material was not address</u>			sis_since_it	's degra
	dation_does_not_affect_operabil				
	comment 2). The gaskets serve	<u>as a seal</u>	<u>between the</u>	<u>pilot exhau</u>	st
	tube nut and junction box cover	r, and betw	<u>een the jun</u>	ction box	
	(which houses the solenoid value	<u>ves), junct</u>	ion box cov	<u>er and the d</u>	ump
	<u>valve_assembly (see Tab_H, dwg.</u>	<u>. No. CFP-3</u>	<u>05-C for ex</u>	<u>ploded view)</u>	<u>•</u>
	Failure of the gaskets would no	<u>ot result i</u>	<u>n moisture</u>	<u>or liquid in</u>	trusion
	(see Tab C/C5). Material compo	osition of	the gaskets	is primaril	v

PAGE <u>B-16</u>

BIND	ER NO. WBNEQ-SOL-004 PLANT WBN UNIT(S) 1 SHEET 17 OF 30 ER TITLE MSIV AIR MANIFOLD COMPUTED BHL DATE 6/0/86 R R R R EMBLY/SOLENOID VALVES- LD ALLIED CHECKED WITH DATE 6/12/86	0						
I.	MATERIALS ANALYSIS							
	JUSTIFICATION/COMMENTS (Continued)							
	asbestos with neoprene acting as a binder. Because							
	asbestos is inorganic and considered not to be age-sensitive, it could							
	still provide a marginal level of sealing at a minimum (even though							
	<u>sealing is not required - (2) page No. xviii, comment 12 for</u>							
	justification.)							
(2)	(2) <u>Electrical tape (Scotch brand #69 Glass Cloth - per Tab C/Cl) was not</u> <u>addressed in materials analysis since its degradation/failure is not con-</u>							
	sidered detrimental to the safety function of the solenoids							
	((2) Section XVII/para. 3.4.4.7, and Table I: item No 1.24.2.1.3).							
(3)	Although WBN solenoid valves are comprised of the same materials as							
	those solenoids (specimen 9A and 9D) tested at Wyle Labs, lower activa-							
	tion_energies were applied to the most limiting materials in order to							
	factor a degree of conservatism into the comparative results (see Tab							
	<u>C/C4A-C4C).</u>							
(4)	Bobbin material is not significant, as failure of this component is judged							
	to not adversely affect the safety-related function of the solenoids							
	((2) Section XVII, Appendix II, para. 1.1.3).							
(5)	Visual inspections and per telecon with Richard Mills of Chicago Fluid							
	Power on September 26, 1985, indicate that General Electric_CR151B							

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	DER NO. WBNEQ-SOL-004 PLANT WBN UNIT(S) 1 SHEET 18 OF 30
BINI	R_1_R DER TITLE <u>MSIV AIR MANIFOLD</u> COMPUTED <u>RHL</u> DATE <u>6/25/86</u> MBLY SOLENOID VALVES -
NOOL	LD ALLIED CHECKED WBK DATE 6/25/86 KHW Z/27/89
I.	MATERIALS ANALYSIS
	JUSTIFICATION/COMMENTS (Continued)
	terminal strips were supplied in WBN MSIV solenoid junction blocks.
	Per GE lefter dated Feb. 24, 1978 (see TAB E/E1), these terminal R1
	strips are comprised of the same materials as noted by Wyle Labs for
	a G.E. CR151A terminal strip (which was qualified based on similarity
	to a tested Square D KC-1 terminal strip - (2) pg. No. xviii.
	comment No. 14). Test results were applied to a conservative
	terminal strip activation energy of 1.06 (See TAB C/C4C).
(6)	Per Tab H/Chicago Fluid Power drawings: Air manifold assembly/
-	solenoid valves contain 0-rings and seals which are comprised of
	either DuPont Viton E-60C or 3M Flourel 2170. Since both materials
	are fluorocarbon rubber, Wyle Labs assumed Viton E-60C with an
	activation energy of 1.18 as the worst case (see (2) Section XVII,
	para. 3.4.4.1). As it has been determined that Viton E-60C has a
	lower activation energy than 3M Flourel (1.16 vs. 1.26, see TAB
	C/C4C: sheets 8 and 8A); Viton E-60C shall be the most limiting O-ring/seal material.
-	U-ring/seal material.

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BINDER NO	D. WBNEQ-SOL-004 PLANT WBN UNIT(S) 1 SHEET 19 OF 30 MSIV AIR MANIFOLD COMPUTED RHL DATE 6/11/56 R R R HSOLENOID VALVES- LLIED CHECKED WH DATE 6/12/86
SPI	JIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE ECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? Yes (Reference (1)Section 3.2)). Identify Acceptance Criteria: Test parameters recorded during test sequence were compared against set limits; but if operation of valve actuator was not affected, failure to meet these limits would not be
(2)	<pre>considered essential. ) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference (1)Section 3.2)) Identify baseline and functional testing:</pre>
(3)	Pneumatic System Leakage (valve open or closed): .5 SCFH max. JUSTIFICATION/COMMENTS <u>Exhaust pressures and times were measured</u> <u>during all subsequent functional tests ((1) Section 4.0, 5.0, 6.0,</u> <u>9.0, and 10.0).</u> Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference (1) Sect. 3.2, last para.).
	JUSTIFICATION/COMMENTS
	PAGE B.19

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	TLE <u>MSIV AIR MAN</u> SOLENOID VALVES -	IFOLD COMPUTED RHL	DATE <u>6/11/86</u>
	IED		DATE <u>6/12/86</u> <u>K80</u> 2/27/89
PERF		CHARACTERISTICS NECES: TIONS CAN BE SATISFIE	SARY TO ENSURE THE D UNDER ACCIDENT CONDITI
(4)			testing reflect normal s_ (Reference:
	(1) Sect. 3.2	······	·)
	JUSTIFICATION/CO	MMENTS	
	<u> </u>	·	
(5)		cal characteristics no mance specifications of	ecessary to ensure the can be satisfied.
. ·	( <u>a</u> ) <u>Parameter</u>	<u>Plant Normal Condit:</u> +12%	ions <u>Reference</u> Vendor Drawing
	Voltage	125 -16% VDC	<u>No. 13824-01-H</u> Solenoid
	- Load	<u>11 Watts</u>	
	Frequency	NA	
	Accuracy	NA	
	Other(s)		
		· · · · · · · · · · · · · · · · · · ·	
	JUSTIFICATI	ON/COMMENTS	· · · · · · · · · · · · · · · · · · ·
	JUSTIFICATI	ON/COMMENTS	
	JUSTIFICATI	ON/COMMENTS	

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BINDED NO	WBNEO-SOL-004	PLANT WBN UNIT(S) 1 SHEET 21 OF 30
	TLE <u>MSIV AIR MA</u> SOLENOID VALVES	ANIFOLD COMPUTED RHL DATE 6/11/86 7/11/89
GOULD ALL		CHECKED <u>WBK</u> DATE <u>6/12/86</u> <u>KBN</u> 2/27/89
		LJ C I [2]4
PERF		<u>. CHARACTERISTICS NECESSARY TO ENSURE THE</u> CATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
. (Ъ)	Parameter	Specific Accident Conditions Reference
	Voltage	<u>NA**</u>
	Load	NA
	Frequency	<u>NA</u>
	Accuracy	<u>NA</u>
	Other(s)	
	JUSTIFICATION/(	COMMENTS <u>**Solenoid valves are deenergized</u>
	during accident	conditions per calculation WBNOSG4-045.
(c)	Parameter	Demonstrated Conditions Reference (2) p xvii,
	Voltage	<u>109 VDC min 140 VDC max*</u> comment No.10&11
	Load	<u>NA</u>
	Frequency	<u>NA</u>
	Accuracy	NA
	Other(s)	NA
	JUSTIFICATION/	COMMENTS <u>*125VDC coils are used in Gould Allied</u>
	model No, 321X-	-21 solenoid valves for WBN valve actuators.
	<u>Airmatic-Allie</u>	i model No. 321X-22 solenoid valves tested by
	A&M use AC coil	s. Demonstrated voltage is based on similarity
	to Wyle DC test	t coil. Materials similarity is addressed in
	TAB B/Section 1	D: Justification/Comments, sheets 5 through 7
	(based on compa	arison of instruction manuals-actual to tested.
	see TAB H and I	Z/E2).  R1

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BINDER NO. WBNEQ-SOL-004 PLANT WBN					
BINDER TITLE MSIV AIR MANIFOLD COMPUTED	<u>R_1_R</u> <u>RHL</u> DATE <u>9/8/86</u> <u>AFM</u> Z/17/89				
ASSEMBLY SOLENOID VALVES - GOULD ALLIED CHECKED	<u>RKW</u> DATE <u>9/9/86</u> Ken				
	2/27/89				
K. <u>REQUIRED OPERATING ENVIRONMENT</u>					
Reference Environmental Drawing No. <u>4</u> 	7 <u>E235–76</u>  R1				
(1) Normal Max (2)	Abnormal Max				
(a) Temperature (°F) <u>130</u>	(a) Temperature (°F) <u>140</u>				
(b) Pressure (psig) <u>ATM(-)</u>	(b) Pressure (psig) <u>ATM</u>				
• • • • • • • • • • • • • • • • • • • •	(c) Humidity (%) <u>100</u>				
(d) Radiation (rd) 1 <u>.8x10 T</u> ID	(d) Radiation (rd) <u>NA</u> R1				
(3) Process Interfaces: <u>Main steam</u>	design process temperature =				
600°F; valve body and stem configuration eliminate signific:					
additional thermal effects which	could degrade solenoid				
components beyond ambient condit	ions				
	State anticipated occurrence frequency and duration of abnormal conditions: Will exist up to 8 hours per excursion and will				
occur less than 1% of the plant	life. Humidity only: could				
exist up to 8 hours and return t	o normal max of 50% RH in 8				
hour period linearly. This cond	ition should occur no more				
than twice during plant life.					
(5) Accident (worst case for any com parameter including peak, duration					
(a) Temperature (°F) <u>325*</u>	Accident type <u>HELB</u>				
(b) Pressure (psig) <u>25.18 psia</u>	<u>*</u> Accident type <u>HELB</u>				
(c) Humidity (%) <u>100</u> ★	Accident type <u>HELB</u>				
(d) Radiation (rd) <u>NA</u>	Accident type <u>HELB</u>				
(e) Spray Type <u>NA</u>	Accident type _ <u>NA</u>				
*See Required Operating Environment on	next page.				

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BINDER NO. WBNEO-SOL-004 PLANT WBN UNIT(S) 1 SHEET 23 OF 30
BINDER TITLE <u>MSIV AIR MANIFOLD</u> COMPUTED RHL DATE <u>9/8/86</u>
GOULD ALLIED CHECKED RKW DATE 9/9/86 KBA
K. <u>REQUIRED OPERATING ENVIRONMENT</u> (Continued)
Comments (duration/peak/profile/spray composition and pH, margin, etc.): **See TVA drawing No. 47E235-76 for duration and profiles, and TAB C/C8 and WBNOSG4-003 for temperature justification during a main steam line break/superheated R1 steam condition. Valves are required to operate during an HELB outside containment accident only; therefore, 1x10 ⁴ rd LOCA radiation dose is not applicable.
(6) Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>No</u> (Reference:
Calculation WBNAPS2-001 Identify initiation time and duration of submergence: Maximum flood level in steam valve vault will-not exceed EL 730.87. MSIV air manifold assembly lowest elevation is EL 742.0; therefore, submergence is not applicable (see TAB F for reference to elevation).
<ul> <li>(8) Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>No</u> (Reference: <u>TAB B, Section L(1)</u>).</li> <li>If yes, identify the fraction of the unattenuated free field</li> </ul>
beta dose to be added to the total dose and justify:
(9) Special environmental calculations (temp., rad., etc.)
See TAB B Section A for a listing of all calculations used in this binder.

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BINDER NO. WBNEQ-SOL-004 PLANT	WBN U	JNIT(S)	SHEET OF
BINDER TITLE MSIV AIR MANIFOLD ASSEMBLY/SOLENOID VALVES- GOULD ALLIED	COMPUTE	0 <u>                                      </u>	6/11/86 R 1/12/86
L. SUMMARY COMPARISON OF TEST	CONDITIONS TO	SPECIFIED CONDIT	TIONS
(1) Comparison of worst-c.	ase maximum par	ameters:	
Parameter	<u>Specified</u> FW/V: 5 min.	Demonstrated	Reference (1)Figure 5,
Operating Time	MS/V: 15 sec	<u>l hour</u>	<u>pg. 56; Tab C/C4C</u> (1)Figure 5; Tab C
Temperature (°F)	$\frac{***380}{(25.18-14.7)}$	<u>***398</u>	<u>C10:Tab C/C8 (MS/▼</u> (1)Sect. 3.2, Tab
Pressure (psig)	= 10.48	<u>110</u> 100 @ 10	<u>C/C9</u> (1)Figure 5, Tab
Relative Humidity (%)	100@24hrs	Days	<u>c/c9</u>
*Chemical Spray	<u>NA</u> 1.8x10	NA	
**Radiation (rd)	(gamma)	$1.74 \times 10^7$	(1)Sect. 3.4, App. 4
Submergence	NA	NA	
*Includes spray concent	tration, flowra	te, density, dur	ation, and pH.
**Enter 40-year integrat and specify type.	ted normal dose	plus integrated	accident dose
(2) Comparison of worst-ca	ase profiles and	d margin assessm	ent:
Parameter	Envelop	Profile es Specified /No/NA)	Reference
Temperature	Yes	· · · · · · · · · · · · · · · · · · ·	See Sect.
Pressure	Yes		<u>L.(1) Ref</u> .
Relative Humidity	Yes	, <del></del>	above
Chemical Spray	NA		
Submergence	NA		

JUSTIFICATION/COMMENTS <u>Sect. L.(1)</u> Radiation: Beta contributions not considered during testing since solenoid valves are sufficiently shielded by a junction box comprised of cold rolled steel. Beta dose is not applicable to the subject devices, as they are not required to operate during a LOCA and are located outside of containment.

***Specified and demonstrated temperatures include coil heat rise: See Tab C/C4B, items B and C.

PAGE	<u>B~a</u>	<u>24</u>	R

BINDE	ER TI	TLE <u>MSIV AIR MANIFOLD</u> COMPUTED <u>RHL</u> D SOLENOID VALVES -		1 R 3 AAM 2117/89	
		LIED CHECKED WBK D	ATE <u>6/12/8</u> 6	2/27/89	
L.		MARY COMPARISON OF TEST CONDITIONS TO SPECI	FIED CONDIJ	CIONS	
		Were margins applied to the test parameters or otherwise addressed in the test program to assure that normal variation and uncertainties are accounted for? (Note margin applied, Yes/No/NA).			
		Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/NA	
		Temperature: +15 degrees F	<u>&gt;15°F</u>	Yes	
		Pressure: +10% but no more than 10 psig	<u>10psig</u>	Yes	
		Radiation: +10% of accident dose	_>10%	Yes	
		Time: +10% (or 1 hour + operating time _per NUREG-0588)	>10%	Yes	
		Voltage: ±10% of rated value	<u>&gt;±10%</u>	Yes	
		Frequency: ±5% of rated value	NA	NA	
		Environmental Transient: the initial transient and the peak temperature applied twice	Same	Yes	
		Vibration: +10% added to acceleration	>10%	Yes	
		JUSTIFICATION/COMMENTS These are suggest	ed margins	only.	
		Radiation, time, and temperature figures	envelope po	velope postulated	
		DBE conditions to such a large degree that the margin			
		not considered to be critical.			
			•		
			·····		
		·			

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	BIND	ER NC	. WBNEQ-SOL-004 PLANT WBN UNIT(S) 1 SHEET 26 OF 30
	ASSE	IBLY	R_1_R TILE <u>MSIV AIR MANIFOLD</u> COMPUTED <u>RHL</u> DATE <u>6/11/86</u> SOLENOID VALVES - Z/17/89
	GOULI	D ALI	LIED CHECKED WBK DATE <u>6/12/86 KEA</u>
	м.	OPER	ABILITY TEST RESULTS
		(1)	Identify the safety function(s) of this equipment: (Reference: <u>See TAB A</u> ). R1
		•	JUSTIFICATION/COMMENTS
		(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (Yes/No/NA)? <u>Yes</u> (Reference: <u>(1) Section 10.0</u> ).
			JUSTIFICATION/COMMENTS Valves are required to de-energize
			5 min. into an Feedwater line break and 15 sec into a Main
			Steam line break (ref. M(1)). Valves were operated every
			10 min. during the first hour of test.
		(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure
			JUSTIFICATION/COMMENTS <u>During Post-DBE the solenoids are no</u> t
			required to operate but must not fail in a manner detrimental
			to plant safety (ref. M(1)) except test solenoids 1-FSV-001- R1
			4F. 4J. 11F. 11J. 22F. 22J. 29F and 29J are category C
			during post-DBE. Since DBE test conditions envelope actual
			Post-DBE requirements, this criteria has been met (see TAB
			C/C4C)
		(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (Yes/No/NA)? <u>Yes</u> (Reference: ( <u>1) Section 10.0</u> ).
			JUSTIFICATION/COMMENTS <u>See M.(2) above</u> .
I	•		

# PAGE B-26 R1

GOUL	D ALL	LIED CHECKED /R1 KBN DATE 2/27/89
Μ.	OPER	ABILITY TEST RESULTS (Continued)
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (Yes/No/NA)? <u>Yes</u> (Reference: <u>(1) Results, pg. 2 and 3; (2) p iii through xi</u>
		JUSTIFICATION/COMMENTS We have reviewed and concur with th
		disposition of anomalies documented in the reference (1)
		and (2) test reports. There is no impact on installed
		equipment: however. TAB G documents those findings which
		resulted in maintenance activities for corrective action.
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GOU	MSIV AIR MANIFOLD COMPUTED RHL DATE 6/11/36 R R R R R R R R R R R R R R R R R R R
۹.	MAINTENANCE AND SURVEILLANCE Has the qualification program identified those surveillance, maintenance and inspection parameters which are essential to maintain qualification a which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets). JUSTIFICATION/COMMENTS (2) Page No. xv through xix, see items 7 and 15.
	Note: Maintenance and surveillance requirements are based on more
	extensive WYLE thermal aging results than results from A&M therefore, only WYLE information is included (for detailed explanation, see Section D: Justification/Comments, sheets 5 through 7).

PAGE B.27

BINDER M BINDER ASSEMB GOULD	UTE MSIV AIR MANIFOLD COMPUTED CHL DATE G	_ SHEET <u>28</u> OF <u>3</u> ////////////////////////////////////
	ALLIED CHECKED DATE	<u>400</u>
0. <u>SUI</u>	MMARY OF REVIEW	Yes/No/NA
(1)	) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
_ (2)	) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>No</u>
(3)	) Choice of qualification methodology adequately justified?	Yes
(4)	) If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	Yes
	(b) Were specific features and failure modes and effects analyzed?	Yes
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	Yes
	(d) Were environmental parameters which affect equipment performance identified?	Yes
(5)	) Adequate similarity between equipment and test specimen established?	Yes
(6)	) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	<u>Yes</u>
	(c) Absence of preaging in test/analysis justified?	<u>NA</u>
	(d) Materials susceptible to thermal/radiation aging identified?	Yes

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BINDER N	O. WBNEQ-SOL-004 PLANT_WBN UNIT(S)	SHEET O
BANDERBE GOULD A	MSIV AIR MANIFOLD COMPUTED KHL DATE 6/	<u>///86</u> R 2/86
0. <u>sum</u>	MARY OF REVIEW (Continued)	Yes/No/NA
x	(e) Normally operating state of device (e.g., normally energized) considered?	
(7)	Qualified life or replacement schedule established?	Yes
.(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	<u>Yes</u>
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	<u>Yes</u>
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	<u>Yes</u>
(10)	Criteria regarding spray satisfied?	NA
	(a) Was the spray testing done while under the extremes of pressure and temperature?	<u>NA</u>
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>NA</u>
(11)	Criteria regarding submergence satisfied?	NA
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	<u>NA</u>
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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PAGE <u>B'29</u>

	DMPUTED <u>RHL</u> DATE G	6/11/86R /12/86
0. <u>SUMMARY OF REVIEW</u> (Continued)		Yes/No/NA
(15) Criteria regarding functional	testing satisfied?	Yes
(a) Does the test plan/report criteria for equipment p	specify an acceptance performed?	Yes
(b) Was an initial base line t required performance cha	est done to establish aracteristics?	Yes
<pre>(c) Has the test/analysis demo performance specificatio (e.g., voltage, load fre electrical characteristi</pre>	ons and characteristics equency, and other	ce <u>Yes</u>
(16) Criteria regarding instrument	accuracy satisfied?	<u>NA</u>
(17) Test duration margin (1 hour + satisfied?	function time)	Yes
(a) Is the minimum specified o l hour?	perating time at least	Yes
(b) If exception to the l-hour was taken, was adequate	minimum operating time justification provided?	<u>NA</u>
(18) Criteria regarding synergistic	effects satisfied?	Yes
(19) Criteria regarding margins sat	isfied?	Yes
(20) Maintenance and surveillance re identified?	equirements adequately	Yes
P. <u>DISCUSSION</u>		
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PAGE B.30

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MANUFACTURER : ASCO PAGE 1 OF 4

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## WATTS BAR NUCR PLANT TABA - EQUIPMENT IDENTICATION MATRIX

EQIS_NUMBERUNII_QEVICE_ID_NO1ALU DESCRIPTIONUNII_QEVICE_ID_NO1ALU	DITH_ ELEV(1) BH/BAD CONTRACT	<u>CAT</u> (2)	QPEB_TIME	EXENT	SAEETY_EUNCTION
NEN-1-FSV -030-0145A -A 1-FSV -030-0146A -A NEN-1-FSV -030-0145A -A 1-FSV -030-0146A -A AUX 5LDG GAS THT FAN A-A EXH DHPR 206-380-2RVU	737 * A05 80 kj3-82 7551	A	100D	L	SOLENOIDS ARE ACTUATED BY AN ABI SIGNAL AND ARE RE- QUIRED TO BE OPERABLE DURING THE MITIGATION OF THIS EVENT.
WBN-1-FSV -030-0146B -A 1-FSV -030-0146B -A AUX BLDG GAS THT FAN A-A EXH OMPR 206-380-2RVU	737 <b>°</b> A05 80kj3-827551	A	1000	L	SOLENDIDS ARE ACTUATED BY AN ABI SIGNAL AND ARE RE- QUIRED TO BE OPERABLE DURING THE MITIGATION OF THIS EVENT.
W6N-2-FSV -030-0157A -B 2-FSV -030-0157A -B AUX BLDG GAS TMT FAN A-A EXH DMPR 206-380-2RVI	737' AO9 U BOKJ3-827551	A	1000	L	SOLENOIDS ARE ACTUATED BY AN ABI SIGNAL AND ARE RE- QUIRED TO BE OPERABLE DURING THE MITIGATION OF THIS EVENT.
WBN-2-FSV -030-0157B -B 2-FSV -030-0157B -B Aux 5LDG GAS TMT FAN B-B SUCT 206-330-2RV	737' A09 U 80KJ3-827551	A	1000	L	SOLENOIDS ARE ACTUATED BY AN ABI SIGNAL AND ARE RE- QUIRED TO BE OPERABLE DURING THE MITIGATION OF THIS EVENT.
WBN-1-FSV -032-0090A -A 1-FSV -032-0080A -A 3 REACTOR BLOG UNIT 1 TRAIN A ISLN 206-380-381		A / A / A /	YB 5MN/1000 YB 5MN/1001 YB 5MN/1001 YB 15MN/1M4 YB 15MN/1M4	D MS/ D FW/ D RH/	C AFTER A PHASE B ISOLATION C SIGNAL IS RECEIVED AND

PAGE Aatur ZIURA 8/27/86 PREPARER/DATE Randy Foust CHECKED/DATE W. B. Kim 8/27/ Ŋ



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BINDER NO. : WBNEQ-SOL-MANUFACTURER : ASCO PAGE 2 OF 4

### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME</u> (2)	EVENT	SAFETY FUNCTION
WBN-1-FSV -032-0080B -A 1-FSV -032-0080B -A 296 Reactor BLDG UNIT 1 test sol 206-380-2RU	718' 4" ANN 80KJ3-827551	B 100D B 100D B 100D B 100 B 1M0 B 1M0	L MS/C FW/C RH/C CV/C	SOLENOID FAILURE MUST NOT CAUSE ASSOCIATED CNTMT ISOL VALVE TO OPEN AFTER A PHASE B ISOLATION SIGNAL IS RECEIVED AND RESET
WBN-1-FSV -032-0102A -B 1-FSV -032-0102A -B 278 Reactor Bldg Unit 1 train B Isln 206-380-3RU	727'10" ANN 78K3-822950	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO	L MS/C FW/C RH/C CV/C	SOLENOIDS MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED AFTER A PHASE B ISOLATION SIGNAL IS RECEIVED AND RESET
WBN-1-FSV -032-0102B -B 1-FSV -032-0102B -B 279 Reactor BLDG UNIT 1 test sol 206-380-2RU	727'10" ANN 80KJ3-827551	B 100D B 100D B 100D B 100 B 1M0 B 1M0	L MS/C FW/C RH/C CV/C	SOLENOID FAILURE MUST NOT CAUSE ASSOCIATED CNTMT ISLN VLV TO OPEN AFTER A PHASE B ISOLATION SIGNAL IS RECEIVED AND RESET
WBN-1-FSV -032-0110A -A 1-FSV -032-0110A -A 295 RB UNIT 1 NON-ESNTL CONT AIR ISLN 206-380-3RU	718' 8" ANN 78K03-822950	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 15MN/1MO A/B 1HR/1MO	L Ms/C FW/C RH/C CV/C	SOLENOIDS MUST DE-ENERGIZE AND REMAIN DE-ENERGIZED  R2 AFTER A PHASE B ISOLATION SIGNAL IS RECEIVED AND RESET
WBN-1-FSV -032-0110B -A 1-FSV -032-0110B -A 296 RB UNIT 1 NON-ESNTL CONT AIR ISLN 206-380-2RU	718' 8" ANN 80KJ3-827551	B 100D B 100D B 100D B 100D B 1M0 B 1M0	L MS/C FW/C RH/C CV/C	SOLENOID FAILURE MUST NOT CAUSE ASSOCIATED CNTMT R2 ISLN VLV TO OPEN AFTER A PHASE B ISOLATION SIGNAL IS RECEIVED AND RESET

PREPARER/DATE RANDY FOUST 8/27/86 21/189 CHECKED/DATE W.B. KIM 8/27/86 2123/89

PAGE A-2 R2

TE: 05/15/90



BINDER NO. : WBNEQ-SOL-O MANUFACTURER : ASCO PAGE 3 OF 4

### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>Contract</u>	<u>CAT OPER TIME</u> (2)	<u>EVENT</u>	SAFETY FUNCTION
WBN-0-FSV -065-0024 -A 0-FSV -065-0024 -A Egis train a fan A-Aisln DMPR 206-380-2RU	757 <b>'</b> A16 80KJ3-827551	A 100D	L	SOLENOIDS MUST REMAIN OPERABLE FOR THE DURATION OF THE LOCA.
WBN-0-FSV -065-0043 -B 0-FSV -065-0043 -B Egts train B fan B-B Isln DMPR 206-380-2RU	757 <b>!</b> A16 80KJ3-827551	A 100D	L	SOLENOIDS MUST REMAIN OPERABLE FOR THE DURATION OF THE LOCA.
WBN-2-FSV -067-0336 -A 2-FSV -067-0336 -A Emerg GAS TRTMT ROOM COOLER A ICR 206-380-2RU	757' A16 80KJ3-827551	-A 1 M0 -A 1 M0 -A 1 M0	L <del>RH/A-</del> <del>AF/A-</del> <del>AB/A- CV/A-</del>	MUST OPERATE TO SUPPORT OPERATION OF EGTS & PEN ROOM COOLERS ONG 40 51211
WBN-2-FSV -067-0338 -B 2-FSV -067-0338 -B Emerg GAS TRTMT ROOM COOLER B ICR 206-380-2RU	757" A16 80KJ3-827551	A 100D	L	MUST OPERATE TO SUPPORT OPERATION OF EGTS & PEN R2 ROOM COOLERS
WBN-1-FSV -067-0350 -A 1-FSV -067-0350 -A PEN RM CLR A2 SUP CNTL VLV 206-380-2RU	713' A06 80KJ3-827551	A 1MO A 1MO	L RH/A CV/A AF/A AB	SOLENOIDS MUST FUNCTION TO Provide flow to coolers Which Serve ESF Equipment

PAGE A-3 R3

PREPARER/DATE RANDY FOUST 8/27/86 2/17/89 CHECKED/DATE W.B. KIM 8/27/86

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BINDER NO. : WBNEQ-SQL-MANUFACTURER : ASCO PAGE 4 OF 4

## HATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMSER DESCRIPTION	UNII_QEYICE_IQ_NQ MQQEL_N	LC _ AZMIIH_ Ē UMBIR C		BMLBAD G	2A I (2)	QPER_IIME	EVENI	SAFETY_EUNCIION
WAN-1-FSV -067-0352 -3 Pēņ RH CLR B2 SUP CNTL VL			13' 30 KJ3-827	AO6 4 2551 4 4 4	A A A	1000 1m0 1m0 1m0 1m0	L RH/A CV/A AF/A AB	SOLENOIDS MUST FUNCTION TO Provide flow to coolers which serve esp equipment
HBN-1-FSV -067-0354 -A PEN RH CLR A3 SUP CNTL VI	1-FSV -067-0354 - _V 206-330		737° 30KJ3-827	•••	A A A	1000 1 NO 1 NO 1 NO 1 NO 1 MO		SOLENOIDS MUST FUNCTION TO Provide flow to coolers Which serve esf equipment
WƏN-2-FSV -G67-0354 -A Pen RH CLR A3 SUP CNTL VLV			7374 30KJ3-827	~~/	A.	1000	L	SOLENOIDS MUST FUNCTION TO PROVIDE FLOW TO COOLERS WHICH SERVE ESF EQUIPMENT
WAN-1-FSV -067-0356 -B PEN RH CLR B3 SUP CNTL VI			7371 30 kj3- 82 i	551	A A A	1000 1m0 1m0 1m0 1m0 1m0	L RH/A CV/A AF/A AB	SOLENOIDS MUST FUNCTION TO Provide flow to coolers Which serve esf equipment
WBN-2-FSV -067-0356 -B PEN RH CLR B3 SUP CNTL VLV			7374 30KJ3-827		A	1000	L	SOLENOIDS HUST FUNCTION TO Provide flow to coolers which serve esf equipment

			R /	R	R
PREPARER/DATE_	Randy Foust	8/27/86	2.11.7/89		
	W. B Kim				
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•	BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 1 OF 1 RR
	BINDER TITLE ASCO SOLENOID VALVES COMPUTED/R1 (HW) DATE Z/17/89 MODEL 206-380 SERIES (AC CONSTRUCTION) CHECKED/R1 667 DATE Z/23/89
	TAB A NOTES:         1). Floor/Actual Elevation - Actual Elevations are documented on field
	PAGE A-5RI

211-3

WBNEQ-SOL-005

## TAB B

## ENVIRONMENTAL QUALIFICATION CHECKLIST

NOTE: The units common, 1 and 2 solenoid valves covered by this binder are required for Unit 1 operation.



EQP098.51

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	DER TITLE <u>ASCO SOLENOID V</u> MODEL 206-380 S	
<u>(AC</u>	CONSTRUCTION)	CHECKEDWBKDATE <u>8/28/86EEM</u> Au 2/23/89 5/2
A.	DOCUMENTATION	
	Equipment Description	Solenoid Valves
	Vendor/Manufacturer	Automatic Switch Company (ASCO)
÷	Equipment Model No.(s)	206-380-2RVU
		206-380-3RU
		206-380-2RU
	QUALIFICATION REPORTS	
	<u>Stations", AQR-673</u> NOTE: Throughout this	Binder, references are made to the ASCO eport listed above. This report is identified
	(2) Title/Number/Revis	ion <u>"Equipment Qualifi- RIMS NEB 840925 351</u>
	Analysis of Class	est Program & Failure IE Solenoid Vlvs", DATE Nov. 1983 Opendix C, and pages F-3
	(3) Title/Number/Revis <u>fication Research</u> <u>Valves, "NUREG/CR-</u>	on Solenoid Operated DATE August 1988
	(4) Title/Number/Revis Report No. 177"	DATE 12/11/79
	OTHER (ANALYSIS, VENDO	R DATA, ETC.)
	· ·	ting Times Calculation WBNOSG4-008 R15

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BINDER N	O. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 1a OF	27
BINDER TI	TLE <u>ASCO SOLENOID VALVES</u> COMPUTED/R1 AFM DATE 2/17/89	
(AC CONST	RUCTION) CHECKED/R1 EEM DATE 2/23/89 A7M 5/21/90	
A. DOCU	MENTATION	
OTHE	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)	
(7)	Category and Operating Times Calculation WBNOSG4-015 R10 (System 65) (B26 900309 226)	F
(8)	Category and Operating Times Calculation WBNOSG4-016 R14 (System 67) (B26 900319 215)	
(9)	WBNP Environmental Data Drawing 47E235-44 Rl	
(10)	WBNP Environmental Data Drawing 47E235-48 R3	
(11)	WBNP Environmental Data Drawing 47E235-49 R2 and DCA-P02351-11-0 per DCN P-02351-A (B26 88 1210 801)	F
. (12)	WBNP Environmental Data Drawing 47E235-56 R1	
(13)	WBNP Environmental Data Drawing 47E235-57 R2 and DCA-P02351-17-0 per DCN P-02351-A (B26 88 1210 801)	F
(14)	WBNP Environmental Data Drawing 47E235-78 R3	
(15)	Calculation WBNNAL3-007 R3 (B26 890605 308), Location Specific Radiation Dose	
(16)	Deleted by Revision 2.	
(17)	Calculation WBNOSG4-044 R1 (B45 860908 218), Flooding	ł
(18)	Calculation GENNAL6-002 R2 (B45 860812 236), Moisture Intrusion	
(19)	Calculation WBNOSG4-045 R1 (B45 860902 219), Status and Duty Cycles of Solenoid Valves	
(20)	Calculation WBNNAL3-031 R1 (B45 880826 235), 100-day LOCA Dose in EGTS Filter Train Room	
(21)	Calculation WBN-EEB-MS-TI06-0017 (B26 900202 410) Solenoid Valve Voltage Study	F
(22)	Calculation TI-ECS-79 R2 (B45 860319 235), EGTS Room Temperature	

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BINDER NO	0. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 15 OF 23
NDER TIT	R 2 R, ILE ASCO SOLENOID VALVES COMPUTED /R1 AFM DATE 2/17/89 A MODEL 206-380 SERIES 5/18/90 RUCTION) CHECKED /R1 EEM DATE 2/23/89 0/7M 5/2//90
A. DOCUI	MENTATION
OTHEI	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)
(23)	ASCO Letter, W. M. Brown to F. W. Chandler dated April 29, 1985 (B43 850502 015)
(24)	Material Aging Data Request WAD-3
(25)	ASCO Certification of Compliance (B43 850326 508, MED 840202 206, B26 860728 022)
(26)	TVA Memorandum D. L. Reed to EEB files dated October 9, 1984 (EEB 841010946)
(27)	Deleted by Revision 2.
(28)	ASCO Letter, W. M. Brown to D. L. Kitchel dated May 8, 1986 (B71 860512 001).
(27)	CATEGORY AND OPERATING TIMES (ALCULATION WBNOSG 4-040, RT
• • • •	UZ COMPONENTS REQUIRED FOR UT SAFE SHUTDOWN (B26 900327 203).
NOTES	•
	) Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.
(2)	) Although most valves in this binder were purchased and certi- fied to be in compliance with ASCO Test Report No. AQS21678/ TR, NRC recognizes this model valve as being qualified to the later ASCO Test No. AQR 67368 (see NRC Information Notice 85-08 in TAB J). Therefore, qualification of the valves in this binder is to the parameters of the later test although the COCs from ASCO in TAB E are to the older test.
	PAGE B-2B R2

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	R 1 R 2 ER TITLE ASCO SOLENOID VALVES COMPUTED RCF DATE 8/28/86 AFM CAR
() (	MODEL 206-380 SERIES 2/23/89 4/9/9 CONSTRUCTION
	CONSTRUCTION)       CHECKED       WBK       DATE       8/28/86       EEM       Apple         2/23/89       2/23/89       2/23/89       2/23/89       2/23/89       2/23/89
в.	CONCLUSION OF REVIEW (Check only one block)
	X Equipment Qualified
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
•	Equipment Qualification Not Established by Documentation
	Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES
	1) Conduit seals must be installed on valve Nos. 1-FSV-67-350-A. R
•	
	COMMENTS/RECOMMENDATIONS None
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PAGE B-3 R2

	CONSTRUCTION) CHECKED CHECKED
C.	QUALIFICATION CRITERIA
•	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of lE Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET IEEE 323-1974, IEEE 344-1975, IEEE 382-1980, and IEEE 627-1980.
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)		ER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 4 OF ER TITLE ASCO SOLENOID ES, MODEL NO. 206-380-SERIES COMPUTED REAL DATE 8/27/8/2
	VALV (AC	ER TITLE ASCO SOLENOID ES, MODEL NO. 206-380-SERIES CONSTRUCTION) CHECKED MAL DATE 8/27/06
	D.	QUALIFICATION METHODOLOGY (Check only one block)
		X Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
		Test of Similar Items with Supporting Analysis
		Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
		Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
		JUSTIFICATION/COMMENTS See TAB C
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					2/23/89 5/21
Ε.	EQUI	PMENT DESCRIPTION	I		
	iden	he equipment ider tical to the plar /No/NA)? <u>yes</u>	it equipment whi		
4			<u>Plant_Device</u>	Qualification 	<u>Reference</u>
	(1)	Equipment Type	<u>Solenoid Vlv</u>	- Solenoid Vlv	See <u>TAB C</u> See
	(2)	Manufacturer	ASCO	ASCO	TAB C
	(3)	Model Number(s)	<u>206–380–2RVU</u>	<u>K206-380-3RVF</u>	See TAB C & pg. <u>5 of (1)</u> See TAB C & pg.
			<u>206-380-3RU</u>	K206-380-3RF	<u>5 of (1)</u>
•		· .	<u>206–380–2RU</u>		 
	. (4)	Serial Number(s)	) <u>See TAB F</u>	Not Listed	
				· · · ·	
	(5)	Identify Compone Unique checkshee attached:			
· .	JUSI	IFICATION/COMMENT	<u>rs</u>	•	

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a	SINDER NO. WBNEQ-SOL-00	5 PLANT WEN	UNIT	(S) <u> </u>	SHEETOF 2
	NOER TITLE ASCO SOLI	INOID (		DATE S	2786 PX7 " -
V	ALVES, MODEL NO. 206-	-180-SERIES		· · · · · · · · · · · · · · · · · · ·	w/s/ 3/18/90
(	AC CONSTRUCTION)		CHECKED	DATE 🗸	1116 <u>aom</u>
				1	5/21/90
	F. INSTALLATION INTE	RFACES			
	List all interfac	es pertinent to	EQ identifie	ed in the test	report
	and/or evaluation	and reference c	he source.	Is the interia	ica a
	requirement for a enter requirement				yes,
	enter requirement	In Quida, II NO,	provide las		
				Plant	
				Requirement?	Reference
	Interface	<u>Identify In</u>	terface	(Yes/No)	<u>Test Report</u>
·		None Specified	See		
	Mounting Bolts	TAB C, "Interf			
					· · ·
	External Process	None Specified	. See		
	Connections	TAB C, "Interf			
		<del>الا بر الحالي ( 1999 م مراجع الحركي ( 1999 م</del>	· · · · · · · · · · · · · · · · · · ·	·	
					· ·
1	Electrical Connections	TAB C, "Interf:	ices"	·	
	Connections				
	Conduit Seals	See TAB C, "Int	erfaces"		
	<b>A</b>				
	Connector Seals	NA			
	JERTZ				
					App. A, Pg. A2 of
ĺ		<u>Vertical &amp; Upri</u>		<b>V</b>	(/) & ASCO Ltr N TAB E-2
	Orientation	vertical a upri	<u>gnt - 4</u>	Yes	
	Physical	N/A	<u> </u>		······································
	Configuration				
	Other	See below	······	Yes	See below
	JUSTIFICATION/COMM	TENTS L. ASCO T	equires the	installation of	of a 90° street
	elbow facing downw	vard connected to	exhaust por	rt or similar o	configuration
	<u>to prevent moistur</u>	e from entering	valve intern	nals (Reference	e: Page Al8
	of (). The purpose	of this require	ment is to p	prevent moistur	e intrusion
<b>-</b>	resulting from a l	iquid spray. Si	nce these va	alves are not s	ubject_to_any_
[	spray condition th	<u>e installation o</u>	f a 90° stre	er elbow is no	t required.

PAGE B-1

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RZ

	DER NO. WENEQ-SOL-005 PLANT WEN UNIT(S) 1 SHEET 7 OF							
BINDE	R TITLE ASCO SOLENOID VALVES COMPUTED RCF DATE 8/28/86							
(AC C	ONSTRUCTION) CHECKED WBK DATE 8/28/86 EEM G							
	2/23/89 5/0							
F.	INSTALLATION INTERFACES (Continued)							
	JUSTIFICATION/COMMENTS (Continued)							
	2). Medium must be oil free instrument air and a strainer or							
	filter must be installed on the inlet as close to the valve							
	as possible (Reference: ASCO Bulletin for Model 206-380							
	valves Tab H). ASCO does not identify specific interfacing requirements except as noted above. It is incumbent on each							
	utility to ensure that interfaces are such that they do not							
	interfere with the proper operation or qualification of the							
	solenoid valve. See TAB C for a description of the TVA							
•	interfaces.							
-								
· -								
-								
_								
-	•							
_								
_								
_								
-								
	PAGE B-8R2							

(1)	T SEQUENCE Test Sequence: Was the test sequen accident environment in accordance	nce established	to simulate the
	(yes/no/NA)? (note below)	Yes/No/NA	Reference
	(a) Equipment inspected for damage	e <u>Tes</u>	Sect. 4, pg 3 of (1) Sect. 4,
	(b) Baseline performance measurements taken	Yes	pg 8 of (1)
	(c) Equipment aged: Thermal	Yes	Sect 4.1.1, pg 8 of (/). Sect 4.1.4, pg 15
	Radiation	Yes	of (1). Sect 4.1.2. pg 12
	Wear	Yes	of (/). Sect. 4.1.5,pg 15 Sect. 4.1.6, pg 1
	(d) Vibration/seismic testing conducted	Yes	Sect. 4.2.1, pg 1 of (/).
	(e) Design basis event (DBE exposure	Yes	Sect. 4.2, pgs 19 23 of (/) Sect. 4.2.3, pgs
	(f) Post-DBE exposure	Yes	22 & 23 of (/)
	(g) Final inspection and disassembly	Чев	Sect. 4.4, pg 24 of (/).
(2)	Was the same piece of equipment use described in item (1) above (yes/no		e test sequence
(3)	Have the test equipment, test equip been appropriately documented (yes/ (Reference <u>Appendix G of (/)</u> ).		and calibration dat -
JUSI	TFICATION/COMMENTS		

.

		CHECKED	DATE 0/10/100 1000
H.	<u>AGIN</u>	<u>IG</u>	
	(1)	Was aging considered in the qualification pr (Yes/no/NA)? <u>Yes</u> (Reference <u>Appendix</u> pg AlO of (1); and TAB C).	-
		JUSTIFICATION / COMMENTS	
	(2)	Were the following effects considered in the	e aging program:
		Aging Effect	Yes/No/NA <u>Reference</u> App. A, Sec
		Thermal aging	Yes 9.4.1 of (
		Radiation exposure	App. A, Sec Yes 9.4.4 of (,
		Vibration (non-seismic) aging	App. A, Sec           Yes         9.4.5 of (
		Operational (electrical/mechanical/process) stress aging	App. A, Sen 9.4.2 and Yes <u>9.4.3 of</u> (4
		JUSTIFICATION/COMMENTS	
	(3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>No</u> (Reference	
		JUSTIFICATION/COMMENTS Synergistic effects	were considered in the
		gualification of these valves. Each section	of TAB C contains a
		discussion on this subject.	
	(4)	Thermal Aging:	
		(a) Was thermal aging considered in the qua (yes/no/NA)? <u>Yes</u> (Reference <u>App. A, Secof (/)</u> , and TAB C),	
		JUSTIFICATION/COMMENTS	

(AC CONST	RUCTIC	ON) CHECKED DATE 8/1/1/86 4000
H. AGI	NG (C	Continued)
	(b)	Were the materials susceptible to thermal aging degradation
		identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: App. B of (1) ).
		JUSTIFICATION/COMMENTS
	(c)	Was the basis for thermal aging identified in the qualification
		program (yes/no/NA)? Yes (Reference See H (1) this Tab ).
		JUSTIFICATION/COMMENTS
		· · · ·
	(b)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program
		(yes/no/NA)? Yes (Reference App. A, Sect. 9.4.1 of ()).
		Parameter Plant Maximum Normal Test Equivalent
	,t	Temperature
		Time
		JUSTIFICATION/COMMENTS See TAB C, "Aging"
	(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? Yes (Reference See H(4)(d) this Tab & TAB C).
		JUSTIFICATION/COMMENTS
		·
	(f)	If activation energies were used for determining accelerated
	•	aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? Yes
		(Reference See H(4)(b) this Tab ).
		JUSTIFICATION/COMMENTS

EOP098.51

BINDE	R TITLE A	SCO SOLENOID COMPUTED $\frac{R}{R}$ DATE $\frac{R}{R}$
VALVE (AC C	S, MODEL ONSTRUCT	NO. 206-380-SERIES CHECKED WITH DATE 8/28 80 AOM
Н.	AGING ((	Continued)
• .	( <b>g)</b> .	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? N/A (Reference).
		JUSTIFICATION/COMMENTS
	( h)	Was the equipment operated during the thermal aging (yes/no/NA)? Yes (Reference Sect. 4.1.1, pg. 11 of (/)).
	·	JUSTIFICATION/COMMENTS
	5) Radi	ation Aging Exposure:
	(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference App. A, Sect. 9.4.4 of (/)).
		JUSTIFICATION/COMMENTS
	(Ъ)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>No</u> (Reference).
		JUSTIFICATION/COMMENTS ASCO's intent was not to subject the
·		test specimen to radiation exposure in accordance with the
		limiting material. Their intent was to demonstrate operabi- lity regardless of the radiation threshold values.
	(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? Yes (Reference See H(5)(a) this Tab ).
		JUSTIFICATION/COMMENTS

...

(AC CONSTRUCT	ASCO SOLENOID VALVES COMPUTED <u>RCF</u> MODEL 206-380 SERIES ION) CHECKED <u>WBK</u>	2/17/89 5/18/
H. <u>AGING</u> (0	Continued)	
(d)	Is the radiation test exposure de acceptable (Yes/No/NA)? <u>Yes</u>	
	4.1.4 of (/) and Appendix D of (	/)).
	Plant normal ambient radiation dose (rd)	Various-See TAB C
	Test exposure dose (rd)	$\frac{7}{2.3 \times 10^{7} \text{ rads, gamma}}$
	Test exposure dose rate (rd/hr)	0.71 Mrad/hr for 33 hours
	Test exposure source type (e.g., Co-60 gamma)	Co-60. gamma
	JUSTIFICATION/COMMENTS	
(6) Vib	ration (non-seismic) Aging:	
(a)	Were the effects of non-seismic w normal and abnormal operation add qualification program ¹ Yes	iressed in the
	Section 9.4.5 and Section 4.1.5 c	of (/.)).R
	JUSTIFICATION/COMMENTS No failur	e which could be
	attributed to vibration aging was	identified.
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>App. A. Section 9.4.</u>	/No/NA)? Yes
	JUSTIFICATION/COMMENTS	

PAGE<u>B-13R2</u>

H. <u>AGIN</u>	1G (Continued)
(7)	Operational Stress Aging:
	<ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation adressed in the qualification program         (Yes/No/NA)? Yes (Reference: App. A. Section 9.4.2         and 9.4.3 of (/)        </li></ul>
	JUSTIFICATION/COMMENTS
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: App. A. Section 9.4.2 & 9.4.3 of (/)
	JUSTIFICATION/COMMENTS
(8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>See below. TAB C. and Section 9.4.1 Appendix</u> <u>A of (/)</u> .
	Qualified life (Document in QMDS)
	JUSTIFICATION/COMMENTS
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>See below and TAB C</u> ).
	JUSTIFICATION/COMMENTS Replacement intervals and qualified
	life are a function of plant specific conditions in comparison
	to test conditions. TABS C and G define the replacement inter-
	vals and qualified life and their basis.
•	

IDE	R TITLE <u>ASCO SOLENOID VALVE</u> MODEL 206-380 SERIE		RCF DATE		2 7 <del>2 R</del> 7 <del>8</del>
: c	CONSTRUCTION)		<u>/BK</u> DATE	8/27/86	azm
	<u> </u>	<u> </u>	. <u></u>	<u>ک</u>	/21/90
•	MATERIALS ANALYSIS				
	Identification of Matorial	a Succestil	la po Ciami	ficant The	
	Identification of Material. Radiation Degradation and A	-	-		
	Detailed Materials Analysi	s)			
	Material/	Radiation		Activation	
	Property/Function	<u>Threshold</u>	<u>Reference</u>	Energy	Referenc
	(Coil) IsoMica bonded				•
	(a) <u>with Hi-Temp Epoxy</u> Ethylene Propylene	<u>rads</u> 1 x 10 ⁷	See below		
	(b) <u>Therpolymer (Seats)</u>		See below	0.94	App. B pg B3 of (/
	•	5 x.10 ⁶			App. B pg
	(c) <u>Viton (Seats)</u>	rads	See below	1.04	_ <u>84_of (</u> /
	(d) <u>*DC 500 Lubricant</u>	NA	NA	NA	<u>NA</u>
	(e)				·
		No. The second s	01		
	JUSTIFICATION/COMMENTS	Noce: Ine	<u>Class H Co</u>	LI 15 COMPO	osed of si
	primary materials. Of the	ese, the on	<u>e with the </u>	owest act:	vation
	energy is Iso-Mica bonded	with hi-te	np epoxy. ]	ts activat	ion energ
	is 1.00 eV. The materials	of coil c	netmation	along with	
	activation energies are id	lentified in	<u>ı Appendix E</u>	, page B5	of (1).
	Radiation threshold values	are typic	al for these	materials	and
	listed for information onl	v These v	ralinae wara	not taken	from the
	test report but were suppl	ied by the	<u>Digital Mat</u>	<u>erials Dat</u>	<u>a Base.</u>
	(See TAB E).				
	*Although net encod in De	C (1) DC			· · · · ·
	*Although not stated in Re				d on
	tested valves as verified 1	by ASCO let	<u>ter dated l</u>	/5/88	F
	(SOO TAR E 11)				
	<u>(see TAB E-11).</u>				
	(See IAD L-11),				(

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PAGE B-15 R2

BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 15 OF 27 BINDER TITLE ASCO SOLENOID COMPUTED 2 DATE 8/27/8/6 CZ4 A A A A A A A A A A A A A A A A A A A
<ul> <li>J. <u>EQUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE</u> <u>SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS</u></li> <li>(1) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if</li> </ul>
not met (yes/no/NA)? <u>Yes</u> (Reference <u>App. A, Sect. 6.1 and 6.2 of</u> (/) ). Identify Acceptance Criteria: <u>Coil only taken from (/) - Must operate</u> R2
at any voltage between 102 VAC and 132 VAC. Insulation resistance must measure greater than or equal to 1 megohm at 500 VDC. Leakage
current must be less than 0.5 milliamps at 1240 VAC for 1 minute. For seats and discs, as taken from (/) - Valves must operate at the R2 minimum and maximum operating pressure differentials. Valves must not
have a pressure increase at a cylinder port which is required to be vented or a pressure decrease at a cylinder port which is required to be pressurized in excess of 10% of the maximum operating pressure
<pre>differential. (2) Performance Characteristics: Does the report/analysis provide the     performance characteristics for the equipment which should be verified     before, after, and periodically during the test to judge equipment per-     formance (yes/no/NA)? Yes (Ref. App. A, Sects. 6.1, 6.2, and App. AIII     of (/).)</pre>
Identify baseline and functional testing: <u>Recording coil excitation</u> , <u>coil dielectric, seat leakage at 150 psig and 10 psig in both the</u>
energized and de-energized state, noise test, external leakage at 150 psi, operational test from 150 psig to 0 psig, insulation resistance
and number of active coil turns during initial baseline and following DBA simulation.

PAGE_<u>B-16</u> RZ

		IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS (Continued)
:		JUSTIFICATION/COMMENTS
(	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Appendix A, Figure 9.2, page A26 of (/)).
		JUSTIFICATION/COMMENTS
-		
• .		· · · · · · · · · · · · · · · · · · ·
	-	
	-	

BINDER NO. W	BNEO-SOL-005	PLANT WEN UNIT(S)	<u>1</u> SHEET <u>17</u> R_1_R
	MODEL 206-380	VALVES COMPUTED RCF DATE SERIES CHECKED WBK DATE	8/28/86 (17ml 2/17/89
J. EOUIPMER	NT ELECTRICAL	CHARACTERISTICS NECESSARY I	O ENSURE THE
(Continu		ATIONS CAN BE SATISFIED UNDE	K ACCIDENT CONDI
ope		loads during baseline testin tions (Yes/No/NA)? <u>Yes</u> (R (/)	
פער	STIFICATION/CO	OMMENTS Loads of voltage an	d pressure.
		ltage during normal operation + 10%	
		of 120VAC - 15% except as no	
	•	ure is within the range test	
		design. (See TAB C).	Interior of the
		cal characteristics necessar mance specifications can be	
equ			
equ	ipment perfor	mance specifications can be	satisfied.
equ	lipment perfor <u>Parameter</u>	mance specifications can be <u>Plant Normal Conditions</u> ¹	satisfied. <u>Reference</u> Procurement Contracts,
equ	voltage	mance specifications can be <u>Plant Normal Conditions</u> ¹ <u>120 VAC ± 10%</u>	satisfied. <u>Reference</u> Procurement Contracts, <u>Sec. E8 &amp; E9</u> Procurement Contracts,
equ	Parameter Parameter Voltage Load	Tmance specifications can be <u>Plant Normal Conditions</u> ¹ <u>120 VAC ± 10%</u> <u>SEE SHEET 18A</u>	satisfied. <u>Reference</u> Procurement Contracts, Sec. E8 & E9 Procurement Contracts, Sec. E8 & E9 Procurement Contracts
equ	Parameter Parameter Voltage Load	Mance specifications can be         Plant Normal Conditions ¹ 120 VAC ± 10%         SEE SHEET 18A         60 HZ	satisfied. <u>Reference</u> Procurement Contracts, Sec. E8 & E9 Procurement Contracts, Sec. E8 & E9 Procurement Contracts
equ	Voltage Load Frequency Accuracy Other(s)	mance specifications can be <u>Plant Normal Conditions</u> ¹ <u>120 VAC ± 10%</u> <u>SEE SHEET 18A</u> <u>60 HZ</u> NA	satisfied. <u>Reference</u> Procurement Contracts, Sec. E8 & E9 Procurement Contracts, Sec. E8 & E9 Procurement Contracts
equ	Parameter Parameter Voltage Load Frequency Accuracy	mance specifications can be <u>Plant Normal Conditions</u> ¹ <u>120 VAC ± 10%</u> <u>SEE SHEET 18A</u> <u>60 HZ</u> NA	satisfied. <u>Reference</u> Procurement Contracts, Sec. E8 & E9 Procurement Contracts, Sec. E8 & E9 Procurement Contracts

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BINDER	TII	LE <u>ASCO SOLEN</u> MODEL 206-	<u>OID VALVES</u> COMPUTED <u>RCF</u> DATE <u>8/</u> 380 SERIES	<u>27/86 AFM</u> 2/17/89 - 7/
AC CO	NSTR	UCTION)	CHECKED WBK DATE 8/	27/86 <u>EEM 4</u> 2/23/89 5/
			CAL CHARACTERISTICS NECESSARY TO E FICATIONS CAN BE SATISFIED UNDER A	
		tinued)	TIGATIONO ONN DE GATIDITED ONDER A	
(5)	(Ъ)	Parameter	Specific Accident Conditions ¹	Reference
	÷			
				Procurement Contracts,
		Voltage	Varies	Sec. E8 & E9 Procurement
		Load	Not specified	Contracts, Sec. E8 & E9
				Procurement Contracts,
		Frequency	Not specified	<u>Sec. E8 &amp; E9</u>
		Accuracy	NA	
		Other(s)		
		JUSTIFICATIO	N/COMMENTS See Sheet 18A	······································
(5)	(c)	Parameter	Demonstrated Conditions	Reference
			- ·	Tbl 4.3 pg 30, Sect. 4.2.3
				p 22, App. A
			+ 10%	Sect. 9.5.3 and App. A Fig.
		Voltage	<u>120 VAC - 15%</u>	9.2 of (/)
		Load	0.249 amps ₂ to 0.262 amps at 102 VAC	Tb1 4.3 p 30
		_		App. A, pg. A26
		Frequency	<u>60 Hz±0%</u>	of (/)
		Accuracy	<u>NA</u>	
		Other(s)		
			I/COMMENTS SEE SHEET 18A	

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BINDER NO. Y	BNEQ-SOL-005	PLANT	WBN	UNIT(S)	1	SHEE	T <u>18a</u>	_OF <u>27</u>
						R	<u>2</u> ,R_	
BINDER TITLE	ASCO SOLENOID	VALVES CO	MPUTED_/	R1 AFM	DATE	<u>2/17/89</u>	CH-	
	MODEL 206-380	SERIES						
(AC CONSTRUCT	TION)	CHEC	KED /RI	EEM	DATE	2/23/89	ATM	
·							5/21/90	

#### JUSTIFICATION/COMMENTS

¹ Valves were procured to be qualified in accordance with IEEE 323-1974 which specifies that operability shall be demonstrated at rated voltage  $\pm 10\%$  and rated frequency  $\pm 5\%$  unless otherwise specified. Contract 827551 and 822950 did not specify a plant unique range. None of the contracts specified frequency or frequency range. TVA Calculation WBN-EEB-MS-TI06-0017 documents that the terminal voltage for all 206-380 series solenoid valves is more than the demonstrated minimum voltage of 102 VAC. Additionally, testing performed by Franklin Research, as documented in Test Report F-C5569-309/315, demonstrates the ability of these valves to operate at a voltage much less than the 102 VAC. Franklin successfully demonstrated the ability of these valves to energize and shift position at voltages between 77 VAC and 95 VAC after exposure to conditions much more severe than what the TVA valves will experience. It is therefore concluded that adequate voltage is supplied for successful operation under worst-case accident conditions.

R2

² The TVA valves have a 20 watt AC rating. Per ASCO Catalog NP-1 (TAB E, Section E1), these solenoids are rated at 41.5 volt-amps holding and 195 volt-amps in-rush. The demonstrated volt-amps holding is determined as follows: 0.262 amps x 102 VAC = 26.72 volt-amps.

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WBEP-00090

(AC C		LE <u>ASCO SOLENOID VALVI</u> MODEL 206-380 SERII UCTION)	ES	$ \underline{ DATE } \frac{8/27/86}{57/86} \underbrace{ \begin{array}{c} 246 \\ 57/8/99 \\ \hline 57/89 \\ \hline 57/89$	
к.		IRED OPERATING ENVIRON			
		rence Environmental D	rawing No. <u>Vari</u>	ous - See TAB C	
1.	(1)	Normal Max (a) Temperature (°F)	Various See	Abnormal Max (a) Temperature (°F)	Various <u>TAB C</u>
		(b) Pressure (psig)	Various See TAB C	(b) Pressure (psig)	Various <u>TAB C</u>
		(c) Humidity (%)	Various See TAB C	(c) Humidity (%)	Various <u>TAB C</u>
		(d) Radiation (rd)	Various See <u>TAB C</u>	(d) Radiation (rd)	Various TAB_C
	(3)	Process Interfaces:	The process flu:	id is oil free instrume	nt air
	(4)	• • • • • •	urrence frequend	cy and duration of abno	rmal .
		percent of plant life		xcursion and less that o	one
CAN	(5)	percent of plant life Accident (worst case parameter including p	e. See TAB C. for any combinat beak, duration, a 0	tion of specified accide and profile):	ent
Change Stall	(5)	percent of plant life Accident (worst case parameter including p (a) Temperature (°F)	for any combinate eak, duration, a 110°F/220°F.	tion of specified accide and profile): Accident Type <u>LOC</u>	ent CA/HELB
CH STUTT	(5)	Accident (worst case parameter including p (a) Temperature (°F) (b) Pressure (psig)	for any combination eak, duration, a <u>110°F/220°F</u> . <u>ATM(-)</u>	tion of specified accide and profile): Accident Type <u>LO(</u> Accident type <u>LO(</u>	ent CA/HELB CA/HELB
ट्राम् इन्म	(5)	<pre>percent of plant life Accident (worst case parameter including p (a) Temperature (°F) (b) Pressure (psig) (c) Humidity (%)</pre>	e. See TAB C. for any combination beak, duration, a <u>110°F/220°F</u> . <u>ATM(-)</u> <u>100%</u>	tion of specified accide and profile): Accident Type <u>LOC</u>	ent CA/HELB CA/HELB
CALL CALL	(5) ,	Accident (worst case parameter including p (a) Temperature (°F) (b) Pressure (psig)	for any combination eak, duration, a <u>110°F/220°F</u> . <u>ATM(-)</u>	tion of specified accide and profile): Accident Type <u>LO(</u> Accident type <u>LO(</u> Accident Type <u>LO(A</u> Accident Type <u>LOCA</u>	ent CA/HELB CA/HELB CA/HELB

PAGE <u>B-20 R2</u>

WBEP-0009Q

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BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) SHEET 20 OF 27 BINDER TITLE ASCO SOLENOID VALVES COMPUTED/R1 AFM DATE 2/17/89 MODEL 206-380 SERIES 5718/90 arm CHECKED/R1 EEM DATE 2/23/89 (AC CONSTRUCTION) 5/21/90 Κ. <u>REQUIRED OPERATING ENVIRONMENT</u> (Continued) Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>Worst case accident environment for the</u> valves in this binder is for the Group E valves. Temperature will be 110°F for 30 days following a LOCA. RZ Following an RHR line break, temperature will spike to 200°F at 11 minutes, decreasing to maximum normal at 24 hours. (6) Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? Yes (Reference: All valves subject to such conditions require conduit seals and are identified in TAB G. (7) Subject to submergence (Yes/No/NA)? No (Reference: See TAB C Identify initiation time and duration of submergence:____N/A (8) Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? Yes (Reference: Only only the Group B valves are subject to to a Beta contribution. If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify: The total accident dose of 1.2 X 10X RADS includes a Beta dose contribution of 6 X 103 RADS per TVA environmental drawing 47E235-44. (9) Special environmental calculations (temp., rad., etc.) Type RIMS No. See TAB B, Section A for a listing of all calculations used in this binder. PAGE B-21 R2 WBEP-00090

	ASCO SOLENOID VALVE MODEL 206-380 SERIE TION)	S.		2417/ <b>89</b> 5/18/ 18/86 <u>EEM</u> AT
				i/23/89 5/21
L. SUMMAR	Y COMPARISON OF TEST	CONDITIONS	IO SPECIFIED C	ONDITIONS
(1) C	omparison of worst-c	ase maximum	parameters:	
	Parameter	Specified	Demonstrated	Reference
();	perating Time	1 <u>100 dav</u> s 200 @ 11	<u>30 davs</u>	Fig. 4.1, pg. <u>25 of (/)</u> Fig. 4.1, pg.
Ţ	emperature (°F)	minutes	448	<u>25 of (/)</u> Fig. 4.1, pg.
P	ressure (psig)	<u>-0-</u>	<u>68 psig</u>	<u>25 of (1)</u>
Re	elative Humidity (%)	² 100	100	Fig. 4.1, pg. 25 of (/)_
Cr	nemical Spray*	3N/A	pf 10.5 (22 hours) 2.05x10 ⁰ gamma	App. A, pg. A20 <u>A21 of (/)</u> App. D of
Ra	diation (rd)**	1 X 10 ⁸ RADS		
Su	bmergence	N/A	N/A	N/A
pH **En do	ter 40-year integrat se and specify type.	ed normal do	se plus integr	ated accident
2 · 3	- At 30 days the ten - At 24 hours the hu - Valves are not sub - Valves containing a maximum of 2x10'	midity return ject to conta Viton elastor	ns to maximum ainment spray. Mers are only	normal.
(2) Co	mparison of worst-ca			essment:
	· .	Test Pro Envelopes Sp (No. (No. 2010)	ecified	
•	Parameter		<u>/NA)</u>	<u>Reference</u>
	iperature Essure	Yes		e TAB C e TAB C
	lative Humidity	Yes	<u>Se</u>	e TAB C
	emical Spray mergence	<u>N/A</u>		e TAB C
	•	N/A	<u>Se</u>	e TAB C
JUS	TIFICATION/COMMENTS		<del> </del>	

- - <u>|</u> - 555

	O.WBNEQ-SOL-005 PLANT WBN UNIT(S	17 DATE	$ \begin{array}{c} \text{SHEET}  \begin{array}{c} 22 \\ R \\ \end{array}  \begin{array}{c} R \\ \end{array} \end{array}  \begin{array}{c} R \\ \end{array}  \begin{array}{c} R \\ \end{array}  \end{array}  \begin{array}{c} R \\ \end{array}  \begin{array}{c} R \\ \end{array} \end{array}  \begin{array}{c} R \\ \end{array} \end{array}  \begin{array}{c} R \\ \end{array}  \begin{array}{c} R \\ \end{array} \end{array} \end{array}  \begin{array}{c} R \\ \end{array} \end{array} \end{array} \end{array}  \begin{array}{c} R \\ \end{array} \end{array} \end{array} \end{array} \end{array} $ \ \end{array} \ \begin{array}{c} R \\ \end{array}
	MODEL NO. 206-380-SERIES CHECKED		18 100 <u>'</u> <u>A</u> M 5/21/90
L. <u>SUM</u>	MARY COMPARISON OF TEST CONDITIONS TO SPECT	IFIED CONDITI	ONS_(Continued)
(3)	Were margins applied to the test paramete the test program to assure that normal va accounted for? (Note margin applied, yes/	ariation and u	
	Suggested Margins per IEEE-323(74)	Margin Applied	Yes/No/NA
	Temperature: +15 degrees F	<u>15 °F</u>	Yes
	Pressure: +10% but no more than 10 psig	<u>68 psig</u>	Yes
·	Radiation: +10% of accident dose	1.05 X 10 8 RAD	s <u>Yes</u> R
	Time: +10% (or 1 hour + operating time per NUREG-0588)	SEE EQUIV. CALCS. IN TAB C	Yes-See Generic Binder WBNEQ-GEN-001 Sec. III.C.4
	Voltage: -10% of rated value	+107 -157	Yes
	Frequency: $-5\%$ of rated value	None	Yes
	Environmental Transient: the initial transient and the peak temperature applied twice	<b></b> *	Yes
		See TAB. C for descript	
	Vibration: $+10\%$ added to acceleration	of_test	<u>Yes</u>
	JUSTIFICATION/COMMENTS: See TAB C for deta	ailed informa	tion_on
	margins as they apply to the TVA valves.	TVA Calculat:	ion
	WBN-EEB-MS-TIOG-0017 documen	nts_a_degrade	<u>i voltage</u> Ri
	condition which has the highest probabilit	ty of occurren	ace. Thus,
	qualification is better substantiated by p	proving operat	oility under
)	a degraded voltage condition.		
	PAGE B-22 R2		

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VAL	LVES,	ITLE ASCO SOLENOID COMPUTED COMPUTED DATE 7/25/86 777 - MODEL NO. 206-380-SERIES CHECKED DATE 7/25/86 78/90 STRUCTION)	
м. °	OPEI	RABILITY TEST RESULTS	
	(1)	Identify the safety function(s) of this equipment: (Reference See TAB $A_{-}$ ).	1
		JUSTIFICATION / COMMENTS FUNCTIONS ARE VARIED. ALL ARE LISTED IN TABA.	R
	(2)	design basis accident exposure (yes/no/NA)? Yes (Ref. 786 5.1, p.59; App, J: D. 30 OF (1) ).	R
		JUSTIFICATION/COMMENTS The test valve was assumed to be normally	
		energized and required to de-energize on receipt of accident sig-	
		nal, then to remain operable for 30 days post-DBA. The specific	
		DBA functions of the TVA valves are described in TAB. C.	
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? $\sqrt{2.5}$ (Ref. $\frac{4.2.3}{App. Jof(1)}$ .	
		JUSTIFICATION/COMMENTS	R
	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate $(\text{yes/no/NA})? \stackrel{\checkmark}{\leq} \leq (\text{Reference } 7BL 5.1 p.59; App. J. 7BL 1 of (1)).$	R:
	2	JUSTIFICATION/COMMENTS See TAB C for the analysis of the test	
		DBA versus the plant specific DBA. However, the test valve did dem-	
		onstrate operability in accordance with the requirements defined	
		in M(2) above.	
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? Yes (Reference Sections 5.2 and 5.3, pgs. 56 and 57 of (/) and page 31 of (/) ).	RZ
		JUSTIFICATION/COMMENTS	,

	ER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1 SHEET 24 ER TITLE ASCO SOLENOID COMPUTED ATE SATISE R R R R R R R R R R R R R R R R R R R	
N.	MAINTENANCE AND SURVEILLANCE Has the qualification program identified those surveillance, maintenance and inspection parameters which are essential to maintain qualification which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder Qualification Maintenance Data Sheets).	and
	JUSTIFICATION/COMMENTS See TABS C and G	
	PAGEB-24	

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BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1	SHEET <u>25</u> OF <u>27</u> RR 
BINDER TITLE ASCO SOLENOID COMPUTED ATE VALVES, MODEL NO. 206-380-SERIES CHECKED ATE (AC CONSTRUCTION)	128/86
0. <u>SUMMARY OF REVIEW</u>	
	<u>Yes/No/NA</u>
(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>N/A</u>
(3) Choice of qualification methodology adequately justified?	Yes
(4) If analysis was performed, complete the following:	
(a) Were equipment performance requirements identified?	<u>N/A</u>
(b) Were specific features and failure modes and effects analyzed?	<u>N/A</u>
(c) Were assumptions and mathematical models used together with appropriate justification for their use?	<u>.</u>
(d) Were environmental parameters which affect equipment performance identified?	<u>N/A</u>
(5) Adequate similarity between equipment and test specimen established?	Yes
(6) Aging degradation evaluated adequately?	Yes
(a) Mechanical and/or cycle aging addressed?	Yes
(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
(c) Absence of preaging in test/analysis justified?	<u>N/A</u>
(d) Materials susceptible to thermal/radiation aging identified?	Yes
PAGEB-25	

BINDER TITLE ASCO SCLENCID       COMPUTED       DATE INTERNATION         VALUES. MODEL NO. 206-380-SERIES       CHECKED       DATE INTERNATION         (a) CONSTRUCTION)       CHECKED       DATE INTERNATION         0. SUPPMARY OF REVIEW (Continued)       Yes/No/NA         (e) Normally operating state of device (e.g., normally       Tes         (f) Qualified life or replacement schedule established?       Yes         (g) Criteria regarding temperature/pressure exposure       Yes         (a) Peak temperature adequate       Yes         (c) Duration adequate       Yes         (d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (f) Criteria regarding test sequence satisfied?       Yes         (g) Criteria regarding spray satisfied?       N/A         (a) Was the spray concentration, flow rate, density.       N/A         (a) Was the spray concentration, flow rate, density.       N/A         (h) Does the spray concentration, flow rate, density.       N/A         (f) Criteria regarding rediation satisfied?       Yes         (h) Was dose rate considered?       Yes </th <th>BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S)</th> <th>1 SHEET <u>26</u> OF <u>27</u></th>	BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S)	1 SHEET <u>26</u> OF <u>27</u>
(AC CONSTRUCTION)       CHECKED Adds       DATE       Amn 5/2/50         0. SUMMARY OF REVIEW (Continued)       Tes/No/NA         (a) Normally operating state of device (e.g., normally Tes energized) considered?       Tes/No/NA         (a) Normally operating state of device (e.g., normally Tes energized) considered?       Tes         (7) Qualified life or replacement schedule established?       Tes         (8) Criteria regarding temperature/pressure exposure Satisfied?       Tes         (a) Peak temperature adequate       Tes         (b) Peak pressure adequate       Tes         (c) Duration adequate       Tes         (d) Required profile enveloped adequately       Tes         (e) Steam exposure adequate       Tes         (f) Criteria regarding spray satisfied?       N/A         (a) Was the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?       N/A         (11) Criteria regarding submergence satisfied?       Yes         (a) Was dose rate considered?       Yes         (b) Was beta radiation considered?       Yes         (12) Criteria regarding operability status/mode satisfied?       Yes         (13) Criteria regarding operability status/mode satisfied?       Yes	BINDER TITLE ASCO SOLENOID COMPUTED	_ DATE SETTE
Yes/No/NA         (e) Normally operating state of device (e.g., normally Yes         (a) Qualified life or replacement schedule established?       Yes         (a) Criteria regarding temperature/pressure exposure yes       Yes         (a) Peak temperature adequate       Yes         (b) Peak pressure adequate       Yes         (c) Duration adequate       Yes         (d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (f) Criteria regarding test sequence satisfied?       Yes         (g) Criteria regarding spray satisfied?       N/A         (a) Was the spray testing done while under the extremes of pressure and temperature?       N/A         (b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?       N/A         (11) Criteria regarding radiation satisfied?       Yes       R2         (12) Criteria regarding radiation satisfied?       Yes       R2         (13) Was dose rate considered?       Yes       Yes         (14) Criteria regarding operability status/mode satisfied?       Yes		_ DATE /////
<ul> <li>(e) Normally operating state of device (e.g., normally <u>Yes</u></li> <li>(7) Qualified life or replacement schedule established? <u>Yes</u></li> <li>(8) Criteria regarding temperature/pressure exposure <u>Yes</u></li> <li>(a) Peak temperature adequate <u>Yes</u></li> <li>(b) Peak pressure adequate <u>Yes</u></li> <li>(c) Duration adequate <u>Yes</u></li> <li>(d) Required profile enveloped adequately <u>Yes</u></li> <li>(e) Steam exposure adequate <u>Yes</u></li> <li>(f) Criteria regarding test sequence satisfied? <u>Yes</u></li> <li>(l0) Criteria regarding spray satisfied? <u>N/A</u></li> <li>(a) Was the spray testing done while under the extremes of pressure and temperature?</li> <li>(b) Does the spray concentration, flow rate, density, <u>N/A</u></li> <li>(l1) Criteria regarding submergence satisfied? <u>Yes</u></li> <li>(l2) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(l3) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(l3) Criteria regarding operability status/mode satisfied? <u>Yes</u></li> </ul>	O. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
energized) considered? (7) Qualified life or replacement schedule established? <u>Yes</u> (8) Criteria regarding temperature/pressure exposure <u>Yes</u> (a) Feak temperature adequate <u>Yes</u> (b) Feak pressure adequate <u>Yes</u> (c) Duration adequate <u>Yes</u> (d) Required profile enveloped adequately <u>Yes</u> (e) Steam exposure adequate <u>Tes</u> (f) Criteria regarding test sequence satisfied? <u>Yes</u> (10) Criteria regarding spray satisfied? <u>N/A</u> (a) Was the spray testing done while under the <u>N/A</u> (a) Was the spray testing done while under the <u>N/A</u> (b) Does the spray concentration, flow rate, density, <u>N/A</u> (c) Does the spray concentration? <u>Yes</u> (c) Criteria regarding submergence satisfied? <u>Yes</u> (c) Criteria regarding submergence satisfied? <u>Yes</u> (c) Does the spray concentration? <u>Yes</u> (c) Does the spray concentration? <u>Yes</u> (c) Does the spray is a satisfied? <u>Yes</u> (c) Does the set are considered? <u>Yes</u> (c) Was dose rate considered? <u>Yes</u> (c) Was beta radiation considered? <u>Yes</u> (c) Yes		
<ul> <li>(8) Criteria regarding temperature/pressure exposure Yes</li> <li>(a) Peak temperature adequate Yes</li> <li>(b) Peak pressure adequate Yes</li> <li>(c) Duration adequate Yes</li> <li>(d) Required profile enveloped adequately Yes</li> <li>(e) Steam exposure adequate Yes</li> <li>(f) Criteria regarding test sequence satisfied? Yes</li> <li>(g) Criteria regarding spray satisfied? N/A</li> <li>(a) Was the spray testing done while under the M/A extremes of pressure and temperature?</li> <li>(b) Does the spray concentration, flow rate, density, M/A duration, and pH used in tests meet or exceed those to be used for the plant?</li> <li>(11) Criteria regarding radiation satisfied? Yes</li> <li>(12) Criteria regarding radiation satisfied? Yes</li> <li>(13) Criteria regarding considered? Yes</li> <li>(14) Criteria regarding test failures or anomalies Yes</li> </ul>		normally <u>Yes</u>
satisfied?         (a) Peak temperature adequate       Yes         (b) Peak pressure adequate       Yes         (c) Duration adequate       Yes         (d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (e) Steam exposure adequate       Yes         (f) Criteria regarding test sequence satisfied?       Yes         (10) Criteria regarding spray satisfied?       N/A         (a) Was the spray testing done while under the extremes of pressure and temperature?       N/A         (b) Does the spray concentration, flow rate, density. M/A       N/A         (11) Criteria regarding submergence satisfied?       Yes         (12) Criteria regarding radiation satisfied?       Yes         (a) Was dose rate considered?       Yes         (b) Was beta radiation considered?       Yes         (13) Criteria regarding operability status/mode satisfied?       Yes         (14) Criteria regarding test failures or anomalies       Yes	(7) Qualified life or replacement schedule establi	ished? Yes .
(b) Peak pressure adequate       Yes         (c) Duration adequate       Yes         (d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (e) Steam exposure adequate       Yes         (f) Criteria regarding test sequence satisfied?       Yes         (10) Criteria regarding spray satisfied?       N/A         (a) Was the spray testing done while under the extremes of pressure and temperature?       N/A         (b) Does the spray concentration, flow rate, density. M/A       N/A         duration, and pH used in tests meet or exceed those to be used for the plant?       N/A         (11) Criteria regarding radiation satisfied?       Yes         (a) Was dose rate considered?       Yes         (a) Was beta radiation considered?       Yes         (13) Criteria regarding operability status/mode satisfied?       Yes         (14) Criteria regarding test failures or anomalies       Yes		ure Yes
(c) Duration adequate       Yes         (d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (e) Steam exposure adequate       Yes         (f) Criteria regarding test sequence satisfied?       Yes         (10) Criteria regarding spray satisfied?       N/A         (a) Was the spray testing done while under the extremes of pressure and temperature?       N/A         (b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?       N/A         (11) Criteria regarding radiation satisfied?       Yes       R2         (12) Criteria regarding radiation satisfied?       Yes       R2         (b) Was dose rate considered?       Yes       (13) Criteria regarding operability status/mode satisfied?       Yes         (14) Criteria regarding test failures or anomalies       Yes       (14)	(a) Peak temperature adequate	Yes
(d) Required profile enveloped adequately       Yes         (e) Steam exposure adequate       Yes         (9) Criteria regarding test sequence satisfied?       Yes         (10) Criteria regarding spray satisfied?       N/A         (a) Was the spray testing done while under the extremes of pressure and temperature?       N/A         (b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?       N/A         (11) Criteria regarding submergence satisfied?       Yes         (a) Was dose rate considered?       Yes         (a) Was beta radiation considered?       Yes         (13) Criteria regarding operability status/mode satisfied?       Yes         (14) Criteria regarding test failures or anomalies       Yes	(b) Peak pressure adequate	Yes
<ul> <li>(e) Steam exposure adequate <u>Yes</u></li> <li>(9) Criteria regarding test sequence satisfied? <u>Yes</u></li> <li>(10) Criteria regarding spray satisfied? <u>N/A</u></li> <li>(a) Was the spray testing done while under the <u>extremess of pressure and temperature?</u></li> <li>(b) Does the spray concentration, flow rate, density. <u>N/A</u></li> <li>(11) Criteria regarding submergence satisfied? <u>Yes</u></li> <li>(12) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(a) Was dose rate considered? <u>Yes</u></li> <li>(b) Was beta radiation considered? <u>Yes</u></li> <li>(13) Criteria regarding operability status/mode satisfied? <u>Yes</u></li> </ul>	(c) Duration adequate	Yes
<ul> <li>(9) Criteria regarding test sequence satisfied? <u>Yes</u></li> <li>(10) Criteria regarding spray satisfied? <u>N/A</u></li> <li>(a) Was the spray testing done while under the <u>N/A</u></li> <li>(a) Was the spray concentration. flow rate. density. <u>N/A</u></li> <li>(b) Does the spray concentration. flow rate. density. <u>N/A</u></li> <li>(b) Does the spray concentration tests meet or exceed those to be used for the plant?</li> <li>(11) Criteria regarding submergence satisfied? <u>Yes</u></li> <li>(12) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(a) Was dose rate considered? <u>Yes</u></li> <li>(b) Was beta radiation considered? <u>Yes</u></li> <li>(13) Criteria regarding operability status/mode satisfied? <u>Yes</u></li> </ul>	(d) Required profile enveloped adequately	Yes
<ul> <li>(10) Criteria regarding spray satisfied? <u>N/A</u></li> <li>(a) Was the spray testing done while under the extremes of pressure and temperature? <u>N/A</u></li> <li>(b) Does the spray concentration, flow rate, density, <u>N/A</u> duration, and pH used in tests meet or exceed those to be used for the plant?</li> <li>(11) Criteria regarding submergence satisfied? <u>YES</u> <u>R2</u></li> <li>(12) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(a) Was dose rate considered? <u>Yes</u></li> <li>(b) Was beta radiation considered? <u>Yes</u></li> <li>(13) Criteria regarding operability status/mode satisfied? <u>Yes</u></li> <li>(14) Criteria regarding test failures or anomalies <u>Yes</u></li> </ul>	(e) Steam exposure adequate	Yes
<ul> <li>(a) Was the spray testing done while under the extremes of pressure and temperature?</li> <li>(b) Does the spray concentration, flow rate, density, <u>N/A</u> duration, and pH used in tests meet or exceed those to be used for the plant?</li> <li>(11) Criteria regarding submergence satisfied? <u>Yes</u></li> <li>(12) Criteria regarding radiation satisfied? <u>Yes</u></li> <li>(a) Was dose rate considered? <u>Yes</u></li> <li>(b) Was beta radiation considered? <u>Yes</u></li> <li>(13) Criteria regarding operability status/mode satisfied? <u>Yes</u></li> <li>(14) Criteria regarding test failures or anomalies <u>Yes</u></li> </ul>	(9) Criteria regarding test sequence satisfied?	Yes
extremes of pressure and temperature? (b) Does the spray concentration, flow rate, density, <u>N/A</u> duration, and pH used in tests meet or exceed those to be used for the plant? (11) Criteria regarding submergence satisfied? <u>YES</u> (12) Criteria regarding radiation satisfied? <u>Yes</u> (a) Was dose rate considered? <u>Yes</u> (b) Was beta radiation considered? <u>Yes</u> (13) Criteria regarding operability status/mode satisfied? <u>Yes</u> (14) Criteria regarding test failures or anomalies <u>Yes</u>	(10) Criteria regarding spray satisfied?	<u>N/A</u>
duration, and pH used in tests meet or exceed         those to be used for the plant?         (11) Criteria regarding submergence satisfied?       YES         (12) Criteria regarding radiation satisfied?       Yes         (a) Was dose rate considered?       Yes         (b) Was beta radiation considered?       Yes         (13) Criteria regarding operability status/mode satisfied?       Yes         (14) Criteria regarding test failures or anomalies       Yes		<u>N/A</u>
<ul> <li>(12) Criteria regarding radiation satisfied? Yes</li> <li>(a) Was dose rate considered? Yes</li> <li>(b) Was beta radiation considered? Yes</li> <li>(13) Criteria regarding operability status/mode satisfied? Yes</li> <li>(14) Criteria regarding test failures or anomalies Yes</li> </ul>	duration, and pH used in tests meet or e	
<ul> <li>(a) Was dose rate considered? Yes</li> <li>(b) Was beta radiation considered? Yes</li> <li>(13) Criteria regarding operability status/mode satisfied? Yes</li> <li>(14) Criteria regarding test failures or anomalies Yes</li> </ul>	(11) Criteria regarding submergence satisfied?	YES R2
<ul> <li>(b) Was beta radiation considered? Yes</li> <li>(13) Criteria regarding operability status/mode satisfied? Yes</li> <li>(14) Criteria regarding test failures or anomalies Yes</li> </ul>	(12) Criteria regarding radiation satisfied?	Yes
<ul> <li>(13) Criteria regarding operability status/mode satisfied? Yes</li> <li>(14) Criteria regarding test failures or anomalies</li> <li>Yes</li> </ul>	(a) Was dose rate considered?	Yes
(14) Criteria regarding test failures or anomalies Yes	(b) Was beta radiation considered?	Yes
	(13) Criteria regarding operability status/mode sati	isfied? Yes
	(14) Criteria regarding test failures or anomalies satisfied?	Yes

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BINDER NO. WBNEQ-SOL-005 PLANT WBN UNIT(S) 1	SHEETOF
BINDER TITLE ASCO SOLENOID VALVES, MODEL NO. 206-380-SERIES COMPUTED 24 DATE S	OFOF / /RR 27/06
(AC CONSTRUCTION) CHECKED WILL DATE	M06
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(15) Criteria regarding functional testing satisfied?	<u>Yes</u>
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	<u>Yes</u>
(b) Was an initial base line test done to establish required performance characteristics?	<u>Yes</u> .
<pre>(c) Has the test/analysis demonstrated that     performance specifications and characteristics     (e.g., voltage, load frequency, and other     electrical characteristics) can be ensured?</pre>	<u>Yes</u>
(16) Criteria regarding instrument accuracy satisfied?	<u>N/A</u>
(17) Test duration margin (1 hour + function time) satisfied?	Yes
(a) Is the minimum specified operating time at least 1 hour?	<u>Yes</u>
(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>N/A</u>
(18) Criteria regarding synergistic effects satisfied?	Yes
(19) Criteria regarding margins satisfied?	<u>Yes</u>
(20) Maintenance and surveillance requirements adequately identified?	Yes
P. <u>DISCUSSION</u>	
The TVA valves as listed in this report are fully qualifi	ed_to_the
requirements of NUREG 0588 Cat. I (IEEE 323-1974) and 10C	FR50.49
TAB C provides a detailed analysis to support this claim.	
PAGE <u>B-27</u>	

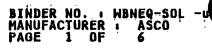
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EQP098.51

BINDER NO. __WBNEQ-SOL-006 PLANT ____WBN___UNIT(S) ____1 SHEET __1 OF BINDER TITLE ASCO SOLENOID VALVES - COMPUTED EEM DATE 7/14/86 MODEL NP 8316 SERIES CHECKED WITH DATE 7/16/86 т. 1. г. TAB A EQUIPMENT IDENTIFICATION MATRIX PAGE A-1







# HATTS BAR NUCLEAR PLANT TABA- EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. Model Num	AZMITH	OCATION ELEV(1) RM∕RAD Contract	<u>CAT</u> <u>OPER TIM</u> (2)	E EVENT	SAFETY FUNCTION	
WBN-1-FSV -061-0097 -B Inlet ISLN VLV Reactor BLDG	1-FSV -061-0097 -B NPX831654		772 <b>" 1" UC</b> 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	MS∕C	MUST DEENERGIZE TO CLOSE ASSOC FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	
WBN-1-FSV -061-0122 -B Outlet Isln Vly Reactor Bld			776° 5° UC 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/100D A/B 15MN/1M0 A/B 1HR/1M0	MS∕C FW∕C	MUST DEENERGIZE TO CLOSE ASSOC FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	RU
WBN-1-FSV -061-0192 -B Gylcol Supply Isolation Val			807'10" UC 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	MS/C	MUST DEENERGIZE TO CLOSE ASSO FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVEN PAM FUNCT OF ASSO LIMIT SWS.	
WBN-1-FSV -061-0194 -B Gylcol Return Isolation Val	1-FSV -061-0194 -B VE NPX831654		808' UC 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	<b>MS∕C</b>	MUST DEENERGIZE TO CLOSE ASSO FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVEN PAM FUNCT OF ASSO LIMIT SWS.	c
WBN-1-FSV -062-0069 -A RC LOOP 3 LETDOWN FLOW	1-FSV -062-0069 -A NPX831654		728' 4" LC 80KJ3-827551	A/B 1HR/1MO	CV/C	THE CLOSING OF THIS VLV IS Necessary to isolate a Break in the CVCS Letdown Line inside containment.	•

PREPARER/DATE EEM 7/30/86 86 CHECKED/DATE_WBK 7 30

PAGE A-2 R4



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BINDER NO. : WBNEQ-SUL Manufacturer : Asco Page 2 of 6



### HATTS BAR NEEDER PLANT TABA - EQUIPMENT INTERICATION MATRIX

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	EQIS NUMBER DESCRIPTION	UNIT DEVICE ID N		OCATION ELEV(1) RM/RAD CONTRACT	CAT OPER TIME (2)	<u>EVENT</u>	SAFETY FUNCTION
V	WBN-1-FSV -062-0070 -A RC LOOP 3 LETDOWN FLOW	1-FSV -062-0070 N	-A 133 PX831654E	723' 9" AC2 80KJ3-827551	A/B 1HR/1MO	CV/C	THE CLOSING OF THIS VLV IS NECESSARY TO ISOLATE A BREAK IN THE CVCS LETDOWN LINE INSIDE CONTAINMENT.
· v	WBN-1-FSV -062-0072 -A Regen HTX LTDN ISLN VALVE A	1-FSV -062-0072 N	-A 042 PX831654E	703' 1" RW 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE ASSOC FCV'S ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.   尺3
	WBN-1-FSV -062-0073 -A Regen HTX LTDN ISLN VALVE B	1-FSV -062-0073 N	-A 052 PX831654E	703' 7" RW 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO	MS/C	MUST DEENERGIZE TO CLOSE ASSOC FCV'S ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
١	WBN-1-FSV -062-0074 -A Regen HTX LTDN ISLN VALVE C	1-FSV -062-0074 N	-A 052 IPX831654E	704 <b>° 8™ RW</b> 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE ASSOC FCV'S ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
	/ WBN-1-FSV -062-0076 -A Regen HTX LTDN ISLN VALVE	1-FSV -062-0076 N	-A 052 IPX831654E	707 <b>" 1" RW</b> 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1M0 A/B 15MN/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE ASSOC FCV'S ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.

PREPARER/DATE <u>EEM 9/19/86</u> CHECKED/DATE <u>WBK 9/19/86</u> PAGE A-3 R3





BINDER NO. 1 HBNEQ-SOL -1 Manufacturer 1 Asco Page 3 of 6

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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID DESCRIPTION		LOCATION ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
HBN-1-FSV -062-0077 -B 1-FSV -062-0077 Letdown line isolation valve	у —В NP8316	713	A28	A/B B A/B B B	5MN/100D 1 MC 15MN/1MO 1 MO 1 MO	L RH/A CV/A AF AB	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN~1-FSV -063-0023 -B 1-FSV -063-0023 SIS Accum fill line ISLN SW	5 – B NP831654E	713° 84KK1-835	A28 5541	A/B B B B B	5MN/100D 1 M0 1 M0 1 M0 1 M0 1 M0		MUST DEENERGIZE TO CLOSE FCV IF OPEN AND NOT FAIL IN THE ENERGIZED POS. MUST NOT FAIL IN MANNER TO PREVENT PAM FUNCT OF ASSO LIMIT SWITCHES.
HBN-1-FSV -063-0064 -A 1-FSV -063-0064 SIS Accum Tank no 2 Hdr Inlet VLV	4 −A NP831654E	713 <b>'</b> 84KK1-835	A28 5541	A/B B B B B	5MN/100D 1 M0 1 M0 1 M0 1 M0 1 M0	L RH/A CV/A AF AB	MUST DEENERGIZE TO CLOSE FCV IF OPEN AND NOT FAIL IN THE ENERGIZED POS. MUST NOT FAIL IN MANNER TO PREVENT PAM FUNCT OF ASSOC LIMIT SWITCHES.
WBN-1-FSV -063-0071 -A 1-FSV -063-0071 SIS CHECK VLV LEAK TEST ISLN VALVE	L –A 290 NPX831654E	724 <b>° 1</b> " 80KJ3-827		A/B A/B A/B	5MN/100D 5MN/100D 5MN/100D 15MN/1M0 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE AND REMAIN TO PREVENT VLV OPENING WITH PHASE A CONT ISO SIG PRESNT & RESET. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -063-0084 -B 1-FSV -063-0084 SIS CHECK VLV LEAK TEST ISLN VALVE	4 – B NP831654E	713 <b>'</b> 84KK1-835	A28 5541	A/B B B B B	5MN/100D 1 M0 1 M0 1 M0 1 M0 1 M0	L RH/A CV/A AF AB	MUST DEENERGIZE TO CLOSE FCV IF OPEN AND NOT FAIL IN THE ENERGIZED POS. MUST NOT FAIL IN MANNER TO PREVENT PAM FUNCT OF ASSOC LIMIT SWITCHES.

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9/19/86 PREPARER/DATE_EEM AFM 5/18/90 9/19/86 <u>AM</u> 9/2450 CHECKED/DATE WBK 3/4/89





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BINDER NO. : WBNEQ-SOL -Manufacturer : Asco Page 4 of 6

#### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NO. AZMITH DESCRIPTION MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIM</u> (2)	EVENI	SAFETY FUNCTION
WBN-1-PSV -065-0081 -A 1-PSV -065-0081 -A 001 Shld Bldg vent and cont annls ISLN VLV NP831654E	832'10" ANN 84KK1-835541	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L MS/C FW/C RH/C CV/C	MUST OPERATE WHENEVER Needed to Help Regulate Annulus pressure.
WBN-1-PSV -065-0083 -B 1-PSV -065-0083 -B 360 Shld Bldg vent and cont annls ISLN VLV NP831654E	830'9" ANN 84KK1-835541	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L MS/C FW/C RH/C CV/C	MUST OPERATE WHENEVER NEEDED TO HELP REGULATE ANNULUS PRESSURE.
WBN-1-FSV -068-0305 -A 1-FSV -068-0305 -A RCS FLOW CNTL VLV HDS N2 MAN TO PRT NP831654E	713' A28 84KK1-835541	A/B 5MN/100D B 1M0 B 1M0 B 1M0 B 1M0 B 1M0	L AB AF CV/A RH/A	MUST DEENERGIZE TO CLOSE ASSOC FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -068-0308 -B 1-FSV -068-0308 -B 318 RCS FLOW CNTL VLV WDS GA TO PRT NPX831654E	723'11" AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/100D A/B 15MN/1M0 A/B 1HR/1M0	MS/C FW/C	MUST DEENERGIZE TO CLOSE ASSOC FCV ON CONT ISO SIG & REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -077-0009 -B 1-FSV -077-0009 -B 279 RCDT PMP DISCH FLOW CONTROL VALVE NPX831654E	725 <b>' 3"</b> AC4 80KJ3-827551	A/B 5MN/100D A/B 5MN/100D A/B 5MN/100D A/B 15MN/1MO A/B 1HR/1MO		MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.

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9/19/86 PREPARER/DATE <u>EEM</u> 9/19/86 CHECKED/DATE________ 9/24/90





BINDER NO. : WBNEQ-SOL -J MANUFACTURER : ASCO PAGE 5 OF 6

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# HATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

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		LOCATION				1 .	
EQIS NUMBER UND DESCRIPTION	IT DEVICE ID NO, AZMITH. Model Number	<u>ELEV(1)</u> <u>RM/RAD</u> Contract	CAT (2)	<u>OPER_TIME</u>	<u>EVENT</u>	SAFETY FUNCTION	
WBN-1-FSV -077-0010 -A 1-1 RCDT PMP DISCH FLOW CONTROL VA	FSV -077-0010 -A LVE NP831654E	713' A28 84KK1-835541	B B B A/B	1M0 1M0 1M0 1M0 5MN/100D	RH∕A CV∕A AF AB L	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	• .
HBN-1-FSV -077-0016 -B 1- RCTD TO GAS ANALYZER FLOH SOL	FSV -077-0016 -B 285 VALVE NPX831654E	718' 9" AC4 80KJ3-827551	A/B A/B A/B	5MN/100D 5MN/100D 5MN/100D 15MN/1M0 1HR/1M0	FW/C RH/C	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	
WBN-1-FSV -077-0017 -A 1- RCDT TO GAS ANALYZER FLOW CONT	FSV -077-0017 -A Rol Valve NP831654E	713' A28 84KK1-835541	A/B B B B B	5MN/100D 1M0 1M0 1M0 1M0 1M0	L CV/A RH/A AB AF	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SHS.	4
WBN-1-FSV -077-0018 -B 1-1 RCDT TO VENT HDR FLOW CONTROL	FSV -077-0018 -B 283 Valve NPX831654E	725' 4" AC4 80KJ3-827551	A/B A/B A/B	5MN/100D 5MN/100D 5MN/100D 15MN/1M0 1HR/1M0	L MS/C FW/C RH/C CV/C	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	)
WBN-1-FSV ~077-0019 -A 1-1 RCDT TO VENT HDR FLOW CONTROL V	FSV -077-0019 -A VALVE NP831654E	713' A28 84KK1-835541	B B B A∕B	1M0 1M0 1M0 1M0 5MN/100D	RH∕A CV∕A AF AB L	MUST DEENERGIZE TO CLOSE ASSOC ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.	

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PREPARER/DATE EEM 9/19/86 4/19/86 WBK CHECKED/DATE____





BINDER NO. : WBNEQ-SOL _ Manufacturer : Asco Page 6 of 6

## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT DEVICE ID NOAZMITH DESCRIPTION MODEL_NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME EV</u> (2)	ENT SAFETY FUNCTION
WBN-1-FSV -077-0020 -A 1-FSV -077-0020 -A RCDT N2 SUPPLY FLOW CONTROL VALVE NP831654E	713' A28 84KK1-835541	B 1M0 RH/ B 1M0 CV/ B 1M0 AF B 1M0 Ab A/6 5MN/100D L	A MUST DEENERGIZE TO CLOSE ASSOC A ISOL VLV AND REMAIN CLOSED TO PREVENT REOPENING. MUST NOT FAIL SO AS TO PREVENT PAM FUNCT OF ASSOC LIMIT SWS.
WBN-1-FSV -081-0012 -A 1-FSV -081-0012 -A PW RCS PRESS RELIEF TK & RCP STAND PIPES NP831654E	713' A28 84KK1-835541	A/B 5MN/100D L	MUST DE-ENERGIZE TO CLOSE THE ISOLATION VALVES AND REMAIN IN THAT POSITION
WBN-1-FSV -087-0007 -A 1-FSV -087-0007 -A 222 Test line isolation valve flow control NPX831654e	708 <b>" 5"</b> RW 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS/ A/B 5MN/100D FW/ A/B 15MN/1M0 RH/ A/B 1HR/1M0 CV/	/C REMAIN DE-ENERGIZED. /C
WBN-1-FSV -087-0008 -A 1-FSV -087-0008 -A 222 Test line isolation valve flow control NPX831654e	706 <b>" 8"</b> RW 80KJ3-827551	A/B 5MN/100D L A/B 5MN/100D MS. A/B 5MN/100D FW A/B 15MN/1M0 RH A/B 1HR/1M0 CV	/C REMAIN DE-ENERGIZED. /C

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EEM 9/19/86. PREPARER/DATE___ WBK 9/19/86 CHECKED/DATE____

BINDER NO. WBNEQ-SOL-006 PLAN	T <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1</u> OF <u>1</u>
BINDER TITLE ASCO SOLENOID	COMPUTED /R1 JDH DATE 3/13/89
VALVES MODEL NP8316 SERIES	CHECKED /R1 KBV DATE 3/21/89
	, .

#### TAB_A

#### NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- See Page B-3 for source of Category and Operating Time assignments.
- 3. Contract numbers shown in this TAB were obtained by tracing the serial number on each valve through TVA procurement records and did not depend on field verification data for contract numbers.

BINDER NO. WBNEQ-SOL- BINDER TITLE ASCO SOL MODEL NP8316 SERIES	ENOID VALVES	COMPUTED	5)1 2 <i>m</i> date <u>7///</u> 2/ date <u>7////</u>	<i>IJB6</i> R
		TAB B		
	ENVIRONMENTAL	QUALIFICATION	CHECKLIST	
				·
	PAGE	0		

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BINDER T	ITLE ASCO SOLENOID COMPUTED EEM	R <u>1</u> R <u>2</u> DATE <u>9/19/86_JDH</u> 3/13/89
VALVES M	ODEL NP8316 SERIES CHECKED WBK/HDR	DATE <u>9/19/86 KBN</u> 3/21/89
A. DOCU	MENTATION (See Note on Page B-4)	
Equi	pment Description <u>Solenoid Valves</u>	
Vend	or/Manufacturer <u>ASCO</u>	<u>, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,</u>
Equi	pment Model No.(s) <u>NPX831654E</u>	
	NP831654E	· · · · · · · · · · · · · · · · · · ·
QUAL	IFICATION REPORTS (TAB D)(See also TAB C Page C-3) (See Note on	
(1)	Title/Number/Revision <u>Automatic Switch</u> Company Test Report No.	RIMS_B43_850627_3
	AQS21678/TR/Rev A	DATE July 1979
(2)	Title/Number/Revision <u>ASCO Catalog NP-1</u>	RIMS_NEB_840328_3
	valves/AOS21678/TR/Supplement 3	DATE_ <u>March 8, 198</u>
(3)	Title/Number/Revision <u>Automatic Switch</u> Company Test Report No.	RIMS_B45_850514_42
	AQR-67368. Rev 1	DATE_August 19, 19
(4)	Title/Number/Revision <u>Franklin Research</u> <u>Center Test Report</u>	LRIMS_NEB_840925_3
	F-C5569-309/315, Appendix C	DATE November 1983
(5)	Title/Number/Revision <u>"Aging and</u>	RIMS_ <u>B74_890623_5(</u>
	Qualification Research on Solenoid	DATE August 1988
	Operated Valves," NUREG/CR-5141 RV	<del></del>
(6)	Title/Number/Revision <u>"ASCO Engineering</u>	RIMS_B25_870612_00
	Report No. 177"	DATE1, 1979
OTHE	R (ANALYSIS, VENDOR DATA, ETC.)	
(7)	ASCO Letter dated April 29, 1985 (B43 85 Mounting Orientation (TAB E-7).	0502 015) NP Valve

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WAT WES M	ITLE       ASCO SOLENOID       COMPUTED       EEM       DA         ODEL       NP8316       SERIES       CHECKED       WBK/HDR       DA	<u> </u>
VALVES M	ODEL MEGSIG SERIES CHECKED WDN/HDR DA.	12 <u>9/19/80 AFM</u> 5/18/90 7
A. DOCU	MENTATION	
OTHE	R (ANALYSIS, VENDOR DATA, ETC.) (Continued)	
	Type	RIMS No.
	Category and Operating Times	
(8)	System 61 (WBNOSG4-012 R5)	B18 900531 252
· (9)	System 62 (WBNOSG4-013 RI2)	0829 202 B26 90 <del>0927 200</del>
(10)	System 63 (WBNOSG4-014 R11)	B26 900309 227
(11)	System 65 (WBNOSG4-015 R10)	B26 900309 226
(12)	System 68 (WBNOSG4-017 R11)	B18 900612 252
(13)	System 77 (WBNOSG4-021 R5)	B18 900612 251
(14)	System 81 (WBNOSG4-023 R3)	B45 851127 219
(15)	System 87 (WBNOSG4-025 R3)	B45 860313 218
(16)	Status and Duty Cycles of IE Solenoid Valves Located in Potentially Harsh Environments (WBN-OSG4-045 R1)	B45 860902 219
(17)	Solenoid Valve Voltage Study (WBNEEB-MS-TI11-0004)	B26 900202 407
(18)	Wyle Laboratories Test Report No. 17523-1	EEB 840731 501

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WBEP-0121Q

	TLE <u>ASCO SOLENOID</u> COMPUTED <u>EEM</u> DATE <u>9/20/86_CDH</u> <u>()</u> 03/22/90 DEL NP8316 SERIES CHECKED_WBK/HDR DATE <u>9/20/86_AFM</u> <u>(</u> )
· ·	03/23/90 %
A. DOCUM	ENTATION
OTHER	(ANALYSIS, VENDOR DATA, ETC.) (Continued)
	Type RIMS No.
(19)	Integrated Accident Dose InsideB45 851105 235Containment (TI-RPS-48 R2)
(20)	Deleted by Revision 2
(21)	Reduction of Beta Dose by Sheet Steel B26 891129 202 (WBNTSR-051 R0)
(22)	Flooding Level Outside the Crane WallB45 860520 235Following Main Feedwater (MFW) and MainSteamline Break (MSLB) (WBNNAL6-005 R0)
(23)	TVA Environmental Drawing 47E235-41 R1 and DCA-P04104-01-0 per DCN P-04104-C (B26 890908 819)
(24)	TVA Environmental Drawing 47E235-42 R2 and DCA-P04104-03-0 and DCA-P04104-05-0 per DCN P-04104-C (B26 890908 819)
(25)	TVA Environmental Drawing 47E235-44 R1
(26)	TVA Environmental Drawing 47E235-61 R1
(27)	Deleted by Revision 4.
(28)	QIR MNMWBN90099 R0, Flooding of CVCS B26 900720 259 Letdown Line Valves 1, 2-FCV-62-72, -73, -74 & -76.
Note:	Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

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WBEP-0121Q

BINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 9/19/86 CDH 5/18/96 5/18/96 VALVES MODEL NP8316 SERIES CHECKED WBK/HDR DATE 9/19/86 AFM	BINDER NO. WBNEQ-SOL-006 PLANT WBN UNIT(S) 1 SHEET 2 OF R 3 R 4
ALVES MODEL NP8316 SERIES       CHECKED_WEK/HDR_DATE 9/19/86_AFM	SINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 9/19/86 CDH
<ul> <li>_X Equipment Qualified</li> <li> Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule</li> <li> Equipment Qualification Not Established by Documentation</li> <li> Equipment Not Qualified Based on Test Failures</li> <li>OPEN ITEMS AND QUALIFICATION DEFICIENCIES</li> <li> Nameplate data not available for 1-FSV-62-77-B.</li> <li>2) Deleted by revision 2.</li> <li>3) Deleted by revision 2.</li> <li>4) Deleted by revision 2.</li> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	VALVES MODEL NP8316 SERIES CHECKED WBK/HDR DATE 9/19/86 AFM 5/18/90
<ul> <li>Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule</li> <li>Equipment Qualification Not Established by Documentation</li> <li>Equipment Not Qualified Based on Test Failures</li> <li>OPEN ITEMS AND QUALIFICATION DEFICIENCIES</li> <li>Nameplate data not available for 1-FSV-62-77-B.</li> <li>2) Deleted by revision 2.</li> <li>3) Deleted by revision 2.</li> <li>4) Deleted by revision 2.</li> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	B. <u>CONCLUSION OF REVIEW</u> (Check only one block)
Life or Justification of Replacement Schedule Equipment Qualification Not Established by Documentation Equipment Not Qualified Based on Test Failures OPEN ITEMS AND QUALIFICATION DEFICIENCIES 1) Nameplate data not available for 1-FSV-62-77-B. 2) Deleted by revision 2. 3) Deleted by revision 2. 4) Deleted by revision 2. 5) Deleted by revision 2. 6) Deleted by revision 2. 7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429. 8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).	X Equipment Qualified
Equipment Not Qualified Based on Test Failures          OPEN ITEMS AND QUALIFICATION DEFICIENCIES         1) Nameplate data not available for 1-FSV-62-77-B.         2) Deleted by revision 2.         3) Deleted by revision 2.         4) Deleted by revision 2.         5) Deleted by revision 2.         6) Deleted by revision 2.         7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of	
OPEN ITEMS AND QUALIFICATION DEFICIENCIES         1) Nameplate data not available for 1-FSV-62-77-B.         2) Deleted by revision 2.         3) Deleted by revision 2.         4) Deleted by revision 2.         5) Deleted by revision 2.         6) Deleted by revision 2.         7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.         8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).	Equipment Qualification Not Established by Documentation
<ol> <li>Nameplate data not available for 1-FSV-62-77-B.</li> <li>Deleted by revision 2.</li> <li>Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ol>	Equipment Not Qualified Based on Test Failures
<ol> <li>2) Deleted by revision 2.</li> <li>3) Deleted by revision 2.</li> <li>4) Deleted by revision 2.</li> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ol>	OPEN ITEMS AND QUALIFICATION DEFICIENCIES
<ul> <li>3) Deleted by revision 2.</li> <li>4) Deleted by revision 2.</li> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	1) Nameplate data not available for 1-FSV-62-77-B.
<ul> <li>4) Deleted by revision 2.</li> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	2) Deleted by revision 2.
<ul> <li>5) Deleted by revision 2.</li> <li>6) Deleted by revision 2.</li> <li>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	3) Deleted by revision 2.
<ul> <li>6) Deleted by revision 2.</li> <li>7) Remove values 1-FSV-087-7, -8 from TAB A upon completion of ECN 6429.</li> <li>8) Values requiring conduit seals to comply with Reg. Guide 1.97 (PAM).</li> </ul>	4) Deleted by revision 2.
<ul> <li><u>7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of</u></li> <li><u>ECN 6429.</u></li> <li><u>8) Valves requiring conduit seals to comply with Reg. Guide 1.97</u></li> <li><u>(PAM).</u></li> </ul>	5) Deleted by revision 2.
ECN 6429. 8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).	6) Deleted by revision 2.
8) Valves requiring conduit seals to comply with Reg. Guide 1.97 (PAM).	7) Remove valves 1-FSV-087-7, -8 from TAB A upon completion of
(PAM).	ECN 6429.
	8) Valves requiring conduit seals to comply with Reg. Guide 1.97
COMMENTS/RECOMMENDATIONS	(PAM)
	COMMENTS/RECOMMENDATIONS
-	
	-

WBEP-0121Q-22

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MOD	R TITLE ASCO SOLENOID VALVES COMPUTED $\frac{\mathcal{E}\mathcal{E}\mathcal{N}}{\mathcal{D}ATE} \frac{\mathcal{A}\mathcal{H}\mathcal{B}\mathcal{B}}{\mathcal{D}ATE} = \frac{\mathcal{R}\mathcal{N}\mathcal{B}\mathcal{B}\mathcal{B}}{\mathcal{D}ATE}$
	UATE //010
C .	QUALIFICATION CRITERIA
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
	JUSTIFICATION/COMMENTS
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET:
	IEEE 323-1974 IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations.
	IEEE 382-1972 IEEE Trial-Use Guide for Type Test of Class I Electric Valve Operators for Nuclear Power Generating Stations.
	IEEE 382 (Draft 3, Rev. 1, June 1977) Draft American National Standard for the Qualfication of Safety-Related Valve Actuators.
	· ·
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1.44

		R TITLE ASCO SOLENOID VALVES COMPUTED <u>EEM</u> DATE <u>7/14/96</u> DEL NP8316 SERIES CHECKED <u>WAK</u> DATE <u>7/16/86</u>
	D.	QUALIFICATION METHODOLOGY (Check only one block)
		Test of Identical Item Under Identical Conditions or Under Simila Conditions with Supporting Analysis
		X Test of Similar Items with Supporting Analysis
		Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
		Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
		JUSTIFICATION/COMMENTS See "Similarity Table", page 6
1		
		·
3		
		·
		·

		8316 SERIES	CHECKED	<u>WMK</u> DATE <u>7</u>	3/23/90	
E.	<u>equi</u>	PMENT DESCRIPTION		. <b>.</b>		
		he equipment iden plant equipment wi				c
•			<u>Plant Device</u>	Qualification	Reference	
	(1)	Equipment Type	Solenoid Vlv	Solenoid Vlv		
	(2)	Manufacturer	ASCO	ASCO		
•.	(3)	Model Number(s)	<u>NPX831654E</u>	<u>NP 831665E</u>	Ref (1) Section 2 <u>Table 1</u>	
			<u>NP 831654E</u>			
				NP 832070E (coil only)	Ref (3) <u>Appendix I</u>	R
		. · ·		·		
	(4)	Serial Number(s)	See TAB F	6	Ref (1) Section 2 Table 1	
				2	Ref (3) Section 3 Table 3.2	
<b></b> .				·	•	
•.•						
	(5)	Identify Componen Unique checkshee attached:	nt- <u>NONE</u> t	·····		
			•			

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#### WBNEQ-SOL-006 33 WBN 1

#### ASOO SOLENOID VALVES

#### MODEL NP8316 SERIES

#### SIMILARITY TABLE

Specification	ASCO Test Valve Model No. NP831665E	TVA Valve Model No. NPX831654E	TVA Velve Model No. NP831654E
Description	Three way direct acting solenoid valve with packless const	Sane	Same
	Pilot Viv Controlling		
Application .	Oil Free Instr Air	Same	Sane
Form of Flow	Normally Closed	Same	Same
Pipe Size	3/8"	3/8"	3/8"
Orifice Size	5/8"	5/8"	5/8"
Body Material	Brass	Brass	Brass
Coil Class	H .	н	Ĥ
Seat & Disc Material	Ethylene Propylene	Ethylene Propylene	Ethylene Propylene
Disc Holder Material	303 Stainless Steel	303 Stainless Steel	303 Stainless Steel
Core Tube Material	300 Series Stainless Steel	300 Series Stainless Steel	300 Series Stainless Steel
Core Material	400 Series Stainless Steel	400 Series Stainless Steel	400 Series Stainless Steel
Coil Enclosure	NEMA 4,7,9	NEMA 6	NEMA 6
Maximum Operating Pressure	•		
Differential	175 psi	175 pei	175 pai -
Nominal Voltage	125V DC	125V DC	125V DC
Power Rating	17.4 Watte	17.4 Watte	17.4 Watts
Conduit Connection	3/4" NPT	1/2" NPT	3/4" NPT
Applicable Form Number	V5967	V5967R1	V5967 R1
Terminal Connection	Pigtails (Splice)	Pigtails (Splice)	Pigtails (Splice)
Ambient Temperature	32 ~ 140 °F	120°F - as specified	120°F - as specified
Maximum Fluid Temperature	180°F based on 140°F Ambient	Same	Same
Safe Working Pressure	300 psig	Same	Same
. · · ·	Notes: From Test Report AQS-21678 TR/Rev A (TAB D-1) Form V5967 (TAB D-1) & ASCO Cat. NP-1 (TAB E-5)	Notes: From Contract 827551. (TAB B-1) Form V5967 R1 (TAB H) & ASCO Cat. NP-1 (TAB E-5). "X" in Model Number denotes 1/2" NPT conduit connection.	Notes: From Contract 835541 (TAB E-3 Form V5967 R1 (TAB H) & ASCO Cat. NP-1 (TAB E-5)

<u>7/14/86</u> 7/16/86 Preparer/Date E.E. Mc Boe Checked/Date W & Kuro •

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documentation and interface a requi- If yes, enter req <u>Interface</u>	RIES CHECKED W RFACES es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i Identify Interface None Specified, See TAB C-1, "Interfaces	BK DATE identified in reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	source. Is the No)? (Note below.) justification.
F. INSTALLATION INTE List all interface documentation and interface a requi If yes, enter req Interface	RFACES es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i Identify Interface None Specified, See TAB C-1,"Interfaces	BK DATE identified in reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	7/16/86 // 3/21/69 the qualification source. Is the No)? (Note below.) justification. Reference
F. INSTALLATION INTE List all interface documentation and interface a requi If yes, enter req Interface	RFACES es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i Identify Interface None Specified, See TAB C-1,"Interfaces	identified in reference the ication (Yes/N f no, provide Plant Requirement? <u>(Yes/No)</u>	3/21/69 the qualification source. Is the No)? (Note below.) justification. Reference
List all interfact documentation and interface a requi- If yes, enter req <u>Interface</u>	es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i <u>Identify Interface</u> None Specified, See TAB C-1,"Interfaces	reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	the qualification source. Is the No)? (Note below.) justification. Reference
List all interfact documentation and interface a requi- If yes, enter req <u>Interface</u>	es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i <u>Identify Interface</u> None Specified, See TAB C-1,"Interfaces	reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	source. Is the No)? (Note below.) justification. Reference
List all interfact documentation and interface a requi- If yes, enter req <u>Interface</u>	es pertinent to EQ /or evaluation and rement for our appl uirement in QMDS, i <u>Identify Interface</u> None Specified, See TAB C-1,"Interfaces	reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	source. Is the No)? (Note below.) justification. Reference
documentation and interface a requi- If yes, enter req <u>Interface</u>	/or evaluation and rement for our appl uirement in QMDS, i <u>Identify Interface</u> None Specified, See TAB C-1,"Interfaces	reference the ication (Yes/N f no, provide Plant Requirement? (Yes/No)	source. Is the No)? (Note below.) justification. Reference
interface a requi If yes, enter req <u>Interface</u>	rement for our appl uirement in QMDS, i Identify Interface None Specified, See TAB C-1,"Interfaces	ication (Yes/N f no, provide Plant Requirement? (Yes/No)	No)? (Note below.) justification. Reference
If yes, enter req Interface	uirement in QMDS, i Identify Interface None Specified, See TAB C-1,"Interfaces	f no, provide Plant Requirement? (Yes/No)	justification. Reference
Interface	<u>Identify Interface</u> None Specified, See TAB C-1,"Interfaces	Plant Requirement? (Yes/No)	Reference
1	None Specified, See TAB C-1,"Interfaces	Requirement? (Yes/No)	
1	None Specified, See TAB C-1,"Interfaces	<u>(Yes/No)</u>	
1	None Specified, See TAB C-1,"Interfaces		<u>Test Report</u>
•	TAB C-1,"Interfaces	<u> </u>	
•	TAB C-1,"Interfaces		
	•		
	For Typical Discuss		
	TABS C-2 through	•	
	C-4 Identical	No	•
-			See Below and
External	See TAB C-1		Ref (3) App.
Process	through C-4	Yes	A. Pg A2
	None specified, See		
	TAB C-1,"Interfaces		
	For Typical Discuss	ion,	
	TAB C-2 through		
-	C-4 Identical	Yes	
	See TAB C-1		
	through C-4		Ref (3)
Conduit Seals	"Conduit Seals"	No	Section 5.3
Connector	•	•	
-	N/A	N/A	
			······································
Orientation	Any orientation	N/A	<u>See Note Below</u>
-	Conduit/junction bo		
	must be orientated		
ł	such that moisutre	•	Ref (3)
Physical d	does not drain		Sec. 5.3 &
Configuration	into coil housing	No	P-1_this TAB
Other	NONE		
-			<del></del> .

NOTE: See ASCO letter in TAB E-7.



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BINDER NO. WBNEQ-SOL-006 PLANT WBN UNIT(S) 1 SHEET 7a OF 33 BINDER TITLE ASCO SOLENOID COMPUTED R1 JDH DATE 3/13/89 VALVES MODEL NP8316 SERIES CHECKED R1 KBN DATE 3/21/89 INSTALLATION INTERFACES (Continued) F. JUSTIFICATION/COMMENTS ASCO does not identify specific interfacing requirements except as follows: (1) ASCO requires a 90° street elbow facing downward connected to exhaust port or similar configuration to prevent moisture instrusion from liquid spray. This is required only on valves located inside containment and subject to containment spray (See TAB C-7). (2) Flowing Medium R2 must be oil-free instrument air and a strainer or filter must be installed on the inlet as close to the valve as possible. See TAB C for a description of the TVA interfaces and TAB J-2 for disucssion of TVA instrument air system.

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WBEP-0121Q

		· · · · · · · · · · · · · · · · · · ·		ATE 7/14/86 JDH 3//3/89
ALVES	MODEL	NP8316 SERIES CHECKEI	D <u>WBK</u> D	ATE <u>7/16/86 <i>KBN</i></u> 3/21/09
_				
G. <u>T</u>	ST SE	QUENCE		
(1	th	st Sequence: Was the test e accident environment in a ragraph 6.3.2 (Yes/No/NA)?	accordance with	th IEEE-323 (74),
			Yes/No/NA	Reference
	(a	) Equipment inspected		Ref (3) p 8 & Ref (1) App. A,
		for damage	<u>Yes</u>	<u>Sec. 9.4.2.1</u> Ref (3) p 8 &
	(b	) Baseline performance measurements taken	Yes	Ref (1) App. A, Sec. 9.4.2.2
		· · · · · · · · · · · · · · · · · · ·	<u>AXU</u>	Ref (1) App. A,
	(c	) Equipment aged: Thermal	Yes	Sec. 9.4.2.3.1 & Ref (3), p 8
				Ref (1) App. A, Sec. 9.4.2.3.2
	•	Radiation	Yes	<u>&amp; Ref (3), App D</u>
				Ref (1) App. A, Sec. 9.4.2.3.3
		Wear	Yes	<u>&amp; Ref (3), p 12</u> Ref (1) App. A,
	(d)	Vibration/seismic testin conducted	g Yes	Sec. 9.4.2.4 & Ref (3), p 15
				Ref (1) App. A,
	.(e)	) Design basis event (DBE) exposure	Yes	Sec. 9.4.2.4 <u>&amp; Ref (3), p 15</u>
				Ref (1) App. A, Sec. 9.4.2.4
	(f)	) Post-DBE exposure	Yes	& Ref (3). p 23
	(g)	) Final inspection and		Ref (1), App. A, Sec. 9.4.3
		disassembly	<u>    Yes    </u>	<u>&amp; Ref (3), p 24</u>
(2	) Was sec	the same piece of equipments the same piece of equipments (1)	nt used throu ) above (Yes/	nghout the test No/NA)? <u>Yes</u>
(3	cal	ve the test equipment, test ibration data been appropri eference: <u>Ref (1), App, C,</u>	iately docume	nt (Yes/No/NA)? Ye
J	USTIFI	CATION/COMMENTS AOR-67368	. was utilize	d to qualify the
С	lass B	coils. Reference to this	renart is is	magand to sail

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BINDI	ER. TI	TLE	ASCO SOLENOID	COMPUTED EEM	DATE <u>7</u> /	R_2_R_ /14/86
	רא אה	וא זיזר	D0216 CEDTEC	CURCERN URV		3/22/90
	<u>10</u> MO		P8316 SERIES	_ CHECKED_WBK	DAIE <u>//</u>	3/23/90
H.	AGIN	G				•
		_				
	(1)		aging considered /No/NA)? <u>Yes</u>			
		<u>Sec.</u>	9.4.2.3 & Ref ()	3) Sec. 4.1, App	p. A, Sectio	<u>on 9,4</u> ).
		JUST	IFICATION/COMMEN	IS <u>See TAB C-1</u>	Thru C-4	
	(2)	Were	the following e	ffects considere	ed in the ag	ging program:
			Aging Effect		Yes/No/N/	<u> Reference</u>
			-			Ref (1), App Section
		Ther	mal aging		Yes	9.4.2.3.1
		Radi	ation exposure		Yes	Section 9.4.2.3.2
			_			Section
		Vibr	ation (nonseismic	c) aging	Yes	9.4.2.3.4
			ational (electric cess) stress agin		Yes	9.4.2.3.3
		JUST	IFICATION/COMMENT	IS <u>See Referenc</u>	ce (3), App,	A, Section
		<u>9.4.</u>	Also, thermal a	aging was done t	<u>ising nitrog</u>	ten as the
,		proc	ess fluid in lieu	<u>of instrument</u>	air (see TA	<u>B C-8).</u>
	(3)	sign	all known synerg ificant effect or g program (Yes/No	1 equipment perf	formance con	sidered in t
			IFICATION/COMMENT			
	(4)	Ther	mal Aging:		<u></u>	
		(a)	Was thermal agin (Yes/No/NA)? <u>Ye</u>	ng considered in es (Reference	the qualif Ref (1)	ication prog
			Section 9.4.2.3.	<u>1. Ref (3) App.</u>	A, Section	<u>9.4.1</u> ).
			JUSTIFICATION/CO	MMENTS See TAB	C-1 Thru C	-4 "Aging."

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	SERIES CHECKED DATE 7/16/80
H. <u>AGING</u> (C	Continued)
(Ъ)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> -(Reference: <u>Ref (2) Sections 1-6</u> ).
	JUSTIFICATION/COMMENTS
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (2) Sections 1-6</u> ).
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (1) App. A Section 9.4.2.3.1</u> & Ref. 3, App. A. Section 9.4.1).
	<u>Parameter Plant Maximum Normal Test Equivalent</u>
	Temperature         *         *         *           Time
	JUSTIFICATION/COMMENTS <u>*See TAB C-1 through C-4, "Aging".</u>
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (2) Section 6</u> ).
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (2),</u> <u>Section 4</u> ).

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NODI	ERIES CHECKED UBK DATE 7/14/86 RR		
MODI	EL NP8	<u>33 16 S</u>	ERIES CHECKED _UPPK DATE ZITTING
н.	AGIN	<u>1G</u> (C	Continued)
		(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>NA</u> (Reference).
			JUSTIFICATION/COMMENTS
		(h)	Was the equipment operated during the thermal aging (yes/no/NA)? Yes (Reference <u>Ref (1), Section 4.2, Ref (3), App Section 9.4.1</u> ).
			JUSTIFICATION/COMMENTS
	(5)	Radi	ation Aging Exposure:
	(5)		Was radiation aging exposure considered in the qualification
	(5)		Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6
	(5)		Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2).
	(5)	(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS Were the materials susceptible to radiation degradation
	(5)	(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS
	(5)	(a)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? NO (Reference).
	(5)	(a)	<pre>Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 &amp; 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2 ). JUSTIFICATION/COMMENTS Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? NO (Refere</pre>
	(5)	(a)	<pre>Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 &amp; 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS</pre>
	(5)	(a) (b)	Was radiation aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Ref (1) Section 4.3 & 4.6 Ref (3), App. A, Section 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? NO (Reference) JUSTIFICATION/COMMENTS Effect on individual materials not considered. Only effect of radiation on overall valve per- formance. Was the basis for radiation aging exposure identified in the

BINDER NO. WI		
	<u>BNEQ-SOL-006</u> PLANT <u>WBN</u> UNI	
BINDER TITLE_	ASCO SOLENOID COMPUTED EEM	R_1 R DATE 7/14/86 <i>JDH</i> <i>3/13/89</i>
		. 1
VALVES MODEL N	P8316 SERIES CHECKED WBK	
•		3/21/89
	· ·	· · ·
H. <u>Aging</u> (Co	ontinued)	
(b)	To the medication back server as 1	
(4)	Is the radiation test exposure do acceptable (Yes/No/NA)? <u>Yes</u>	
	Section 4.3, App. D Ref (3) App.	
	ARAAAA AARAAAAAAAA	<u> </u>
	Plant normal ambient radiation	Various - See
	dose (rd)	TABS C-1 through C-4
		$5 \times 10^7$ - Aging
	Test exposure dose (rd)	$\frac{1.5 \times 10^8 - \text{Accident}}{5.1 \times 10^5 \text{ for } 00 \text{ here}}$
	· _	5.1 x $10^5$ for 99 hours 8.0 x $10^5$ for 188.5 hrs
	Test exposure dose rate (rd/hr)	
	TORE ENDOUTE HORE TALE (LU/UL)	<u>quulucii</u>
	Test exposure source type	
	(e.g., Co-60 gamma)	<u>Co-60 gamma</u>
	· · ·	
	JUSTIFICATION/COMMENTS	<u></u>
(6) Vibr	ration (non-seismic) Aging:	
(a)	Were the effects of non-seismic w	dhaatiaa intusst turiss
(4)	normal and abnormal operation add	
	qualification program ¹ (Yes/No/NA	
	(Reference: <u>Ref (1), Section 4,5</u>	
	Section 4.1.5	).
	HERTEICARTON (COLORIDA	
	JUSTIFICATION/COMMENTS	
(b)		identified and justified
(b)	Was the basis for vibration aging	identified and justified /No/NA)? Yes
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u>	/No/NA)? <u>Yes</u>
(b)	Was the basis for vibration aging in the qualification program (Yes	/No/NA)? <u>Yes</u>
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u>	/No/NA)? <u>Yes</u>
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u>	/No/NA)? <u>Yes</u>
	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u>	/No/NA)? <u>Yes</u>
(7) Opera	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging:	/No/NA)? <u>Yes</u> on 8.1.6. Ref (3). ).
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me	/No/NA)? <u>Yes</u> on 8.1.6. Ref (3). ). ). ).
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific	<pre>/No/NA)? Yes_ on 8.1.6. Ref (3)). ). chanical, and process g normal and abnormal ation program</pre>
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? <u>Yes</u> (Reference: (	<pre>/No/NA)? Yes_ on 8.1.6. Ref (3), ). chanical, and process g normal and abnormal ation program</pre>
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific	<pre>/No/NA)? Yes_ on 8.1.6. Ref (3), ). chanical, and process g normal and abnormal ation program</pre>
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? <u>Yes</u> (Reference: (	<pre>/No/NA)? Yes_ on 8.1.6. Ref (3)). ). chanical, and process g normal and abnormal ation program</pre>
(7) Opera (a)	Was the basis for vibration aging in the qualification program (Yes (Reference: Ref (1) App. A Secti App. A. Sec. 9.4.5 JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? Yes (Reference: ( (3) Section 4.1.2	<pre>/No/NA)? Yes_ on 8.1.6. Ref (3), ). chanical, and process g normal and abnormal ation program 1) Section 4.4, Ref).</pre>
(7) Opera (a) ¹ Qualifica	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1) App. A Secti</u> <u>App. A. Sec. 9.4.5</u> JUSTIFICATION/COMMENTS tional Stress Aging: Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? <u>Yes</u> (Reference: ( (3) Section 4.1.2	<pre>/No/NA)? <u>Yes</u> on 8.1.6. Ref (3). ). chanical, and process g normal and abnormal ation program 1) Section 4.4. Ref). ).</pre>

	ITLE ASCO SOLENOID COMPUTED EEM DATE 7/14/86 JDH CA 3/13/89 <b>7</b> ODEL NP8316 SERIES CHECKED WBK DATE 7/16/86 KBN A
VALVES P	<u> </u>
H. <u>AGIN</u>	G (Continued)
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: <u>Ref (1) App. A</u>
	<u>Section 7.1 &amp; 5.2, Ref (3), App. A, Section 9.4.2</u> ).
	JUSTIFICATION/COMMENTS
(8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes (Reference: <u>Ref (2), Section 6 Ref (1), Section 3.2.2,</u>
	Ref (3), Appendix C, p. C-8
	Qualified life (Document in QMDS) <u>See TABS C and G</u>
	JUSTIFICATION/COMMENTS The qualified life is different, in
	most cases, from the value given in the test report. TAB C,
• (9)	most cases, from the value given in the test report. TAB C,
(9)	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes</pre>
<b>.</b> (9)	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes</pre>
<b>.</b> (9)	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes</pre>
<b>.</b> (9)	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: <u>Ref (2) Section 8</u>).</pre>
	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (2) Section 8</u> JUSTIFICATION/COMMENTS <u>Replacement interval depends upon</u> <u>maximum normal ambient temperature and percentage time</u> palement interval depends upon</pre>
<b>.</b> (9)	<pre>most cases, from the value given in the test report. TAB C, page C-3, provides rationale. </pre>
<b>.</b> (9)	most cases, from the value given in the test report. TAB C,         page C-3, provides rationale.

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BINDER	NO.	WBNEQ-S	OL-006	PLANT	WBN	t	JNIT(S	5)_1	SHEET	14	OF 33
BINDER	TITL	E <u>ASCO</u>	SOLENOII	)	COMPUTED	EEM		DATE	R_2 7/14/86		,
VALVES	MODEI	<u>. NP8316</u>	SERIES		CHECKED_	WBK		DATE	7/16/86 0	1/90 M 1/90	

# I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis).

	Mat	erial/Property/Function			iati ėsho			efer		Activatio <u>Energy</u>	<u>Reference</u>
	(a)	EPDM	1	x	107	Ś	lee	TAB	E6	0.94	Ref (2) Sec. 4.1.1
	(b)	VITON	5	x	106	s	lee	TAB	E6	1.04	Ref (2) Sec. 4.1.2
	(c)	NOMEX	7	x	106	S	ee	TAB	E6	0.96	Ref (2) Sec. 4.1.3
	(d)	MAGNET-WIRE ENAMEL	1	x	107	S	ee	TAB	E6	1.16	Ref (2) Sec.4.2.1 Ref (2)
	(e)	ISO-MICA W/EPOXY	1	x	10 ⁹	S	ee	TAB	E6	1.00	Sec. 4.2.6
	(f)	SILICONE RUBBER LEAD WIRE INSULATION	1	x	106	S	ee	TAB	E6	1.59	Ref (2) Sec. 4.2.5
*	(g) _	DC 550 LUBRICANT		· j	NA			NA		NA	NA R2

JUSTIFICATION/COMMENTS The above materials are those with lowest activation energies listed in reference (2), Section 4.1, and 4.2. Radiation threshold values are typical for these materials and are listed for information only. These values were not taken from the test report, but were supplied by the Digital Engineering System 1000, Materials Data Base (see TAB E6).

*Although not stated in reference (2), DC 550 lubricant was used on tested valves as verified by ASCO letter dated January 5, 1988 (see TAB E-12).



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BINIDER		WBNEQ-SOL-006 PLANT WBN UNIT(S) 1 SHEET 15 OF 33
		- ASCO SOLENOID VALVES
BINDER		$E _ ASCO SOLENOID VALVES COMPUTED _ \mathcal{E} \mathcal{E} \mathcal{M} DATE \frac{7/\mathcal{H}}{94} \mathbb{R} _ \mathbb{R} $
		8316 SERIES CHECKED DATE 7/16/86
J.	<u>SPE</u>	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (1), App. A, Sec.6.1 &amp; 6.2</u> ).
		Identify Acceptance Criteria: <u>Valves must operate from 90-140VDC at</u> <u>minimum and maximum operating pressure differential.</u> Coil insulation <u>resistance must be a minimum of 1.0 megohm at 500VDC.</u> During Hypot <u>test, current leakage must be less than 0.5 milliamp at twice the</u> <u>rated voltage plus 1000VAC applied for a period of one minute.</u> Valves
		<u>must operate at test or low voltage condition (90VDC) at maximum</u> <u>pressure differential under all conditions. Valves are not to have a</u> <u>pressure build-up at a vented cylinder port or a pressure decrease at</u> <u>a cylinder port which is required to be pressurized in excess of 10%</u> <u>the nominal inlet supply pressure under all postulated environmental</u>
	(2)	conditions. Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference <u>Ref (1) Section 4.1</u> ).
	•	Identify baseline and functional testing: <u>Recording coil excitation</u> <u>seat leakage, noise test, operational test, external leakage in ener-</u> <u>gized and de-energized state before and after thermal, radiation, wear</u> <u>and vibration aging, and accident radiation and LOCA simulation. Mea-</u> <u>surement of insulation resistance &amp; coil dielectric tests before ther-</u> <u>mal aging &amp; after completion of accident radiation and LOCA simulation.</u>
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Ref</u> (1) Appendix A, Section 7.0 ).
	(4)	Do the applied loads during baseline testing reflect normal operating conditions (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (1), Section 4.8 &amp; Ref (3), Table 4.3</u> ).
		JUSTIFICATION/COMMENTS
		PAGE B-18

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i teres

BINDER T	ITLE ASCO	SOLENOTO	COL	MPUTTED E	EM	DATE		R2
	ODEL NP8316					-	3/	13/89 🕺
								21/89 3/
PER	IPMENT ELEC FORMANCE SP ntinued)							
(5)	Identify					-	to ensur atisfied.	
		meter	-	Normal_C			Refer	ence
	Volt	age	<u>125 VD</u>	C			TAB E-1, <u>TAB E-3,</u>	-
·	Load	L .	<u>Not sp</u>	ecified				
•	Freq	uency	NA (a)	<u>ll valve</u>	s DC)			
		iracy	NA		<u> </u>			
		er(s)	. <u></u>					
	JUST	IFICATION	I/COMME	NTS				
	JUST	IFICATION	I/COMME	NTS				
(b)	. <u></u>	: <u>S</u> 1	pecific	Acciden	t Condi	tions	Refe	rence
(Ⴆ)		: <u>Sı</u> 90	pecific VDC m:	Acciden	•	tions	Refe	rence
(b)	Parameter	: <u>S</u> 90 <u>(</u> ;	pecific VDC m:	Acciden in. ment bel	•	tions	Refe	rence
(b)	Parameter Voltage Load Frequency	: <u>S</u> 1 90 (S No	oecific ) VDC m lee com ot spec:	Acciden in. ment bel	ow) *		Refe	
(b) 	Parameter Voltage Load Frequency Accuracy	: <u>S</u> 1 90 (S No	Decific VDC m: See com ot spec:	Acciden in. ment bel ified	ow) *			A
(b) 	Parameter Voltage Load Frequency	: <u>S1</u> 90 (S NC NC	Decific VDC m: See com ot spec:	Acciden in. ment bel ified	ow) *		N	A
(b) 	Parameter Voltage Load Frequency Accuracy	: <u>Sr</u> 90 (5 <u>Nd</u> <u>Nd</u>	oecific VDC m See com ot spec:	Acciden in. nent bel ified valves D	ow) C power	ed)	N	A A
(b) 	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICA	SI 9( (S NG NA NA TION/COMM	ecific VDC m ee com ot spec (All v ENTS 1	Acciden in. ment bel ified valves D	ow) C_power	<u>ed)</u>	N	A A 10004

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BINDER	NO. WBNEQ-SOL-006	_ PLANT UNIT(S)1	SHEET <u>16a_</u> OF <u>33</u> R_2 R_4(
BINDER	TITLE ASCO SOLENOI	D COMPUTED R1 JDH DATE	
			3/22/90 9/12/90
VALVES N	MODEL NP8316 SERIES	CHECKED R1 KBN DATE	3/21/89_AFMGM
			3/23/90 9/24/50
74 54			
		CHARACTERISTICS NECESSARY TO TIONS CAN BE SATISFIED UNDER	
	ontinued)	TITONS CAN BE SATISFIED UNDER	ACCIDENT CONDITIONS
(0)	Suctificed)		
(c)	) <u>Parameter</u>	Demonstrated Conditions	Reference
•			Ref(3) Fig. 9.2 R4
	Voltage	<u>90 VDC</u>	<u>p_A26, App. A</u>
·			Ref(3) Table
	Load	.080 AMPS	4.7
		W A	
	Frequency	<u>NA</u>	
	Accuracy	NA	
	Other(s)		
			· ·
	JUSTIFICATION/CO	MMENTS <u>Reference (3), Append</u>	dix A. Section
	<u>6.1.1, requires</u>	125 VDC valves to operate on	demand at any
•			
	voltage between	90-140 VDC. Per Figure 9.2	
	the test value w	vas successfully tested at 90	R4
		as successfully cested at 70	VDO: A DIIMALY
	concern with sol	enoid valves is that of volta	age available at
	<u>the coil termina</u>	ls. TVA Calculation WBN EEB-	<u>-MS-TI11-0004</u>
	shave that the s	alwag in this birds and an	
	shows that the v	valves in this binder are supp	Diled Voltage
	within their env	ironmentally qualified minimu	m ratings as
	required to perf	orm their safety function du	ring accident
	••		
	conditions.		

BIND	ER NO	. WBNEQ-SOL-006 PLANT WBN UNIT(S) 1 SHEET 17 OF
BIND	ER TI	TLE ASCO SOLENOID COMPUTED EEM DATE 7-14-86
VALV	<u>es mo</u>	DEL NP8316 SERIES CHECKED WBK DATE 7-16-86 AFM
ĸ.	<u>REQU</u>	IRED OPERATING ENVIRONMENT
	Refe	erence Environmental Drawing No. <u>Various - See TABS C-1 thru C-4</u>
	(1)	Normal Max (2) Abnormal Max
		(a) Temperature (°F) <u>Various</u> (a) Temperature (°F) <u>Various</u>
		(b) Pressure (psig) <u>Various</u> (b) Pressure (psig) <u>Various</u>
		(c) Humidity (%) <u>Various</u> (c) Humidity (%) <u>Various</u>
		(d) Radiation (rd) <u>Various</u> (d) Radiation (rd) <u>Various</u>
	(3)	Process Interfaces: The process fluid for these valves is
		oil-free instrument air with a maximum design temperature of
		100°F. Therefore, the bounding temperature for these valves
		is the ambient.
	(4)	
		conditions: <u>Will occur less than 1 percent of plant life and</u>
		could exist for up to 8 hours per excursion.
	(5)	Accident (worst case for any combination of specified accident parameter including peak, duration, and profile):
		(a) Temperature (°F) <u>327°F</u> Accident type <u>LOCA/HELB</u>
		25.6 psia (b) Pressure (psig) <u>(11.2 psig)</u> Accident type <u>LOCA/HELB</u>
		(c) Humidity (%) <u>100%</u> Accident type <u>LOCA/HELB</u>
		4.7x10 ⁸ rads beta
		(d) Radiation (rd)4.0x <u>10⁷ rads gamma Accident type LOCA/HELB</u>

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BINDER	NO	WBNEQ-S	SOL-006	PLANI	WBN	UNIT(	S)_1	SHEE	T <u>18</u>	OF 33
					401001000D	-		R	2 R	4
BINDER	TITLE	ASCO_	SOLENOIL	)	COMPUTED_	EEM	DATE	<u>7/14/8</u> 6_	3/22/	90 19/18/90
VALVES	MODEL	. NP8316	5 SERIES		CHECKED_V	VBK	DATE	7/16/86	AFM	am
									3/23/	90 9/24/90

K. <u>REQUIRED OPERATING ENVIRONMENT</u> (Continued)

Comments (duration/peak/profile/spray composition and pH, margin, etc.): The worse case accident profile combination was not utilized as the enveloping environment. Qualification to the environment would only produce replacement/ refurbishment schedules which would be overly conservative for many of the valves. Qualification and replacement schedules were based on valve specific environments which are defined in TAB C-1 through C-4, TAB G defines the maintenance which is reflective of these environments.

(6) Is the equipment subject to moisture or liquid intrusion which can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? Yes (Reference:

See P.1 "Discussion"

(7)	Subject	to	submergence	(Yes/No/NA)?	<u>Yes</u>	(Reference:	
-----	---------	----	-------------	--------------	------------	-------------	--

See P.1, "Discussion," TAB C-4

Identify initiation time and duration of submergence:

Following an accident inside primary containment, valves

identified in TAB C-4 and located below elevation 722'

inside the crane wall or 717.7' outside the crane wall are

subject to submergence. However, these valves will all

complete their safety function prior to submergence

R4

(See TAB C-4). No valves located outside containment and

covered by this binder are subject to submergence.

 (8) Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>Environmental Drawing 47E235-42</u>)

If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:

See Section P

(0) 0			(Continued			
(9) S	pecial envir	onmental calo	culations (t	RIMS No.	etc.)	
	See TAB B S	ect. A	-	· · · · - · · · · · · · · · · · · · · ·	•	
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		·	-		<u></u>	
-						
						• •
			•			

WBNEQ-SOL-006

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BII	IDER NO.WBNEQ-SOL-OC6 PLANT	WBN	UNIT(S) 1	SHEET 21 OF 33
				R_2_R
BII	DER TITLE ASCO SOLENOID	COMPUTED	EEM DATE 7-	-14-86
				3/22/90
	LVES MODEL NP8316 SERIES	CHECKED	WBK DATE 7-	<u>-16-86 4014</u> <u>3/28/90</u>
	- Andre Barry - Marganit - Manana - Carabany			
L	SUMMARY COMPARISON OF TEST	CONDITIONS	TO SPECIFIED	CONDITIONS
	<ol> <li>Comparison of worst-ca</li> </ol>	ase maximum	parameters:	
	Parameter	Specified	Demonstrated	Reference
		opectited	Demonscraced	Ref (1)
	Operating Time	<u>100 Days</u>	<u>30 days</u>	Fig 2
				Ref (1)
	Temperature (°F)	<u>327°F</u>	<u>346°F</u>	Sec 4.7
		25.6 psia		Ref (1)   R2
	Pressure (psig)	$\frac{23.0 \text{ psia}}{(11.2 \text{ psig})}$		Sec 4.7
		( <u>3315-F318</u> /	<u> </u>	Ref (1)
	Relative Humidity (%)	100%	100%	Sec 4.7
	2000 Chemical Spray*		3000 ppm Boron	
	chemical Spray*	ph 8.3	<u>pH 9.5-10.5</u>	<u>Sec 4./</u> R2
				Ref (1)
•	Radiation (rd)**8.52x1	10 ⁷ <u>rads</u>	$2.01 \times 10^8$	app D
				See P. 1
	Submergence	Yes	Yes .	"Discussion"
•	*Includes spray concent pH.	tration, flo	owrate, density	y, duration, and
	**Enter 40-year integrat dose and specify type. 4.0 x 10 ⁷ gamma + 2 x TID. The total dose o (see section P.3 of th	. 2.52 x 10 10 ⁷ 40-year on the pigta	$0^7$ beta (attenu dose = 8.52 p	ated dose) + R2
		•		
			,	
			. <b>.</b>	
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			•.	
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			_	

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WBEP-0121Q

	BINDE	R TITL	WBNEQ-SOL-006 PLANT E ASCO SOLENOID VALVES 8316 SERIES		SHEET22_OF3 R 7/16/86 7/16/86
	L.			CONDITIONS TO SPECIFIED CONDI	
		a	Parameter	Test Profile Envelopes Specified	
1				(Yes/No/NA)	<u>Reference</u>
			Temperature	Yes	See (1) above
			Pressure	Yes	See (1) _above
			Relative Humidity	Yes	See (1) _above
			Chemical Spray	Yes	See P. 2 "Discussion"
			Submergence	Yes	See P. l <u>"Discussion"</u>
			JUSTIFICATION/COMMENTS		<u> </u>
			· · · ·		
			· ·		
		·	· · · ·	· · · · · · · · · · · · · · · · · · ·	
		·	· · · · · · · · · · · · · · · · · · ·		
				· · · · · · · · · · · · · · · · · · ·	

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PAGE BAS

BINDER NO.WBNEQ-SOL-006 PLANT WBN U	NIT(S) 1 SHEET 23 OF 33
BINDER TITLE ASCO SOLENOID COMPUTED EE	$\begin{array}{c} R \underline{2} & R \underline{4} \\ M \underline{M} & DATE & \underline{7-14-86} & \underline{CDH} & \underline{CH} \\ \end{array}$
VALVES MODEL NP8316 SERIES CHECKED WB	3/22/90 9//8/94 <u>BK</u> DATE <u>7-16-86 AFM ///M</u>
L. SUMMARY COMPARISON OF TEST CONDITIONS TO	3/23/90 3/24/90 SPECIFIED CONDITIONS
(Continued)	
(3) Were margins applied to the test pa addressed in the test program to as and uncertainties are accounted for Yes/No/NA).	ssure that normal variation
Suggested Margins per IEEE-323(74	Margin ) Applied Yes/No/NA
Temperature: +15 degrees F	+19°F Yes
Pressure: +10% but no more than 10 psig	<u>+98psig NA</u>
Radiation: +10% of accident dose	+136% Yes
Time: +10% (or 1 hour + operating per NUREG-0588)	time <u>None Yes*</u>
Voltage: ±10% of rated value	<u>No** No**</u>
Frequency: $\pm 5\%$ of rated value	<u>N/A N/A</u>
Environmental Transient: the initi transient and the peak temperatur applied twice	
	Ref (1), Section 9.4.2.4.2
Vibration: +10% added to accelerat (during seismic testing)	
JUSTIFICATION/COMMENTS <u>*Accident d</u>	egradation_calculation_(see
TAB C) proves that the 30-day test	envelops the 100-day post-
<u>accident requirement. See Generic</u>	Binder WBNEP-GEN-001,
Section III.C.4.	
**The valve was tested at a minimum	90 VDC during operability   R4
testing which is better proof of op	erability than increased
coil voltage, During all other tes	ts, either the nominal
voltage of 125VDC or the test current	nt of .080 amps was used.

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MOI	DEL NF	R R R R R R R R R R R R R R R R R R R							
M.	OPER	ABILITY TEST RESULTS							
	(1)	Identify the safety function(s) of this equipment: (Reference <u>See TAB A and TAB C</u> ).							
		JUSTIFICATION/COMMENTS Functions are varied. All are listed in							
		TAB A and TABS C-1 through C-4.							
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference Ref (1) Section 5).							
		JUSTIFICATION/COMMENTS							
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? Yes (Reference <u>Ref (1) Section 5</u> ).							
		JUSTIFICATION/COMMENTS							
	(4)	Did the test demonstrate the operability requirements for the require time interval for which the equipment is required to operate (yes/no/NA)? <u>No</u> (Reference).							
		JUSTIFICATION/COMMENTS <u>See TABS C-1 through C-4 for the analysis</u>							
		of the test DBA versus the plant specific DBA.							
	(5)	addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (1) Table 2F</u>							
		$\frac{\text{Ref (3), App. J}}{\text{JUSTIFICATION/COMMENTS}}$							
		with disposition.							

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EQP099.51

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BINDER NO. WBNEQ-SOL-006 PLA	NTWBN UNIT(S)	SHEET OF3
BINDER TITLE ASCO SOLENOID VA	LVES COMPUTED	DATE
MODEL NP8316 SERIES	CHECKED	_ DATE 7/16/86

## N. MAINTENANCE AND SURVEILLANCE

.

Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? <u>Yes</u> (Enter all requirements in Section G of the EQC Binder Qualification Maintenance Data Sheets).

JUSTIFICATION/COMMENTS See TABS C and G.

TVA 19537 (0F-3-86)

EQP099.51

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BINDER NO. WBNEQ-SOL-006 BINDER TITLE ASCO SOLENOID		UNIT(S) TED _ <u> </u>		R	R
MODEL NP8316 SERIES			· · ·		
	CHECKE	D WARK	DATE /////	<u>86</u>	
0. <u>SUMMARY OF REVIEW</u>				Yes/No/NA	
all extrapolat	ence of qualificati imptions, mathemati tions of test data justified and docu	ical models, used in an		Yes	
(2) Any exceptions ( taken to the s adequately jus	specified qualifica		ntrary)	NA	
(3) Choice of qualif justified?	ication methodolog	y adequatel	у	Yes	
(4) If analysis was	performed, complet	e the follo	wing:		
(a) Were equipme identified	ent performance req 1?	uirements		<u>_NA</u>	
(b) Were specifi effects an	ic features and fai nalyzed?	lure modes	and	<u>NA</u>	
(c) Were assumpt together w their use?	ions and mathemati with appropriate ju	cal models a stification	used for	NA	
(d) Were enviror equipment	mental parameters performance identi	which affec: fied?	t ·	<u>_NA</u>	
(5) Adequate similar specimen estab	ity between equipm lished?	ent and test	t	Yes	
(6) Aging degradatio	n evaluated adequa	tely?		Yes	
(a) Mechanical a	md/or cycle aging	addressed?		Yes	
(b) Equipment ag applicatio	ed to end of life on of DBE condition	condition pr s?	rior to	Yes	
(c) Absence of p	preaging in test/an	alysis just:	ified?	NA	
(d) Materials su aging iden	sceptible to therm. tified?	al/radiation	1	Yes	

PAGE	B	:2	9
			•

•

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BINDER NO. WBNEQ-SOL-006 PLANT WBN UNIT(S) 1	
BINDER TITLE ASCO SOLENOID VALVES COMPUTED <u>EEM</u> DATE 7/14 MODEL NP8316 SERIES CHECKED WAK DATE 7/16	
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
 (e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	Yes
(a) Peak temperature adequate	Yes
(b) Peak pressure adequate	Yes
(c) Duration adequate	Yes
(d) Required profile enveloped adequately	Yes
(e) Steam exposure adequate	Yes
(9) Criteria regarding test sequence satisfied?	Yes
(10) Criteria regarding spray satisfied?	Yes
(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11) Criteria regarding submergence satisfied?	Yes
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes
(b). Was beta radiation considered?	Yes*
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes
*See P. 3 "Discussion".	
PAGE B. 30	

FOPODO

			Q-SOL-006 PLANT	WBN	UNIT(	(S) <u>1</u>		EET <u>23</u> ( <u>3                                    </u>	
BIND	ER TIT	rle <u>A</u>	SCO SOLENOID	_ COMPUTED_	EEM	_ DATE	7-14-8	6 <u>CDH</u> 5/18/90	
VAL	VES MO	DDEL	NP8316 SERIES	_ CHECKED	WBK	DATE	7-16-8		
ο.	SUMM	ARY O	F REVIEW (Contin	ued)					
								<u>Yes/No/I</u>	
	(15)	Crit	eria regarding f	unctional t	esting s	satisfi	ed?	Yes	
	·	(a)	Does the test p acceptance crit				med?	Yes	
		(b)	Was an initial establish requi				istics	? <u>Yes</u>	
		(c)	Has the test and performance species, (e.g., voltage, electrical chara	cifications load frequ	and cha ency, ar	aracter nd othe	r	Yes	
	(16)	) Criteria regarding instrument accuracy satisfied? <u>NA</u>							
	(17)	Tes sat:	t duration margin isfied?	n (l hour +	functio	on time	)	<u>Yes</u>	
		(a)	Is the minimum least 1 hour?	specified	operatin	ng time	at	<u>Yes</u>	
		<b>(b)</b>	If exception to time was taken provided?	b the 1-hou , was adequ	r minimu ate just	m oper ificat	ating ion	<u>NA</u>	
	(18)	Crit	teria regarding s	synergistic	effects	satis	fied?	<u>Yes</u>	
	(19)	Cri	ceria regarding n	argins sat:	isfied?			<u>Yes</u>	
	(20)		ntenance and surv quately identifie		equireme	ents		Yes	
Ρ.	DISCU	ISSIO	I						
	<u>1. M</u>	loisti	<u>ire or liquid int</u>	rusion and	submerg	ence (	Sec. K(	6) & K(7	
	<u>All_s</u>	olenc	oid valves covere	ed by this h	<u>oinder t</u>	hat ar	e subje	<u>ct to</u>	
	moist	ure i	ntrusion other t	han submerg	<u>rence_ar</u>	e requ	ired to	operate	
	<u>only</u>	<u>1-hou</u>	ur into an accide	nt, deenerg	<u>tize and</u>	remain	<u>1 deene</u>	rgized.	

WBEP-0121Q

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	· · · · · · · · · · · · · · · · · · ·
BINDER NO. WBNEQ-SOL-006 PLANT WBN	
BINDER TITLE ASCO SOLENOID COMPU	
LVES MODEL-NP8316 SERIES CHECK	5/18/90 '9//8/90 CEDWBKDATE 7-16-86_AFMQ7M
	5/18/90 9/24/90
P. <u>DISCUSSION</u> (Continued)	
Each solenoid valve is enclosed	in a NEMA 6 enclosure. Per NEMA
publication 250, section 3.09 (c	c), the design test required for a
· · · · ·	osure to be submerged to a depth of
<u>6 feet of water for 30 minutes w</u>	
	aboratories for TVA (reference Test
	•
Report 17523-1, and Wyle letter	
	cimen A) operated 114.5 hours and a
<u>second valve (specimen D) operat</u>	ed for the full 30-day LOCA test
with their enclosures full of wa	ter. Based on the above facts, we
conclude that these valves will	operate for 1 hour regardless of
moisture intrusion from condensa	tion. All valves in this binder
	orm their safety function for all R4
,	ee TAB C-4, pages C-91 and C-92).
•	ing. TVA has thoroughly analyzed
moisture intrusion and has instat	
	s list areas in the plant subject R4
	mine which valves required conduit
seals, TVA's analysis considered	NRC Information Notice 88-86 (TAB
J-9), Reg, Guide 1.97 PAM concerr	ns, and Category A to Category C
interaction. From this analysis,	those valves determined to
	MDS (TAB G). TVA utilizes either
Conax or Namco conduit seals for	
WBNEQ-CSC-001 documents qualifica	
-	DA
Namco seals are qualified in Bind	ler wbNEU-CSC-002.
J	

PAGE B-32 R4

	WBN UNIT(S) <u>1</u> SHEET <u>30</u> OF <u>33</u>
BINDER TITLE ASCO SOLENOID VALVES	COMPUTED DATE R
MODEL NP8316 SERIES	CHECKED WBK/ 2434 DATE 2/19/86

P. <u>DISCUSSION</u> (Continued)

2. Chemical Spray (Sec L. (1) & (2)).

The containment spray flow rate is equal to 9500 gal/min or 0.92 gpm per square foot of containment cross section. The spray duration is 30 days. The chemical spray composition is an Alkaline borate solution (ph 8.3) produced by mixing boric acid ( $H_{3}BO_{3}$ ) with sodium tetraborate ( $NA_{2}B_{4}O_{7}$ . 10  $H_{2}O$ ). The ASCO test valve was subjected to a spray solution of 3000ppm Boron as Boric Acid in solution with 0.064 molar sodium thiosulfate buffered with sodium hydroxide to a pH value of 10 at room temperature at a rate of 0.306 gpm per square foot of area covered by the spray for the full 30 days of the test. The test solution is more corrosive than the containment spray. Therefore all valves listed in this binder subjected to containment spray fall within the qualification provided by the test valve.

Reference: Environmental Drawings 47E235-41 and -42.



BINDER NO. WBNEQ-SOL-006 PLAN	T WBN UNIT(	(S) <u>1</u> SHEET <u>31</u> OF <u>33</u>
BINDER TITLE ASCO SOLENOID	COMPUTED EEM	R 1 R 2 DATE 9/18/86 JDH CAT
VALVES MODEL NP8316 SERIES	CHECKED <u>WBK</u>	DATE <u>9/18/86 JDH</u> 3/13/893/22/90 DATE <u>9/19/86 KBN</u> 3/21/89 3/23/89

## P. DISCUSSION

3. Beta Radiation (Sect. 0.12.b)

Post-DBA beta radiation must be addressed for all equipment located inside containment which is required for LOCA mitigation. Solenoid valves in Group D are located inside containment in the Lower Compartment, in the Accumulator Rooms and Fan Rooms; Group A valves are in the Upper Compartment; and Group B valves are in the Annulus.

Per drawing 47E235-44, which covers the Annulus, the 100-day accident radiation dose is  $1.2 \times 10^7$  rads (includes a Beta dose contribution of 6 x  $10^5$  rads). Since the ASCO valves are qualified to 2.01 x  $10^8$  rads, no credit for reduction of the beta dose is necessary for the valves in Group B.

Per drawing 47E235-42, which covers the Lower Compartment, the R2 100-day accident radiation dose is  $4.7 \ge 10^8$  rads beta and  $4 \ge 10^7$  rads gamma.

Per drawing 47E235-41, which covers the Upper Compartment, the 100-day accident radiation dose is  $4.7 \times 10^8$  rads beta and  $3.8 \times 10^7$  rads gamma.

Since the combined gamma/beta doses possible in the Lower (Group D) and Upper (Group A) Compartments exceed the qualified level of the valves on face value, it is necessary to consider the inherent shielding afforded these valves.

All non-metallic parts of the valves are totally enclosed by metal with the exception of the 18" wire pigtails. The minimum thickness of metal is assumed to be the coil housing, which is 3/32" (0.09375) steel, per ASCO's Tom Hays telecon with TVA's Dean Helton on January 7, 1986. OE Calculation WBNTSR-051 "Reduction of Beta Dose by Sheet Steel," page 3.1, shows the beta reduction factor for 14 gauge (0.0747)" steel is equal to 0.0536. This reduces the total 100-day beta dose to the valve internal parts to (4.7 x  $10^8$ ) x (5.36 x  $10^{-2}$ ) = 2.52 x  $10^7$ 

In the Lower Compartment, the total combined 100-day beta and accident radiation dose will equal  $(2.52 \times 10^7 \text{ beta}) + (4.0 \times 10^7 \text{ gamma}) = 6.52 \times 10^7 \text{ rads}$ . The combined 100-day accident radiation plus the 40-year dose  $(2 \times 10^7)$  equals a total radiation dose of  $8.52 \times 10^7$  rads TID.

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P-0121Q

R 2 R BINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 7/14/86 CX4 3/22/90	BINDER NO	WBNEQ-SOL-006 PLAN	NT <u>WBN</u> UNII	:(S) <u>1</u>	SHEET 33 OF 33
	BINDER TITL	E ASCO SOLENOID	COMPUTED EEM	DATE 7/14	R_2_R /86 CSA
VALVES MODEL NP8316 SERIES CHECKED WBK DATE 7/16/86	VALVES MODE	L NP8316 SERIES	CHECKED WBK	DATE <u>7/16</u>	3/22/90

P. <u>DISCUSSION</u> (Continued)

4. Synergistic Effects (Sec. H(3))

Ethylene Propylene Terpolymer (EPDM) elastomer is used in the construction of ASCO solenoid valves as gaskets and diaphragms. EPDM is the only material having a potential for radiation induced synergisms based on a review of technical inforamtion provided in NUREG/CR-2157 and NUREG/CR-2553. Data in NUREG/CR-2157 suggests that dose rate effects in EPR materials are insignificant up to doses of 10 to 20 MRADS. A review of the location and environments of ASCO solenoid valves listed in TABs C-1 through C-4 indicate that the maximum normal radiation dose will be seen by valves in subgroup D-2. These valves are qualified for 40 years without replacement of elastomer parts and will therfore be exposed to a maximum normal doses to 20 MRADs. Since all elastomer parts are totally enclosed in metal, the radiation dose to these parts will be less than 20 MRADs. Synergistic effects will be negligible for normal service aging.

Potential dose rate and test sequence synergisms will not impact qualification for accident conditions as demonstrated by Test Report AQS-21678. The test sequence of thermal aging followed by radiation aging plus accident radiation at high (0.8 MRAD/HR) dose rate is a reasonable simulation of actual plant requirements. Additional assurance is provided by the severity of the radiation test because the test valve was exposed to 201 MRADS whereas an actual dose of about 101 MRADs (81 MRADs accident plus 20 MRADs normal service) is required.

R2

$WBN \qquad UNIT(S) _ 1 \qquad SHEET _ 1 OF _ B _ B _ B _ B$	
WBNEQ-SOL-007 PLANT	
ASCO SOLENOID VALVES - COMPUTED	
MODEL NP 8321 SERIES CHECKED W DATE 128/86	

201-00

TAB A EQUIPMENT IDENTIFICATION MATRIX

BINDER NO. WBNEO-SOL-007 PLANT WBN	UNIT(S)SHEETOF
BINDER TITLE ASCO SOLENOID COMPUTED_	RR
VALVES-MODEL NP8321 SERIES CHECKED	RIJDH DATE 3/13/89

## TAB A

## NOTES

- 1. Floor/Actual Elevation Actual elevations are documented on field verification sheets found in TAB F. All elevations shown are floor elevations.
- 2. See TAB B, Section A for Category and Operating Times calculations used in this binder.
- 3. Contract Column Contract numbers shown in this TAB were obtained by tracing the serial number on each valve through TVA procurement records and did not depend on field verification data for contract numbers.

# PAGE A-3 R1



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BINDER NO. : WBNEQ-S MANUFACTURER : ASCO PAGE 1 OF 1



TAB A - EQUIPMENT IDENTIFICATION MATRIX ------LOCATION-----EQIS_NUMBER_______UNIL_DEVICE_ID_NO______AZMIIU___ELEV(1)_____CAT_OPER_IIME_EVENT SAFETY_EUNCIION______ DESCRIPTION_______UQEL_NUMBER______ (2)

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and the second second

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A/B 5HN/100D L 80KJ3-827551

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1000

MUST DEENERGIZE TO CLOSE DAMPER AFTER A PHASE A CNTHNT ISOL SIGNAL TO ISOLATE VACUUM FANS.

NBN-2-FSV -065-0005 -A 2-FSV -065-0005 -A 757° A16 A/B 5HN/1000 L CNTHT ANN VAC FANS ISLN DHPR NP8321A2E 80KJ3-827551

MUST DEENERGIZE TO CLOSE Danper After a phase a Cntmt ISLN SIGNAL TO ISOLATE

VACUUM FANS-

DAMPER IS NORMALLY CLOSED AND MUST REMAIN CLOSED DURING THE MITIGATION OF THIS ACCIDENT.

DAMPER IS NORHALLY CLOSED AND

MUST REMAIN CLOSED DURING THE MITIGATION OF THIS ACCIDENT.

WBN-2-FSV -065-0029 -B 2-FSV -065-0029 -B EGTS TRAIN B UNIT 2 SUCTION NP8321A2E

WBN-2-FSV -065-0009 -A 2-FSV -065-0009 -A

EGTS TRAIN A UNIT 2 SUCTION NP8321A2E

WBN-2-FSV -065-0004 -B 2-FSV -065-0004 -B

CNTHT ANN VAC FAN ISLN DMPR NP8321A2E

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757° A16

80KJ3-827551

757° A16

80KJ3-827551

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PREPARER/DATE E.E. MªBEE S/18/86 CHECKEDIDATE F.W. VOSBURY 9/18/86

3/13/89

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BINDER TITLE ASCO SOLENOID VALVES	BN UNIT(S) COMPUTED <u>EEM</u> CHECKED <u>HW</u>	1SHEET _1 R DATE 7/24/66 DATE 7/28/86	_ OF <u>1</u> _R
	TAB B		
ENVIRONMENTAL Q	UALIFICATION CHECK	LIST	•
•			
	· ·		
			•
	5E B-1		

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`	BINDER NO. WBNEQ-SOL-007 PLANT WBN UNIT(S) 1 SHEET 1 OF 28
	BINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 9/18/86 AFM
	3/13/897/20/90 VALVES-MODEL NP8321 SERIES CHECKED FWV DATE 9/18/86 JDH 43/13/89 3/13/89 8/7/90
	A. DOCUMENTATION
	Equipment Description <u>Solenoid Valves</u>
	Vendor/Manufacturer <u>ASCO</u>
	Equipment Model No.(s) <u>NP8321A2E</u>
	a 
	QUALIFICATION REPORTS
	(1) Title/Number/Revision <u>Automatic Switch RIMS B43 850627 322</u>
	<u>Company Test Report AQS-21678/TR/Rev. A</u> DATE July, 1979
	(2) Title/Number/Revision <u>Automatic Switch RIMS B45 850514 428</u>
	Company Test Report AOR-67368, Rev. 1 DATE August 19, 1983
	(3) Title/Number/Revision <u>ASCO Catalog NP-1 RIMS NEB 840328 363</u>
	Valves AQS 21678/TR/Supplement 3DATE March 8, 1983
	(4) Title/Number/Revision <u>Franklin Research</u> RIMS <u>NEB 840925 351</u> <u>Center Test Report F-C5569-309/315.</u>
	Appendix C DATE November, 1983
	(5) Title/Number/Revision <u>"Aging and RIMS B74 890623 502</u> Qualification Research on Solenoid Operated
	Valves," NUREG/CR-5141 RVDATE August 1988 R2
	(6) Title/Number/Revision <u>"ASCO Engineering</u> RIMS B25 870612 003 Report No. 177" DATE Dec. 11, 1979
	NOTE: Throughout this binder references are made to the above qualification reports which may be identified as (1), (2), or (3), etc., as shown, in these references.
	OTHER (ANALYSIS, VENDOR DATA, ETC.)
	RIMS_Number
	<pre>(7) Category and Operating Times for Unit 2 Components Required for Unit 1 Operation (WBNOSG4-040 R8) B26 900626 224</pre>
	(8) Status and Duty Cycles of IE Solenoid Valves Located in Potentially Harsh Environmenta (UENOSCA 045 D1)
	Harsh Environments (WBNOSG4-045 R1) B45 860902 219

PAGE B-2 R2

WBEP-0122Q

BINDER T	ITLE ASCO	SOLENOID	COMPUTED	EEM	_ DATE	R <u>9/18/8</u> 6	<u>1</u> R <u>4</u> <u>AFM</u> <u>(</u> 3/13/89	
-VALVES-M	ODEL NP832	1 SERIES	CHECKED	FWV -	DATE	<u>9/18/8</u> 6		
A. <u>DOCU</u>	MENTATION	·						
OTHE	R (ANALYSI	S, VENDOR I	DATA, ETC.)	(Contin	ued)			
						<u>RIMS Nu</u>	umber	
		alve Voltag S-TI11-0004				B26 9002	202 407	
(10)	Electrical	ss of Coola Equipment (WBNNAL3-0	in the EGT			B45 8808	326 235	
(11)	WBNP Envir	onmental Da	ata Drawing	47E235-	78 R3			
		•						
							•	
	. *							
Note	equipmen Informat: above, n This list essentia	s listed ab t qualifica ion Managem eed not be ting includ l to qualif ed a comple	tion. The ent System repeated in es only the ication and	revision (RIMS) n other s ose docum l accordi	1 level numbers section nents w ngly s	s and Re , as lis s of the hich are hould no	cords & ted binder.	
****** <u>*******************************</u>	· · · · · · · · · · · · · · · · · · ·			-3 R2			<u> </u>	

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	TITLE ASCO SOLENOID COMPUTED EEM DATE 9/29/86 AFM C 3/13/897
ALVES	-MODEL NP8321 SERIES CHECKED KW/FWV DATE 9/29/86 JDH 3/13/89
в. <u>сс</u>	NCLUSION OF REVIEW (Check only one block)
_	X Equipment Qualified
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation
-	Equipment Not Qualified Based on Test Failures
OF	PEN ITEMS AND QUALIFICATION DEFICIENCIES 1) Deleted by Revision 2
2)	Valve 2-FSV-65-4 not installed. Nameplate data not available
	for 2-FSV-65-9.
3)	Deleted by Revision 2.
_	
<u>4)</u>	Location specific radiation calculations must be reanalyzed for
_	all valves.
<u>5)</u>	Deleted by Revision 2.
	·
<u>6)</u>	Deleted by Revision 2.
<u></u>	
<u>7)</u>	Deleted by Revision 2.
	•
CO	MMENTS/RECOMMENDATIONS
co	MMENTS/RECOMMENDATIONS
CO	MMENTS/RECOMMENDATIONS

PAGE B-4 R2

BINDER NO. WBNEQ-SOL-007 PLANT WBN UNIT(S) 1 SHEET 3 OF 28 R R R
BINDER TITLE ASCO SOLENOID VALVES COMPUTED
MODEL NP8321 SERIES CHECKED UN DATE 7/28/6
C. <u>QUALIFICATION CRITERIA</u>
Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):
X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)
Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of lE Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)
JUSTIFICATION/COMMENTS
INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET
IEEE 323-1974 IEEE Standard for Qualifying Class IE Equipment for
Nuclear Power Generating Stations.
IEEE 382-1972 IEEE Trial-Use Guide for Type Test of Class 1 Electric
Valve Operators for Nuclear Power Generating Stations.
IEEE 382 (Draft 3, Rev 1, June 1977) Draft American National
Standard for the Qualification of Safety-Related Valve Actuators.
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PAGE B-5

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EOP161.51

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	BINDER TITLE ASCO SOLENOID VALVES COMPUTED	Þ
	<ul> <li>D. <u>QUALIFICATION METHODOLOGY</u> (Check only one block)</li> <li> Test of Identical Item Under Identical Conditions or Under Sim Conditions with Supporting Analysis</li> <li> X Test of Similar Items with Supporting Analysis</li> <li> Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions</li> <li> Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis</li> </ul>	nilar
	JUSTIFICATION/COMMENTS <u>See "Similarity Table," page 6.</u>	
	PAGE <u>B-6</u> 19537 (0E-3-86) E0P161.51	

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BIND	ER TI	TLE ASCO SOLENOID VALVES	COMPUTED_	EEM DATE	7/31/86 CAH 7/20/90
MOD	<u>el np</u>	8321 SERIES	CHECKED	FWV DATE	7/31/86 (19M 8/7/90
E.	<u>EQUI</u>	PMENT DESCRIPTION			
	iden	the equipment iden tical to the plan No/NA)? <u>No</u>	tified in the o t equipment whi	qualification r ich requires qua	eport alification
2		•	<u>Plant Device</u>	Qualification Document	Referenc
	(1)	Equipment Type	<u>Solenoid Vlv</u>	Solenoid Vlv	
	(2)	Manufacturer [.]	ASCO	ASCO	
	(3)	Model Number(s)	NP8321A2E	NP8321A5E	Ref (1) Section 2 Table 1
				NP832070E (coil only)	Ref (2) App. I
	(4)	Serial Number(s)	See TAB F	<u>Test Valve 8</u>	Ref (2) Section 3 Table 3.2
				(coil only) Test Valves 15 and 16	Ref (2) App. I Sec. 2
	(5)	Identify Componer Unique checksheet attached:	nt <u>None</u>		
	JUST	IFICATION/COMMENTS	<u>.</u>		
	NEMA	"Similarity Table, 4 enclosure was s 6 enclosure. The 4.	pecified. The	valve furnishe	d hy ASCO has
			PAGE B-7	K2	

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## WENEQ-SOL-007

ASCO SOLENOID VALVES

HBN

### MODEL NP8316 SERIES

#### SIMILARITY TABLE

Specification	ASCO Test Valve Model No. NF8321A5E	TVA Valve Model No. NP8321A2E
Description	Three way direct acting solenoid	Same .
	valve with packless const	
	Pilot Vlv Controlling	
Application	Oil Free Instr Air	Same
Form of Flow	Normally Closed	8ame
Pipe Size	1/4"	3/8"
Orifice Size	9/32" Pressure 11/32" Exhaust	9/32" Pressure 11/32" Exhaust
Body Material	Brass	Brass
Coil Class	R	H
Sealș & Disc Material	Ethylene Propylene	Ethylene Propylene
Disc Holder Material	Stainless Steel	Stainless Steel
Core Tube Material	300 Series Stainless Steel	300 Series Stainless Steel
Core Material	400 Series Stainless Steel	400 Series Steinless Steel
Coil Enclosure	NEMA 4,7,9	NEMA 6
Maximum Operating Pressure		
Differential	150 psi	150 pai
Nominal Voltage	125V DC	125V DC
Power Rating	17.4 Watts	17.4 Watta
Conduit Connection	3/4" NPT	3/4" NPT
Applicable Form Number	V5971	V5971 R1
Ferminal Connection	Pigtails (Splice)	Pigtaile (Splice)
mbient Temperature	32 - 180 °F	120 F - as specified
faximum Fluid Temperature	180°F based on 140°F Ambient	Sane
afe Working Pressure	200 peig	Sant
	Notes: From Test Report	Notes: From Contract 827551
	AQS-21678 TR/Bev A (TAB D-1)	(TAB E-1), Form V5971 R1
	Form V5971 (TAB D-1) & A800	(TAB H) & ASCO Cat. NP-1
	Cat. NP-1 (TAB E-3)	(TAB B-3)

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R <u>R</u> Preparer/Date 6. E. Mc Res 7/24/86 Checked/Date FUL 10 May 1/28/64

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BINDER NO. WBNEQ-SOI	-007PLANTWBN	UNIT(S)	<u>1 SHEET 7 OF 28</u> R 1 R
BINDER TITLE ASCO S	OLENOID COMPUTED E	M DATE	7/24/86 4074
	SERIES CHECKED FV		3/13/89
VALVES-MODEL NP8321	SERIES CHECKED FY	V DATE	<u>7/28/86_JDH</u> 3/13/89
F. INSTALLATION IN	TERFACES		
	aces pertinent to EQ ide		
	nd/or evaluation and ref uirement for our applica		
	equirement in QMDS, if r		
		-	-
	Re	Plant quirement?	Reference
<u>Interface</u>	Identify Interface	(Yes/No)	Test Report
	None specified; See		1
Mounting Bolts	TAB C-3, "Interfaces"	No	
External			See Below and Ref. (2)
Process	See TAB C-3	Yes	<u>App. A. p A2</u>
Connections			F
	None specified; See		
Electrical	TAB C-3, "Interfaces"	Yes	
Connections			
	See TAB C-3		Ref (2)
Conduit Seals	"Conduit Seals"	<u>No</u>	Section 5.3
Connector			
Seals	<u>N/A</u>	N/A	
Orientation	Any Orientation	Yes	See Note Below
	Conduit/Junction box		
	must be oriented		
Physical	such that moisture does not drain into		Ref (2) Section 5.3
Configuration	coil housing	<u>N/A</u>	and TAB C-3
Other	None		· ·

## JUSTIFICATION/COMMENTS

ASCO does not identify specific interfacing requirements except as follows: (1) ASCO requires a 90° street elbow facing downward connected to exhaust port or similar configuration to prevent moisture intrusion from liquid spray. This is required only on valves located inside containment and subject to containment spray. (2) Flowing medium must be oil-free instrument air and a strainer or filter must be installed on the inlet as close to the valve as possible. See TAB C for a description of the TVA interfaces and TAB J-2 for discussion of TVA instrument air system.

NOTE: See ASCO letter in TAB E-5.

	TLE ASCO			R_1_R ATE 7/24/86_ <i>A7m</i> <i>3/13/89</i>
VALVES-M	DEL NP832	<u>L SERIES</u> CHEC	KED <u>FWV</u> D	ATE <u>7/28/86 <i>TD#</i></u> 3/13/89
G. <u>TES</u>	SEQUENCE			<u></u>
(1)	the accid		n accordance wi	ablished to simulate th IEEE-323 (74), .)
			Yes/No/NA	Reference
	· .	•	ومعتهي ا	Ref (2), p 8 &
	(a) Equi	pment inspected		Ref (1) App. A
		damage	Yes	Sec. 9.4.2.1
			<u>A_V.M</u>	Ref (2), p 8 &
	(b) Base	line performance		Ref (1) App. A
		urements taken	Yes	Sec. 9.4.2.2
	(c) Equi	pment aged:		Ref (1) App. A,
	-		·	Sec. 9.4.2.3.1 &
	The	rmal	Yes	<u>Ref (2), p 8</u>
				Ref (1) App. A
				Sec. 9.4.2.3.2 &
	Rad	iation	<u>    Yes</u>	<u>Ref (2), App. D</u>
			•	Ref (1) App. A,
				Sec. 9.4.2.3.3 &
	Wea	r	Yes	Ref (2), p 12
	(4) 1745-			Ref (1) App. A,
		ation/seismic tes ucted	•	Sec. 9.4.2.3.4 &
	COLLE	ucied	<u>    Yes    </u>	<u>Ref (2), p 15</u>
	(e) Desi	<b>gn basis</b> event (D)	RF)	Ref (1) App. A Sec. 9.4.2.4 &
	expo		Yes	Ref (2), p 19
			<u>+_</u>	Ref (1) App. A
				Sec. 9.4.2.4 &
	(f) Post-	-DBE exposure	Yes	Ref (2), p 23
				Ref (1) App. A
		l inspection and		Sec. 9.4.3 &
	disa	ssembly .	<u>    Yes</u>	<u>Ref (2), p 24</u>
(2)	Was the sa sequence of	ame piece of equip described in item	pment used throu (1) above (Yes/	ghout the test No/NA)? <u>Yes</u>
(3)	calibratio	test equipment, te on data been appro e: <u>Ref (1), App.</u>	opriately docume	nted (Yes/No/NA)? Yes
JUS	TIFICATION,	COMMENTS		
Ref	erence (2) e to this r	was utilized to c	qualify the Clas	s H coils. Refer-

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DINDER 1	ITLE ASCO SOLENOID COMPUTED EEM	7/20/90
VALVES-M	ODEL NP8321 SERIES CHECKED FWV	DATE <u>7/28/86_ AFM</u> <i>8/7/50</i>
H. AGI	NG	
(1)	Was aging considered in the qualific (Yes/No/NA)? <u>Yes</u> (Reference:	
	Sec. 9.4.2.3 and Ref (2), App. A, S	<u>ec. 9.4</u> ).
,	JUSTIFICATION/COMMENTS <u>See TAB C-3</u>	•
(2)	Were the following effects considere	d in the aging program:
	Aging Effect	<u>Yes/No/NA</u> <u>Reference</u> Ref (1), A
	Thermal aging	Section <u>Yes</u> <u>9.4.2.3.1</u> Section
	Radiation exposure	Yes 9.4.2.3.2 Section
	Vibration (non-seismic) aging	Yes 9.4.2.3.4
	Operational (electrical/mechanical/ process) stress aging	Section Yes 9.4.2.3.3
	JUSTIFICATION/COMMENTS See Reference	(2), App. A,
	Section 9.4. Also, thermal aging w	as done using nitrogen
	as the process fluid in lieu of inst	rument air (See TAB C-5
(3)	Were all known synergistic effects w significant effect on equipment perf aging program (Yes/No/NA)? <u>Yes</u>	ormance considered in t
	JUSTIFICATION/COMMENTS <u>See discus</u>	sion, Section P-1.
(4)	Thermal Aging:	
	(a) Was thermal aging considered in (Yes/No/NA)? <u>Yes</u> (Reference	
	<u>Sec. 9.4.2,3,1; Ref (2), App. A</u>	, Sec. 9.4.1
	JUSTIFICATION/COMMENTS See TA	<u>B C-3 "Thermal Aging"</u>

BINDER NO. WBN	EQ-SOL-007 PLANT WBN UNIT(S) 1 SHEET 10 OF 28
BINDER TITLE	ASCO SOLENOID COMPUTED EEM DATE 7/24/86
VALVES-MODEL	7/20/90 NP8321 SERIES CHECKED FWV DATE 7/28/86 /1714 9/7/90
H. <u>AGING</u> (Co	ntinued)
(b)	Were the materials susceptible to thermal degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (2), Appendix B &amp; Ref (3), Section 4)</u> .
	JUSTIFICATION/COMMENTS
(c)	Was the basis for thermal aging identified in the quali-
	fication program (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (3)</u> , <u>Sections 5 &amp; 6)</u> .
-	JUSTIFICATION/COMMENTS
(d) CA 1/20/40	Was the aging acceleration rate justified and the parameter of time and temperature identified in the qualification program (yes/no/NA)? <u>yes</u> (Reference: <u>Ref (1), App A,</u> <u>Section 9.4.2.3.1 &amp; Ref (2), App. A, Section 9.4.1).</u>
	<u>Parameter Plant Maximum Normal Test Equivalent</u>
	Temperature         *         *         *           Time
	JUSTIFICATION/COMMENTS <u>*See TABs C-1 &amp; C-3</u> "Thermal
	Aging,"
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (3), Sections 5 &amp; 6)</u> .
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (2), Appendix B &amp; Ref (3), Section 4</u> ).
	JUSTIFICATION/COMMENTS

	ILE <u>A</u>	SCO SOLENOID COMPUTED EEM DATE 8/7/86
VALVES-MOD	DEL N	IP8321 SERIES CHECKED FWV DATE 8/7/86 AFM -
H. AGING	<u>G</u> (Cor	tinued)
,	(g)	If a regression line was used for determining accelerate
		aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>NA</u> (Reference
4.		
		JUSTIFICATION/COMMENTS
	(h)	Was the equipment operated during the thermal aging
	()	(yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (1), Section 4.2;</u> <u>Ref (2), Section 4.1).</u>
		JUSTIFICATION/COMMENTS
. (5)		Ation Aging Exposure: Was radiation aging exposure considered in the qualifi-
. (5)		
. (5)		Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference <u>Ref (1).</u> Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4
. (5)		Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4 and 9.5.2).
. (5)	(a)	Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4 and 9.5.2).
(5)	(a)	Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference <u>Ref (1).</u> <u>Section 4.3 and 4.6; Ref (2). App. A. Sections 9.4.4</u> and 9.5.2). JUSTIFICATION/COMMENTS 
(5)	(a)	<pre>Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS</pre>
. (5)	(a)	Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A. Sections 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? No (Reference). JUSTIFICATION/COMMENTS Effect on individual materials
. (5)	(a) (b)	<pre>Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS</pre>
(5)	(a) (b)	Was radiation aging exposure considered in the qualifi- cation program (yes/no/NA)? Yes (Reference Ref (1), Section 4.3 and 4.6; Ref (2), App. A, Sections 9.4.4 and 9.5.2). JUSTIFICATION/COMMENTS

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BINDER NO. WBN	EQ-SOL-007 PLANT WBN UNIT	C(S) <u>1</u> SHEET <u>12</u> OF <u>2</u> R 1 R 2
BINDER TITLE	ASCO SOLENOID COMPUTED EEM	DATE 7/24/86 AFM 3/13/89 7/24/
VALVES-MODEL	NP8321 SERIES CHECKED FWV	DATE 7/28/86_JDH 3/13/89 8/7/
H. <u>AGING</u> (Co	ntinued)	
(d)	Is the radiation test exposure do acceptable (Yes/No/NA)? <u>Yes</u> ( <u>Section 4.3, App. D; Ref (2), App</u>	Reference: <u>Ref (1),</u>
а. . 1	Plant normal ambient radiation dose (rd)	$\frac{1.8 \times 10^3}{1.8 \times 10^3}$
	Test exposure dose (rd)	2.01 x 10
	Test exposure does rate (rd/hr)	5.1 x $10^5$ for 99 hour 8.0 x $10^5$ for 188.5 hours
	Test exposure source type (e.g., Co-60 gamma)	<u>Co-60 gamma</u>
	JUSTIFICATION/COMMENTS	
(6) Vibr	ation (non-seismic) Aging:	
(a)	Were the effects of non-seismic v normal and abnormal operation add qualification program ¹ Yes Section 4.5; Ref (2), Section 4.1	ressed in the (Reference: <u>Ref (1),</u>
• .	JUSTIFICATION/COMMENTS	·
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>Ref (1), App. A, Sec</u> <u>App. A, Section 9.4.5</u>	s/No/NA)? Yes
. •	JUSTIFICATION/COMMENTS	
l Qualifica mental do	tion program refers to the test re cumentation including TVA analyses	port and any supple- in TAB C of the Binder.

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<ul> <li>3/13/89 ⁴</li> <li>H. AGING (Continued)</li> <li>(7) Operational Stress Aging: <ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and ahnormal operation addressed in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), Section 3.2.4; Ref (2), Section 4.1.2 &amp; 4.1.3</li> <li>JUSTIFICATION/COMMENTS</li> <li>(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), App. A, Section 7.1: Ref (2), App. A, Sections 9.4.2 &amp; 9.4.3)</li> <li>JUSTIFICATION/COMMENTS</li> </ul> </li> <li>(8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), Section 3.2.2: Ref (2), Appendix C, p.G-8, 4.1.1</li> <li>Qualified life (Document in QMDS) See TABS C and G</li> <li>JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale.</li> <li>(9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (3), Section 8; ref (2), App. C</li> </ul>		IITLE ASCO SOLENOID COMPUTED EEM DATE 7/24/86 AFM 3/13/89 7/2
<ul> <li>(7) Operational Stress Aging:</li> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), Section 3.2.4; Ref (2), Section 4.1.2 &amp; 4.1.3</li> <li>JUSTIFICATION/COMMENTS</li> <li>(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), App. A, Section 7.1; Ref (2), App. A, Sections 9.4.2 &amp; 9.4.3)</li> <li>JUSTIFICATION/COMMENTS</li> <li>(8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), Section 3.2.2; Ref (2), Appendix C, p. C-8, 4.1.1</li> <li>Qualified life (Document in QMDS) See TABS C and G</li> <li>JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale.</li> <li>(9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (3), Section 3; ref (2), App. C</li> <li>JUSTIFICATION/COMMENTS Replacement interval depends upon</li> </ul>	VALVES-1	
<ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), Section 3.2.4; Ref (2), Section 4.1.2 &amp; 4.1.3</li> <li>JUSTIFICATION/COMMENTS</li> <li>(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), App. A, Section 7.1; Ref (2), App. A, Sections 9.4.2 &amp; 9.4.3)</li> <li>JUSTIFICATION/COMMENTS</li> <li>(8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), Section 3.2.2; Ref (2), Appendix C, p C-8, 4.1.1</li> <li>Qualified life (Document in QMDS) See TABS C and G</li> <li>JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale.</li> <li>(9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (3), Section 8; ref (2), App. C</li> <li>JUSTIFICATION/COMMENTS Replacement interval depends upon</li> </ul>	H. AGII	<u>¶G</u> (Continued)
<pre>operational stresses induced during normal and abnormal operation addressed in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), Section 3.2.4; Ref (2), Section 4.1.2 &amp; 4.1.3 ) JUSTIFICATION/COMMENTS (b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), App. A. Section 7.1; Ref (2), App. A. Sections 9.4.2 &amp; 9.4.3) JUSTIFICATION/COMMENTS (8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), Section 3.2.2; Ref (2), Appendix C, p C-3, 4.1.1 Qualified life (Document in QMDS) See TABS C and G JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (3), Section 8; ref (2), App. C JUSTIFICATION/COMMENTS Replacement interval depends upon</pre>	(7)	Operational Stress Aging:
JUSTIFICATION/COMMENTS (b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), App. A, Section 7.1; Ref (2), App. A, Sections 9.4.2 & 9.4.3) JUSTIFICATION/COMMENTS (8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), Section 3.2.2; Ref (2), Appendix C, p C-8, 4.1.1) Qualified life (Document in QMDS) See TABS C and G JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (3), Section 8; ref (2), App. C) JUSTIFICATION/COMMENTS Replacement interval depends upon]		operational stresses induced during normal and abnormal operation addressed in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (1), Section 3.2.4;</u>
<pre>aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: Ref (1), App. A, Section 7.1; Ref (2), App. A, Sections 9.4.2 &amp; 9.4.3) JUSTIFICATION/COMMENTS</pre>		· · · · · · · · · · · · · · · · · · ·
<ul> <li>(8) Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (1), Section 3.2.2; Ref (2), Appendix C,</u> <u>p C-8, 4.1.1</u>)</li> <li>Qualified life (Document in QMDS) <u>See TABS C and G</u> JUSTIFICATION/COMMENTS <u>The qualified life is different from</u> the value given in the test report. TAB C-1 provides rationale.</li> <li>(9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (3), Section 8; ref (2), App. C</u>)</li> <li>JUSTIFICATION/COMMENTS <u>Replacement interval depends upon</u></li> </ul>	•	aging identified and justified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (1), App.</u>
<pre>in the qualification program (Yes/No/NA)? Yes_ (Reference: Ref (1), Section 3.2.2; Ref (2), Appendix C, p C-8, 4.1.1 ) Qualified life (Document in QMDS) See TABS C and G JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (3), Section 8; ref (2), App. C JUSTIFICATION/COMMENTS Replacement interval depends upon</pre>		JUSTIFICATION/COMMENTS
JUSTIFICATION/COMMENTS The qualified life is different from the value given in the test report. TAB C-1 provides rationale. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes (Reference: Ref (3), Section 8; ref (2), App. C JUSTIFICATION/COMMENTS Replacement interval depends upon	(8)	in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (1), Section 3.2.2; Ref (2), Appendix C,</u> <u>p C-8, 4.1.1</u> ).
<pre>the value given in the test report. TAB C-1 provides rationale. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes     (Reference: Ref (3), Section 8; ref (2), App. C</pre>		Qualified life (Document in QMDS) See TABS C and G
defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>Ref (3), Section 8; ref (2), App. C</u> ) JUSTIFICATION/COMMENTS <u>Replacement interval depends upon</u> )		the value given in the test report. TAB C-1 provides
· ·	(9)	defined in the qualification program (Yes/No/NA)? <u>Yes</u>
		JUSTIFICATION/COMMENTS <u>Replacement interval depends upon</u>
maximum normal ambient temperature and percentage time		maximum normal ambient temperature and percentage time
solenoid valve is energized.		solenoid valve is energized.
·		•

BINI	DER TITLE_	ASCO SOLENOID	COMPUT	EDEEM	DATE <u>7/24</u>	1/86 CA4
VALV	TES-MODEL	NP8321 SERIES	CHECKE	D <u>FWV</u>	DATE <u>7/28</u>	
I.	and/or Ra	<u>ANALYSIS</u> ation of Mater diation Degrad led Materials	lation and A			
Ma	aterial/Pr	operty/Functio	Radiation n <u>Threshold</u>		ctivation Energy	<u>Reference</u>
(a)	EPDM		<u>NA</u>	NA	0.94	
(Ъ)	VITON	·····	<u>NA</u>	<u>NA</u>	1.04	
(c)	NOMEX		NA	<u>NA</u>	0.96	
(đ)	MAGNET-W	IRE ENAMEL	NA	NA	1.16	
(e)	ISO-MICA	W/EPOXY RUBBER LEAD	NA	NA	1.00	
(f)	WIRE INS		NA	NA		Ref(3)&(2)App.1 <u>Sec. 4.2.5</u>
<b>₩(</b> g)	DC 550 L	UBURCANT	NA	NA	<u>NA</u>	NA
		TION/COMMENTS on energies li				with lowest
						analysis was
		d. The device				
*	Although	not stated in	references	(1) or (2),	DC 550 1	ubricant was
	used on	tested valves	as verified	by ASCO let	ter dated	R2
	January	5, 1988 (See T	<u>AB E-9).</u>			· · · · · · · · · · · · · · · · · · ·
				······································		

BINDER TI	$\begin{array}{c} R \\ 2 \\ R \\ 1 \\ 2 \\ 1 \\ 1 \\ 2 \\ 1 \\ 2 \\ 2 \\ 2 \\ 2$
VALVES-MO	DDEL NP8321 SERIES CHECKED RWV DATE 7/28/86 47M 8/7/50
	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE FORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITION
(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not yet (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (1) &amp; (2), App. A, Sections 6.1 &amp; 6.2).</u>
	Identify Acceptance Criteria: <u>Valves must operate from</u> <u>90-140VDC at minimum and maximum operating pressure</u> <u>differential. Coil insulation resistance must a minimum of</u> <u>1.0 megohm at 500VDC. During Hypot test, current leakage</u> <u>must be less than 0.5 milliamp at twice the rated voltage</u> <u>plus 1000 VAC applied for a long period of one minute.</u>
	Valves must operate at test or low voltage condition (90VDC) at maximum pressure differential under all conditions. Valves are not to have a pressure build-up at a vented cylinder port or a pressure decrease at a cylinder port which is required to be pressurized in excess of 10% the nominal inlet supply pressure under all postulated environmental conditions.
(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Ref (1), Section 4.1); (2) TABLE 4.10). All
•	Identify baseline and functional testing: <u>Recording coil</u> <u>excitation, seat leakage, noise test, operational test,</u> <u>external leakage in energized and de-energized state before</u> <u>and after thermal, radiation, wear and vibration aging, and</u> <u>accident radiation and LOCA simulation. Measurement of</u> <u>insulation resistance and coil dielectric tests before thermal</u> <u>aging and after completion of accident radiation and LOCA</u> <u>simulation.</u>
(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (1), App. A, Section 7.0, Ref (2), Table 4.10,</u> Fig. 9.2).
(4)	Do the applied loads during baseline testing reflect normal operating conditions (yes/no/NA)? Yes (Reference <u>Ref (1),</u> <u>Section 4.8 &amp; Ref (2), Table 4.10).</u>
	JUSTIFICATION/COMMENTS

DINDI	ER NO	WBN	<u>EQ-SOL-007</u>	PLANT <u>WBN</u> UNIT(S) <u>1</u>		28
BIND	ER TI	TLE	ASCO SOLENOI	D COMPUTEDR1_AFM_DATE	R_2_R 3/13/89 CAH	
VALVI	S-MO	DET.	NP8321 SERIE		7/20/90	
<u>VAUV1</u>	10-110		MIOJZI JERIE	<u> CHECKEDRI JUH</u> DAIE	<u>3713789 4////</u> <u>8/7/90</u>	
J.	PERF	<u>ORMAN</u> tinue	<u>CE SPECIFICA</u> d)	CHARACTERISTICS NECESSARY TO TIONS CAN BE SATISFIED UNDER	ACCIDENT CONDITIO	<u>NS</u>
		equi	pment perfor	cal characteristics necessar mance specifications can be	y to ensure the satisfied.	
3		(a)	Parameter	Plant Normal Conditions	Reference	
		·	Voltage	90-140 VDC	Section J(5)(b) of this TAB	
			Load	20 Watts	NP-1 Catalog	H
			Frequency	<u>NA</u>		
			Accuracy	NA		
			Other(s)			
		•				
			THETELCATT	ON/COMMENTS		
			JUJIII IGAII		······································	
		•				
			·			
				······		
				·		
				· · · ·		
				· ·		

WBEP - 0330Q

			PLANT UNIT(S)1		
BIND	ER TI	TLE ASCO SOLENO	DID COMPUTEDEEM DATE 7	$\frac{R_{1}}{1/24/86} \xrightarrow{R_{2}}{\text{AFM}} CAF$	
• · • • •				3/13/897/20/90	
ALV.	<u>es-mo</u>	DEL NP8321 SERI	IES CHECKEDFWV DATE 7	7/24/86 JDH 07M 3/13/89 8/7/90	
				57 157 65	
J.			L CHARACTERISTICS NECESSARY TO E		
		ORMANCE SPECIFIC tinued)	CATIONS CAN BE SATISFIED UNDER A	ACCIDENT CONDITIONS	
	(001				
	(b)	Parameter	Specific Accident Conditions	<u>Reference</u>	
		Voltage	90 VDC Min. (See comment below)	R2	
		TOTEREE		KZ	
		Load	Not Specified		
		Frequency	NA	RT A	
		rrequency		<u>NA</u>	
		Accuracy	<u>NA</u>	<u>NA</u>	
		Other(s)	· ·		
		000000	· · · ·	· · · ·	
		JUSTIFICATION/(			
		JUSTIFICATION	COMMENTS <u>TVA Calculation WBN E</u>	<u>LB-MS-1111-0004</u>	
		<u>determines vol</u>	ltage available during accident	conditions R2	
		(see commont			
				1 1	
			after J.(5)(c)).		
	(c)	Parameter		Reference	·
	(c)		· · ·		
	(c)	Parameter	Demonstrated Conditions	<u>Reference</u> Ref (2) <i>Flor.9.2</i> Table 4.10	C
	(c)		· · ·	Ref (2) F16.9.2 Table 4.10 p-34 A26, App. A	C/ 81
	(c)	Parameter	Demonstrated Conditions	Ref (2) <i>Fig.9.2</i> Table 4.10 <u>p-34 A26, App. A</u> p-44 R2	21
	(c)	Parameter	Demonstrated Conditions	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	28
	(c)	<u>Parameter</u> Voltage Load	<u>Demonstrated Conditions</u> 90 05 VDC .080 amps	Ref (2) <i>Fig.9.2</i> Table 4.10 <u>p-34 A26, App. A</u> p-44 R2	281
	(c)	<u>Parameter</u> Voltage	Demonstrated Conditions 90 65 VDC	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	2
	(c)	<u>Parameter</u> Voltage Load	<u>Demonstrated Conditions</u> 90 05 VDC .080 amps	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	21
	(c)	Parameter Voltage Load Frequency Accuracy	<u>Demonstrated Conditions</u> <u>90</u> <u>95</u> VDC <u>.080 amps</u> <u>NA</u>	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	<i>C</i> / 9]/
	(c)	Parameter Voltage Load Frequency	<u>Demonstrated Conditions</u> <u>90</u> <u>95</u> VDC <u>.080 amps</u> <u>NA</u>	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	24
	(c)	Parameter Voltage Load Frequency Accuracy	<u>Demonstrated Conditions</u> <u>90</u> <u>95</u> VDC <u>.080 amps</u> <u>NA</u>	Ref (2) $F_{10}$ .9.2 Table 4.10 p=34 AZ6, App. A p=44 Ref (2)	2
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/O	Demonstrated Conditions 90 05 .080 amps NA NA NA COMMENTS: Reference (3), Append	Ref (2) $F_{10}$ .9.2 Table 4.10 p-34A26, App.A p-44 Ref (2) Table 4.10	22 9]1
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C 6.1.1, requires	<u>Demonstrated Conditions</u> <u>90</u> <u>05</u> VDC <u>.080 amps</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>COMMENTS: Reference (3), Append</u> s 125 VDC valves to operate on d	Ref (2) <i>Flor.9.2</i> Table 4.10, <u>p-34 AZ6, App. A</u> p-44 Ref (2) Table 4.10 Lix A, Section Lemand at any	2) 8)4 C
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C 6.1.1, requires voltage between	<u>Demonstrated Conditions</u> <u>90</u> <u>05</u> VDC <u>.080 amps</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>COMMENTS: Reference (3), Append</u> s 125 VDC valves to operate on d a 90-140 VDC. Per <u>Table 9.10</u> of	Ref (2) $F_{16}$ .9.2 Table 4.10, $p=34AZ_6, App.A$ p=44 Ref (2) Table 4.10 Lix A, Section lemand at any reference (2).	27 81 81
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C 6.1.1, requires voltage between the test valve concern with so	<u>Demonstrated Conditions</u> <u>90</u> <u>05 VDC</u> <u>.080 amps</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>COMMENTS: Reference (3), Append</u> a 125 VDC valves to operate on d a 90-140 VDC. Per Table 4.10 of was successfully tested at 05 V plenoid valves is that of voltag	Ref (2) $F_{16}.9.2$ Table 4.10, p=34A26, App.A p=44 Ref (2) Table 4.10 Lix A, Section lemand at any reference (2), DC. A primary e available at	C/ 8/4 2/ 8/4
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C 6.1.1, requires voltage between the test valve concern with so the coil termin	Demonstrated Conditions          90         05       VDC         .080 amps         NA         NA         NA         NA         Source         OMMENTS:         Reference (3), Append         s 125 VDC valves to operate on d         90-140 VDC.         Per Table 4.10 of         was successfully tested at 05 V         olenoid valves is that of voltag         slas.         TVA calculation WBN EEB-M	Ref (2) $F/G.9.2$ Table 4.10 p=34A26, App.A p=44 Ref (2) Table 4.10 Lix A, Section lemand at any reference (2), DC. A primary e available at S-TI11-0004 shows	
	(c)	Parameter Voltage Load Frequency Accuracy Other(s) JUSTIFICATION/C 6.1.1, requires voltage between the test valve concern with so the coil termin that the valves	<u>Demonstrated Conditions</u> <u>90</u> <u>05 VDC</u> <u>.080 amps</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>NA</u> <u>COMMENTS: Reference (3), Append</u> a 125 VDC valves to operate on d a 90-140 VDC. Per Table 4.10 of was successfully tested at 05 V plenoid valves is that of voltag	Ref (2) $F_{16}$ .9.2 Table 4.10, $p=34AZ_6, App.A$ p=44 Ref (2) Table 4.10	C/ 8/4 8/4 8/

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	ES-MO	DEL	NP8321 SERIES	CHECKED FWV	DATE <u>9/18/86_JDH</u> 3/13/	
K.	<u>REQU</u>	IRED_	OPERATING ENVIRON	MENT		
	Refe	rence	Environmental Dr	awing No. <u>47E23</u>	15-78	
	(1)	Norm	al Max	(2) Abr	ormal Max	
*		(a)	Temperature (°F)	<u>104</u> (a)	Temperature (°F) <u>11</u>	L0
		(b)	Pressure (psig)	<u>ATM</u> (b)	Pressure (psig) <u>Al</u>	IM
		(c)	Humidity (%)	<u>80</u> (c)	Humidity (%) <u>90</u>	)
		(d)	Radiation (rd)	$\frac{3}{1.8 \times 10}$ (d)	Radiation (rd) <u>NA</u>	1
	(3)	Proc	ess Interfaces:	The process flu	<u>id for valves is oil-</u>	-free
		<u>inst</u>	rument air with a	maximum design	temperature of 100°F	·
		<u>Ther</u>	efore, the boundi	ng temperature	for these valves is t	he
		<u>ambi</u>	ent.		<u> </u>	
	(4)		e anticipated occ	urrence frequen	lcy and duration of al	norm
					percent of plant life	e and
		<u>coul</u>	d exist for up to	<u>8 hours per ex</u>	cursion.	
	•					
	(5)	Acci para	dent (worst case meter including p	for any combina eak, duration,	tion of specified acc and profile):	iden
		(a)	Temperature (°F)	(1)	Accident type LOCA	
		(b)	Pressure (psig)	<u>NA</u>	Accident type <u>LOCA</u>	
		(c)	Humidity (%)	<u>NA</u>	Accident type LOCA	-
		(d)	Radiation (rd)	6 (2) <u>3.3x10 rads</u>	Accident type LOCA	
			Spray Type	NA	Accident type <u>LOCA</u>	<u> </u>
		(e)				
	(1)	Return	ns to maximum normalculation WBNNAL.	mal after 30 da	ys.	-

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K. <u>REQU</u>	IRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH,
	margin, etc.):
(6)	Is the equipment subject to moisture or liquid intrusion whi
	can affect the performance of the equipment under design bas accident conditions (Yes/No/NA)? No (Reference:
	Drawing 47E235-78
(7)	Subject to submergence (Yes/No/NA)? <u>No</u> (Reference: Drawing 47E235-78
	Identify initiation time and duration of submergence:
	Is the equipment subject to a beta radiation contribution to the total accident dose (Yes/No/NA)? <u>No</u>
	(Reference: <u>See note below</u>
	If yes, identify the fraction of the unattenuated free field beta dose to be added to the total dose and justify:
	Note: Beta dose is not applicable to the subject devices as
	they are located outside of containment.
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See TAB B. Section A for a listing of all calculations used
	in this binder.

WENEQ-SOL-007

Sheet <u>19</u> of <u>28</u>

The information on this page was deleted per Revision 1.

PAGE<u>B-ZIR</u>

BINDER NO. WBNEQ-SOL-007 PLANT WBN UNIT(S) 1 SHEET 20 OF 28
BINDER TITLE ASCO SOLENOID COMPUTED EEM DATE 7/24/86
VALVES-MODEL NP8321 SERIES CHECKED FWV DATE 7/28/86 0711

## L. SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS

(1) Comparison of worst-case maximum parameters:

Parameter	<u>Specified</u>	Demonstrated	<u>Reference</u>
Operating Time	<u>100 Days</u>	<u>30 Days</u>	Ref (1) Fig 2
Temperature (°F)	110°F	<u>346°F</u>	Ref (1) <u>Sec. 4.7</u>
Pressure (psig)	ATM	<u>110 psig</u>	Ref (1) <u>Sec. 4.7</u>
Relative Humidity	90%	100 %	Ref (1) <u>Sec. 4.7</u>
*Chemical Spray	NA	3000ppm Boron pH 9.5-10.5	Ref (1) <u>Sec. 4.7</u>
**Radiation (rd)	6 <u>3.3 x 10</u> rads gamma	$\frac{2.01 \times 10^8}{\text{rads}}$	Ref (1) <u>App D</u>  R2
Submergence	No	No	

*Includes spray concentration, flowrate, density, duration, and pH. **Enter 40-year integrated normal dose plus integrated accident dose and specify type.

CB

BINDER TITLE ASCO SOLENOID VALVES MODEL NP8321 SERIES	COMPUTED <u>66 m</u> DATE CHECKED <u>fun</u> DATE	RR 7/24/04 1/28/86
L. SUMMARY COMPARISON OF TEST CO	NDITIONS TO SPECIFIED CONDI	<u>FIONS</u> (Continued)
(2) Comparison of worst-case	profiles and margin assess	ment:
Parameter	Test Profile Envelopes Specified	، مت الد
	(Yes/No/NA)	<u>Reference</u>
Temperature	Yes	See (1) <u>above</u> See (1)
Pressure	_Yes	above
Relative Humidity	Yes	See (1) _above
Chemical Spray	NA	· ••••••••••••••••••••••••••••••••••••
Submergence	<u>NA</u>	
JUSTIFICATION/COMMENTS		

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EQP161.51

BIND	ER TII	LE	ASCO	SOLENOI	D	COME	UTED_	EEM	D	ATE	<u>7/24</u>	R /86_0	2 R			
VALV	ES-MOL	EL	NP832	1 SERÌE	S	CHEC	KED	FWV	ם	ATE	7/28	7 2/86	20 90 AM			
											<u>// dy</u>	<u>/ 0</u> 0	8/7/90			
ι.	SUMMA	<u>RY (</u> inue	<u>:OMPAR</u> :d)	ISON OF	TESI	CONE	<u>MOLTIO</u>	IS TO S	<u>SPECI</u>	FIED	CON	DITI	<u>ons</u>			
ş		addı and	essed	ins app in the taintie )	test	: prog	ram t	o assi	ure t	hat	norm	al v	ariat	ion ,		
	-									largi						
	2	ugge	sted	Margins	per	IEEE-	<u>·323_(</u>	<u>74)</u>	<u>A</u>	ppli	ed	Yes	<u>/No/N</u>	<u>A</u>		
	I	empe	ratur	e: +15	degi	ees F	•		>	<u>15 °</u>	<u>F</u>	<u> </u>	es	_		
	P	ress	ure:	+10% b	ut no	more	than	10 ps	sig				Yes			0
	R	adia	ition:	+10%	of ac	ciden	it dos	e		599		<u> </u>	es	-	R2	8/0
	T	ime:	+10 pe	% (or 1 r NUREG	hour -0588	; + op ;)	erati	ng tin	ne _	None		<u> </u>	<u>es*</u>			
	* <b>*</b> V	olta	ige:	±10% of	rate	d val	ue		-	12% 28%		<u> </u>	es	-	R2	C. 84
	F	requ	iency:	±5% o	f rat	ed va	lue			NA	<b></b>	N	<u>A</u>	-		
		trar	sient	tal Tra and th							·		· .			
		appı	ied t	Wice						Yes		<u> </u>	es	-		
									S		9.4.	2.4.	2		•	
	V (	ibra duri	tion: ng se	+10% ismic t	added estin	. to a g)	ccele	ration		ef ( <u>ec.</u>		<u>6 Y</u>	es			
	(	See	TAB C	ION/COM ) prove ent req	s tha	t the	ccide 30-d	nt deg ay tes	grada st en	tion velo	cal ps t	cula he li	tion 00-day	7		
	W. V	nicn olta	. 15 D ge	was tes etter p <del>During</del>	roof <del>all o</del>	of op <del>ther</del>	erabi <del>tests</del>	uring _A lity t <del>, cith</del>	han <del>ler t</del> i	abil incr <del>he n</del>	ease	d co: <del>al v</del> a	il <del>Sltage</del>	<u>-</u>	R2	ĊĂ
	2	DCA	HELE	or the B TESTIN URE 9.2	VG Z	rfe Vi	ALVE	UAS .	ENER	GIZ	50 /	47° 9	o voc	r •		8/6

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VALV	ES-MO	7/20/70 DEL NP8321-SERIES CHECKED FWV DATE 7/28/86 8/7/90
Μ.	OPER	ABILITY TEST RESULTS
	(1)	Identify the safety function(s) of this equipment: (Reference See TAB A and TAB C).
		JUSTIFICATION/COMMENTS _Functions are varied. All are
\$		listed in TAB A and TAB C-1.
	(2)	Did the equipment performs its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference: <u>Ref (1), Section 5)</u> .
		JUSTIFICATION/COMMENTS The test valve is assumed to be
		normally energized and required to de-energize on receipt
		of accident signal, then to remain operable for 30 days
		post-DBA. The specific DBA functions of the TVA valves
		are described in TAB C.
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference: <u>Ref (1), Section 5)</u> .
		JUSTIFICATION/COMMENTS
	. (4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (6)).</u>
		JUSTIFICATION/COMMENTS <u>See TAB C-1 for the analysis of the</u>
		test DBA versus the plant specific DBA. The test valve
		demonstrated operability in accordance with the requirements
	,	defined in M(2) above.
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>Ref (1), Table 2H; Ref (2), App. J).</u>
		JUSTIFICATION/COMMENTS <u>TVA has reviewed test anomalies and</u>

	DER NO. WBNEQ-SOL-007 PLANT WBN UNIT(S) 1 SHEET 24 R R R DER TITLE ASCO SOLENOID VALVES COMPUTED 88 R R	
	DEL NP8321 SERIES CHECKED FUN DATE 1/28/86	<u></u>
N.	MAINTENANCE AND SURVEILLANCE	
	Has the qualification program identified those surveillance, maintenance and inspection parameters which are essential to maintain qualification a which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder Qualification Maintenance Data Sheets).	and
	JUSTIFICATION/COMMENTS See TABS C and G.	
	PAGE 0-26	

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BINDER TITLE ASCO SOLENOID VALVES COMPUTED 5677 DATE 7	· / .
MODEL NP8321 SERIES CHECKED 100 DATE 1/2	28/16
0. <u>SUMMARY OF REVIEW</u> (Continued)	Yes/No/NA
(e) Normally operating state of device (e.g., normally energized) considered?	
(7) Qualified life or replacement schedule established?	Yes
(8) Criteria regarding temperature/pressure exposure satisfied?	Yes
(a) Peak temperature adequate	Yes
(b) Peak pressure adequate	Yes
(c) Duration adequate	Yes
(d) Required profile enveloped adequately	Yes
(e) Steam exposure adequate	Yes
(9) Criteria regarding test sequence satisfied?	Yes
(10) Criteria regarding spray satisfied?	Yes
(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11) Criteria regarding submergence satisfied?	Yes
(12) Criteria regarding radiation satisfied?	Yes
(a) Was dose rate considered?	Yes
. (b) Was beta radiation considered?	_NA
(13) Criteria regarding operability status/mode satisfied?	Yes
(14) Criteria regarding test failures or anomalies satisfied?	Yes

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# TVA 19537 (OE-3-86)

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BIND	ER TIT	LE ASCO SOLENOID COMPUTED EEM DATE 7/24/8	$\frac{R_{2}}{R_{36}} \xrightarrow{R_{120}} R$
VAL	VES MO	DEL NP8321 SERIES CHECKED FMV DATE 7/28/8	
0.	<u>SUMMA</u>	RY OF REVIEW (Continued)	
			<u>Yes/No/N</u>
	(15)	Criteria regarding functional testing satisfied?	Yes
		(a) Does the test plan/report specify an acceptance criteria for equipment performed?	Yes
	•	(b) Was an initial baseline test done to estable required performance characteristics?	ish <u>Yes</u>
		(c) Has the test/analysis demonstrated that performance specifications and	Yes
	-	characteristics (e.g., voltage, load frequer and other electrical chaacteristics) can be	
	(16)	Criteria regarding instrument accuracy satisfied?	NA
	(17)	Test duration margin (1 hour + function time) satisfied?	<u>Yes</u>
		(a) Is the minimum specified operating time at least 1 hour?	Yes
	·	(b) If exception to the 1-hour minimum operating time was taken, was adequate justification provided?	<u>NA</u>
	(18)	Criteria regarding synergistic effects satisfied?	<u>Yes</u>
	(19)	Criteria regarding margins satisfied?	<u>Yes</u>
•	(20)	Maintenance and surveillance requirements adequately identified?	Yes
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BINDER NO. WBNEQ-SOL-007 PLANT	WBN	UNIT(S	)	1	SHEET 28 OF 28
· · · · · ·				]	$R_2, R_1$
BINDER TITLE ASCO SOLENOID	COMPUTED_	EEM D	ATE	7/24/8	6 CAT
					7/20/90
VALVES MODEL NP8321 SERIES	CHECKED	<u>FMV</u> D	ATE	7/28/8	
					8/7/90

### . DISCUSSION

1. Synergism Effects (Sec. H(3))

Ethylene Propylene Terpolymer (EPDM) elastomer is used in the construction of ASCO solenoid valves as gaskets and diaphragms. EPDM is the only material having a potential for radiation induced synergisms based on a review of technical information provided in NUREG/CR-2157 and NUREG/CR-2553. Data in NUREG/CR-2157 syggests 10 that dose rate effects in EPR materials are insignificant up to doses of 10 to 20 MRADS. A reivew of the location and environments of ASCO solenoid valves listed in TAB C-1 indicates that the maximum normal radiation dose will be seen by valves in subgroup A-2. These valves are qualified for 40 years without replacement of elastomer parts and will therefore be exposed to a maximum normal dose of .001 MRADS. Since all elastomer parts are totally enclosed in metal, the radiation dose to these parts will be less than .001 MRADS. Synergism effects will be negligible for normal service aging.

Potential dose rate and test sequence synrgisms will be impact qualification for accident conditions as demonstrated by Test Report AQS-21678. The test sequence of thermal aging followed by radiation aging plus accident radiation at high (0.8 MRAD/HR) dose rate is a reasonable simulation of actual plant requirements. Additional assurance is provided by the severity of the radiation test because the test valve was exposed to 201 MRADs whereas an actual dose of about 3,3 MRADs (3.3 MRADs accident plus .001 MRADs |R2 normal service) is required.

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PAUL

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	WATTS BAR TABA - EQUIPMENT	NUCLEAR P IDENTIFICATION M	L A DE	· · ·
	UNIT DEVICE ID NO. AZMITH	-LOCATION	<u>CAT OPER TIME</u> (2)	EVENT SAFETY FUNCTION
<u>S NUMBER</u> ICRIPTION N-O-SPLC-510-0001 - W VOLTAGE TUBING	0-SPLC-510-001 WCSF-N	VAR IOUS VAR IOUS	A 100D A 100D	L PROVIDE INSULATING PROPERTIES HELB FOR ELECTRICAL CONNECTIONS.
3N-0-SPLC-510-0002 -	0-SPLC-510-002	VARIOUS	A 100D	L PROVIDE INSULATING PROPERTIES
OW VOLTAGE MOLDED PARTS	END CAPS	VARIOUS	A 100D	HELB FOR ELECTRICAL CONNECTIONS.
JBN-0-SPLC-510-0003 -	0-SPLC-510-003	VAR IOUS	A 100D	L PROVIDE INSULATING PROPERTIES
LOW VOLTAGE MOLDED PARTS	BREAKOUTS	VAR IOUS	A 100D	HELB FOR ELECTRICAL CONNECTIONS.
WBN-0-SPLC-510-0004	- 0-SPLC-510-004	VAR IOUS	A 100D	L PROVIDE INSULATING PROPERTIES
LOW VOLTAGE KIT TB REPLA		VAR IOUS	A 100D	HELB FOR ELECTRICAL CONNECTIONS.
	- 0-SPLC-510-005	VAR IOUS	A 100D	L PROVIDE INSULATING PROPERTIES
	CABLE SPLICE NPKC	VAR IOUS	A 100D	HELB FOR ELECTRICAL CONNECTIONS.

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PACE A-1

LOW VOLTAGE KIT CONTROL CAB

PREPARER/DATE HDR/ 9-23-EU CHECKED/DATE NN13/ 9-23-86

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BINDER NO. : WBNEQ-SPLC-OO1 MANUFACTURER : RAYCHEM PAGE 2 OF 3

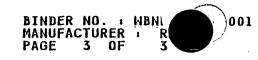


EQIS NUMBER UNIT DEVICE ID DESCRIPTION		LOCATION ELEY(1) RM/RAD CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-O-SPLC-510-0006 - O-SPLC-510-006	NPKP	VARIOUS	A	100D	L	PROVIDE INSULATING PROPERTIES
LOW VOLTAGE KIT POWER CABLE SPLICE		VARIOUS	A	100D	Helb	FOR ELECTRICAL CONNECTIONS.
WBN-0-SPLC-510-0007 - 0-SPLC-510-007	NPKS	VARIOUS	A	100D	L	PROVIDE INSULATING PROPERTIES
LOW VOLTAGE KIT INSTRUMENT CABLE SPLICE		VARIOUS	A	100D	HELB	FOR ELECTRICAL CONNECTIONS.
WBN-0-SPLC-510-0008 - 0-SPLC-510-008	ŅPKV	VARIOUS	A	100D	L	PROVIDE INSULATING PROPERTIES
LOW VOLTAGE KIT "V" STUB CONNECTION		VARIOUS	A	100D	HELB	FOR ELECTRICAL CONNECTIONS.
WBN-0-SPLC-510-0009 - 0-SPLC-510-009	NMCK	VARIOUS	A	100D	L	PROVIDE INSULATING PROPERTIES
LOW VOLTAGE KIT MOTOR CONNECTION		VARIOUS	A	100D	HELB	FOR ELECTRICAL CONNECTIONS.
WBN-0-SPLC-510-0010 - 0-SPLC-510-010 LOW VOLTAGE KIT CABLE BREAKOUT	ИСВК	VARIOUS VARIOUS	A A	• 100D 100D	L HELB	PROVIDE INSULATING PROPERTIES FOR ELECTRICAL CONNECTIONS.

PREPARER/DATE/<u>K2</u> <u>Checkenne</u> <u>B</u> R_ R_ PREPARER/DATE/<u>K2</u> <u>Checkenne</u> <u>B-1677</u>







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#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID	NO. AZMITH MODEL NUMBER	LOCATION - <u>Elev(1)</u> <u>Rm/RAD</u> Contract	<u>CAT</u> OPER TIME (2)	EVENT SAFET	Y FUNCTION
WBN-0-SPLC-510-0011 - Loh Voltage Kit end sealing	0-SPLC-510-011 KIT	NESK	VARIOUS Various	A 100D A 100D	L PROVI Helb For e	DE INSULATING PROPERTI LECTRICAL CONNECTIONS.
			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
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, , ,						
ſ	PAGE A	3 R3		<u>IR2 CAG</u> IR2 JFW E	<u>8-11-89</u>	R <u>3</u> R R <i><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u>1</u><u></u></i>
			UNLOKED DATE		<u>, , , , , , , , , , , , , , , , , , , </u>	<u>M.O.I. I.C.</u>

		LIFI- COMPUTED <u>2/0/2</u> DATE <u>9/20/86</u>
	ION OF RAYCHEM HEAT SHRIN LE SPLICES	
Α.	DOCUMENTATION Equipment Description	Heat Shrink Cable Sleeve (for applications of 600 VAC or less)
	Vendor/Manufacturer	Raychem Corporation
	Equipment Model No.(s)	Raychem's complete line of nuclear grade cable
	nt An Alina an Alina (Mariana)	connection heat shrink splices and terminations
		(600 volts or less) (Raychem material Type-52
· ·		and/or WCSF).
	QUALIFICATION REPORTS	
Report	No. 1 Title/Number/Rev:	ision See title below/ RIMS B70 851119 101
•	Wyle Labs Report	58722-2/Revision 0 DATE Nov. 18, 1982
Report	No. 2 Title/Number/Rev	ision See title below/ RIMS B70 851112 102
• .	Raychem Report E	DR 5046 DATE March 4, 1982
Report	No. 3 Title/Number/Rev	ision See title below/ RIMS B70 851112 101
•	Raychem Report E	DR 5040 DATE Oct. 15, 1981
•	OTHER (ANALYSIS, VENDO	R DATA, ETC.) <u>Report Titles:</u>
	1. "Environmental Qual	ification Test Report of Raychem WCSF-N In-Line
	Bolted Splice Assem	blies."
	2. Analysis of Heat Ag	ing Data on WCSF Material to Determine Pre-Aging
	Conditions for Nucl	ear Qualification Testing."
	3. Analysis of Heat A	ging Data on -52 Molding Material to Determine
	Pre-Aging Condition	ons for Nuclear Qualification Testing.
	See TAB E for addition	nal qualification documentation. (Listed on pages
	2 and 3).	

TVA 19537 (OE-3-86)

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BINDER NO. WBNEQ-SPLC-001 PLANT WBN U	NIT(S) <u>1</u> SHEET <u>2</u> OF <u>40</u> R <u>1</u> R
BINDER TITLE_Environmental COMPUTEDHD	R DATE 9/22/86
Qualification of Raychem Heat Shrink Cable Splices CHECKEDNMB	DATE <u>9/22/86</u>
Shrink Cable Splices CHECKED NMB	<u></u> 5.112 <u>/1==1 01</u> /2-2-FF
ADDITIONAL DOCUMEN	TATION
1. Environmental Qualification Test Report	
of Raychem NRPKV Nuclear Plant Stub	DATE <u>August 24, 1982</u>
Connection Kit for Raychem Corporation	
<u>Report 58722-1 Rev. 0.</u>	_
2. Environmental Qualification Test Report	RIMS <u>B70851119102</u>
of Raychem Nuclear Cable Breakout and	DATE <u>April 3, 1981</u>
End Sealing Kits Report 58442-2 Rev. 0.	
	•
3. Qualification Report Supplement for	
Raychem Nuclear Grade Adhesive S119	
<u>Raychem Nuclear Grade Adnesive 5115</u>	
Report EDR 5021 Rev. 0.	
4, Wyle Laboratories Report "Environmental	<u>1 RIMS B70 851112 105</u>
Qualification Test Report on Raychem	DATE Dec. 21. 1982
Nuclear Plant Kit (NPK) Report 58722-6	
Rev. 0.	
5. Raychem Palo Verde I Test Report	RIMS <u>B70_851015_102</u>
EDR 5019	DATE March 4, 1982
NOTE: Documents listed above are used threequipment qualification. The revise Information Management System (RIMS need not be repeated in other section listing includes only those documen qualification and accordingly should	ion levels and Records & ) numbers, as listed above, ons of the binder. This Rits which are essential to
complete listing of binder reference	

PAGE B-2 R-1

ualificat	LE Environmental COMPUTED HDR ion of Raychem Heat le Splices CHECKED NMB	7/14/89*
	ADDITIONAL DOCUMENT.	ATION
of	ronmental Qualification Test Report Raychem N-MCK Nuclear Motor Nection Kits Report 58442-3 Rev. 0,	RIMS <u>B70 851112 104</u> DATE <u>July 28, 1980</u>
of	ironmental Qualification Test Report Raychem WCSF-050-N Shim Stock ort 58722-5, Revision 0.	RIMS_B36_900604_001 DATE_December 21, 1982
ien	le inside conduit temperature trans- t during a MSLB in the Valve Vault. culation WBNNAL6001.	
<u>in</u> ste	ety evaluation of superheated steam the valve vaults caused by a main am line break. Calculation No. OSG4-003, Rev 2.	RIMS <u>B45851112218</u> DATE <u>November 12, 1985</u>
	vironmental Drawings TVA Dwgs E235-42 Rev. 2, and 47E235-76 Rev. 3	- RIMS <u>NA</u> DATE <u>NA</u>
Co	alification Test Report for mmonwealth Edison Co. le Lab Report No. 17859-02B	RIMS <u>L33 870318 801</u> DATE <u>March 18, 1987</u>
L	BPEVAR 8904055 R0, Class IE Splice st - Unit 1, Common, and Unit 2 equired for Unit 1 Safe Shutdown	RIMS <u>B26 890511 501</u> DATE <u>March 26, 1989</u>
NOTE :	Documents listed above are used through equipment qualification. The revision Information Management System (RIMS) need not be repeated in other section listing includes only those documents qualification and accordingly should complete listing of binder reference	on levels and Records & numbers, as listed above ns of the binder. This s which are essential to not be considered a

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R3

R_3_R BINDER TITLE <u>Environmental</u> COMPUTED HDR DATE 9/22/86	
BINDER TITLE Environmental COMPUTED HDR DATE 9/22/86	1
Qualification of Raychem Heat	
Shrink Cable Splices CHECKED NMB DATE 9/22/86 HAR	

The reports on page 2 will help substantiate the qualification of the different configurations of heat shrink cable connections used at Watts Bar (see TAB B).

Report 1 - Covers NPKV kits (Stub Connection Kit)

Report 2 - Covers the nuclear cable breakout (-52 material) and end caps.

Report 3 - Qualification report for new adhesive (S1119) which replaced S1024. This report demonstrates that the new adhesive is equivalent or superior to the S1024.

Report 4 - Covers NPK kits nuclear cable break-out (-52 material).

Report 5 - Covers in-line splices using both the S1119 and S1024 adhesives.

Report 6 - Covers N-MCK Kits Motor connect connection kits.

Report 7 - Covers WCSF-050-N shim stock.

The DBE profiles for these tests encompass the Watts Bar profile and are qualified for 40 years at 90°C, one DBE and 100 days post-accident time. Some of the test items failed to hold the 1,000 volts AC test voltage during the test. In all cases the failures were shown to be caused by overaging of the test cable that the splices were used on. All splices passed the voltage withstand test and had acceptable IR measurements in a water bath when tested with the damaged portion of the leads out of the water during the test. The remainder of the test item held the test voltage (1000 AC) during the complete DBE test.

The above reports (located in TAB E) along with the binder test report 58722-2 qualifies all Raychem splices 600 volts and below at Watts Bar Nuclear Plant.

WBEP-0022Q

R 3

INDE	R TITLE <u>ENVIRONMENTAL QUALIFI</u> COMPUTED <u>HOR</u> DATE <u>Apple</u>
	LON OF RAYCHEM HEAT SHRINK CHECKED 2 DATE 9/21/86
в.	<u>CONCLUSION OF REVIEW</u> (Check only one block)
	X Equipment Qualified
	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule
	Equipment Qualification Not Established by Documentation
	Equipment Not Qualified Based on Test Failures
	OPEN ITEMS AND QUALIFICATION DEFICIENCIES
	COMMENTS/RECOMMENDATIONS The nuclear grade Raychem cable connection
	heat shrink splices are environmentally qualified for 40 years at
	90°C including a DBA and 100 day post-accident operation for the
	accident and normal conditions at the Watts Bar Nuclear Plant.
	Note: Qualification contingent on resolution of all open items.
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	TITLE ENVIRONMENTAL QUALIFI- COMPUTED DATE	
CATIO	N OF RAYCHEM HEAT SHRINK CHECKED DATE 9/22/86	<u> </u>
С <u>. Q</u>	UALIFICATION CRITERIA	
	riteria Used to Demonstrate Qualification is in Accordance with the collowing (Indicate Which Criteria is Applicable):	
-	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
-	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
J	USTIFICATION/COMMENTS	
-		
I	NDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	NDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	

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BIND	ER NO. <u>WBNEQ-SPLC-00</u> 1 PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>6</u> OF <u>40</u> R <u>R</u> R
BIND	ER TITLE ENVIRONMENTAL QUALIFI- COMPUTED 242 DATE 9/20/86
	CION OF RAYCHEM HEAT SHRINK CHECKED DATE 9/2/26
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS This binder qualifies the different con-
	figurations of the Raychem cable connection heat shrink splices
	using WCSF and/or -52 type nuclear grade heat shrink materials.
	The test reports used in TAB B for qualification are for the WCSF-N
	sleeve configuration. Additional test reports have been included in
	TAB E detailing other configurations that have been tested. All the
	profiles encompass the Watts Bar environmental accident conditions
	and all tested samples were aged (heat and radiation) to levels well
•	above those required for Watts Bar. All anomalies were addressed in
	each test report and no failures of the Raychem materials were noted
	in any of the test. All apparent failures were not Raychem failures
	but were attributed to excessive heat aging (causing cracks in cable
	insulation) of the cable used in the tests.
	All cable connections must be made using TVA Standard Construction
1	Specification C-38 which requires nuclear grade Raychem heat shrink

Syccastodeton v Jo which requires increat grave hajonem heat Shiring

be used on all safety-related equipment located in a harsh environ-PAGE B-6

ment that are spliced. This specification details the sizes of heat

<u>shrink sleeves and breakouts to use for each cable size and configu-</u> TVA 19537 (OE-3-86)

BINDER NO. WBNEQ-SPLC-001 PL	INT WBN UNIT(	S) <u>1</u> SHEET <u>7</u> OF <u>40</u>
		R R
BINDER TITLE Environmental	COMPUTED HDR	DATE 9/22/86 HTT
Qualification of Raychem Heat	_	
Shrink Cable Splices	CHECKED NMB	DATE <u>9/22/86</u> <u>2494</u>
		7-26-90

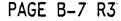
ratian. This specification is used in conjunction with the installation instructions supplied with the heat shrink material (see TAB H).

This binder covers all nuclear grade Raychem splices 600 volts or less. No safety-related equipment, located in a harsh environment, requiring a nuclear-grade Raychem splice is rated more than 600 volts. The splice loading during the DBE test is less than the 90°C cable rating per National Electric Code 1990. For the purpose of the qualification, the additional heat rise resulting from the difference between these current values is calculated and added to the accident profiles (see TAB C).

The IR measurements taken during the DBE test of the test specimens (Raychem splice and connecting cable) were much greater than comparable readings taken during the qualification testing for TVA Type MS cable (signal cable) used in instrumentation circuits. The splices are required to maintain its required performance during all postulated service conditions. Thus, assurance is provided that the presence of splices in these cables will not result in degraded signal levels caused by current leakage resulting from the use of the Raychem splices.

All Raychem splice material and applications covered in this binder are consistent with Watts Bar applications.

The above information gives reasonable assurance that the nuclear grade Raychem heat shrink splices and terminations at Watts Bar Nuclear Plant are environmentally qualified for 40 years at 90°C and one DBA with 100 days post-accident operation.



BIND	ER NO	. WBNEQ-SPLC-001	PLANT WBN	UNIT(S)1	
		TLE <u>Environmental</u> tion of Raychem H		<u>HDR</u> DATE	R_2 R_3 9/20/86 CAG /// 8/11/896/4
		ble Splices	CHECKED	<u>NMB</u> DATE	<u>9/21/86 JFW /84</u> 8/15/897-24
<b>E</b> .	EQUI	PMENT DESCRIPTION	I		
	to t	he equipment ider he plant equipmer /No/NA)? <u>Yes</u>	nt which requir	-	
			<u>Plant Device</u>	Qualification Document	Reference
	(1)	Equipment Type	<u>Cable Sleeve</u>	Cable Sleeve	Report 1 Sec. 2.1.1
	(2)	Manufacturer	Raychem	Raychem	Report 1 Sec. 2.1.1
	¨(3)	Model Number(s)	See Comments	See Comments	NA
	(4)	Serial Number(s)	) <u>NA</u>	NA	<u>NA</u>
	(5)	Identify Compone Unique checkshee attached:			
	of L -52 are cabl (mot kit)	IFICATION/COMMEN OCA-qualified Ray molding material covered: WCSF-N es); NPKV (V stul or connection); N ; low voltage mol I (terminal block	ychem nuclear a and/or WCSF sl NPKC (control b connection); NCBK (cable bre lded parts (end	rade products c eeves. The fol cable), NPKS ( NPKP (power cab akout kit); NES caps and break	lowing products instrumentation le); NMCK K (end sealing
			· .		

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	BIND	ER NO. <u>WBNEQ-SPLC-001</u> PLANT <u>WBN</u> UNIT(S) <u>1 &amp; 2</u> SHEET <u>9</u> OF <u>40</u>
-		ER TITLE <u>Environmental</u> COMPUTED HDR DATE <u>9/20/86</u>
		nk Cable Splices CHECKED NMB DATE 9/21/86 90
	F.	INSTALLATION INTERFACES
	4	List all interfaces pertinent to EQ identified in the qualification R2 documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

Interface	<u>Identify Interface</u>	Plant Requirement? (Yes/No)	Reference <u>Test Report</u>
Mounting Bolts	NA		
External Process Connections	_NA		
Electrical Connections	_NA		
Conduit Seals	NA		· · · · · · · · · · · · · · · · ·
Connector Seals	NA		
Orientation	_ <u>NA</u>		
Physical Configuration	NA		
Other	NA		

JUSTIFICATION/COMMENTS 1) Raychem nuclear grade splices are designed to provide an environmental seal to smooth non-woven surfaces including polyolefin, most synthetic cable jackets and to many metals (TAB H Product Features). The qualification status of the Raychem splice is conditional upon the capability of the substrate materials maintaining physical integrity under the same conditions under which the Raychem materials are qualified. All safety related cables at WBN are qualified and are expected to maintain their physical integrity under the normal and DBE conditions at WBN (Ref. all cable qualification binders).

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BINDER NO. WBNEQ-SPLC-001 PLANT WBN	UNIT(S) <u>1</u> SHEET <u>10</u> OF <u>4</u>	40
BINDER TITLE ENVIRONMENTAL QUALIFI-	COMPUTED 2400 DATE 9/22/86	
CATION OF RAYCHEM HEAT SHRINK CABLE SPLICES	CHECKED DATE 9/24/91	

F. <u>INSTALLATION INTERFACES</u> (Continued)

JUSTIFICATION/COMMENTS (1)

TVA

The test reports included in this binder do not include all sizes of Raychem splices used at WBN or all cable jacket/insulation material to which the splices must seal. As stated above, the Raychem will seal most cable material. Also during qualification testing of safety related cables used at WBN, Raychem splices were required to connect the cable being tested to the test leads. These splices used during qualification of the cable show that the cable sizes and material types at WBN are compatable with and provide a qualified seal on the cable installations at WBN.

2) Splice installation is to be done in accordance with the latest revision of TVA Standard Drawings (SD)-El2.5.6, El2.5.7-1, El2.5.7-2, and El2.5.8 and Raychem installation instructions taking into account the two-inch minimum seal length after shrinking for in-containment applications. The test set-up utilized Raychem's installation instructions which also require a two-inch minimum seal length. (See TAB H for vendor installation/inspection guides and TAB G installation).

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BINDER TITLE ENVIRONMENTAL QUALIFI- CATION OF RAYCHEM HEAT SHRINK	UNIT(S) <u>1</u>	SHEET 11 O
CATTON OF THE	COMPUTED HOK	DATE 9/2/2/ R R
CATION OF RAYCHEM HEAT SHRINK CABLE SPLICES	CHECKED	
	CHECKED	DATE 9/4/66
G. TEST SEQUENCE		
	Se dilence and it is	
(ves/no/NA)2	rdance with TERE 200	ed to simulate the
accident environment in acco (yes/no/NA)? (note below)	The with IEEE-323	(74), paragraph 6.3.2
	Yes/No/NA	Reference
(a) Equipment inspected for	(1) See	
(b) Baseline part	damage <u>Comments</u>	See Comments
electine periormance	Yes	
measurements taken		<u>58722-2, Sec. 3.2</u>
(c) Equipment aged:		
<del>-</del>		
Thermal	Yes	
Radiation	103	<u>58722-2, Sec. 3.3.</u>
Maulation	Yes	
Wear		58722-2, Sec. 3.3.2
	(2) <u>NA</u> *	
(d) Vibration/seismic testing		
conducted costing	(2) <u>NA</u> *	
(e) Design basis		
(e) Design basis event (DBE) exposure		
	Yes	<u>58722-2, Sec. 3.4</u>
(f) Post-DBE exposure	Yes (Total	<u> </u>
•	<u>of 30 days)</u>	<u>58722-2, Sec. 3.4</u>
(g) Final inspection and disassembly		
-	Yes	50700 -
(2) Was the same piece of equipment described in item (1) above (yes		<u>58722-2, Sec. 4.3</u>
described in item (1) above (yes	used throughout the	test sequence
(3) Have the bar	/no/NA)? <u>Yes</u>	
been appropriate quipment, test eq	Widment commu	
<ul> <li>(3) Have the test equipment, test equipment appropriately documented (y)</li> <li>(Reference <u>58722-2</u>, Appendix B)</li> </ul>	es/no/NA)? Yes	and calibration data
· · · · · · · · · · · · · · · · · · ·		
JUSTIFICATION/COMMENTS 1) The rule inspection; however Raycher have		
increation <u>1/ The r</u>	<u>eport did not descri</u>	be test speci-
inspection; however Raychem has o	Onductod	Specimen
inspection; however Raychem has on have no reason to believe that	many test	programs and we
Lieve char in	spection was not de	
2) See TAB B, Section P.		1e.
SOCIOL F.		
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BINDER T	IO.WBNEQ-SPLC-001 PLANT_WBNUNIT(S)	1	SHEET 12OF
CATION CABLE S	ITLE ENVIRONMENTAL QUALIFI- COMPUTED 2000 OF RAYCHEM HEAT SHRINK CHECKED 2	DATE <u>9/20</u> DATE <u>9/20</u>	180
H. <u>AG</u>	ING		
(1)	Was aging considered in the qualification p (Yes/no/NA)? <u>Yes</u> (Reference <u>58722-2</u> ,	rogram <u>Sec. 3.3).</u>	
	JUST IF ICATION / COMMENTS		
(2)	Were the following effects considered in the	aging pro-	
	Aging Effect	Yes/No/NA	<u>Referenc</u> e
	Thermal aging	Yes	58722-2, <u>Sec. 3.3.1</u>
	Radiation exposure	Yes	58722-2, Sec. 3.3.2
	Vibration (non-seismic) aging Operational (electrical/mechanical/process)	<u>No*</u>	
	stress aging JUSTIFICATION/COMMENTS <u>See TAB B, Section P.</u>	<u>Yes*</u>	
(3)	Were all known synergistic effects which are significant effect on equipment performance c program (yes/no/NA)? Yes (Reference No	believed to onsidered in	have a n the aging
	JUSTIFICATION/COMMENTS See TAB B, Section P.		
(4)	Thermal Aging:		
	(a) Was thermal aging considered in the quali (yes/no/NA)? <u>Yes</u> (Reference <u>58722-2</u>	fication pr	ogram 1).
	JUSTIFICATION/COMMENTS		

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BINDER NO. WBNEQ-SPLC-001	PLANT WBN	UNIT(S) 1	SHEET 13 OF 40
			R_3 R
BINDER TITLE <u>Environmenta</u> Qualification of Raychem		$DR_{1}$ DATE <u>97.</u>	20/86 AFL
Shrink Cable Splices	CHECKED N	MB DATE <u>9/</u>	21/86 HOR

- H. <u>AGING</u> (Continued)
  - (b) Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>IEEE 383-1974 & Raychem Reports EDR 5046</u> and EDR 5040).

JUSTIFICATION/COMMENTS All insulation materials are considered

susceptible to aging degradation.

(c) Was the basis for thermal aging identified in the qualification program . (yes/no/NA)? Yes (Reference 58722-2, Section 3.3.1)

JUSTIFICATION/COMMENTS Analysis of heat aging data found in

Raychem Reports EDR 5046 and EDR 5040 (see TAB D).

(d) Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>58722-2</u>, <u>Section 3.3.1</u>)

Parameter	<u>Plant Maximum Normal</u>	<u>Test</u>	Equivalent
Temperature	90°C	<u>150°C</u>	<u>90°C</u> R3
Time	40 years	916.75 HRs	<u>&gt;40 years</u> R3

JUSTIFICATION/COMMENTS For analysis see Raychem Reports

EDR 5046 (TAB D) and EDR 5040 (TAB D). Also see TAB C.

(e) Was the Arrhenius methodology used for accelerated aging (Yes/no/NA)? <u>Yes</u> (Reference <u>58722-2, Section 3.3.1)</u>

JUSTIFICATION/COMMENTS Also see Raychem Reports EDR 5046 and 5040.

(f) If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical date (Yes/no/NA)? No_____ Reference NA.

JUSTIFICATION/COMMENTS See H(4)(g).

	<u>Environmental</u> COMPUTED HDR DATE <u>9/20/86</u>
Qualification Shrink Cable	of Raychem Heat Splices CHECKED NMB DATE 9/20/86/22-55
H. <u>AGING</u> (Co	ntinued)
(g)	If a regression line was used for determining accelerataging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>Yes</u> (Reference: <u>See below</u>
	JUSTIFICATION/COMMENTS Rychem Reports EDR 5046 and EDR 5040. A failure mode of retaining 30% of initial elongation was used, since this resulted in the lowest activation energy and is considered the most conservaticase.
(h)	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>No</u> (Reference: <u>NA</u>
	JUSTIFICATION/COMMENTS Thermal aging calculation based
	90°C maximum conductor temperature.
(5) Radi	ation Aging Exposure:
(a)	Was radiation aging exposure considered in the qualific program (Yes/No/NA)? <u>Yes</u> (Reference: <u>58722-2</u> ,
	Section 3.3.2
	JUSTIFICATION/COMMENTS
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? <u>N</u> (Reference: <u>NA</u>
-	JUSTIFICATION/COMMENTS Splices were subjected to a tot
	8 dose of 2.2 x 10 rads and passed all functional tests.
	This dose exceeds the worst case dose at WBN. (See pag
	B-35),
(c)	Was the basis for radiation aging exposure identified in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>58722-2, Section 3.3.2</u>
	JUSTIFICATION/COMMENTS <u>Aging and accident dose done at</u> the same time at 5.7E+5 rads/hour for 386 hours yieldin TID of 2.2E+8 rads.

BINDER	R NO.WBNE	O-SPLC-001 PLANT	WBN	UNIT	(S) 1		
		Environmental	COMPUTED_	HDR	_ DATE	R_1_R_3 9/20/86_CAG 12/5/88 6/4	2
<u>Qualify</u> Shrink	c Cable S	of Raychem Heat plices	CHECKED	NMB	_ DATE	9/21/86_WCG240 12/6/88 7-26	<u>R</u>
H. <u>/</u>	<u>AGING</u> (Co	ontinued)				<b>,</b>	
	(d)	Is the radiation acceptable (Yes/					
~	,	Section 3.2.2 ar	d Table I				).
		Plant normal amb dose (rd)	ient radiat	ion	8 1x10	(See Section K)	
		Test exposure do	se (rd)		<u>2.2E+8</u>	(accident includ	ed)
		Test exposure do	se rate (ro	l/hr)	<u>5.7E+5</u>		
		Test exposure so (e.g., Co-60 g			<u>Co-60</u>	zamma	
		JUSTIFICATION/CO	MMENTS <u>Rad</u>	liation	dose ar	nd rate are	
	•••	<u>acceptable in ac</u>	cordance wi	th IEE	E 383-19	974	
	6) Vibr	ation (nonseismic	) Aging:		•		
	(a)	Were the effects normal and abnor qualification pr	mal operati	on add:	ressed i	n the	>.
		JUSTIFICATION/CO	MMENTS <u>Sei</u>	smic co	oncerns	are not appli-	
		<u>cable to cable s</u>	plicing sys	tems wi	nich hav	e inherently	
		high damping and	for which	<u>vibrat</u> :	<u>ion is n</u>	ot a principal	
		failure mode.					
	(b)	Was the basis fo in the qualifica (Reference:	tion progra	m (Yes,	No/NA)?		i ).
		JUSTIFICATION/CO	MMENTS				
1		ation program ref ocumentation incl					

**R**3

W.

			IRONMENTAL QUALIFI- COMPUTED 7/01/10 DATE 9/20/86
CAT CABI	LON O	F RAYC LICES	CHEM HEAT SHRINK CHECKED DATE 9/24/86
H.	AGI	<u>NG</u> (C	Continued)
	(7)	0per	ational Stress Aging:
		(a)	Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? <u>Yes</u> (Reference
			<u> </u>
			JUSTIFICATION/COMMENTS See TAB B, Section P.
	·	(Ъ)	Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference
			).
			JUSTIFICATION/COMMENTS See TAB B, Section P.
	(8)	quali	the qualified life of the equipment and its basis defined in the fication program (yes/no/NA)? <u>Yes</u> erence <u>58722-2, Sec. 3.3.1).</u>
		Quali	fied life (Document in QMDS) <u>40 years at 90°C</u>
		JUSTI	FICATION/COMMENTS Also see Raychem Reports EDR 5046 and EDR
		<u>5040.</u>	See TAB C for qualified life calculation.
			· •

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BINDER NO.WBNEO-SPLC-001 PLANT WBN UNIT(S)_1 SHEET 17 OF 40 R_1 , R'_ BINDER TITLE Environmental COMPUTED HDR DATE 9/20/86 CHAR 1-4-24 Qualification of Raychem Heat NMB DATE 9/21/86 WER Shrink Cable Splices CHECKED 1-4-84 H. <u>AGING</u> (Continued) (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: ). R1 JUSTIFICATION/COMMENTS See TAB C for aging equivalent. RI PAGE 3-17

BINDER NO. WBNEQ-SPLC-001 PLAN	r wbn UNIT(S) 1 SHEET 18 OF	40
	R R	
BINDER TITLE Environmental	COMPUTED HDR DATE 9/26/86 HTC	
Qualification of Raychem Heat		
Shrink Cable Splices	CHECKED NMB DATE <u>9/21/86 2/OR</u>	

#### I. MATERIALS ANALYSIS

Identification of Materials Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis)

	Material/Property/Function	Radiation Threshold	<u>Reference</u>	Activation <u>Energy</u>	Reference	
a.	Raychem-52 Molding Material			1.30	EDR 5040 and TAB C	R3
b.	Raychem WCSF-N Sleeving	NA	<u>NA</u>	1.33	EDR 5046 and TAB C	
c.	<u></u>	- <u></u>			<u></u>	
đ.	····		·		<u></u>	

JUSTIFICATION/COMMENTS The insulation material (polyolefin) and sealant are considered susceptible to thermal and radiation degradation. The test was done in accordance with IEEE 383-1974 and IEEE 323-1974 and the test values exceeded those values expected during a DBE. The test program included tests on all materials used in the splices; therefore, no material analysis is required.



Ī	BINDER	NO. WBNEQ-SPLC-001	PLANT	WBN	UN	IT(S)_1		SHEET_	19_0	F_40
	BINDER	TITLE Environmental		COMPUTED	HDR	DATE	9/20/	R <u>3</u> 86 <i>AF</i>	 ₽	
	<u>Qualifi</u>	cation of Raychem H						6141	<b>191</b>	
	Shrink	Cable Splices		CHECKED	NMB	DATE	9/21/	86 20	K 70 –	

- J. <u>EQUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE</u> <u>SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS</u>
  - (1.) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure if not met (yes/no/NA)? <u>Yes</u> (Reference 58722-2, Section 1.0)

Identify Acceptance Criteria: IEEE 383-1974 criteria -FunctionContinuously during test then pass high-voltage withstand test after conclusion of DBE simulation.

(2.) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? <u>Yes</u> (Reference: See page 18.1.)

Identify baseline and functional testing: Immersed in water for 16 hours then IR measurements at 500 VDC and voltage withstand test with 3600 VAC hi-pot while still immersed in water.



JUSTIFICATION/COMMENTS

(3.) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference 58722-2. Section 3.4). 90A- M²/₅/_{1/16}

JUSTIFICATION/COMMENTS 90A

PAGE B-19 R3

R3

BINDER TITLE Environmental COM	$\begin{array}{c} R \\ 1 \\ R \\ 1 \\ R \\ R \\ R \\ R \\ R \\ R \\$
Qualification of Raychem Heat Shrink Cable Splices CHE(	CKED NMB DATE $\frac{9/21/86}{12-2-55}$
J. <u>EQUIPMENT ELECTRICAL CHARACTERIS</u> PERFORMANCE SPECIFICATIONS CAN BI	<u>TICS NECESSARY TO ENSURE THE</u> E SATISFIED UNDER ACCIDENT CONDITION
1) Functional Test Baseline (1	Ref. 58722-2 Section 3.1 and 3.2)
	- Immersed in water for 16 hou
	- Insulation resistance in wat
	at 500 VDC
	- 3600 VAC voltage withstand t
,	in water
• •	
2) Post Thermal and Radiation Aging (Ref. 58722-2 Section	
3) DBE Exposure (Ref. 58/22-2	Section 3.4; Fig. 4 and Table 3)
	- Energized at 1000 volts AC a 90 amps (nominal)
4) Post DBE (Ref. 58722-2 Sec	tion 4.3)
	- Same as above (1)
!	

Qual	lifica	tion	nvironmental of Raychem H plices	eat		•	DATE	<u>9/22/8</u> 9/22/8	بسر من م روم من م	ĩ
J.	PERF		ELECTRICAL CE SPECIFICA							<u>IDITIO</u>
	(4)		he applied 1 ating condit							
		<u>5872</u>	<u>2-2 sec 3.4</u>			n				
		JUST	IFICATION/CO	MMENTS	<u>Baseli</u>	ne_testi	ng cons	isted	of ins	su
		<u>lati</u>	<u>on resistanc</u>	e at 5	007 DC v	<u>oltage w</u>	vithstan	<u>d at 3</u>	600 vc	olts
		<u>AC.</u>	The connect	<u>ion sp</u>	<u>lices ar</u>	<u>e qualif</u>	ied to	the re	levant	•
		<u>indu</u>	<u>stry standar</u>	ds and	IEEE-38	3-1974.				
									•	
	(5)		tify electri pment perfor				-			:he
	(5)		pment perfor	mance	specific		an be s	atisfi		
	(5)	equi	pment perfor	mance	specific	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perfor	mance	specific <u>t Normal</u>	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perform Parameter Voltage	mance	specific <u>t Normal</u> 480V	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perfor <u>Parameter</u> Voltage Load	mance	specific <u>t Normal</u> 480V NA	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perform <u>Parameter</u> Voltage Load Frequence	mance	specific <u>t Normal</u> <u>480V</u> <u>NA</u> NA	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perform <u>Parameter</u> Voltage Load Frequence Accuracy	mance	specific <u>t Normal</u> <u>480V</u> <u>NA</u> NA	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perform <u>Parameter</u> Voltage Load Frequence Accuracy	mance	specific <u>t Normal</u> <u>480V</u> <u>NA</u> NA	ations o	an be s	atisfi	ed.	
	(5)	equi	pment perform <u>Parameter</u> Voltage Load Frequence Accuracy	mance <u>Plan</u> 	specific <u>t Normal</u> 480V NA NA NA	ations o	an be s	atisfi	ed.	
	(5)	equi	<pre>pment perfor <u>Parameter</u> Voltage Load Frequence Accuracy Other(s) </pre>	mance <u>Plan</u> 	specific <u>t Normal</u> 480V NA NA NA	ations o	an be s	atisfi	ed.	
·	(5)	equi	<pre>pment perfor <u>Parameter</u> Voltage Load Frequence Accuracy Other(s) </pre>	mance <u>Plan</u> 	specific <u>t Normal</u> 480V NA NA NA	ations o	an be s	atisfi	ed.	
	(5)	equi	<pre>pment perfor <u>Parameter</u> Voltage Load Frequence Accuracy Other(s) </pre>	mance <u>Plan</u> 	specific <u>t Normal</u> 480V NA NA NA	ations o	an be s	atisfi	ed.	
	(5)	equi	<pre>pment perfor <u>Parameter</u> Voltage Load Frequence Accuracy Other(s) </pre>	mance <u>Plan</u> 	specific <u>t Normal</u> 480V NA NA NA	ations o	an be s	atisfi	ed.	

PAGE 3-21 R-1

BIND	ER NO			
		WBNEQ-SPLC-(	001 PLANT <u>WBN</u> UNIT(S) <u>1</u>	SHEET_22_OF_40_ R 1 R 3
BIND	ER TI	TLE_Environmer	ntal COMPUTED_HDR DATE 9/	
<u>Qual</u>	ifica	tion of Rayche	em Heat	12/6/88 6/4/9
<u>Snri</u>	nk Ca	ble Splices	CHECKED NMB DATE 9/	<u>21/86 WCC 26/812</u> 12/6/88 7-26-90
	·		· ·	
J.,			CAL CHARACTERISTICS NECESSARY TO EN	
		tinued)	FICATIONS CAN BE SATISFIED UNDER AC	CIDENT CONDITIONS
	•	•		
	( <b>b</b> )	<u>Parameter</u>	Specific Accident Conditions	<u>Reference</u>
		Voltage	MFG STD (600 volts or less)	See comments
		• • • • •		See
		Load	See Comments	comments
		Frequency	NA	NA
		A = =====		
		Accuracy	NA	NA
		Other(s)		
		JUSTIFICATION	COMMENTS The splice loading duri	ng l
		the DBE test	is less than 90°C cable rating per	National
		Electric Code	1990. For the purpose of the qua	lification.
				R3
		additional ne	at rise resulting from the differen	nce between
		these current	values is calculated and added to	the accident
		<u>profiles (see</u>	TAB C)	
			- 1AB - 0),	······································
	(c)	Parameter	Demonstrated Conditions	Reference
		Voltage	1000 VAC	58722-2 Sec. 3.4
		•		58722-2
		Load	90 amps	<u>Sec. 3.4</u>
		Frequency	NA	NA
		A c cura or	XT A	
		ACCULACY		
		Other(s)		
			) .	
				- <del></del>
		JUSTIFICATION	COMMENTS	- <del>1</del>
		JUSTIFICATION	COMMENTS	
		Accuracy	NA	<u>NA</u>

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PAGE B-22 R3

		_		UNIT	(S) <u>1</u>		23_0F
BINDER T	ITLE_	Environmental	COMPUTEDH	DR	_ DATE 9.	R <u>1</u> /20/86 <u>C</u>	_ R_3_ AG Ø
Shrink C.	ation able	of Raychem Heat Splices	CHECKED NM	<u>B</u>		12. / <u>21/86 _W</u>	11/887
K. <u>REQU</u>	UIRED	OPERATING ENVIRO	ONMENT				
Refe	erenci	e Environmental I	Drawing No. <u>Wor</u> and	<u>st ca</u> 47E2	<u>se 47E23</u> 35-76	35-42	
(1)	Nori	nal Max	(2)	Abno	rmal Max		
÷	(a)	Temperature (°F	?) <u>130</u>	(a)	Tempera	ture (°F)	140
	(b)	Pressure (psig)	0.3	(Ъ)·	Pressur	e (psig)	0.3
	(c)	Humidity (%)	80	(c)	Humidit	у (%)	100
		Radiation (rd)	<u>1.0 x 10</u> 8	(d)	Radiati	on (rd)	<u>NA</u>
(3)	Proc	ess Interfaces:	None,			·.	
(4)	Stat	e anticipated oc	currence freque	ncy a	und durat	tion of al	bnorma
(4)		e anticipated oc itions: <u>Abnormal</u> t hours per occur	<u>service condit</u>	ions	duration	<u>ı is less</u>	bnorma than
(4)	eigh	e anticipated oc itions: <u>Abnormal</u> t hours per occur ent of plant life	rrence and tota	ions	duration	<u>ı is less</u>	bnorma than
· · ··-	eigh perce Accie	t hours per occur	for any combine	<u>ions</u>	duration	<u>i is less</u> ss than l	than
(5)	<u>eigh</u> <u>Derce</u> Accie param	t hours per occur ent of plant life ient (worst case meter including p	for any combination,	<u>ions</u> <u>l tim</u> ation and	duration le is les of spec profile)	<u>i is less</u> ss than 1 ified acc	than
(5)	eigh perce Accid paran (a) (b)	<u>t hours per occur</u> ent of plant life dent (worst case meter including p Temperature (°F) Pressure (psig)	for any combination,	l tim	duration ne is les of spec profile) ident ty	<u>i is less</u> ss than 1 ified acc : pe <u>LOCA/</u>	than ident
(5)	eigh <u>perce</u> Accie paran (a) (b) (c)	t hours per occur ent of plant life dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	for any combination, <u>327*</u> <u>11.2</u> <u>100</u> <u>4 x 10⁷gamma</u>	l tim ation and Acc Acc: Acc:	duration le is les of spec profile) ident ty ident ty	<u>ss than 1</u> ified acc : pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u>	than than tident <u>(HELB</u> <u>HELB</u>
(5)	eigh <u>perce</u> Accid param (a) (b) (c) (d)	t hours per occur ent of plant life dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd)	for any combination,	l tim ation and Acc Acc: Acc:	duration le is les of spec profile) ident ty ident ty	<u>ss than 1</u> ified acc : pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u>	than than tident <u>(HELB</u> <u>HELB</u>
(5)	eigh <u>perce</u> Accid param (a) (b) (c) (d)	<u>t hours per occur</u> <u>ent of plant life</u> <u>ient (worst case</u> <u>meter including p</u> <u>Temperature (°F)</u> <u>Pressure (psig)</u> <u>Humidity (%)</u> Radiation (rd)	for any combination, <u>327*</u> <u>11.2</u> <u>100</u> <u>4 x 10⁷gamma</u>	l tim ation and Acc Acc: Acc:	duration le is les of spec profile) ident ty ident ty ident ty	n is less ss than 1 sified acc pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u>	than than tident <u>HELB</u> <u>HELB</u> HELB
(5) * See	eigh perce Accid paran (a) (b) (c) (d) (c) (d) (e) TAB	<u>t hours per occur</u> <u>ent of plant life</u> <u>ient (worst case</u> <u>meter including p</u> <u>Temperature (°F)</u> <u>Pressure (psig)</u> <u>Humidity (%)</u> Radiation (rd)	for any combination, <u>327*</u> <u>11.2</u> <u>100</u> <u>4 x 10⁷gamma</u> <u>4.7 x 10⁸beta</u> <u>Yes (See L(2))</u>	l tim l tim ation and Acc Acc: Acc: Acc:	duration le is les of spec profile) ident ty ident ty ident ty ident typ	n is less ss than 1 sified acc pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u>	than than tident <u>HELB</u> <u>HELB</u> HELB
(5) * See	eigh perce Accid paran (a) (b) (c) (d) (c) (d) (e) TAB	t hours per occur ent of plant life dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%) Radiation (rd) Spray Type B, Section P for	for any combination, <u>327*</u> <u>11.2</u> <u>100</u> <u>4 x 10⁷gamma</u> <u>4.7 x 10⁸beta</u> <u>Yes (See L(2))</u>	l tim l tim ation and Acc Acc: Acc: Acc:	duration le is les of spec profile) ident ty ident ty ident ty ident typ	n is less ss than 1 sified acc pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u> pe <u>LOCA/</u>	than than tident <u>HELB</u> <u>HELB</u> HELB

		. <u>WBNEQ-SPLC-00</u> 1 PLANT_		NIT(S) <u>1</u> DATE <u>9/</u>	R_1R
	Qualifica	TLE <u>Environmental</u> tion of Raychem Heat			101-00 WCST
	<u>Shrink Ca</u>	ble Splices	CHECKED NME	DATE <u>9/</u>	21/86_12-2-58
	K. <u>REQU</u>	IRED OPERATING ENVIRON	MENT (Continu	ed)	
		Comments (duration/pe margin, etc.): <u>Refer</u>			
		Series 47E235 and dis	cussions in TA	<u>B B on Radia</u>	tion and
		Temperature.			
	(6)	Is the equipment subj can affect the perfor accident conditions (	mance of the e	quipment und	er design basis
	(7)	Subject to submergenc	e (Yes/No/NA)?	Yes (Ref	erence: <u>See</u>
		TAB B. Discussion pag	e		).
		Identify initiation t	ime and durati	on of submer	gence: <u>NA</u>
		·	· · · · · ·		
	(8)	Is the equipment subj the total accident do (Reference: <u>GENNAL3-</u>	se (Yes/No/NA)	? <u>Yes</u>	ntribution to
		If yes, identify the beta dose to be added			
		are located in juncti	on boxes which	are conserva	atively assumed F
•		to be fabricated of 1	<u>6 ga sheet ste</u>	el which prov	vides a beta
		reduction factor of 9	.98E-2. There	fore, the max	kimum beta dose
		the splices will be e	xposed to is 4	.7E + 07 rad	s
		<u>(4.7E+8 x 9.98E-2).</u>	· · · · · · · · · · · · · · · · · · ·		
	(9)	Special environmental	calculations	(temp., rad.	, etc.)
		Type		RIMS 1	No.
Ţ					
/				•	

BINDER NO. WBNEQ-SPLC-001 PLANT_	WBN	UNIT(S)	<u> </u>	SHEET 25_0	F_40
BINDER TITLE Environmental	COMPUTED_	<u>HDR</u> D	ATE <u>9/20/</u>	R <u>3</u> R /86 1725/10	
Qualification of Raychem Heat Shrink Cable Splices	CHECKED		ATE <u>9/21/</u>		

### SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS L.

(1) Comparison of worst-case maximum parameters:

Parameter	Specified	<u>Demonstrated</u>	<u>Reference</u> 58722-2,	
		31.3 days	Sec. 4.2	
Operating Time (da	ys) <u>100</u>	(See TAB C)	<u>(c), Fig. 6</u>	,
Temperature (°F)	373***	442	58722-2, <u>Fig.6, (pl0)</u> 58722-2,	R3
Pressure	<u>25.6 psia</u>	132 psig	Fig.6, (p10) 58722-2,	•
Relative Humidity	(%) <u>100</u>	<u>100</u> IEEE 323-1974	<u>Sec. 5.0</u>	
		(See L(2) for	58722-2,	
*Chemical Spray	<u>Yes</u>	<u>Justification</u>	<u>Sec. 3.4</u> 58722-2,	•
	1.4 x 10 ⁸ gamma	2.2E+8	Table 1,	R3
**Radiation (rd)	<u>4.7 x 10⁸beta</u>	gamma	<u>p 17</u> TAB B, Sec. P,	·
Submergence	No	No	"Submergence"	

*Includes spray concentration, flowrate, density, duration, and pH. **Enter 40-year integrated normal dose plus integrated accident dose and specify type. See discussion TAB B, Section P "Radiation." ***327°F + 46°F heat rise = 373°F

(2) Comparison of worst-case profiles and margin assessment:

	Test Profile	
Parameter	Envelopes Specified (Yes/No/NA)	Reference
	(Reference discussion	58722-2, Fig. 6, <b>R3</b>
Temperature	Yes in Sect. P.)	<u>(p 10)</u>
		58722-2, Fig. 6,
Pressure	Yes	<u>(p 10)</u> 58722-2,
Relative Humidity	<u>Yes (saturated steam)</u>	<u>Sec. 5.0</u>
Chemical Spray	Yes (see below)	58722-2, <u>Sec. 3.4</u>
Submergence	NA	TAB B, Sec. P, <u>"Submergence"</u>

JUSTIFICATION/COMMENTS - All cables in containment at WBN are enclosed in conduit; therefore, the splices are not subject to direct impingement of chemical spray. Test chemical spray encompasses requirements for WBN composition. (See TAB B Discussion.)

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R3

CABLE SI	DF RAYCHEM HEAT SHRINK CHECKED PLICES	DATE <u>//</u>	
°	MARY COMPARISON OF TEST CONDITIONS TO SPECIN		
(3)	Were margins applied to the test parameter the test program to assure that normal var accounted for? (Note margin applied, yes/m	riation and u	
	Suggested Margins per IEEE-323(74)	Margin Applied	Yes/No/NA
	Temperature: +15 degrees F	<u>    15°F</u>	Yes
	Pressure: +10% but no more than 10 psig	10%	Yes
	Radiation: +10% of accident dose	1 <u>0%</u> _	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)	1 <u>0%</u> (equivalent)	Yes*
	Voltage: <u>+</u> 10% of rated value	10%	Yes
	Frequency: <u>+</u> 5% of rated value	<u>NA</u>	<u>NA</u>
	Environmental Transient: the initial transient and the peak temperature applied twice	2 <u>Transient</u> s	Yes
	Vibration: +10% added to acceleration	NA	NA
	JUSTIFICATION/COMMENTS: Note: Margins not	ted are the d	ifference
	between the required WBN values and the va		-
	*Refer to TAB C for operating time evaluat	ion.	
	· · · · · · · · · · · · · · · · · · ·		

TVA 19537 (OE-3-86)

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CATION C CABLE SP	DE RAYCHEM HEAT SHRINK CHECKED DATE 4/4/86
M. <u>OPER</u>	RABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference <u>None).</u>
	JUSTIFICATION/COMMENTS To maintain mechanical and electrical
	integrity and insulation characteristics during and following a
	DBE to allow the cable to which the splice is attached to maintain
	its required performance during all postulated service conditions.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference <u>58722-2, Section 5.0).</u>
	JUSTIFICATION/COMMENTS <u>Ten of twelve test assemblies maintained</u>
	rated current and voltage during test. All sleeves passed voltage
	withstand test and had high IR measurements. (See TAB B, Section P).
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? Yes (Reference <u>58722-2, Section 5.0).</u>
	JUSTIFICATION/COMMENTS See M(2) above.
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? <u>No</u> (Reference <u>NA).</u>
	JUSTIFICATION/COMMENTS Time required is 100 days. Test included
	31.3-day LOCA test only (See TAB C).

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	•	WBNEQ-SPLC-001 PLANT WBN UNIT(S) 1 SHEET 28 OF 40 R R R	
CAT		LICES	
М.	OPER	ABILITY TEST RESULTS (Continued)	
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>58722-2, Section 5.0).</u>	
		JUSTIFICATION/COMMENTS See TAB B, Discussion.	
		PAGE B-28	

	R R DER TITLE ENVIRONMENTAL QUALIFI- COMPUTED HOR DATE 9/24/86
CAB	LE SPLICES
N.	MAINTENANCE AND SURVEILLANCE
	Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the Binder - Qualification Maintenance Data Sheets).
	JUSTIFICATION/COMMENTS See TAB G. There were no surveillance or
	maintenance requirements identified from the vendor or test documentation;
	however, TVA does have a maintenance and surveillance program at the
	plant.
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BINDER T	OF RAYCHEM HEAT SHRINK CHECKED DATE	R R 9/24/84 9/1/86
CATION CABLE S	OF RAICHEM HEAT SHRINK CHECKED DATE DATE	<i>µиµи</i>
0. <u>SUN</u>	MARY OF REVIEW	Yes/No/NA
(1)	Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an analysis been justified and documented)?	<u>Yes</u>
(2)	Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>None_taken</u>
(3)	Choice of qualification methodology adequately justified?	Yes
(4)	If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	NA <u>(type test)</u>
	(b) Were specific features and failure modes and effects analyzed?	NA (type test)
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	NA (type_test)
	(d) Were environmental parameters which affect equipment performance identified?	NA <u>(Type test)</u>
(5)	Adequate similarity between equipment and test specimen established?	Yes
(6)	Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	NA
-	(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
	(c) Absence of preaging in test/analysis justified?	NA (aging)
	(d) Materials susceptible to thermal/radiation aging identified?	Yes

PAGE B.30

BINDER TIT	TLE ENVIRONMENTAL QUALIFI- COMPUTED ARE DATE 2/2	SHEET <u>31</u> OF <u>40</u> R <u>R</u> R <u>40</u> M/86 <u>40</u>
0. <u>SUMM</u>	MARY OF REVIEW (Continued)	Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7)	Qualified life or replacement schedule established?	Yes
(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
•	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	Yes
	(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>Yes</u>
(11)	Criteria regarding submergence satisfied?	Yes
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
•	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

PAGE 8-3/

BINDER NO. WBNEQ-SPLC-001 PLANT WBN UNIT(S) 1 BINDER TITLE ENVIRONMENTAL QUALIFI- COMPUTED	R R
CATION OF RAYCHEM HEAT SHRINK CHECKED DAT	
0. <u>SUMMARY OF REVIEW</u> (Continued)	
	<u>Yes/No/NA</u>
(15) Criteria regarding functional testing satisfied?	<u>Yes</u>
(a) Does the test plan/report specify an acceptance criteria for equipment performed?	e <u>Yes</u>
(b) Was an initial base line test done to establish required performance characteristics?	h <u>Yes</u>
(c) Has the test/analysis demonstrated that perform performance specifications and characteristic (e.g., voltage, load frequency, and other electrical characteristics) can be ensured?	
(16) Criteria regarding instrument accuracy satisfied?	Yes
<pre>(17) Test duration margin (1 hour + function time) satisfied?</pre>	Yes
(a) Is the minimum specified operating time at leas 1 hour?	st <u>Yes</u>
(b) If exception to the 1-hour minimum operating the was taken, was adequate justification provide	
(18) Criteria regarding synergistic effects satisfied?	Yes
(19) Criteria regarding margins satisfied?	Yes
(20) Maintenance and surveillance requirements adequate identified?	ly <u>Yes</u>
P. <u>DISCUSSION</u>	
See continuation page.	
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PAGE 8-32	

TVA 19537 (OE-3-86)

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BINDER NO.WBNEQ-SPLC-001 PLANT_	WBN	UNIT(S	)_1_	SHEET 33	<u>3_0F_40</u>
BINDER TITLE Environmental	COMPUTED_	HDR	DATE	R_1_F 9/20/86	۲ <u></u>
Qualification of Raychem Heat Shrink Cable Splices	CHECKED	NMB	DATE	9/21/86 Micir	- <u></u>
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BINDER NO. <u>WBNEQ-SP</u>	<u>LC-00</u> 1 PLANT_	WBN	UNIT(	(s) <u>1</u>	SHEET 34	0F_4
BINDER TITLE Envi					$R_1, R_$	
Qualification of R	avchem Heat	_			12.244	
Shrink Cable Splic	es	_ CHECKED	NMB	DATE	<u>9/21/86 4037</u> 166.88	
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BINDER NO. WBNEQ-SPLC-001 PLANT_	WBN	UNIT(S) 1	SHEET 35_0F 40
BINDER TITLE Environmental	COMPUTED	HDR DATE	$\frac{R_{1}}{9/20/86_{CAG}} \xrightarrow{R_{3}}$
Qualification of Raychem Heat	·		12/1/88 3/16/20
Shrink Cable Splices	CHECKED	NMB DATE	9/21/86 WCG MAR
			12/6/88 8-17-90

### P. <u>DISCUSSION</u> (Continued)

### A. Radiation

In their worst-case installed environment (inside containment), the total radiation exposure is  $14 \times 10^7$  rads gamma (including 40-year dose of  $1 \ge 10^8$  rads) and a beta dose of 4.7  $\ge 10^8$  rads. The cables are routed in either rigid steel conduit or American Boa flexible conduit and are terminated in 16-gauge (minimum) sheet steel enclosures. The rigid steel conduit effectively blocks beta radiation completely. Per calculation GENAPS3-023 RO, all radiosensitive material contained in an enclosure formed of 26 gauge or thicker iron will receive a beta dose of no more than one percent of the free-field beta dose. Per calculation is WBNTSR-015, the minimum wall thickness of the American Boa Supra flex conduit is 5.9 mils. This type of conduit is made up of corrugated steel sections that are welded together. The sections are overlapped so that the outermost layers of the conduit are double thickness (11.8 mils). From Figure 1 of WENTSR-015, it can be seen that the axial distance of each convex or concave section is so small (0.0492") that a typical 6" long flexible conduit (minimum length of Raychem WCSF sleeve is 6") is covered by approximately 50 convex portions (11.8 mils thick) and 50 concave portions (5.9 mils thick) along the length of the conduit. Therefore, it is reasonable to detimine the beta reduction afforded by this conduit based on the average thickness of these two portions. For an average thickness of 8.8 mils (5.9 mils + 11.8 mils /2 = 8.8 mils), the corresponding beta dose reduction factor is 14 (See Figure 1 of GENAPS3-023). To conservatively calculate beta radiation transmitted through American Boa flexible conduit, only 70 percent of this factor is utilized. Applying a fraction of 0.102 (1/9.8) to the beta dose of 4.7 x  $10^8$  yields a dose of 4.8 x  $10^7$ . This dose added to the total gamma yields a worst case total 100 day radiation dose to the conductor insulation of  $1.88 \times 10^8$  rads.

The worst-case radiation dose for inside containment installation is shown below:

40-year normal gamma dose	e = 1.0 x 10 ⁸ rads (reference TVA drawing 47E235-42)	R3
Accident gamma dose	= 4.0 x 10 ⁷ rads (reference TVA drawing 47E235-42)	
Accident beta dose	= 4.8 x 10 ⁷ rads (see above)	R3

PAGE B-35 R3

R3

1	BINDER NO.WBNEQ-SPLC-001 PLANT_	WBN	UNIT(	5)_1	SHEET 35a0F 40
					R_1_ R_3
	BINDER TITLE <u>Environmental</u>	COMPUTED_	<u>HDR</u>	DATE	9/20/86 CAG HE
	Qualification of Raychem Heat				12/6/88 6/4/90
-	Shrink Cable Splices	CHECKED	NMB	DATE	9/21/86 WCG HDR
	•				12/6/88 7-26-90

## P. <u>DISCUSSION</u> (Continued)

The 40-year dose plus accident dose with margin is calculated as:

	$= 10.0 \times 10^7$ rads	١	R3
	$= 4.0 \times 10^7$ rads		,
	$= 4.8 \times 10^7$ rads		R3
10-percent accident margin	$= 8.8 \times 10^6$ rads		

1.968 x 10⁸ rads = Total worst-case dose for a 40-year qualified life |R3

1	
BIN	DER NO. <u>WBNEQ-SPLC-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>36</u> OF <u>40</u>
BIN	DER TITLE Environmental COMPUTED HDR DATE 9/20/86
	lification of Raychem Heat 12100
Shr	ink Cable Splices CHECKED NMB DATE 9/21/86
Р.	DISCUSSION (Continued)
	B. <u>Submergence</u> R1
	The only safety related cables which have cable splices that are
	subjected to submergence are connected to the following-devices:
	1-FSV-62-72 1-FSV-1-147
	1-FSV-62-73 1-FSV-3-185
	1-FSV-62-74 1-FSV-3-186 1-FSV-62-76 1-FSV-3-187
	1-FSV-3-7-7
	1-FSV-87-8
	The required operating time for the above devices is one hour or
	less. The cables become de-energized and failure of the splice
•	after this time would not be a safety concern (see EO Binders
	WBNEO-SOL-006 and WBNEO-SOL-003 for operating time justification).
	No splices are required for submergence longer than the-1 hour
	given above.
	The splices are located in conduit and/or steel junction boxes and
	therefore not exposed to the direct chemical spray solution. When
	the conduit or junction box becomes submerged, the solution may
	submerge the splice. The splices were subjected to the direct
-	chemical spray at a much higher pressure and temperature (than
	plant accident conditions) for 31.3 days. Also the splices were
	subjected to a 16 hour water bath prior to the performance of each
	functional test cycle. The 31.3 day exposure to direct chemical
	spray and the 42 hour water bath (3 at 16 hours) ensure that the
	splices will not fail during the required 1 hour of submergence.

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PAGE 8-36 R-1

BINDER NO. WBNEQ-SPLC-001 PLANT_	WBN	UNIT(S	5)_1	SHEET 37 OF 40
	COMPUTED_	HDR	DATE	R_1_R_3 9/20/86_CAG 12/5/88
Qualification of Raychem Heat Shrink Cable Splices	CHECKED	NMB	DATE	<u>9/21/86 WCG 2/0R</u> 12/6/88 7-26-70

### P. <u>DISCUSSION</u> (Continued)

### C. <u>Temperature</u>

The maximum accident temperature the splices will be subjected to is 453°F (MSLB in steam valve rooms, see QIR NUMWBN90032, (B26 900226 251), but per QIR MNMWBN90057 (B26 900515 250), Raychem splices are only exposed to a peak accident ambient of 349° F. This peak temperature is enveloped by the peak temperature of the test profile with a margin of 93°F (see TAB B, Sect. L.(1)). In addition, the duration of the MSLB is short, i.e., the temperature reaches the peak of 349°F in about 580 seconds and then drops rapidly to 140°F in 40 seconds, while the accident temperature inside containment remains above 150°F for approximately 147,000 seconds after attaining a peak of 324.2°F (see WBN Generic Curve #4, B44 900222 803). Since the splices have been demonstrated to be qualified for use inside containment, they are qualified for the MSLB.

R3

				WBN			R_	EET <u>38</u>	
BINDER	TITLE_	Environme of Rayche	<u>ntal</u> m Heat	COMPUTED_			6	2.9.05	
Shrink	Cable	<u>Splices</u>		CHECKED	NMB	_ DATE	<u>9/21/8</u> 6	میں تکنی 12-6-55	
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SHELIK	Cable	<u>Sprices</u>			CHECKED	NEID	_ DAIL	21.211.00	12-6.15	
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Qualifi	ication	of Raychem	Heat			DATE	<u>9120100 (6109</u> 	
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TB-001 PLANT WBN UNIT(S) 1 SHEET	$\frac{1  \text{OF} \ 1}{R  5}$
DER TITLE <u>GENERAL ELEOTAZO</u>	<u>DH</u> <u>JUA</u> 7/90 9/14/90 1CG
TERMINAL BLOCKS CHECKED ETD DATE 7/18/80	/21/90
DISCUSSION FOR TAB A 1. This binder addresses the qualification of General Electric CR151B terminal blocks which have been installed in category Class 1E harsh environment junction boxes at WBN. Field ver for the terminal blocks is provided in TAB F. The qualification	tion
on any General Electric terminal blocks supprise of with his equipment package is addressed in the binder(s) fo	
<ul> <li>equipment.</li> <li>2. Since the terminal blocks are in many safety-related circul of which are required to operate for 100 days following and the category and operating times for all terminal blocks at designated as "a" and "100 days", respectively, for all and "3. The terminal block EQIS and unit device identification non synonymous with the junction box EQIS and unit device identification non. except for the component function code (TELK). Thermultiple terminal blocks in some junction box es; however individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction box is not individual terminal block within a junction block within a junction block within a junction block</li></ul>	re cidents. 4. are R5 ntification e are each

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BINDER NO. : WBNEQ-TB -001 MANUFACTURER : GENERAL ELECTRIC PAGE 1 OF 45

### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL NUM	AZMITH	LOCATION- ELEV(1) CONTRACT	RM/RAD	<u>CAT</u> (2)	OPER TIME	EVENI	SAFETY FUNCTION
WBN-1-TBLK-276-L182A -D Terminal block	1-TBLK-276-L182A -D CR151B	183	721' 6" VARIOUS	FN2	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L182B -D TERMINAL BLOCK	1-TBLK-276-L182B -D CR151B	181	721' 6 <b>"</b> Various	FN2	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L183A -E Terminal Block	1-TBLK-276-L183A -E CR151B	005	721' 6" VARIOUS	FN1	A	100D	AĻL	DISTRIBUTE POWER
WBN-1-TBLK-276-L183B -E Terminal block	1-TBLK-276-L183B -E CR151B	002	721' 6" Various	FN1	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L183C -B Terminal Block	1-ТВLК-276-L183С -В CR151B	359	721' 6" Various	FN1	A	100D	ALL	DISTRIBUTE POWER

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 PREPARER/DATE
 J.L.H.
 7/26/86
 JDH
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 CHECKED/DATE
 E.T.D.
 7/26/86
 10/16/90
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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION- ELEV(1) CONTRACT		<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-TBLK-276-L196 Terminal Block	-D	1-TBLK-276-L196 -D CR151B	713! Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L197 Terminal block	-E	1-ТВLК-276-L197 -Е CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L216 TERMINAL BLOCK	-A	1-TBLK-276-L216 -A CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-276-L217 TERMINAL BLOCK	-A	1-TBLK-276-L217 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0004 Terminal Block	-A	1-TBLK-292-0004 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER

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EQIS_NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
WBN-2-TBLK-292-0006 Terminal Block	- <b>B</b>	2-TBLK-292-0006 -B CR151B	737 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-O-TBLK-292-0228 Terminal Block	-A	0-TBLK-292-0228 -A CR151B	729' VARIDUS	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-0229 Terminal Block	-B	0-TBLK-292-0229 -B CR151B	729' VARIOUS	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0358 TERMINAL BLOCK	<b>- B</b>	1-TBLK-292-0358 -B CR151B	692' Various	A12	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0359 Terminal Block	- <b>B</b>	1-TBLK-292-0359 -B CR151B	692' Various	A13	A	100D	ALL	DISTRIBUTE POWER

5 PREPARER DATE J.L.H ?/26/86 <u>IDH</u> 10/16/90 <u>NBR</u> 16-30 90 CHECKED/DATE E.T.D. 7/26/86

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BINDER NO. : WBNEQ-TB -001 Manufacturer : general electric Page 4 of 45

EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	·
WBN-1-TBLK-292-0530 - Terminal block	-B	1-TBLK-292-0530 -B CR151B	729' Various	A01	A	100D	ALL .	DISTRIBUTE POWER	t and the second se
WBN-1-TBLK-292-0540 - Terminal block	-A	1-TBLK-292-0540 -A CR151B	729' Various	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-0567 - Terminal block	A	1-TBLK-292-0567 -A CR151B	676' Various	A16	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-0569 - Terminal Block	-B	1-TBLK-292-0569 -B CR151B	676' Various	A16	A	100D	) ALL	DISTRIBUTE POWER	a the second
WBN-1-TBLK-292-0593 - Terminal block	-A	1-TBLK-292-0593 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER	ļ ,

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BINDER NO. : WBNEQ-TB -001 MANUFACTURER : GENERAL ELECTRIC PAGE 5 OF 45

EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
WBN-1-TBLK-292-0748 - Terminal Block	- B	1-TBLK-292-0748 -B CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0772 - Terminal block	<b>B</b>	1-TBLK-292-0772 -B CR151B	676 <b>'</b> Various	A16	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0773 - TERMINAL BLOCK	- <b>A</b>	1-TBLK-292-0773 -A CR151B	676 VARIOUS	A16	A	1,00D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0846 Terminal block	-B	1-TBLK-292-0846 -B CR151B	692 <b>'</b> Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-0847 - Terminal Block	-A	1-TBLK-292-0847 -A CR151B	692 <b>"</b> Various	A06	A	100D	ALL	DISTRIBUTE POWER
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BINDER NO. : WBNEQ-TB -001 MANUFACTURER : GENERAL ELECTRIC PAGE 6 OF 45

EQIS NUMBER DESCRIPTION		<u>UNIT DEVICE ID NO.</u> Model Numi	AZMITH	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	
WBN-1-TBLK~292-1005 TERMINAL BLOCK	-A	1-TBLK-292-1005 -A CR151B		737 VARIOUS	A05	A	100D	ALL	DISTRIBUTE POWER	
								1		
WBN-1-TBLK-292-1006 Terminal Block	-B	1-TBLK-292-1006 -B CR151B		737 <b>!</b> Various	A05	A	100D	ALL	DISTRIBUTE POHER	
WBN-2-TBLK-292-1008 Terminal Block	-B	2-TBLK-292-1008 -B CR151B	·	737 <b>'</b> Various	A09	A	100D	ALL	DISTRIBUTE POWER	
WBN-0-TBLK-292-1163 TERMINAL BLOCK	-B.	0-TBLK-292-1163 -B CR151B		757' VARIOUS	A16	A	100D	ALL	DISTRIBUTE POWER	
			·							
WBN-0-TBLK-292-1164 Terminal Block	-A	0-TBLK-292-1164 -A CR151B		757 <b>'</b> Various	A16	A	100D	ALL	DISTRIBUTE POWER	
TERMINAL BLOCK								• •	·	
			•					•		
				PREPA	RER/DATE	J	L.H. 7/	26/86	R_5_ R R	
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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. MOD	AZMITH_ DEL_NUMBER		<u>RM/RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	<u>event</u>	SAFETY FUNC	TION
WBN-1-TBLK-292-1189 Terminal Block	-A	1-TBLK-292-1189 CR1		692' VARIOUS	A09	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-1190 Terminal block	- B	1-TBLK-292-1190 CR1		692' VARIOUS	A10	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-1195 TERMINAL BLOCK	-A	1-TBLK-292-1195 CR1		692' Various	A13	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-1196 TERMINAL BLOCK	-в	1-TBLK-292-1196 CR1		692' Various	A12	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-1235 TERMINAL BLOCK	-A	1-TBLK-292-1235 CR1		713' Various	A13	A	100D	ALL	DISTRIBUTE	POWER

R 5 TDH 10/16/90 240R 10-30-80 PREPARER DATE J.L.H. 7/26/86 CHECKED/DATE E.T.O. 7/26/86

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- Elev(1) Contract	RM⁄RAD	<u>CAT</u> (2)	OPER TIME	<u>event</u>	SAFETY_FUNCTION
WBN-1-TBLK-292-1246 TERMINAL BLOCK	-A	1-TBLK-292-1246 -A CR151B	713' Various	A13	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1352 TERMINAL BLOCK	-A	1-TBLK-292-1352 -A CR151B	713' Various	A28	A	100D	ALL .	DISTRIBUTE POWER
WBN-1-TBLK-292-1353 Terminal Block	-A	1-TBLK-292-1353 -A CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1354 TERMINAL BLOCK	<b> B</b>	1-TBLK-292-1354 -B CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1355 TERMINAL BLOCK	- B	1-TBLK-292-1355 -B CR151B	713' Various	A28 -	A	100D	ALL	DISTRIBUTE POWER

R 5 PREPARER / DATE J.L.H. 7/26/86 10/16/90 240R 16-30-90 CHECKED/DATE E.T.D. 7/26/86

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EQIS NUMBER . DESCRIPTION		UNIT DEVICE ID NO, AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAI</u> (2)	OPER TIME	<u>event</u>	SAFETY FUNCTION	
WBN-1-TBLK-292-1356 Terminal Block	-A	1-TBLK-292-1356 -A CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-1357 Terminal Block	A	1-TBLK-292-1357 -A CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-1358 TERMINAL BLOCK	- <b>B</b>	1-TBLK-292-1358 -B CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-1367 TERMINAL BLOCK	-A	1-TBLK-292-1367 -A CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER	·
WBN-1-TBLK-292-1368 TERMINAL BLOCK	~ B	1-TBLK-292-1368 -B CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER	f

R_5 <u>IDH</u> 10116/90 <u>NHOR</u> 10-30-80 PREPARER/DATE <u>J.L.H.</u> 7/26/86 CHECKED/DATE <u>E.T.D.</u> 7/26/86

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID		LOCATION ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-TBLK-292-1369 Terminal Block	-A	1-TBLK-292-1369	9 – A CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1370 Terminal block	-A	1-TBLK-292-137	0 -A CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1371 TERMINAL BLOCK	-B	1-TBLK-292-137	1 -B CR151B	713' VARIOUS	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1391 Terminal Block	-5	1-TBLK-292-139	1 -S CR151B	692' Various	A01 ⁻	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1421 TERMINAL BLOCK	-A	1-TBLK-292-142	1 -A CR151B	713' VARIOUS	A12	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- Elev(1) Contract		<u>CAI</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
WBN-1-TBLK-292-1422 TERMINAL BLOCK	- <b>B</b>	1-TBLK-292-1422 -B CR151B	713' Various	A11	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1425 TERMINAL BLOCK	-A	1-TBLK-292-1425 -A CR151B	713' Various	A07	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1426 Terminal Block	-B	1-TBLK-292-1426 -B CR151B	713' Variouș	A07	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1446 TERMINAL BLOCK	-B	1-TBLK-292-1446 -B CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1447 TERMINAL BLOCK	-A	1-TBLK-292-1447 -A CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER

10/10/90 20/10/90 20/10/90 10-30-40 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/24/86

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAI</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY_FUNCTION
WBN-2-TBLK-292-1448 TERMINAL BLOCK	-B	2-TBLK-292-1448 -B CR151B	713' Various	A19	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-1449 Terminal block	-A	2-TBLK-292-1449 -A CR151B	713' VARIOUS	A19	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1502 Terminal Block	-A	1-TBLK-292-1502 -A CR151B	713' VARIOUS	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-1503 Terminal Block	-A	2-TBLK-292-1503 -A CR151B	713' VARIOUS	A19	A	100D	ALL	DISTRIBUTE POWER
HBN-1-TBLK-292-1504 Terminal block	-B	1-TBLK-292-1504 -B CR151B	713' VARIOUS	A06	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION	<u> </u>	NIT DEVICE ID		LOCATION ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENT	SAFETY FUNCT	<u></u>	1
WBN-2-TBLK-292-1505 - Terminal Block	B 2	-TBLK-292-1505	-B CR151B	713' VARIOUS	A19	A	100D	ALL	DISTRIBUTE F	POWER	-
WBN-1-TBLK-292-1512 - Terminal block	A 1	-TBLK-292-1512	-A CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE F	POWER	, <b>1</b>
WBN-1-TBLK-292-1514 - Terminal block	A 1	-TBLK-292-1514	-A CR151B	729 <b>'</b> VARIOUS	A02	<b>A</b>	100D	ALL	DISTRIBUTE F	POWER	
WBN-1-TBLK-292-1516 - Terminal Block	B 1	-TBLK-292-1516	-B CR151B	729' VARIOUS	A01	<b>A</b>	1000	ALL	DISTRIBUTE I	POWER	-
WBN-1-TBLK-292-1518 - Terminal Block	B 1	-TBLK-292-1518	-B CR151B	729' VARIOUS	A02	A	100D	ALL	DISTRIBUTE I	POWER	

R 5 PREPARER/DATE J.L. H. 7/26/86 JDH 10/16/90 CHECKED/DATE E.T.D. 7/26/86 10-31-90

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EQIS NUMBER		UNIT DEVICE ID	L NO. AZMITH	OCATION	RM/RAD	CAT	OPER TIME	EVENT	SAFETY FUNCTION
DESCRIPTION			MODEL NUMBER	CONTRACT		(2)			
WBN-1-TBLK-292-1543 Terminal block	-A	1-TBLK-292-1543	-A CR151B	6921 Various	A07	Â, ∖	1000	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1544 Terminal Block	-B	1-TBLK-292-1544	-B CR151B	6924 Various	A07	A	100D	ALĹ	DISTRIBUTE POWER
WBN-0-TBLK-292-1547 Terminal Block	A	0-TBLK-292-1547	-A CR151B	737 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-1548 Terminal Block	- <b>B</b>	0-TBLK-292-1548	-B CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1549 TERMINAL BLOCK	-A	1-TBLK-292-1549	-A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER

<u>IOH</u> 10/16/40 10-30-30 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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EQIS NUMBER DESCRIPTION	<u>UNIT</u>	DEVICE ID NO. Model	AZMITH	LOCATION ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENI	SAFETY FUNCTION
WBN-2-TBLK-292-1550 -/ Terminal block	2-TBI	K-292-1550 CR151	-A L B	737 <b>'</b> Various	A09	A	100D .	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1551 -) TERMINAL BLOCK	1-TBI	.K-292-1551 CR153	-B LB	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-1552 -1 TERMINAL BLOCK	2-TBI	K-292-1552 CR151	-B LB	737 <b>'</b> Various	AD9	A	100D	) All	DISTRIBUTE POWER
WBN-2-TBLK-292-1553 -/ Terminal block	2-TBI	K-292-1553 CR15	-A 1 B	692' Various	A25	A	1000	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-1554 - TERMINAL BLOCK	2-TBI	K-292-1554 CR15	-B 1 B	692' VARIOUS	A25	A	100D	ALL	DISTRIBUTE POWER

PREPARER/DATE J.L.H. 7/26/86 10/16/90 CHECKED/DATE E.T.D. 7/26/86 24042

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION <u>elev(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	<u>CAT OPER TIME EVEN</u> (2)	I SAFETY FUNCTION
WBN-2-TBLK-292-1555 TERMINAL BLOCK	-A 2-TBLK-292-1555 -A CR151B		A 100D ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-1556 Terminal Block	-B 2-TBLK-292-1556 -B CR151B	692" A25 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1564 Terminal block	-A 1-TBLK-292-1564 -A CR151B	692' AO8 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1565 Terminal Block	-B 1-TBLK-292-1565 -B CR151B	692" A08 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1566 TERMINAL BLOCK	-B 1-TBLK-292-1566 -B CR151B	692' A08 Various	A 100D ALL	DISTRIBUTE POWER

PREPARER/DATE J.L.H. 7/26/86 JD 10/16/40 24011 10-30-90 CHECKED/DATE 6.T.D. 7/16/86

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EQIS NUMBER		UNIT DEVICE ID NO. AZMITH	LOCATION-	<u>RM⁄RAD</u>	çat	OPER TIME	EVENT	SAFETY FUNCTION
DESCRIPTION WBN-1-TBLK-292-1567 TERMINAL BLOCK	-A	MODEL NUMBER 1-TBLK-292-1567 -A CR151B	CONTRACT 6924 VARIOUS	A08	(2) A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1598 TERMINAL BLOCK	-A	1-TBLK-292-1598 -A CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1599 TERMINAL BLOCK	- B	1-TBLK-292-1599 -B CR151B	713 VARIOUS	Å28	A	100D	ALL '	DISTRIBUTE POWER
WBN-1-TBLK-292-1933 TERMINAL BLOCK	-5	1-TBLK-292-1933 -S CR151B	692' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-1942 Terminal Block	-A	0-TBLK-292-1942 -A CR151B	757 <b>'</b> Various	A16	A	100D	ALL	DISTRIBUTE POWER

R_<u>5</u> JAH 10116/90 241922 10-30-90 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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PRINT DATE: 10/10/90

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION- ELEV(1) Contract	<u>RM⁄RAD</u>	<u>CAT</u> (2)	OPER_TIME	EVENT	SAFETY FUNCTION
WBN-O-TBLK-292-1943 -B Terminal block	I	0-TBLK-292-1943 -B CR151B	757 <b>.</b> Various	A16	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1964 -B Terminal Block	ŀ	1~TBLK-292-1964 -B CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1966 -A Terminal block	L.	1-TBLK-292-1966 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1968 -A Terminal block	l	1-TBLK-292-1968 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1970 -B Terminal block	3	1-TBLK-292-1970 -B CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION	······	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAI</u> (2)	OPER TIME	EVENI	SAFETY FUNCTION
WBN-1-TBLK-292-1972 Terminal Block	-B	1-TBLK-292-1972 -B CR151B	729 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1974 Terminal block	-A	1-TBLK-292-1974 -A CR151B	729' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1985 Terminal block	<b>-A</b>	1-TBLK-292-1985 -A CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1986 Terminal block	- B	1-TBLK-292-1986 -B CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-1987 Terminal <u>B</u> lock	- B	1-TBLK-292-1987 -B CR151B	729' VARIOUS	<u>A02</u>	A	1000	ALL	DISTRIBUTE POWER

R 5 · 10116190 10116190 103080 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION	,
WBN-1-TBLK-292-1988 Terminal Block	-A	1-TBLK-292-1988 -A CR151B	729' VARIOUS	A02	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2007 Terminal Block	B	1-TBLK-292-2007 -B CR151B	692' Various	A07	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2008 TERMINAL BLOCK	-A	1-TBLK-292-2008 -A CR151B	692' Various	A07	A	100D	ALL	DISTRIBUTE POWER	i ,
WBN-1-TBLK-292-2012 TERMINAL BLOCK	-B	1-TBLK-292-2012 -B CR151B	713' VARIOUS	A13	A	100D _.	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2013 TERMINAL BLOCK	-A	1-TBLK-292-2013 -A CR151B	713' VARIOUS	A13	A	100D	ALL	DISTRIBUTE POWER	R5
	PA	GE <u>A-21</u> R5		ARER∕DAT KED∕DATE		L.H. 7/2 T.D. 7/2	6/86 26/86	R_5 R R 	





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		UNIT DEVICE ID I	NO	AZMITH	LOCATION ELEV(1)	RM/RAD	CAT	OPER TIME	EVENT	SAFETY FUNC	TION
EQIS NUMBER DESCRIPTION			TODEL NUME		CONTRACT		(2)				
WBN-1-TBLK-292-2063 TERMINAL BLOCK	-A	1-TBLK-292-2063	-A CR151B		692' Various	A07	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-2064 TERMINAL BLOCK	-B	1-TBLK-292-2064	-B CR151B		692' Various	A07	A	100D	All	DISTRIBUTE	POWER
WBN-1-TBLK-292-2065 TERMINAL BLOCK	-A	1-TBLK-292-2065	-A CR151B		692" Various	A07	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-2066 TERMINAL BLOCK	- B	1-TBLK-292-2066	-B CR151B		692' Various	A07	A	100D	ALL	DISTRIBUTE	POWER
WBN-1-TBLK-292-2070 Terminal block	-	1-TBLK-292-2070	CR151B		737' Various	A05	A	100D	ALL	DISTRIBUTE	POWER

PREPARER/DATE J.L.H. 7/26/86 10/16/90 CHECKED/DATE E.T.D. 7/26/86 NON-11-30-90

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#### WATTS BAR NUCLEAR PLANT TABA- EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH. Model Number	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	•
WBN-1-TBLK-292-2071 Terminal Block	. <b>-A</b>	1-TBLK-292-2071 -A CR151B	737 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER	-
WBN-1-TBLK-292-2122 Terminal Block	-A	1-TBLK-292-2122 -A CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2140 TERMINAL BLOCK	-A	1-TBLK-292-2140 -A CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2141 TERMINAL BLOCK	В	1-TBLK-292-2141 -B CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2202 TERMINAL BLOCK	-A	1-TBLK-292-2202 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER	,

R 5 PREPARER/DATE J.L.H. 7/26/86 10/16/20 24012 10-30-80 7/26/86 CHECKED/DATE E.T.O.

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EQIS NUMBER		UNIT DEVICE ID NO. AZMITH	-LOCATION- ELEV(1)	<u>RM/RAD</u>	<u>ça</u> t	OPER TIME	EVENT	SAFETY FUNCTION	
DESCRIPTION		MODEL NUMBER	CONTRACT		(2)				
WBN-1-TBLK-292-2204 Terminal block	-A	1-TBLK-292-2204 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2205 Terminal Block	-A	1-TBLK-292-2205 -A CR151B	737! VARIOUS	A01	A	100D	ALL '	DISTRIBUTE POWER	
WBN-1-TBLK-292-2206 TERMINAL BLOCK	-A	1-TBLK-292-2206 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2207 Terminal Block	-A	1-TBLK-292-2207 -A CR151B	692 <b>'</b> Various	A07	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-2208 TERMINAL BLOCK	-B	1-TBLK-292-2208 -B CR151B	737' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER	
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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. Model Num	AZMITH	LOCATION- <u>ELEV(1)</u> <u>Contract</u>	<u>RM⁄RAD</u>	<u>CAI</u> (2)	OPER TIME	<u>event</u>	SAFETY FUNCTION
WBN-1-TBLK-292-2209 TERMINAL BLOCK	- B	1-TBLK-292-2209 -B CR151B	·	737 <b>'</b> Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2211 TERMINAL BLOCK	- B	1-TBLK-292-2211 -B CR151B		692 <b>'</b> Various	A07	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2212 TERMINAL BLOCK	- B	1-TBLK-292-2212 -B CR151B		737 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-2215 TERMINAL BLOCK	-	2-TBLK-292-2215 CR151B	· •	737 <b>'</b> Various	A09	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2234 TERMINAL BLOCK	-s [*]	CR151B		692 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
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	PÅ	<b>JE</b> <u>A</u> – 25 R5			RER⁄DATE ED⁄DATE_			6/86	<u>IDH</u> 10/16/90 <u>HAL</u> 16-30-90





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## WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID		LOCATION ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER_TIME	<u>event</u>	SAFETY FUNCTION
WBN-1-TBLK-292-2236 TERMINAL BLOCK	<b>-S</b>	1-TBLK-292-2236	-S CR151B	692' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2238 TERMINAL BLOCK	-5	1-TBLK-292-2238	-S CR151B	692' Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2242 TERMINAL BLOCK	-s	1-TBLK-292-2242	-S CR151B	692 <b>'</b> Various	A06	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2252 Terminal Block	-A	1-TBLK-292-2252	-A CR151B	757' Various	A16	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2257 Terminal block	-A	1-TBLK-292-2257	A CR151B	713' Various	A06	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO, AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM⁄RAD</u>	<u>CAT</u> (2)	OPER TIME	<u>EVENT</u>	SAFETY FUNCTION
WBN-1-TBLK-292-2260 Terminal block	- B	1-TBLK-292-2260 -B CR151B	713' Various	A06	A	1000	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2262 TERMINAL BLOCK	-B	1-TBLK-292-2262 -B CR151B	757 <b>'</b> Various	A16	Å	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2265 TERMINAL BLOCK	-B	1-TBLK-292-2265 -B CR151B	737! Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2386 TERMINAL BLOCK	-В	1-TBLK-292-2386 -B CR151B	737 V Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2387 Terminal Block	-A	1-TBLK-292-2387 -A CR151B	737' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER

R 5 PREPARER/DATE J.L.H. 7/26/86 104 10/16/90 HGR CHECKED/DATE E.T. D. 7/26/86 10-30-90

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PRINT DATE: 10/10/90

EQIS NUMBER DESCRIPTION	<u></u>	UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION- ELEV(1) CONTRACT		<u>Cat</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
HBN-1-TBLK-292-2388 TERMINAL BLOCK	-A	1-TBLK-292-2388 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-2389 TERMINAL BLOCK	-A	2-TBLK-292-2389 -A CR151B	737 <b>'</b> Various	A01	A	100D _.	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-2390 TERMINAL BLOCK	- B	2-TBLK-292-2390 -B CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-2391 TERMINAL BLOCK	-A	2-TBLK-292-2391 -A CR151B	737' Various	A01	A	100D	ALĻ	DISTRIBUTE POWER
WBN-1-TBLK-292-2503 Terminal Block	-B	1-TBLK-292-2503 -B CR151B	676 <b>'</b> Various	A 0 8	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION
WBN-1-TBLK-292-2504 Terminal block	-A	1-TBLK-292-2504 -A CR151B	676 <b>"</b> Various	A09	<b>A</b>	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2507 Terminal Block	<b>B</b>	1-TBLK-292-2507 -B CR151B	676' Various	A10	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-2508 TERMINAL BLOCK	-A	1-TBLK-292-2508 ~A CR151B	676' Varidus	A11	A	100D	ALL	DISTRIBUTE POWER
WBN-2-TBLK-292-2761 Terminal Block	- B	2-TBLK-292-2761 -B CR151B	757'. Various	A16	A	100D	ALL	<b>DISTRIBUTE POWER</b> ,
WBN-2-TBLK-292-2762 Terminal block	-A	2-TBLK-292-2762 -A CR151B	757' Various	A16	A	100D	ALL	DISTRIBUTE POWER

R 5 R PREPARER/DATE J.L. H. 7/26/86 JDH 0//6/90 CHECKED/DATE E.T.D. 7/26/86 10-30-20

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO AZMITH MODEL NUMBER	LOCATION- <u>ELEV(1)</u> <u>CONTRACT</u>	<u>RM/RAD</u>	<u>CA1</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY_FUNCTION
WBN-0-TBLK-292-2765 TERMINAL BLOCK	<b>-A</b>	0-TBLK-292-2765 -A CR151B	692 <b>'</b> Various	A01	<b>A</b>	100D	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-2766 Terminal Block	- B	0-TBLK-292-2766 -B CR151B	692 <b>'</b> Various	A01	<b>A</b>	1000	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-2856 Terminal Block	-A	0-TBLK-292-2856 -A CR151B	737 <b>"</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-0-TBLK-292-2894 Terminal Block	- B	0-TBLK-292-2894 -B CR151B	737 <b>'</b> Various	A01	A	100D [°]	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-3032 TERMINAL BLOCK	- B	1-TBLK-292-3032 -B CR151B	713' VARIOUS	A28	A	1000	۲ ALL ۱	DISTRIBUTE POWER

PREPARER/DATE J.L.H. 7/26/86 <del>[0]16/9</del>0 1+012 10-30-90 7/26/86 CHECKED/DATE E.T.D.

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EQIS_NUMBER		UNIT DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION- ELEV(1) Contract		<u>çai</u>	OPER TIME	EVENT	SAFETY FUNCTION
DESCRIPTION WBN-1-TBLK-292-3033 TERMINAL BLOCK	-A	1-TBLK-292-3033 -A CR151B	713' VARIOUS	A28	A		ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-3208 Terminal Block	-A	1-TBLK-292-3208 -A CR151B	692' Varidus	A07	A	100D	ALL	DISTRIBUTE POWER
WBN-O-TBLK-292-3213 Terminal Block	- B	0-TBLK-292-3213 -B CR151B	692' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-3214 TERMINAL BLOCK	- B	1-TBLK-292-3214 -B CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-O-TBLK-292-3215 Terminal Block	-A	0-TBLK-292-3215 -A CR151B	737" Various	A01	A	100D	ALL	DISTRIBUTE POWER

r 5 PREPARER/DATE J.L. H 7/26/86 0/16/90 CHECKED/DATE E.T.D. 7/26/86 HAR-10-30-90

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EQIS NUMBER DESCRIPTION	•	UNIT DEVICE ID NO. AZMITH. Model Number	LOCATION- ELEV(1) CONTRACT	<u>RM∕RAD</u>	<u>Cat</u> (2)	OPER TIME	EVENT	SAFETY FUNCTION	
WBN-0-TBLK-292-3341 TERMINAL BLOCK	<b>B</b>	0-TBLK-292-3341 -B CR151B	737 <b>'</b> Various	A01	A	100D	ALL	DISTRIBUTE POWER	) )
WBN-0-TBLK-292-3342 Terminal Block	-A	0-TBLK-292-3342 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-3422 Terminal Block	-A	1-TBLK-292-3422 -A CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-3423 TERMINAL BLOCK	B	1-TBLK-292-3423 -B CR151B	713' Various	A28	A	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-292-3870 Terminal Block	-A	1-TBLK-292-3870 -A CR151B	737' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER	

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			OCATION	RM/RAD	CAT.	OPER TIME	EVENT	SAFFTY FUNCTION
EQIS NUMBER DESCRIPTION		<u>UNIT DEVICE ID NO. AZMITH.</u> Model Number	<u>CONTRACT</u>	BIE BOR			FIRMI	SAFETY FUNCTION
WBN-1-TBLK-292-4011 Terminal Block	-A	1-TBLK-292-4011 -A CR151B	729' VARIOUS	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4013 Terminal Block	-A	1-TBLK-292-4013 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4015 TERMINAL BLOCK	- B	1-TBLK-292-4015 -B CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4026 TERMINAĽ BLOCK	- <b>B</b>	1-TBLK-292-4026 -B CR151B	737' VARIOUS	A05	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4027 Terminal Block	-A	1-TBLK-292-4027 -A CR151B	737' Various	A05	A	100D	ALL	DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION Elev(1) Contract		<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-TBLK-292-4166 TERMINAL BLOCK	-A	1-TBLK-292-4166 -A CR151B	729' Various	A04	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4167 TERMINAL BLOCK	B	1-TBLK-292-4167 -B CR151B	729' VARIOUS	A04	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4275 TERMINAL BLOCK	-A	1-TBLK-292-4275 -A CR151B	737' Various	A01	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4984 TERMINAL BLOCK	- <b>A</b>	1-TBLK-292-4984 -A CR151B	757 <b>'</b> Various	A16	A	100D .	ALL	DISTRIBUTE POWER
WBN-1-TBLK-292-4985 TERMINAL BLOCK	B	1-TBLK-292-4985 -B CR151B	757 <b>'</b> Various	A16	A	100D	ALL	DISTRIBUTE POWER

JDH 10/16/90 24011-10-30-90 PREPARER / DATE J.L. H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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EQISOUMBER	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME</u> (2)	EVENT SAFETY FUNCTION
DESCRIPTION WBN-1-TBLK-293-0159 -1 TERMINAL BLOCK		804! 3" UC VARIOUS	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0368 -} TERMINAL BLOCK	1-TBLK-293-0368 -B CR151B	806' UC Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0394 -/ Terminal block	1-TBLK-293-0394 -A 045 CR151B	706' RW Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0542 -/ TERMINAL BLOCK	1-TBLK-293-0542 -A 234 CR151B	736' 4" AC3 Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0544 - Terminal block		754' LC Various	A 100D	ALL DISTRIBUTE POWER

R 5 <u>IDH</u> 10/16/90 <u>IDH</u> 10-30-20 PREPARER / DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. MODEL NUM	AZMITH_	LOCATION Elev(1) Contract	<u>RM/RAD</u>	<u>Cat</u> (2)	OPER TIME	<u>event</u>	SAFETY FUNCTION	<u>.</u>
WBN-1-TBLK-293-0546 -B TERMINAL BLOCK	1-TBLK-293-0546 -B CR151B	300	724' 5" Various	ANN	A	100D	ALL	DISTRIBUTE POW	ĒR
WBN-1-TBLK-293-0548 -B TERMINAL BLOCK	1-TBLK-293-0548 -B CR151B	248	753'10" Various	АŅŅ	A	100D	ALL	DISTRIBUTE POW	ĒR
WBN-1-TBLK-293-0550 -A Terminal block	1-TBLK-293-0550 -A CR151B	287	792 <b>'</b> Various	ANN	A	100D	ALL	DISTRIBUTE POW	ĒR
WBN-1-TBLK-293-0553 -A TERMINAL BLOCK	1-TBLK-293-0553 -A CR151B	4	744' 6" Various	ANN	A	100D	ALL	DISTRIBUTE POŅ	ER
WBN-1-TBLK-293-0574 -A Terminal block	1-TBLK-293-0574 -A CR151B	013	734° 9" Various	FN1	A	100D	ALL	DISTRIBUTE POW	ER

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO, AZMITH MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME</u> (2)	EVENT SAFETY FUNCTION
WBN-1-TBLK-293-0578 -B Terminal block	1-TBLK-293-0578 -B 349 CR151B	730' 5" FN1 Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0596 -B Terminal block	1-TBLK-293-0596 -B 346 CR151B	706º 7º LC Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0656 -A TERMINAL BLOCK	1-TBLK-293-0656 -A 132 CR151B	731' 7" AC2 Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0691 -A TERMINAL BLOCK	1-TBLK-293-0691 -A 213 CR151B	706' RW Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0724 -B TERMINAL BLOCK	1-TBLK-293-0724 -B 059 CR151B	748º 6ª ANN Various	A 100D	ALL DISTRIBUTE POWER

R 5 PREPARER/DATE J.L.H. 7/26/86 10/16/90 24012 10-30-90 CHECKED/DATE E.T.D. 7/26/86

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. A MODEL NUMBE	AZMITH ELEV(1) BM/ ER CONTRACT	RAD CAT OPER TIME (2)	EVENT SAFETY FUNCTION
WBN-1-TBLK-293-0745 -/ Terminal block	1-TBLK-293-0745 -A 1 CR151B	199 805'8" UC VARIOUS	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0760 -I TERMINAL BLOCK	1-TBLK-293-0760 -B 1 CR151B	115 731'4" IIR Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0762 -/ Terminal block	1-TBLK-293-0762 -A 1 CR151B	105 751'6" ANN Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0764 -/ Terminal block	1-TBLK-293-0764 -A 0 CR151B	060 740'2" IIR Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-0766 -1 Terminal block	1-TBLK-293-0766 -B 2 CR151B	291 745' AC4 Various	A 100D	ALL DISTRIBUTE POWER

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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. MODEL NUM	AZMITH	LOCATION- ELEV(1) Contract	<u>RM/RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENI	SAFETY FUNCTION
WBN-1-TBLK-293-0768 TERMINAL BLOCK	A	1-TBLK-293-0768 -A CR151B	297	731• 4¤ VARIOUS	ANN	A	100D	ALL .	DISTRIBUTE POWER
WBN-1-TBLK-293-0775 TERMINAL BLOCK	-A	CR151B	035	720' 4" Various	AC1	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-0788 Terminal Block	-A	1-TBLK-293-0788 -A CR151B	287	727 <b>' 9"</b> Various	ANN	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-0792 Terminal Block	-B	1-TBLK-293-0792 -B CR151B	285	722 <b>'</b> Various	AC4	A	100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-0795 TERMINAL BLOCK	A	1-TBLK-293-0795 -A CR151B	283	728' 9" Various	ANN	A	100D	ALL	DISTRIBUTE POWER

R_ 5 R R -JOH 10/16/90 24012 10-30-90 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER	UNIT DEVICE ID NO AZMITH_	LOCATION	CAT OPER TIME EVENT	SAFETY FUNCTION
DESCRIPTION	MODEL NUMBER	CONTRACT		
WBN-1-TBLK-293-1034 -A Terminal block	1-TBLK-293-1034 -A 006 CR151B	835' 9" ANN Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1036 -B Terminal Block	1-TBLK-293-1036 -B 357 CR151B	835' 9" ANN Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1255 -A Terminal block	1-TBLK-293-1255 -A 028 CR151B	727'10" ANN Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1277 -A Terminal Block	1-TBLK-293-1277 -A 311 CR151B	804'10" ANN Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1283 -B Terminal Block	1-TBLK-293-1283 -B 317 CR151B	804'10" ANN Various	A 100D ALL	DISTRIBUTE POWER

PREPARER / DATE J.L.H. 7/26/86 10/16/90 CHECKED/DATE E.T.D. 7/26/86 HAR-10-30-80

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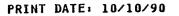
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EQIS NUMBER DESCRIPTION		UNIT DEVICE ID NO. MODEL NUM	AZMITH_	LOCATION- ELEV(1) CONTRACT	<u>RM/RAD</u>	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION	1
WBN-1-TBLK-293-1285 TERMINAL BLOCK	- B	1-TBLK-293-1285 -B CR151B	31.9	804'10" Various	ANN	A	100D	ALL	DISTRIBUTE POWER	,
WBN-1-TBLK-293-1287 TERMINAL BLOCK	-A	1-TBLK-293-1287 -A CR151B	313	804'10" VARIOUS	ANN	A .	100D	ALL	DISTRIBUTE POWER	
WBN-1-TBLK-293-1576 TERMINAL BLOCK	-A	1-TBLK-293-1576 -A CR151B	100	787 Various	PRS	A	100D	ALL	DISTRIBUTE POWER	-
WBN-1-TBLK-293-1736 TERMINAL BLOCK	- <b>B</b>	1-TBLK-293-1736 -B CR151B	304	738' 6" Various	AC4	A	100D	ALL	DISTRIBUTE POWER	<b>!</b>
WBN-1-TBLK-293-1738 Terminal Block	B	1-TBLK-293-1738 -B CR151B	285	720' Various	AC4	A	100D	ALL	DISTRIBUTE POWER	·

PREPARER / DATE J.L.H. 7/26/86 101/6/90 HOU 10-30-80 CHECKED/DATE E.T.D. 7/26/86

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EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMIT MODEL NUMBER	LOCATION <u>HELEV(1)</u> RM∕RAD CONTRACT	<u>CAI OPER TIME EVEN</u> (2)	IT SAFETY FUNCTION
WBN-1-TBLK-293-1750 -A Terminal Block	1-TBLK-293-1750 -A 308 CR151B	724"10" AC4 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1758 -1 Terminal Block	1-TBLK-293-1758 -B 280 CR151B	719'10" AC4 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1764 -] Terminal block		719'11" AC4 Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1883 -1 Terminal Block	1-TBLK-293-1883 -B 165 CR151B	727'll" ANN Various	A 100D ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-1885 -/ Terminal Block	1-TBLK-293-1885 -A 191 CR151B	727'11" ANN Various	A 100D ALL	DISTRIBUTE POWER

R 5 10/16/90 10/16/90 10-30-90 PREPARER/DATE J.L.H. 7/26/86 CHECKED/DATE E.T.D. 7/26/86

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## WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION <u>Elev(1)</u> <u>Rm/RAD</u> <u>Contract</u>	<u>CAT OPER TIME</u> (2)	EVENT SAFETY FUNCTION
WBN-1-TBLK-293-1887 -A TERMINAL BLOCK	1-TBLK-293-1887 -A 007 CR151B	725" 3" ANN Various	A 100D	ALL, DISTRIBUTE POWER
WBN-1-TBLK-293-1889 -B Terminal Block	1-TBLK-293-1889 -B 350 CR151B	728º 2º ANN Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-1921 -A TERMINAL BLOCK	1-TBLK-293-1921 -A 297 CR151B	718' 1" AC4 Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-2649 -A TERMINAL BLOCK	1-TBLK-293-2649 -A CR151B	805' 7" UC Various	A 1QOD	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-3193 -B Terminal block	1-TBŁK-293-3193 -B CR151B	784'10" UC Various	A 100D	ALL DISTRIBUTE POWER

R .5 PREPARER/DATE J.L.H. 7/26/86 10/16/90 CHECKED/DATE E.T.D. 7/26/86 15-30

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EQIS NUMBER	UNIT DEVICE ID NO	LOCATION H_ ELEV(1) RM/RAD	<u>ÇAT OPER TIME</u>	EVENT	SAFETY FUNCTION
DESCRIPTION	MODEL NUMBER	CONTRACT	(2)		
WBN-1-TBLK-293-3201 -B TERMINAL BLOCK	1-TBLK-293-3201 -B 285 CR151B	720' 3" AC4 Various	A 100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-3203 -A Terminal block	1-TBLK-293-3203 -A 235 CR151B	721º 2º AC3 Various	A 100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-3317 -B Terminal block	1-TBLK-293-3317 -B 280 CR151B	732'11" AC4 Various	A 100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-4326 -D Terminal Block	1-TBLK-293-4326 -D 30 CR151B	720' 5" LC Various	A 100D	ALL	DISTRIBUTE POWER
WBN-1-TBLK-293-4328 -D TERMINAL BLOCK	1-TBLK-293-4328 -D 050 CR151B	721'11" LC Various	A 100D .	ALL	DISTRIBUTE POWER

PREPARER/DATE J.L.H. 7/26/86 CHECKED DATE E.T.D. 7/26/86 10-70-80

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### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH MODEL NUMBER	-LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT OPER TIME</u> (2)	EVENT SAFETY FUNCTION
WBN-1-TBLK-293-4330 -E Terminal block	1-ТВLК-293-4330 -Е 150 CR151B	721' LC Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-4332 -E Terminal block	1-ТВLК-293-4332 -Е 135 CR151B	721' 3" LC Various	<u>,</u> a 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-4334 -F Terminal block	1-TBLK-293-4334 -F 224 CR151B	723' 7" LC Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-4336 -F TERMINAL BLOCK .	1-TBLK-293-4336 -F 229 CR151B	720' 8" LC Various	A 100D	ALL DISTRIBUTE POWER
WBN-1-TBLK-293-4338 -G TERMINAL BLOCK	1-TBLK-293-4338 -G 333 CR151B	720' 9" LC Various	A 100D	ALL DISTRIBUTE POWER

R 5 PREPARER/DATE J.L.H. 7/26/86 10116/90 CHECKED / DATE 6. T. D. 7/26/86 HOR 10-3090

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PAGE A-45 RS



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PRINT DATE: 10/10/90



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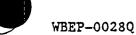
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EQIS NUMBER DESCRIPTION	<u>UNIT DEVICE ID NO.</u> Model Num	AZMITH_ELEV(1) RM/RA 18ERCONTRACT	_ <u>D CAT OPER TIME EVENT S</u> _ (2)	AFETY FUNCTION
WBN-1-TBLK-293-4340 TERMINAL BLOCK	-G 1-TBLK-293-4340 -G CR151B	315 717'1" LC Various	A 100D ALL D	ISTRIBUTE POWER
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<b>.</b>	<u>.</u>	PREPARERZDA	TE J.L.H. 7/26/16	к <u>э</u> к к ЛЛН
	PAGE A - 46 R5		E E.T.D. 2/26/86	IAH I 0 / 16/9 0 HAN IO-30-70

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Pages <u>A-48</u> thru <u>A-50</u> were deleted per revision <u>3</u>.

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BINDER NO. WE	<u>BNEQ-TB-001</u> PLAN			S) <u>1</u>		T <u>B1</u> 2_R
BINDER TITLE_	GENERAL ELECTRI	<u>C</u> COMPUTED_	JLH	DATE <u>7/</u>		<u>_CAG</u> 9/18/8
	TERMINAL BLOCKS	CHECKED	ETD	DATE <u>7/</u>	/30/86	
A. DOCUMENTA	TION					
Equipment	: Description	Terminal Bl	ock			<u>.</u>
Vendor/Ma	nufacturer	General Ele	<u>ctric Co</u>	mpany		
Equipment	: Model No.(s)	CR151B				
					<u></u>	<u> </u>
QUALIFIC	ATION REPORTS	- <u></u>				
*(1) Tit]	Le/Number/Revisio	n "Nuclear E	nviron-	RIMS	B43 86	0514
ment	al Qualification	Test Program	m on Ter			
Auth	nority," Wyle Te	st Report	-		a (1 a (a	
<u>No.</u>	<u>17733-1, Revisio</u>	<u>n B</u>		DATE_	3/19/8	6
(2) Tit!	le/Number/Revisio	n		RIMS_		
			•			
·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		DATE_		
(3) Tit	le/Number/Revisio	n		RTW2_		<u>.</u>
<del>-,, -,, -</del>				DATE		
OTHER (4	ANALYSIS, VENDOR	DATA, ETC.)				
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(coate	eport addresses t ed and uncoated) nal blocks (speci	and certain	cables.	Only th	ne data	on th

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NP I	BINDER NO. WBNEQ-TB-001 PLANT WBN UNIT(S) 1 SHEET Bla OF B39
) lik	R_3_R_5_
	3/7/90 10//6/90
	TERMINAL BLOCKS CHECKED ETD DATE 7/18/86 WCG 4404C 3/21/90 20-36 20
	ADDITIONAL DOCUMENTATION
	Other (Analysis, Vendor Data, etc) (Continued)
	4. WBN-OSG4-048 R4 (B26 890510 504), "Equipment Submergence Requirements in Reactor Building."
	5. WBNTSR-057RO (B26 891221 201), "Beta Dose Reduction From Finite Volume."
	6. TVA Environmental Drawing 47E235-Series (specifically 47E235-42 R2 and DCA P-04104-02-1 and DCA P-04104-03-0).
·	7. TVA Central Laboratories Technical Report M86-86-0032, dated November 13, 1985 (E13 851113 251), "TB Terminals From Sequoyah Nuclear Plant Environmental Qualification."
	8. John A. Raulston memorandum, with attachments, to R. A. Sessoms dated November 20, 1985 (B45 851120 263).
	9. WBNTSR-051R0 (B26 891129 202), Reduction of Beta by Sheet Steel.
	10. TVA Central Laboratories Technical Report Cl86-86-1186, dated August 8, 1986 (E13 860808 251), "Examination of Electrical Terminal Blocks Manufactured by General Electric Company."
	11. General Electric Company letter dated July 16, 1986 (B70 860721 100).
	12. General Electric Company letter dated February 24, 1978.
	NOTE: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a
	complete listing of binder references.
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	ER NO. <u>WBNEQ-TB-001</u> PLANT <u>WBN</u>		R_1_ R_
BIND	ER TITLE <u>GENERAL ELECTRIC</u> COMP	UTEDJLH	DATE <u>7/16/86 CAG</u> 1/17/89
TE	RMINAL BLOCKS CHEC	KEDETD	DATE <u>7/18/86_JFW</u> 1/23/89
ġ.	CONCLUSION OF REVIEW (Check onl	y one block)	
	<u>X</u> Equipment Qualified *		
	Equipment Satisfies All Life or Justification		
	Equipment Qualification	Not Establish	ed by Documentation
	Equipment Not Qualified	Based on Test	Failures
	OPEN ITEMS AND QUALIFICATION DEF	ICIENCIES <u>*Th</u>	<u>e conclusion of equi</u>
	ment qualified is conditional de	pending upon r	esolution of the
	cechnical issues listed (see from	nt of binder).	
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	••••••••••••••••••••••••••••••••••••••	•	
ł	COMMENTS/RECOMMENDATIONS The Gen	neral Electric	terminal blocks are
	ualified for inside and outside	containment s	ervice for 40 years.
	The blocks are qualified for powe	er and control	applications in any
2	area of the plant. TVA supplied	and installed	terminal blocks in
	ocal junction boxes inside conta	ainment and the	e main_steam_valve
	ault rooms are coated with Dow (	Corning RTV 31	40 coating.
-			······································
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BINDER	TITLE_	GENERA	L ELF	ECTRIC	COMPUT	[ED_/R1	<u>Cel4</u>	DATE	<u>[-73</u>	Γ <u>-</u>	<u>_</u>	
	<u> </u>	TERMIN	AL BI	LOCKS	CHECKI	ED <u>/R1</u>	Hw	DATE	<u> /-23-</u>	89		
			<u> </u>		<u></u>							
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	]	Page	<u>B-4</u>	was d	eleted	per re	vision	1	<u> </u>	•		
		•										
								•				

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	RMINAL BLOCKS CHECKED K.T. Q. DATE 7/26/86	
с.	QUALIFICATION CRITERIA	
	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate Which Criteria is Applicable):	
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of 1E Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
	JUSTIFICATION/COMMENTS NA	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	IEEE Standard 344-1975	
	10CFR50/Appendix B	
	ANSI N45.2	
	NEMA ICS4	
	NEMA ICS4 UL 1059	

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BIND	R_2_R ER TITLE <u>GENERAL ELECTRIC</u> COMPUTED <u>JLH</u> DATE <u>7/16/86</u>
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<u></u>	
D.	QUALIFICATION METHODOLOGY (Check only one block)
	Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	X Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Simi Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS

# PAGE B-6 R2

RTND	LK TI	ILE <u>GENERAL ELECT</u>	RIC COMPUTED		126/86 JDH 10/16/90
TEI	RMINAL	L BLOCKS	CHECKED	<u>ETD</u> DATE <u>7</u>	126/86 Hole 10-31-90
E.	Is the iden	<u>PMENT DESCRIPTION</u> he equipment iden tical to the plan	tified in the o t equipment whi	qualification do ich requires qua	cumentation lification
	(Yes.	/No/NA)? Yes			
	•		<u>Plant Device</u> Terminal	Qualification <u>Document</u> Terminal	<u>Referenc</u> Page I-2,
	(1)	Equipment Type	<u>Block</u> General	<u>Block</u> General	<u>Par. 2.1</u> Page I-2,
	(2)	Manufacturer	<u>Electric</u> CR151B	<u>Electric</u>	Par. 2.1 Page I-2,
	(3)	Model Number(s)		<u>CR151B6</u>	Par. 2.1
			<u></u>		
	(4)	Serial Number(s)	<u>NA</u>	NA	<u>NA</u>
	(5)	Identify Compone Unique checkshee attached:			
	Wyle TVA fill conc thei the mine conc anal	IFICATION/COMMENT Test Report No. concludes that th ed phenolic, rath luded in the test r letter to B. Ho block material wa ral-filled phenol lusion has been p ysis performed by eport No. C186-86	17733-1 Revision te tested blocks for than cellulo program, since oper dated July s changed from ic in May of 19 proven to be val TVA's Central	s' base material ose-filled pneho e General Electr y 16, 1986 (See cellulose-fille 983, approximate lid based upon a Laboratories an	h 19, 1986. was mineral lic, as Wyle ic states in TAB E), that d phenolic ly. This material
	mate <u>type</u>	<u>CR151B terminal b</u> rial, either cell <u>s of phenolic mat</u> resistance to the	ulose-filled or erials are sim	r mineral-filled	. These two ce, texture,

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BINDER NO	WBN	UNIT(S)	1	SHEET 0F
BINDER TITLEGENERAL ELECTRIC			DATE 7/6	R R
TERMINAL BLOCKS	_ CHECKI	D Eth	DATE 7-/18	/sc

## F. INSTALLATION INTERFACES

List all interfaces pertinent to EQ identified in the test report and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if No, provide justification. Plant

Interface	Identify Interface	Requirement? _(Yes/No)	Reference <u>Test Report</u>
	Terminal Block		Page X-11,
Mounting Bolts	Mounting Screws	<u>(3) Yes</u>	Par. 3.2.1_
External Process Connections	None	<u>NA</u>	<u>NA</u>
	Terminal Lugs		Page I-2,
Electrical Connections	(1) See Comment	(3) Yes	Par. 2.2.1
Conduit Seals	None	<u>NA</u>	NA
Connector Seals	None	NA	<u>NA</u>
Orientation	Horizontal or Vertical	(2)(3) No	Page X-10, <u>Par. 3.2.1</u> Page VIII-3,
Physical Configuration	Mounted Inside Enclosures	<u>(3) Yes</u>	Par. 2.1.1
		•	Page 1-2,
Other	Junction Boxes and Jumper Wiring	<u>(3)(4) Yes</u>	Par. 2.2.1; Page VIII-3, Par. 2.1.1
JUSTIFICATION/COMM	ENTS <u>(1) All terminations</u>	on_terminal_blo	<u>cks at Watts</u>
Bar are made using	prescribed materials and p	rocedures per TV.	A General
Construction Speci:	fication G-38. Included in	G-38 are crimp t	<u>vpe_insulated</u>
and uninsulated te	rminals (tin coated for oxi	dation/corrosion	inhibition
and compatibility	with terminal block materia	<u>ls) which are in</u>	stalled by
using the appropria	ate terminal manufacturer's	_calibrated_crim	ping_toole.
Sources for these	terminals are the AMP Produ	cts_Corp.,_Burnd	y Corp., and
Thomas and Betts C	ompany.		
	PAGE B-10		

TVA 19537 (OE-3-86)

BINDER NO	WBN UNIT(S)	1 SHEET OF
BINDER TITLEGENERAL ELECTRIC	COMPUTED 25H	DATE 7/16/86
TERMINAL. BLOCKS		DATE 7/18/9

F. <u>INSTALLATION INTERFACES</u> (Continued)

The performance of the terminals in the test confirms the suitability of these materials. Terminal blocks screws are tightened to provide a snug connection with terminals, unless otherwise instructed by terminal block or terminal vendors. These procedures are required by TVA General Construction Specification G-38, "Installing Insulated Cables Rated Up to 15,000 Volts," and Watts Bar Nuclear Plant Modifications and Additions Instruction M&AI-4, "Installation and Inspection of Cable Terminations."

(2) Terminal block orientation in test was vertical with open conduit entering top of box. This allowed the chemical spray entering junction box to flow or drip down terminal block across adjacent circuits, thus increasing chances of leakage currents and subsequent failure of the safety-related circuits. Although the blocks were not located directly under the conduit entry in the test, the possibility exists that some blocks may be located directly under top entry conduits at Watts Bar. But in the high accident pressure areas where steam/chemical spray might be forced into the boxes (i.e., containment and the main steam valve vault rooms), the conduit systems are closed to minimize this possibility and the terminal blocks are coated inside containment and the main steam valve vault rooms to help protect them. Also see note (3).

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TVA 19537 (OE-3-86)

В	INDER NO	PLANT	VB N	UNIT(S)	1	SHEET B10	OF
) , В	INDER TITLEGENERAL ELE	CTRIC	COMPUTE	ED J.SH	DATE 7/16/	<u> </u>	
-	TERMINAL BLOCKS		CHECKE	ERU	DATE 7/18/	<u> &amp;</u>	

F. INSTALLATION INTERFACES (Continued)

(3) The standard physical configuration is to install terminal blocks in enclosures per the National Electrical Code Article 110-17 and the NEMA Standard Publication 250. The attachment of the terminal blocks to the enclosure internal panels by mounting screws, the attachment of wiring to the terminal blocks by terminal lugs, and the orientation of the terminal blocks within the enclosures are all standard considerations in all terminal block applications/installations and do not require any special considerations for QMDS. Terminal blocks in WBN safety-related circuits are installed in gasketed and ungasketed sheet steel enclosures (see Binder WBNEQ-JBOX-001). The enclosures provide a degree of physical protection but are not relied upon for environmental qualification other than for direct spray impingement. The Wyle test program, 17733-1, qualified terminal blocks installed in NEMA 12 (gasketed) enclosures. However, since the enclosures had weepholes drilled in them and they had open conduits entering them, the test essentially applied to ungasketed enclosures, also.

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	DER NO PLA	
T	ERMINAL BLOCKS	CHECKED 270 DATE 7/18/86
	F. INSTALLATION INTERFAC	ES (Continued)
	(4) The environmental	qualification of junction boxes_and jumper wire
	interfaces of the termi	nal blocks is addressed in the following binders:
	Binder No.	Interface
	WBNEQ-JBOX-001	Junction Box
	WBNEQ-CABL-044	Rockbestos XLPE Jumper Wire
	**************************************	
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		• • • • • • • • • • • • • • • • • • •
		· · · · · · · · · · · · · · · · · · ·
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		PAGE B-13

		NEQ-TB-001 PLANT		UNIT(S)1 JLH DATE <u>7/26</u>	SHEET <u>B1</u> R <u>5</u>
BINDER	1111.	GENERAL ELECTRIC	COMPUTED	. —	10/16/
		TERMINAL BLOCKS	_ CHECKED	<u>ETD</u> DATE <u>7/26</u>	6/86 Hole 10-31-9
G. <u>TE</u>	ST SEQU	ENCE			
(1				ence established	
				ce with IEE-323 (7	74), para
	0.3.	2 (yes/no/NA)? (	noce berow)	Yes/No/NA	Refe
					Page
	(a)	Equipment inspec	ted for dama	age <u>Yes</u>	<u>Par.</u> Page
	(b)	Baseline perform taken	ance measure	ements <u>Yes</u>	Par.
	(c)	Equipment aged:			
		-fashmana aQagi			Page
		Thermal		Yes*	<u>Par.</u> Page
		Radiation		Yes	Page Par.
					See
		Wear		<u>    Yes</u>	Page
	(d)	Vibration/seismi conducted	ic testing	<u>    Yes</u>	Page <u>Par</u> .
	(e)	Design basis eve	ent (DBE)	_	Page
		exposure		Yes	<u>Par.</u> Page
	(f)	Post-DBE exposu	e	Yes	Par.
				17	Page
	(g)	Final inspection disassembly	i and	Yes	<u>Par.</u>
(2		-		used throughout th /no/NA)? <u>Yes</u>	ie test
(3	data	the test equipme been appropriate erence <u>Page vii,</u>	ly document	••	s and ca Yes
					-1
				ated terminal bloc rning RTV 3140 was	
	<u>be s</u>	ensitive to therm	nal aging. 7	The uncoated block	<u>ks_in_th</u>
				he thermal bock ma termperature effe	
				6.5- and Page B-15	
			· · · · · · · ·	<b>C</b> ,	

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BINDER NO. WBNEQ-TB-001 PLANT_	WBN	UNIT(S) <u>1</u> SHEET <u>B13</u> OF <u>B39</u>
		R <u>5</u> R
BINDER TITLE GENERAL ELECTRIC	COMPUTED_	_JLH_ DATE 7/16/86 _TOH
		(16/90
TERMINAL BLOCKS	CHECKED	ETD DATE 7/18/86 7/04/-
		10-31-90

G.(1)(c) Thermal - The basis for evaluating the thermal sensitivity of each non-metallic material is to determine the expected life in its service environment. Per Wyle Test Report No. 17733-1, Page X-52, if the expected life is greater than 1,000 years for materials located in a mild environment, and 10,000 years for materials located in a harsh environment, the material is considered age insensitive for the application. Page X-32, Table II, gives the expected life of phenolic as 6 x  $10^6$  years at 49°C (120°F) and page X-30, Table I, states that phenolic is age insensitive.

A test report by R. M. Schuster of General Electric Company dated November 6, 1973, "Terminal Block LOCA Test for Electrical Penetration Assemblies" showed that terminal block performance was not significantly affected by high temperatures (260°F minimum and 340°F maximum during a 10-day test). See TAB E.

R5

Sandia Laboratories Report No. NUREG/CR3691 dated September 1984, "An Assessment of Terminal Blocks in the Nuclear Power Industry," concluded that the terminal block phenolilc material is not a significant factor to terminal block failures, but rather leakage currents caused by conductive film formation on the terminal block insulating surfaces. Several sources exist which contribute to the film formation: contaminants (dust, manufacturing residues, body salts from handling, etc.) in the block crevices and on its surfaces; corrosion of the block metallics (conductive strips, screws) and condensation formed from both normal and accident conditions.

G.(1)(c) Wear - The terminal blocks contain no moving parts and thus, wear aging is not appropriate for this equipment. The blocks are passive electrical devices that are energized at levels below the manufacturer's ratings (30A,600V). Thus there are no electrical, mechanical, or process stresses induced in them.



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TERMINA	L BLOCKS CHECKED ETC	DATE 7/18/86	<u> </u>
H. <u>AG</u>	NG		
(1)	(Yes/no/NA)? Yes (Reference Page IV-	rogram 1, par. 2.0 a 1, par. 2.0).	
	JUSTIFICATION/COMMENTS		
(2)	Were the following effects considered in the	e aging progr	: an :
·	Aging_Effect	<u>Yes/No/NA</u>	<u>Reference</u> Page IV-1,
	Thermal aging	<u>Yes</u>	<u>Par. 2.0</u> Page II-1,
	Radiation exposure	Yes	<u>Par. 2.0</u>
	Vibration (non-seismic) aging	No	<u>See TAB C</u>
· *	Operational (electrical/mechanical/process) stress aging	<u>No</u>	<u>See Sht. Bl</u>
	JUSTIFICATION/COMMENTS	·	
(3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? <u>NA</u> (Reference]	considered i	
	JUSTIFICATION/COMMENTS See sheet B15.		
(4)			
	(a) Was thermal aging considered in the quant (yes/no/NA)? <u>Yes</u> (Reference <u>Page</u> )		
	JUSTIFICATION/COMMENTS		
			- -
		· · · · · · · · · · · · · · · · · · ·	<u></u>

TVA 19537 (OE-3-86)

BINDER NO. WBNEQ-	TB-001 PLANT	WBN	UNIT(S)_	1	SHEET B15_OF_B3
BINDER TITLE GEN	ERAL ELECTRIC	COMPUTED_	JLH DATE	<u>7/16/86</u>	R_3_R 57DH 3/7/90
TERMINAL BLOCK	S	_ CHECKED	ETD DATE	7/18/86	5 NUCT 3.21-90

#### TEST SEQUENCE AND SYNERGISTIC EFFECTS, SECTIONS G AND H (3)

A review of NUREG/CR-2157 and 2932 determined that there are no known synergistic effects on the RTV coating material that would cause unsatisfactory performance of the terminal blocks. The terminal block materials were assumed to be insensitive to thermal aging effects, and the test program proved that they are not sensitive to radiation effects of the levels exposed. As shown in Sections I, III, and V of Wyle Test Report 17733-1 (see TAB D), the result of sequential radiation and thermal aging on the thermal block coating material was increased insulation resistance after each exposure from initial baseline measurements. No visible damage or degradation to the terminal blocks or coating had occurred. Because each exposure (thermal aging and radiation exposure) on its own increased the insulation resistance of the blocks, it is reasonable to conclude that the reverse sequence of exposure or simultaneous exposure to these parameters would have the same effect. It is concluded that sequence has no effect on these materials.

No dose rate synergisms are known to apply to the RTV or terminal block materials. Moisture is the only other environmental parameter that could have a potential synergistic effect on the terminal blocks. EPRI Report No. NP-2129, "Radiation Effects on Organic Materials in Nuclear Plants," states that cellulose-filled phenolics become more susceptible to moisture damage after irradiation. However, this phenomenon was not observed in Wyle Test Report 17733-1. Also, any moisture induced cracking of the phenolic insulating material would be minimized as the entire block is held intact and rigid by the mounting screws. In addition, changes in relative humidity could cause condensation to form on the terminals, thus increasing the chances of corrosion; however, terminal blocks in areas that experience periods of 100 percent relative humidity during nonaccident conditions (i.e., containment and the main steam valve vault rooms are coated with Dow Corning RTV 3140 coating.

BINDER NO	D. <u>WBNEQ-TB-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>B16</u> 0 R_3_R
BINDER TI	ITLE <u>GENERAL ELECTRIC</u> COMPUTED JLH DATE <u>7/16/86</u> JDH <u>7</u> 3-7-90 ^{(0/}
TERMII	NAL BLOCKS       CHECKED       ETD       DATE       7/18/86       WCG       MCG         3-21-90       //-
H. <u>AGINO</u>	G (Continued)
(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? Yes (Reference: Section X, paragraph 3.6 through 3.6.4.1: Tables
	I and II: Appendix IV).
	JUSTIFICATION/COMMENTS Phenolics were shown not to be
	age-sensitive. (Refer to Justification/Comments, Section I).
(c)	Was the basis for thermal aging identified in the qualificat: program (yes/no/NA)? <u>Yes</u> (Reference <u>Page X-15, paragrap</u> <u>3.6)</u> .
	JUSTIFICATION/COMMENTS
(d)	Was the aging acceleration rate justified and the parameters time and temperature identified in the qualification program (yes/no/NA)? Yes (Reference Page X-16, paragraph 3.6.4
	Page X-19, paragraph 3.6.5).
	<u>Parameter Plant Maximum Normal Test Equivalent</u>
	Temperature         130°F (54.4°C)         90°C         130°F (54.4°C)           Time         40-years         498 hrs         40-years
	JUSTIFICATION/COMMENTS See Page B-19A
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>Page X-49, Appendix IV).</u>
	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? Yes (Reference Page X-16, paragraph 3.6.4.1).
	JUSTIFICATION/COMMENTS <u>The RTV activation energy was used a</u> the basis for the aging program because phenolics are not age
-	sensitive. Resultant age-conditioning was comparable to 40 years on the RTV coating.
-	

	GE	NERAL ELECTRIC COMPUTED 2 H DATE 7/16/86
TERMINAL		
H. AGING	<u>}</u> (c	ontinued)
	(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>NA</u> (Reference <u>See below)</u> . JUSTIFICATION/COMMENTS <u>Regression line not used</u> .
	(h)	Was the equipment operated during the thermal aging (yes/no/NA)? No (Reference Page X-19, paragraph 3.6.5).
		JUSTIFICATION/COMMENTS See sheet B18.
(5)	Radia	ation Aging Exposure:
	(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? Yes (Reference Page II-1, paragraph 2.0).
		JUSTIFICATION/COMMENTS
	(Ъ)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>Page X-30, Items 1.1 &amp; 1.2: Page X-14</u> ,
		paragraph 3.4.1).
		JUSTIFICATION/COMMENTS
	(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? Yes (Reference Page X-15, paragraph 3.4.3).
		JUSTIFICATION/COMMENTS
	·	

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EQP127.31

BINDER NO. WBNEQ-TB-001 PLANT_	WBNUNIT(S)1_SHEET_B17aOF_B39
BINDER TITLE GENERAL ELECTRIC	COMPUTED R2/CAGDATE 9/18/89 $\frac{R_3}{JDH}$ $\frac{R_5}{JDH}$ 3/7/90 $\frac{70H}{10/16/90}$
TERMINAL BLOCKS	CHECKED R2/WCG DATE 9/20/89 WCG 1/042 3/21/90 10-31-90

### H. <u>AGING</u> (Continued)

#### 4. (d) <u>JUSTIFICATION/COMMENTS</u> (continued)

Thermal aging performed in the Wyle 17733-1 test program equates to a qualified life of 40 years at 120°F and 14.2 R5 years at 130°F (maximum normal temperature in the MSVV rooms). Based on the following, however, the qualified life is extended to 40 years at 130°F.

The thermal aging program was performed to assess timetemperature effects on the RTV coating, since the terminal block phenolic material was determined to be insensitive to thermal aging effects over a 40-year lifetime for temperatures present at Watts Bar. Since the coating has a U.L. rating of 365°F (180°C) (per page X-17, Section 3.6.4.1.2 of 17733-1), it is reasonable to expect it to be qualified for 40 years at 130°F. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance during an accident whether or not they are coated. Therefore, for DBE qualification, the presence of RTV coating on the blocks is not required. However, as an added measure of conservatism, TVA applies the coating to blocks inside containment and the MSVV rooms to help protect the terminal block conducting materials (terminal screws and connector plates) from corrosion and potential leakage currents if the block is exposed to moisture.



WBEP-0028Q

PAGE B-19A R5

BINDER TITLE       GUNRARD ELECTRIC       COMPUTED AM       DATE 7//6/66         TERMINAL BLOCKS       CHECKED       CTD       DATE 7//3/3C         R.(4)(b)       JUSTIFICATION/COMMENTS - The terminal blocks were not energized durin thermal aging sequence of Wvle test program 17733-1 for the following reasons:         I.       The terminal blocks are passive devices. Thus, there is no need monitor their performance during thermal aging.         2.       Anv temperature rise in the blocks' enclosures due to energizatio is negligible due to the following:         a.       The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wvle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19) paragraph 3.6.5).         b.       There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		WBNEQ-TB-001 PLANT WBN UNIT(S) 1 SHEET B18 OF
TERMINAL BLOCKS       CHECKED 2770       DATE 7//3/3C         H.(4)(b) JUSTIFICATION/COMMENTS - The terminal blocks were not energized during thermal aging sequence of Wyle test program 17733-1 for the following reasons:         I. The terminal blocks are passive devices. Thus, there is no need monitor their performance during thermal aging.         2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following:         a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance during an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).         b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)	BINDER TITL	E GENERAL ELECTRIC COMPUTED
<pre>thermal aging sequence of Wyle test program 17733-1 for the following reasons:  1. The terminal blocks are passive devices. Thus, there is no need monitor their performance during thermal aging. 2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following:     a. The results of the 17733-1 test program revealed that there is     little difference, if any, on terminal block performance durin     an accident whether or not they are coated. Thus, the effect     temperature on the coating material is irrelevant. Wyle had     concluded that the terminal block materials were not sensitive     to time-temperature effects over a 40-year lifetime (page X-19     paragraph 3.6.5).     b. There is minimal thermal contribution from terminal blocks     inside enclosures because: (1) instrumentation circuits     operate with low current, thus there is no heat rise and (2) </pre>		$\mathbf{\wedge}$
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<ul> <li>1. The terminal blocks are passive devices. Thus, there is no need monitor their performance during thermal aging.</li> <li>2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following: <ul> <li>a. The results of the 17733-1 test program revealed that there is</li> <li>little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul> </li> </ul>		thermal aging sequence of Wyle test program 17733-1 for the following
<ul> <li>monitor their performance during thermal aging.</li> <li>2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following: <ul> <li>a. The results of the 17733-1 test program revealed that there is</li> <li>little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had</li> <li>concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul> </li> </ul>		reasons:
<ul> <li>monitor their performance during thermal aging.</li> <li>2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following: <ul> <li>a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance during an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul> </li> </ul>		
2. Any temperature rise in the blocks' enclosures due to energization is negligible due to the following: <ul> <li>a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul>		1. The terminal blocks are passive devices. Thus, there is no need to
<ul> <li>is negligible due to the following:         <ul> <li>a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance during an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul> </li> </ul>		monitor their performance during thermal aging.
<ul> <li>a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul>		2. Any temperature rise in the blocks' enclosures due to energization
<ul> <li>a. The results of the 17733-1 test program revealed that there is little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul>		is negligible due to the following:
<ul> <li>little difference, if any, on terminal block performance durin an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)</li> </ul>		
an accident whether or not they are coated. Thus, the effect temperature on the coating material is irrelevant. Wyle had concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5). b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		
<ul> <li>temperature on the coating material is irrelevant. Wyle had</li> <li>concluded that the terminal block materials were not sensitive</li> <li>to time-temperature effects over a 40-year lifetime (page X-19</li> <li>paragraph 3.6.5).</li> <li>b. There is minimal thermal contribution from terminal blocks</li> <li>inside enclosures because: (1) instrumentation circuits</li> <li>operate with low current, thus there is no heat rise and (2)</li> </ul>		· · · · · · · · · · · · · · · · · · ·
concluded that the terminal block materials were not sensitive to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5). b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		
to time-temperature effects over a 40-year lifetime (page X-19 paragraph 3.6.5). b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		
paragraph 3.6.5). b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		
b. There is minimal thermal contribution from terminal blocks inside enclosures because: (1) instrumentation circuits operate with low current, thus there is no heat rise and (2)		
inside enclosures because: (1) instrumentation circuits		· · · · ·
operate with low current, thus there is no heat rise and (2)		
	•	inside enclosures because: (1) instrumentation circuits
<u>safety-related control circuits are operated only periodically</u>	. •	operate with low current, thus there is no heat rise and (2)
		safety-related control circuits are operated only periodically.

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	<u>GENERAL ELECTRIC</u> COMPUTED <u>JLH</u> DATE <u>7/16/86</u> <u>CAG</u> 1/6/89 <u>TERMINAL BLOCKS</u> CHECKED <u>ETD</u> DATE <u>7/16/86</u> <u>JFW</u> 1/6/89
H. <u>AGING</u> (Co	ntinued)
(d)	Is the radiation test exposure dose and dose rate acceptable (Yes/No/NA)? <u>Yes</u> (Reference: <u>Page II-1</u>
	Para. 2.0
	Plant normal ambient radiation dose (rd) <u>2.0 x 10 gamma</u>
	Test exposure dose (rd) <u>2.534 x 10 gamma</u>
	Test exposure dose rate (rd/hr) $\frac{(1.0 \times 10^6)}{(1.0 \times 10^6)}$
•	Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
	JUSTIFICATION/COMMENTS
(6) Vibr	ation (non-seismic) Aging:
	ation (non-seismic) Aging: Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u>
	Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u>
	Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u> JUSTIFICATION/COMMENTS <u>Equipment installed in enclosu</u>
(a)	Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u>
(a)	Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u> JUSTIFICATION/COMMENTS <u>Equipment installed in enclosu</u> which are rigidly mounted. See TAB C (pg C2). Was the basis for vibration aging identified and justi in the qualification program (Yes/No/NA)? <u>NA</u>
(a)	Were the effects of non-seismic vibration induced duri normal and abnormal operation addressed in the qualification program* <u>No</u> (Reference: <u>NA</u> JUSTIFICATION/COMMENTS <u>Equipment installed in enclosu</u> which are rigidly mounted. See TAB C (pg C2). Was the basis for vibration aging identified and justi in the qualification program (Yes/No/NA)? <u>NA</u> (Reference: <u>NA</u>

PAGE B-21 R2

	R TITLE	WBNEQ-TB-001       PLANT       WBN       UNIT(S)       1       SHEET $B20$ OF         GENERAL ELECTRIC       COMPUTED $334$ DATE $7/16/86$ R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R       R
H.	AGINO	Continued)
	(7)	Operational Stress Aging:
		(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operati addressed in the qualification program (yes/no/NA)? <u>No</u> (Reference <u>NA).</u>
		JUSTIFICATION/COMMENTS See sheet B13.
		(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (yes/no/NA)? <u>NA</u> (Reference <u>NA).</u>
		JUSTIFICATION/COMMENTS See sheet B13.
	¢	Nas the qualified life of the equipment and its basis defined in the qualification program (yes/no/NA)? <u>Yes</u>
	( (	
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>
	( (	qualification program (yes/no/NA)? <u>Yes</u> Reference <u>Page v. paragraph 4.0).</u> Qualified life (Document in QMDS) <u>40-years</u>

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BINDER NO. WBNEQ-TB-001 PLANT WBN UNIT(S) 1 SHEET B21 OF B39 R_1 BINDER TITLE <u>GENERAL ELECTRIC</u> COMPUTED JLH DATE 7/16/86 Ŗ 1-17-24 TERMINAL BLOCKS CHECKED ETD DATE 7/16/86 MW 1-23-39 AGING (Continued) H. (9) Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? No (Reference: See below R1 JUSTIFICATION/COMMENTS No replacement intervals: Terminal blocks gualified for 40 years. PAGE B-23 RI

IDEE	R NO. <u>WBNEQ-TB-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>B22</u> OF <u>B3</u> R 3 R
IDEE	R TITLE <u>GENERAL ELECTRIC</u> COMPUTED <u>JLH</u> DATE <u>7/16/86</u> <u>JDH</u> 3/7/90
MIN	VAL BLOCKS         CHECKED ETD         DATE 7/18/86         west           7-21-40         3-21-40         3-21-40
. <u>M</u>	MATERIALS ANALYSIS
a	Identification of Material's Susceptible to Significant Thermal and/or Radiation Degradation and Aging (Use Section C of Binder for Detailed Materials Analysis).
	RadiationActivationMaterial/Property/FunctionThresholdReferenceEnergyReference
	(a) <u>DOW Corning RTV 3140 unknown Page X-30 1.61</u> Page X-3 Coating
	(b)
	(d)
(	(e)
3	JUSTIFICATION/COMMENTS The phenolic material forms the base of the
t	terminal block and is used as the insulating material between
2	circuits on the block. The RTV coating is used to help protect the
<u>t</u>	terminal block conducting materials (terminal screws and connector
I	plates) from corrosion and potential leakage currents if the block
į	is exposed to moisture. The RTV activation energy was used as the
<u>.</u>	basis for the thermal aging program because phenolics are not age-
5	sensitive. The resultant age-conditioning was equivalent to 37
2	years on the terminal blocks that had the coating, the coating was
ġ	aged to the equivalent of 40 years (activation energy 1.61). A
ġ	letailed analysis for the phenolic and coating is presented in
M	Vyle Test Report No. 17733-1. Section X, paragraphs 3.4 and 3.6.
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PAGE B-24 R3

		$E _ GENERAL ELECTRIC \\ COMPUTED \frac{324}{24} = DATE \frac{7/16/86}{166} = 0$
J.	EQU	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE
		CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	(1)	Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure i not met (yes/no/NA)? Yes (Reference Page VIII-2, paragraph 1.5).
		Identify Acceptance Criteria: The terminal blocks shall distribute
		sufficient power for proper operability of end devices during the
		LOCA test. Proper operability of (see sheet B24).
	(2)	Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference Page VIII-2,
		paragraph 1.5).
		Identify baseline and functional testing: <u>Insulation resistance</u>
		measurements after thermal aging, radiation exposure, seismic testing,
		load current monitoring during accident simulation, and periodic
		leakage current measurements during accident simulation.
×		JUSTIFICATION/COMMENTS
	(3)	Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Page VIII-2, paragraph 1.5.1).</u>
		JUSTIFICATION/COMMENTS

TVA 19537 (OE-3-86)

EQP127.31

BINDER NO. WBNEQ-TB-001	PLANTWBN		1s	SHEET OF
BINDER TITLEGENERAL ELE	CTRIC COMPU	TED <u>}}</u>	DATE 7/16/8	R R
TERMINAL BLOCKS	CHECK	ED ETT	DATE 7/18/8	·

J.(1)(Continued): end devices is defined as follows:

- 1. RTD End Devices The output resistance shall be within 20 percent of the values recorded during the pre-LOCA operability checks.
- 2. Transmitter End Devices The output currents shall be within 20 percent of the values recorded during the pre-LOCA operability checks.

3. Solenoid Valve End Devices - The solenoid valves shall remain energized during the LOCA test and not change state.

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	ITLE <u>GENERAL ELE(</u>	CTRIC COMPUTED JLH DA	TE <u>9/15/86</u>
	TERMINAL BL	OCKS CHECKED ETD DA	TE <u>9/15/86</u> ( <i>Au</i> )
PERI		CHARACTERISTICS NECESSARY ATIONS CAN BE SATISFIED UNI	
(4)	* *	loads during baseline testi tions (Yes/No/NA)? <u>No.</u> (	
	JUSTIFICATION/CO	DMMENTS See Page B-29.	
			<u></u>
(5)	•	ical characteristics necess rmance specifications can b	
	(a) <u>Parameter</u>	<u>Plant Normal Conditions</u>	Reference
	Voltage	120 VAC, 125 VDC	NA
	Load	NA (1)	<u>NA (1)</u>
	Frequency	NA (1)	<u>NA (1)</u>
	Accuracy	NA (2)	<u>NA (2)</u>
	Other(s)		
			· · · · · · · · · · · · · · · · · · ·
	JUSTIFICATI	ION/COMMENTS (1) Electrica	l parameters
	for termine	al blocks, under specified	accident conditions
	are the sam	ne as under plant normal co	nditions. The Watt
	<u>Bar termina</u>	al blocks are used in contr	ol applications
			to 1 amp (turning)11
	where contr	<u>ol circuit loads range up</u>	to I amp (cypically

PAGE B-27 R-1

BINDER NO	. WBNEQ-TB-001	PLANT WBN UNIT(S) 1	
INDER TI	TLE <u>GENERALE</u>	LECTRIC COMPUTED JLH DATE	
	TERMINAL	BLOCKS CHECKED ETD DATE	1-17-34 
			i-23-81
J. EOUI		AL CHARACTERISTICS NECESSARY TO 1	INCLOF THE
PERF	ORMANCE SPECIF	ICATIONS CAN BE SATISFIED UNDER	
	tinued)		
(5)(b)	Parameter	Specific Accident Conditions	<u>Reference</u>
	Voltage [.]	120 VAC, 125 VDC	NA
	Load	NA (1)	<u>NA (1)</u>
	Frequency	NA (1)	<u>NA (1)</u>
	Accuracy	NA (2)	<u>NA (I)</u>
	Other(s)		
	JUSTIFICATION	/COMMENTS	
(5)(c)	Parameter	Demonstrated Conditions	Reference
	Voltage	120 VAC, 125 VDC (3)	pV111-20
	Load	432ma, 108ma	<u>pV111-20</u>
	Frequency	NA	NA
	Accuracy	(2)	(2)
	Other(s)		
	<u>NA</u>	NA	NA
	JUSTIFICATION	/COMMENTS (2) The test program w	was designed to
	<u>determine the</u>	ability of the terminal blocks	to provide
	sufficient po	wer for proper operability of end	d devices
	<u>during an acc</u>	ident at loads typical of those a	<u>at Watts Bar.</u>
	<u>There ar</u> e no	10CFR50.49 instrumentation trans	<u>mitter</u> and RTD
		inated on terminal blocks at Wat	
		THE THE TELEVISION OF MAL	
	for an and a second	v is not a consideration. The do	

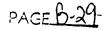
PAGE B-20 RI

BINDER	RRRRRRR
	TERMINAL BLOCKS CHECKED /R1 Grd DATE 1-23-89
	QUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE
	ERFORMANCE SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDI Continued)
(	5)(c)
	JUSTIFICATION/COMMENTS (continued)
	close to values which were predetermined by pre-LOCA opera-
	bility checks of the end devices.
	(3) See TAB C, sheet C-9, for discussion of qualification of
	terminal blocks for 480 VAC applications.
	•
	·

BINDER NO. WBNEQ-TB-001 PLANT WE	3N UNIT(S)	1 SHEET B27 OB39
BINDER TITLE GENERAL ELECTRIC	COMPUTED	DATE 7/16/86
TERMINAL BLOCKS	CHECKED ETD	DATE 7/18/8

J.(4) JUSTIFICATION/COMMENTS

Only insulation resistance measurements were performed for baseline testing. Testing for operability with test loads was considered unnecessary because terminal blocks are not complex equipment, and insulation resistance measurements and visual inspection did not provide indication to the contrary that the terminal blocks would not carry the load. Pre-accident simulation load conditions were established. See J.(5).



EQP127.31

K. REC	DUIRED	OPERATING ENVIRON	MENT		1/23/89 /0-3/
				st cas	e 47E235-42 and 47E235-
(1)	) Norm	al Max	(2)	Abnor	mal Max
	(a)	Temperature (°F)	130	(a)	Temperature (°F) <u>140</u>
	(b)	Pressure (psig)	0.3	(b)	Pressure (psig) 0.3
	(c)	Humidity (%)	80	(c)	Humidity (%) <u>100</u>
	(d)	Radiation (rd)	<u>2x107</u>	(d)	Radiation (rd) <u>NA</u>
. (3)	) Proc	ess Interfaces:	None	<u>_ //</u>	· · ·
( )	\	a anticipated coo	urranca fragu	an esz a	nd duration of abnormal
	cond <u>than</u> ) Acci	itions: <u>Up to 8</u> 1% of the plant	hours per excu life. for any combin	arsion nation	n of specified accident
	cond <u>than</u> ) Acci para	itions: <u>Up to 8</u> 1% of the plant dent (worst case	hours per excu life. for any combin eak, duration,	nation, and	and will occur less of specified accident profile):
	cond <u>than</u> ) Acci para	itions: <u>Up to 8</u> <u>1% of the plant</u> dent (worst case meter including p	hours per excu life. for any combin eak, duration *340	nation, and	and will occur less of specified accident profile):
	cond than Acci para (a) (b)	dent (worst case meter including p Temperature (°F)	hours per excu life. for any combin eak, duration *340	nation , and Acc Acc	and will occur less a of specified accident profile): eident type <u>HELB</u>
	cond tham Acci para (a) (b) (c)	dent (worst case meter including p Temperature (°F) Pressure (psig)	hours per excu life. for any combin eak, duration <u>*340</u> <u>11.2</u> <u>100</u> 4.7x10 ⁸ Beta	nation , and Acc Acc	and will occur less a of specified accident profile): eident type <u>HELB</u> eident type <u>LOCA/HELB</u> eident type <u>LOCA/HELB</u>
	<pre>cond than</pre>	itions: <u>Up to 8</u> <u>1% of the plant</u> dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	hours per excu life. for any combin eak, duration <u>*340</u> <u>11.2</u> <u>100</u> 4.7x10 ⁸ Beta	nation , and Acc Acc Acc	and will occur less a of specified accident profile): eident type <u>HELB</u> eident type <u>LOCA/HELB</u> eident type <u>LOCA/HELB</u>
(5	<pre>cond tham </pre>	dent (worst case meter including p Temperature (°F) Pressure (psig) Humidity (%)	hours per excu life. for any combin eak, duration <u>*340</u> <u>11.2</u> <u>100</u> 4.7x10 ⁸ Beta <u>4.0x10⁷ Gamma</u> <u>Chemical</u>	arsion nation , and Acc Acc Acc	and will occur less a of specified accident profile): eident type <u>HELB</u> eident type <u>LOCA/HELB</u> eident type <u>LOCA/HELB</u> eident type <u>LOCA</u>

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	D. WBNEQ-TB-001	PLANT	WBN	UNI	T(S)_	<u>    1     </u> S	SHEET <u>B2</u> R 3	
BINDER T	ITLE <u>GENERAL EI</u>	ECTRIC	COMPUTED_	JLH	DATE S	9/15/86	5 JDH	_ ]
	TERMINAL E	LOCKS	CHECKED	ETD	DATE 9	0/15/86	3/7/90 <u>WCG</u> <u>3/21/9</u>	
K. <u>REQU</u>	JIRED OPERATING	ENVIRONME	ENT (Con	tinued	)			
·	Comments (dura margin, etc.):	-	-		-		, <del>, , ,</del> , , , , , , , , , , , , , , ,	•
	<u>gpm/ft². Spra</u>	y composi	ition is	<u>an alk</u>	aline	borate	<u>soluti</u>	on (
	8.3) produced	by mixing	<u>z boric a</u>	cid wi	th soc	lium te	trabora	<u>ate.</u>
(6)	Is the equipme can affect the accident condi	performa	ance of t	he equ	ipment	under	design	ı bas
	P. Discussion					·····		
(7)	Subject to sub	mergence	(Yes/No/	NA)?	<u>No</u>	(Refer	ence:	-
	Telement Constant							
	Identify initi	ation tim	ne and du	ration	. of su	ibmerge	ence:	
	Identify initi	ation tin	ne and du	ration	of su	ıbmerge	ence:	
(8)		ent subject	ct to a b e (Yes/No.	eta ra /NA)?	diatio <u>Yes</u>			
(8)	Is the equipme the total acci	nt subjec dent dose <u>BNTSR-05</u> fy the fr	ct to a b e (Yes/No L. TVA DW raction o	eta ra /NA)? <u>G 47E2</u> f the	diatio <u>Yes</u> 35-42 unatte	on cont	ributic	on to
(8)	Is the equipme the total acci (Reference: <u>b</u> If yes, identi	ent subject dent dose /BNTSR-051 fy the fr de added t	t to a b (Yes/No. L. TVA DW raction o to the to	eta ra /NA)? <u>G 47E2</u> f the tal do	diatio <u>Yes</u> 35-42 unatte se and	enuated justi	free f	on to Sield
(8)	Is the equipme the total acci (Reference: <u>M</u> If yes, identi beta dose to b	nt subject dent doset BNTSR-051 fy the fr de added t ated in f	t to a b (Yes/No. L. TVA DW faction o to the to junction 1	eta ra /NA)? <u>G 47E2</u> f the tal do boxes	diatio <u>Yes</u> 35-42 unatte se and which	enuated justi are co	free f fy: <u>Te</u>	ielo rmir
(8)	Is the equipme the total acci (Reference: <u>W</u> If yes, identi beta dose to b <u>blocks are loc</u>	nt subject dent doset BNTSR-051 fy the fr e added t ated in f fabricate	t to a b (Yes/No. L. TVA DW raction of to the to junction i ed of 16 (	eta ra /NA)? G 47E2 f the tal do boxes GA she	diatic <u>Yes</u> 35-42 unatte se and which et ste	on cont enuated l justi are co	free f fy: <u>Te</u> nservat	ield rmir ivel
(8)	Is the equipme the total acci (Reference: <u>M</u> If yes, identi beta dose to b <u>blocks are loc</u> <u>assumed to be</u>	ent subject dent doset BNTSR-051 fy the fr e added t ated in f fabricate factor c	et to a b (Yes/No. L. TVA DW raction o to the to junction 1 ed of 16 ( of 9.98E-(	eta ra /NA)? <u>G 47E2</u> f the tal do boxes <u>GA she</u> O2. T	diatio <u>Yes</u> 35-42 unatte se and which et ste herefo	on cont enuated l justi are co el whi re, th	free f fy: <u>Te</u> nservat ch_prov e_max_B	on to Field rmin tivel
(8)	Is the equipme the total acci (Reference: <u>w</u> If yes, identi beta dose to b <u>blocks are loc</u> <u>assumed to be</u> <u>beta reduction</u>	ent subject dent doset BNTSR-051 fy the fr de added t ated in f fabricate factor c will be e	et to a b (Yes/No. L. TVA DW raction o to the to junction 1 ed of 16 ( of 9.98E-(	eta ra /NA)? <u>G 47E2</u> f the tal do boxes <u>GA she</u> O2. T	diatio <u>Yes</u> 35-42 unatte se and which et ste herefo	on cont enuated l justi are co el whi re, th	free f fy: <u>Te</u> nservat ch_prov e_max_B	ield rmir ivel
(8)	Is the equipme the total acci (Reference: <u>W</u> If yes, identi beta dose to b <u>blocks are loc</u> <u>assumed to be</u> <u>beta reduction</u> <u>dose the TB's</u> <u>See page C-105</u>	ent subject dent dose BNTSR-051 fy the fr de added t ated in f fabricate factor o will be e	t to a b (Yes/No. , TVA DW raction of to the to junction i ed of 16 ( of 9.98E-( exposed to	eta ra /NA)? G 47E2 f the tal do boxes GA she O2. T o is 4	diatic <u>Yes</u> 35-42 unatte se and which et ste herefo .7E+07	on cont enuated l justi are co el whi re, th rads.	free f fy: <u>Te</u> nservat ch prov e max B	ield rmin ivel
· · ·	Is the equipment the total acci (Reference: M If yes, identi beta dose to b blocks are loc assumed to be beta reduction dose the TB's See page C-105	ent subject dent dose BNTSR-051 fy the fr de added t ated in f fabricate factor o will be e	t to a b (Yes/No. , TVA DW raction of to the to junction i ed of 16 ( of 9.98E-( exposed to	eta ra /NA)? G 47E2 f the tal do boxes GA she O2. T o is 4	diatio <u>Yes</u> <u>35-42</u> unatte se and which <u>et ste</u> herefo .7E+07 emp.,	on cont enuated l justi are co el whi re, th rads.	etc.)	ield rmin ivel

PAGE B-31 R5

BINDER NO. WBNEQ-TB-001 PLANT	WBN UNIT(	S) SHEET OF
BINDER TITLE GENERAL ELECTRIC		R_5_R DATE <u>1-23-89</u> <u>JD</u> <del>//</del> (0//6/90
TERMINAL BLOCKS	CHECKED /R1 JPW	DATE <u>1-23-89</u> Holl- 10-31-70

K. REQUIRED OPERATING ENVIRONMENT (continued)

### (5)(a)

Accident temperature: A peak temperature of 535°F occurs in the main steam valve rooms in the event of a main steam line break (MSLB) per TVA environmental drawing 47E235-76. However, QIR MNMWBN90057 documents a peak temperature exposure to the terminal block after the MSLB of 340°F for qualification purposes. This value will be revised after WBN specific thermal lag analysis is completed in 1991.



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WBEP-0028Q

BINDER NO. WBNEQ-TB-001 PLANT_	WBN UNIT(S) 1	
BINDER TITLE <u>GENERAL ELECTRIC</u>	COMPUTED JLH DATE	R <u>3</u> R <u>5</u> 9/15/86 JDH <u>J</u>
· · · · · · · · · · · · · · · · · · ·		3/7/90 9/0
TERMINAL BLOCKS	CHECKED ETD DATE	9/15/86 WCG 3
		3/21/90/4
L. SUMMARY COMPARISON OF TEST	CONDITIONS TO SPECIFIED	CONDITIONS
(1) Comparison of worst-ca	ase maximum parameters:	÷
Parameter	Specified Demonstr	ated Reference
		PP VIII-28
		29, 30
		P X-26, Pa
Operating Time	<u>100 days</u> 83 hours	3 <u>.10.7</u>
Temperature (°F)	340 350	<u>P VIII-28</u>
	17 A 17 A	
Pressure (psig)	<u>NA NA</u>	<u> NA</u>
		P X-25,
		Par. 3.10
Relative Humidity (%)	100 100	<u>P VIII-28</u>
	2000ppm boron 2000ppm b	
*Chemical Spray	<u>pH 8.3</u> <u>pH 8.3 +</u>	<u>1</u> Par. 2.4
	2.31E+08gamma	p II-1
**Radiation (rd)***	<u>and_beta_</u> 2. <u>53E+08ga</u>	<u>mma</u> <u>Par. 2.0</u>
Submergence	NA NA	<u> NA</u>
*Includes spray concen	tration, flowrate, densi	ty, duration, an
pH.		
**Enter 40-year integra	ted normal dose plus int	egrated accident
dose and specify type		
***See TAB C, page C-105 culation	, for Beta Radiation Dos	e Reduction Cal-
(2) Comparison of worst-ca	ase profiles and margin	assessment:
	Test Profile	
	Envelopes Specified	
Parameter	(Yes/No/NA)	Reference
Temperature	Yes	<u>P_VIII-28</u>
Pressure	Yes	P VIII-28
Relative Humidity	Yes	P VIII-28
Chemical Spray	Yes	P VIII-4
Submergence	<u>NA</u>	NA
JUSTIFICATION/COMMENTS	S	
		· · ·

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# PAGE B-33 R5

BIN	DER TI								5
		TLE_GENERAL	ELECTRIC	COMPUTED_	JLH	DATE			I
		TERMINAL	BLOCKS	CHECKED	ETD	DATE	7/26/86		7
L.		MARY COMPARISO	N OF TESI	CONDITION	<u>s to spec</u>	IFIED	<u>CONDIT</u>	<u>ions</u>	
	(3)	Were margins addressed in and uncertai Yes/No/NA).	the test	program to	o assure	that	normal	variati	
						Ma	rgin		
		<u>Suggested</u>	<u>Margins_</u> r	er IEEE-32.	3(74)		<u>plied</u>		$\sqrt{N}$
		Temperature:	+15 deg	rees F			age B-3: °F		
		Pressure: + 1	10% but n O psig	o more that		) <u>NA</u>		NA	
		Radiation:	+10% of a	accident do	se	<u>+ i</u>	0%	Yes	
		Time: +10% per NUREG-	•	ır + operat	ing time	Non	e	Yes	
		Voltage: <u>+</u> 1	.0% of rat	ed value	(3	L) <u>Non</u>	e	NA	
		Frequency:	$\pm 5\%$ of ra	ated value	(3	L) <u>Non</u>	e	NA	
		Environmenta transient applied tw	and the p	ent: the i beak temper		2) <u>NA</u>		<u>NA</u>	
		Vibration:	+10% add	ed to accel	eration(	3) <u>NA</u>		<u>NA</u>	
		JUSTIFICATIC							ie
		(2) Although							
		<u>environmenta</u> needed if su	fficient	margin is	added to	the t	emperat	ure and	
		<u>pressure par</u> <u>vided in IEE</u>			onsistent	: with	тле ор	cion pi	-07
		<u>(3) The ter</u> in the test							
		as assemblie inside enclo	s, which	they are,	<u>as actual</u>	ly in	stalled	(mount	tec
			•	, •					
		(4) Pressure	to not	failur			al blac		

PAGE B-34 R5

BINDER T	D. <u>WBNEQ-TB-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>B32</u> OF R <u>5</u> R TLE <u>GENERAL ELECTRIC</u> COMPUTED <u>JLH</u> DATE 7/16/86 JDH
	TERMINAL BLOCKS         CHECKED         ETD         DATE         7/18/86         24/04/2           /o-34-90         /o-34-90         /o-34-90         /o-34-90         /o-34-90         /o-34-90
M. <u>OPE</u>	ABILITY TEST RESULTS
(1)	Identify the safety function(s) of this equipment: (Reference: <u>Page X-9, paragraph 2.2).</u>
	JUSTIFICATION/COMMENTS The terminal blocks distribute suf- ficient power for proper operability of safety-related devices before, during, and after design basis accidents.
(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (Yes/No/NA)? <u>Yes</u> (Reference: <u>Page VIII-5, paragraph 3.0).</u>
	JUSTIFICATION/COMMENTS
(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (Yes/No/NA)? Yes (Reference: Page VIII-5, paragraph 3.0)
).	JUSTIFICATION/COMMENTS
(4)	
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (Yes/No/NA)? Yes (Reference: Page VIII-5,
(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (Yes/No/NA)? Yes (Reference: Page VIII-5, paragraph 3.0; TAB C, Page C-54). JUSTIFICATION/COMMENTS

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-	BINDI	R NO WBNEQ-TB-001 PLANT	WBN UNIT(S)	1 SHEET B33 OF	B3 9
		R TITLE	COMPUTED	RR	
		MINAL BLOCKS	CHECKED 270	_ DATE 7/15/86	<u></u>
	N.	MAINTENANCE AND SURVEILLANCE		MANA 48240	
		Has the qualification program and inspection parameters whi which aid in detecting degrad (yes/no/NA)? <u>Yes</u> (Enter Binder - Qualification Mainte	ich are essential to ling materials or eq c all requirements i	maintain qualification an uipment performance n Section G of the	nd
		JUSTIFICATION/COMMENTS		<u>.</u>	
		·			
				· · · · · · · · · · · · · · · · · · ·	
				<u></u>	
			·		
					.•
			•		· .
			PAGE B-36		

	TLE <u>GENERAL ELECTRIC</u> C	OMPOIED_JLA	DATE <u>7/16/86</u>	3/7/90	
TERMINAL	BLOCKS C	HECKED ETD	DATE <u>7/18/86</u>	1.21-90 -	
0. <u>Summ</u>	ARY OF REVIEW				
				<u>Yes/No/</u>	<u>NA</u>
(1)	Documented evidence of o (Have all assumptions, m extrapolations of test o justified and documented	nathematical mod lata used in an	lels, and all	Yes	
(2)	Any exceptions (i.e., s taken to the specified adequately justified?			) <u>NA</u>	
(3)	Choice of qualification justified?	n methodology ad	lequately	Yes	•
(4)	If analysis was perform	ned, complete th	e following:		
	(a) Were equipment per identified?	formance requir	ements	Yes	-
	(b) Were specific feat effects analyzed?	ures and failur	e modes and	Yes	_
	(c) Were assumptions a together with appr their use?			Yes	
	(d) Were environmental equipment performa	-		Yes	_
(5)	Adequate similarity bet specimen established?	ween equipment	and test	Yes	
(6)	Aging degradation evalu	nated adequately	?	Yes	
	(a) Mechanical and/or	cycle aging add	lressed?	Yes	
	(b) Equipment aged to to application of			<u>Yes</u>	— •
	(c) Absence of preaging	ng in test/analy	sis justified	? <u>Yes</u>	
	(d) Materials suscepti aging identified?	ble to thermal/	radiation	Yes	

BINDER TIT	TLE GENERAL ELECTRIC COMPUTED	R R 6 <i>/8</i> 6
TERMINA	L BLOCKS CHECKED ER DATE	
0. <u>SUM</u>	MARY OF REVIEW (Continued)	Yes/No/NA
	(e) Normally operating state of device (e.g., normally energized) considered?	Yes
(7)	Qualified life or replacement schedule established?	Yes
(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	<u>Yes</u>
(10)	Criteria regarding spray satisfied?	Yes
	(a) Was the spray testing done while under the extremes of pressure and temperature?	· Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes
(11)	Criteria regarding submergence satisfied?	NA
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	<u>Yes</u>
	(b) Was beta radiation considered?	<u>Yes</u>
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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BINDER NO. WBNEQ-TB-001 PLANT WBN BINDER TITLE GENERAL ELECTRIC CO TERMINAL BLOCKS CF	UNIT(S)	_ DATE 7/16	SHEET <u>B36</u> OF <u>B39</u> R R /SC
0. <u>SUMMARY OF REVIEW</u> (Continued)			Yes/No/NA
(15) Criteria regarding functional	testing satisfi	.ed?	Yes
(a) Does the test plan/report criteria for equipment p		ptance.	Yes
(b) Was an initial base line t required performance cha		ablish	Yes
(c) Has the test/analysis demo performance specificatio (e.g., voltage, load fre electrical characteristi	ons and characte equency, and oth	ristics er	<u>Yes</u>
(16) Criteria regarding instrument	accuracy satisf	ied?	<u>NA</u>
(17) Test duration margin (1 hour 4 satisfied?	function time)		Yes
(a) Is the minimum specified of 1 hour?	operating time a	t least	Yes
(b) If exception to the 1-hour was taken, was adequate			NA
(18) Criteria regarding synergistic	effects satisf	ied?	Yes
(19) Criteria regarding margins sat	isfied?		<u>Yes</u>
(20) Maintenance and surveillance r identified?	equirements ade	quately	Yes
P. <u>DISCUSSION</u>			
See_sheet_B37			· · · ·
PAGE	<u>B-39</u>		

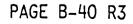
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TVA 19537 (OE-3-86)

EQP127.31

BINDER NO. WBNEQ-TB-001 P	LANT WBN	_ UNIT(S)1	SHEET <u>B37</u> OF <u>B39</u>
			R_2_ R_3_
BINDER TITLE GENERAL ELEC	TRIC COMPUTED	JLH DATE 9/	18/86 CAG JDH
			9/18/89 3/22/90
TERMINAL BLOCKS	CHECKED	<u>ETD</u> DATE <u>9/</u>	
			9/20/89 3/22,43

- P. <u>DISCUSSION</u> (Continued)
  - 1. The terminal blocks are used to terminate circuits of safetyrelated equipment inside and outside containment and applications are in the 120 VAC and 125 VDC range. All 10CFR50-49 instrumentation transmitter and RTD circuits have been spliced out at Watts Bar. This action was taken to relieve uncertainties due to leakage currents which are inherent in low voltage instrumentation circuit/terminal block applications under accident conditions and which degrade instrumentation signal levels/loop accuracies. Wyle test program 17733-1 showed that leakage currents are a potential problem for terminal blocks in accident conditions, and corrosion is a contributing factor to the leakage current. The test program also showed that coating of terminations can reduce the levels of leakage currents. Coating will also reduce corrosion effects during normal, nonaccident conditions. TVA-supplied and installed terminal blocks used in local junction boxes inside containment and the main steam R3 valve vault rooms at Watts Bar in safety-related circuits are coated with Dow Corning RTV 3140.



BINDER NO. WBNEQ-TB-001 PLANT WBN UNIT(S) 1 SHEET B38 OF B39
R_3_R BINDER TITLE GENERAL ELECTRIC COMPUTED JLH DATE 7/16/86 JDH
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BATH 1/10/00
P. <u>DISCUSSION</u> (Continued)
The blocks are constructed of a phenolic material and are rated for
30 amps and 600 volts. They utilize screw terminals for circuit
wire connections. The terminal blocks are mounted in enclosures
to provide a degree of protection from the environment. All
10CFR50.49 terminal blocks are located above the maximum
postulated flood levels. Terminal block enclosures in areas
susceptible to high accident pressures (containment and the main
steam vault rooms) and areas subject to moisture instrusion (see
environmental drawings) have weep holes drilled in them.
Wyle Laboratories test program 17733-1 proved that the terminal R3
blocks are qualified for 40 years and will perform adequately
before, during, and after design basis accidents.
2. Anomalies that occurred during the Wyle Laboratories 17733-1
test program that could affect the terminal blocks' ability to
perform their safety functions are addressed below:
A. Anomaly No. 1: Terminal barriers on terminal block
specimens 2, 4, and 15 were broken during shipment from the
radiation facility. Since the functional operability of
the terminal blocks was demonstrated in subsequent
functional tests and accident testing, the damage does not
affect the qualification of the terminal blocks.
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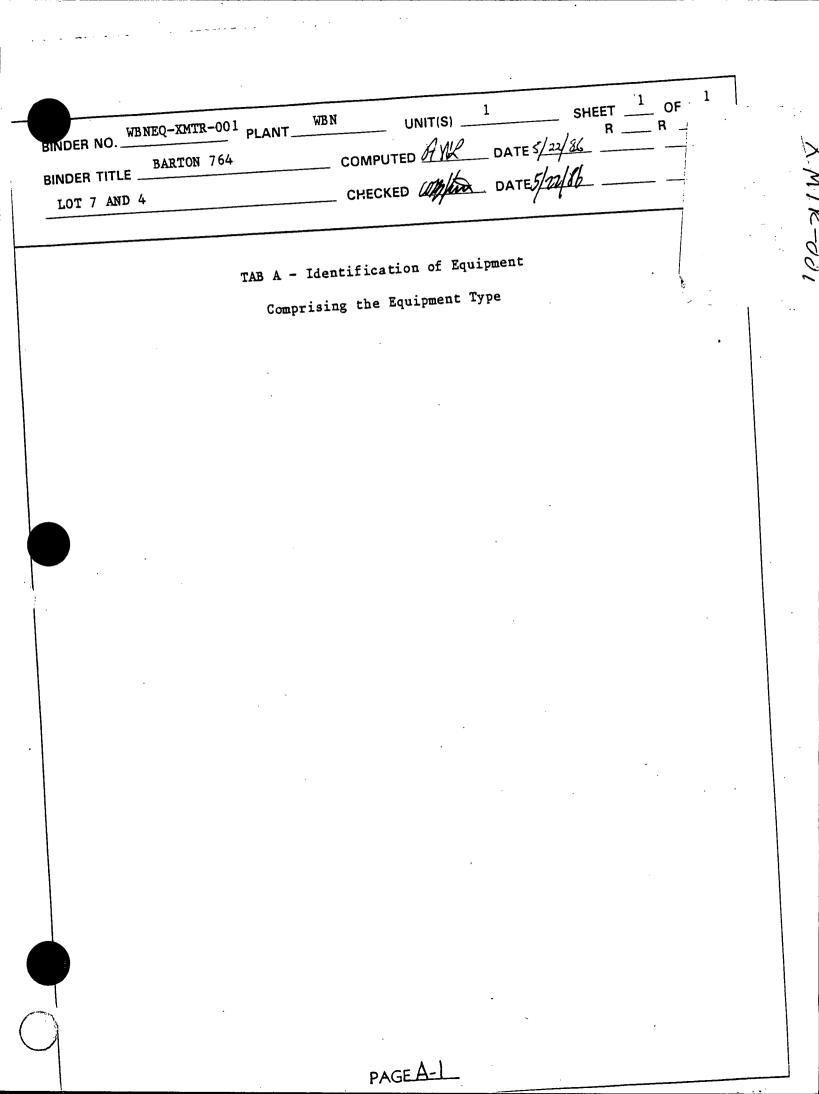
PAGE B-41 R3

BINDER NO	WBN UNIT(S)	1 SHEET OF
BINDER TITLEGENERAL ELECTRIC	COMPUTED	DATE 7/16/86 R
TERMINAL BLOCKS	CHECKED	DATE 7/18/86

P. <u>DISCUSSION</u> (Continued)

B. Anomaly No. 2: The output of the RTD end device for terminal block specimens 4 and 9 was less than the required 1.04 mA (approximately 0.9 mA) after 15 hours into the LOCA test. Measurements taken on the blocks revealed that specimen 4 was the problem. Testing was continued successfully with specimen 9 only in the circuit. A post-LOCA inspection of specimen 4 revealed a loose terminal screw. The screw was tightened and the voltage was applied to specimen 4 only with the RTD end device. The output was normal, indicating that the cause of the anomaly was probably the loose screw, and the terminal block would have performed adequately in the test with the tightened screw.

PAGE B- 42







BINDER NO. : WBNEQ-XMTR-L MANUFACTURER : BARTON PAGE 1 OF 7

### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER UNIT	DEVICE ID NO. AZMITH MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> <u>OPER_TIME</u> (2)	EVENI	SAFETY FUNCTION
WBN-1-FT -001-0003A -D 1-FT SG1 MAIN STEAM HDR FLOW CHAN 1	-001-0003A -D 764 LOT 7	(3) 71C62-54114-1	A 5MIN A 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION On High STM Flow, Initiate Reac Trip on Low FW Flow
WBN-1-FT -001-0003B -E 1-FT SG1 MAIN STEAM HDR FLOW CHAN 2	-001-0003B -E 764 Lot 7	(3) 71C62-54114-1	A 5MIN A 5MIN	FW/C	INITIATE SI & MS ISOLATION ON HIGH STM FLOW, INITIATE REAC TRIP ON LOW FW FLOW
WBN-1-FT -001-0010A -D 1-FT SG2 MAIN STEAM HDR FLOW CHAN 1	-001-0010A -D 764 Lot 7	(3) 71C62-54114-1	A 5MIN A 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION ON HIGH STM FLOW, INITIATE REAC TRIP ON LOW FW FLOW
WBN-1-FT -001-0010B -E 1-FT SG2 MAIN STEAM HDR FLOW CHAN 2	-001-0010B -E 764 Lot 7	(3) 71C62-54114-1	A 5MIN A 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION ON HIGH STM FLOW, INITIATE REAC TRIP ON LOW FW FLOW
WBN-1-FT -001-0021A -D 1-FT SG 3 MAIN STEAM HDR FLOW CHAN 1	-001-0021A -D 764 Lot 7	(3) 71C62-54114-1	A 5MIN A 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION ON HIGH STM FLOW, INITIATE Reac TRIP ON LOW FW FLOW
PAGE A-2 R2			E A.W. Lewis D.D. Meyer		2-24-89 3-21-40



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BINDER NO. : WBNEQ-XMTR-001 Manufacturer : Barton Page 2 of 7

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PRINT DATE: 07/06/90

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P.L

### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

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EQIS NU DESCRIP		<u></u>	DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<u>CAT</u> (2)	<u>OPER TIME</u>	EVENT	SAFETY_FUNCTION
WBN-1-F Sg 3 Ma	T -001-0021B In Steam HDR Fi	-E 1-FT Low Chan 2	-001-00218 -E 764 LDT 7	(3) 71C62-54114-1	A A	5MIN 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION On High STM Flow, initiate Reac Trip on Low FW Flow
WBN-1-F Sg 4 Ma	T -001-0028A In steam HDR F	-D 1-FT Low Chan 1	-001-0028A -D 764 Lot 7	(3) 71C62-54114-1	A A	5MIN 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION ON HIGH STM FLOW, INITIATE REAC TRIP ON LOW FW FLOW
WBN-1-F Sg 4 ma	T -001-0028B In Steam HDR F	-E 1-FT Low Chan 1	-001-0028B -E 764 Lot 7	(3) 71C62-54114-1	A A	5MIN 5MIN	MS/C FW/C	INITIATE SI & MS ISOLATION On High STM Flow, Initiate Reac Trip on Low FW Flow
	T -003-0038 Vel XMTR (NR)	-E 1-LT	-003-0038 -E 764 LOT 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	FW/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAM/TMI
SG 1 LE	T -003-0039 Vel XMTR (NR)	-F 1-LT	-003-0039 -F 764 LOT 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	FW/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAM
PAGE A -3				₽REPARER∕DAT Checked∕date	<u>е А.'</u>			R_1 R_2 R_4 3/86 WCG WCG ANCT 3/86 WCG WCG ANCT 3-34-59 J-21-90 F-Ju-93 3-3-89 J-21-90 F-Ju-93 HDR HDR EB-4 J-J-89 J-21-90 H/3190



BINDER NO. : WBNEQ-XMTR-001 MANUFACTURER : BARTON PAGE 3 OF 7

PRINT DATE: 07/06/90

R4

## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT_DEVICE_ID_NOAZMITHMODEL_NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	<del>CAT</del> {2}	<u>OPER TIME</u>	<u>EVENT</u>	SAFETY FUNCTION	
WBN-1-LT -003-0042 -0 SG 1 LEVEL XMTR (NR)	1-LT -003-0042 -G 764 LDT 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	MS/C RH/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, Control Sg LVL and Detect A Breach of containment thru the Sg. アガッ ノナハゴ	TR
WBN-1-LT -003-0043 -F STM GEN 1 LEVEL WIDE RANGE	1-LT -003-0043 -F 764 Lot 7	• (3) 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	MS/C RH/C	MEASURES SG WATER LVL TO DETER MINE IF A SG HAS BLOWN DRY. ALSO USED FOLLOWING RX TRIP WHEN THE NR LVL IS TEMPORARILY OFF SCALE. PAM	
WBN-1-LT -003-0051 -D SG 2 LEVEL XMTR (NR)	1-LT -003-0051 -D 764 LOT 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	FW/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAM/TMI	<b>R</b> 4
WBN-1-LT -003-0052 -F SG 2 LEVEL XMTR (NR)	1-LT -003-0052 -F 764 LOT 7	(3) 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L FW/C MS/C CV/C RH/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. アダウ ノてバズ	R1
WBN-1-LT -003-0055 -G SG 2 LEVEL XMTR (NR)	1-LT -003-0055 -G 764 LOT 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAmy TriI	R'
A - 4		PREPARER/DATE CHECKED/DATE_				9,90, FO 7,9,00 S-6,79	

BINDER NO. : HBNEQ-XMTR-001 Manufacturer : Barton Page 4 of 7

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PRINT DATE: 07/06/90

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# WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

	EQIS NUMBER DESCRIPTION	UNIT	DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION Elev(1) Rm/RAD Contract	CAI (2)	OPER TIME	EVENI	SAFETY FUNCTION	
	WBN-1-LT -003-0056 -G STM GEN 2 LEVEL WIDE RANGE	1-LT	-003-0056 -G 764 LOT 7	(3) 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L FW/C MS/C RH/C CV/C	MEASURES SG WATER LVL TO DETER MINE IF A SG HAS BLOWN DRY. ALSO USED FOLLOWING RX TRIP WHEN THE NR LVL IS TEMPORARILY OFF SCALE. PAM	
	WBN-1-LT -003-0093 -D SG 3 LEVEL XMTR (NR)	1-LT	-003-0093 -D 764 Lot 7	(3) 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAM/TMI	<i>R</i> 4
	WBN-1-LT -003-0094 -F SG 3 LEVEL XMTR (NR)	1-LT	-003-0094 -F 764 Lot 7	(3) 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PMm /Tmゴ	R4
	WBN-1-LT -003-0097 -0 SG 3 LEVEL XMTR (NR)	1-LT	-003-0097 -0 764 Lot 7	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C CV/C RH/C	MEASURES SG WATER LVL TO DETER MINE IF SI CAN BE TERMINATED, CONTROL SG LVL AND DETECT A BREACH OF CONTAINMENT THRU THE SG. PAM/TNI	R4
R4	WBN-1-LT -003-0098 -G SG 3 LEVEL XMTR (WR)	1-LT	-003-0098 -G 764 Lot 7 ,	(3) 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	L FW/C MS/C RH/C CV/C	MEASURES SG WATER LVL TO DETER MINE IF A SG HAS BLOWN DRY. Also used following RX TRIP When the NR LVL IS TEMPORARILY OFF SCALE. PAM	
-	PAGE							r 1 r 2 r 4	

PREPARER/DATE A.W. Lewis 9/23/86 WCG		····		···
CHECKED/DATE B. D. Meyer 9/23/86 HDR HDR HDR HDR GIAN	PREPARER/DATE A.W. Lewis 9/23/86	WCG	WCG	wan
	CHECKED/DATE B. D. Meyer 9/23/86	2-24-29 HDR 1.1.29	HDR 3-21-90	66M A/20180

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R 4

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BINDER NO. : WBNEQ-XMTR-001 Manufacturer : Barton Page 5 of 7

#### WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER DESCRIPTION	UNIT DEVICE ID NO. AZMITH. MODEL NUMBER	LOCATION ELEV(1) RM/RAD CONTRACT	CAT OPER TIME	EVENT SAFETY FUNCTION	
₩BN-1-LT ~003-0106 ~E SG 4 LEVEL XMTR (NR)	1-LT -003-0106 -E 764 LOT 7	(3) 71C62-54114-1	A 100D A 100D A 100D A 100 A 1M0 A 1M0	L MEASURES SG WATER LVL TO DETER MS/C MINE IF SI CAN BE TERMINATED, FW/C CONTROL SG LVL AND DETECT A RH/C BREACH OF CONTAINMENT THRU THE CV/C SG. PAM/TMI	R ²
WBN-1-LT -003-0107 -F SG 4 LEVEL XMTR (NR)	1-LT -003-0107 -F 764 Lot 7	(3) 71C62-54114-1	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L MEASURES SG WATER LVL TO DETER MS/C MINE IF SI CAN BE TERMINATED, FW/C CONTROL SG LVL AND DETECT A RH/C BREACH OF CONTAINMENT THRU THE CV/C SG. PAM	
WBN-1-LT -003-0110 -G SG 4 LEVEL XMTR (NR)	1-LT -003-0110 -G 764 LOT 7	(3) 71C62-54114-1	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L MEASURES SG WATER LVL TO DETER MS/C MINE IF SI CAN BE TERMINATED, FW/C CONTROL SG LVL AND DETECT A RH/C BREACH OF CONTAINMENT THRU THE CV/C SG. FMM /TMI	IR
HBN-1-LT -003-0111 -F SG 4 LEVEL XMTR (WR)	1-LT -003-0111 -F 764 LOT 4	(3) 71C62-54114-1	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L MEASURES SG WATER LVL TO DETER FW/C MINE IF A SG HAS BLOWN DRY. MS/C ALSO USED FOLLOWING RX TRIP RH/C WHEN THE NR LVL IS TEMPORARILY CV/C OFF SCALE. PAM	2
HBN-1-PDT -030-0042 -G CNTMT PRESS DIFF XMTR	1-PDT -030-0042 -G 301 764 LOT 7	728'7" ANN 71C62-54114-1	A 100D A 100D A 100D A 100D A 1M0 A 1M0	L PROVIDES A SIGNAL FOR MS/C PHASE B ISOLATION, PAM FW/C RH/C CV/C	
<b>JE</b> <u>A</u> <u>-</u> <u>6</u> R4		PREPARER/DATE Checked/date_	A.W. Lewis B.D. Meyer	R_1 R_2 R_4 S_9/23/86 WCG WCG WCG AVEN 9/23/86 HDR HDR BE: 1-3-89 3-21-90 8/30-90 9/30/90	





BINDER NO. : WBNEQ-XMTR-Manufacturer : Barton Page 6 of 7

#### WATTS BAR NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER	UNIT DEVICE ID NO. MODEL	AZMITH	LOCATION <u>ELEV(1)</u> <u>RM/RAD</u> <u>CONTRACT</u>	CAI (2)	<u>OPER TIME</u>	EVENT	SAFETY FUNCTION
WBN-1-PDT -030-0043 -F CNTMT PRESS DIFF XMTR	1-PDT -030-0043 764 1	-F 296 .0T 7	729' 1" ANN 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	PROVIDES A SIGNAL FOR Phase b isolation, pam
WBN-1-PDT -030-0044 -E CNTMT PRESS DIFF XMTR	1-PDT -030-0044 764 L	-E 285 .0T 7	746' 1" ANN 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	PROVIDES A SIGNAL FOR PHASE B ISOLATION, PAM
WBN-1-PDT -030-0045 -D CNTMT PRESS DIFF XMTR	1-PDT -030-0045 764 L	-D 307 .017	728' 7" ANN 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	PROVIDES A SIGNAL FOR PHASE B ISOLATION, PAM
WBN-1-LT -063-0180 -D Cntmt level min level RHR R	1-LT -063-0180 ECIR 764 L	-D 169 .0T 7	720 <b>' 3"</b> FN2 71C62-54114-1	A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	DETECT HIGH SUMP WATER LVL INITIATE SWITCHOVER ON LOW RWST, PAM
WBN-1-LT -063-0181 -E CNTMT LEVEL MIN LEVEL RHR R	1-LT -063-0181 ECIR 764 L	-E 359 OT 7	720 <b>' 2" FN1</b> 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C RH/C CV/C	DETECT HIGH SUMP WATER LVL INITIATE SWITCHOVER ON LOW RWST, PAM
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PAGE Ą J R2

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PREPARER/DATE <u>A.W. Lewis</u>	9/23/86	WCG	wer	
CHECKED/DATE B. D. Meyer	9/23/86	2-24-89 HDR	3-21-90 240R	
		<u>HDR</u> 3-3-89	3-21-90	

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PRINT DATE: 09/26/90

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BINDER NO. : WBNEQ-XMTR-001 Manufacturer : Barton Page 7 of 7

#### HATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS NUMBER Description	<u>UNIT</u>	DEVICE ID NO. Model Num	AZMITH	LOCATION ELEV(1) RM/RAD CONTRACT		OPER TIME	EVENT	SAFETY_EUNCTION
WBN-1-LT -063-0182 CNTMT LEVEL MIN LEVEL	-F 1-LT RHR RECIR	-063-0182 -F 764 Lot 7	277	720' 2" AC4 71C62-54114-1	A A A A A	1 МК 1 МК 1 ИК 1 ИК 1 МК 1 МК	L MS/C FW/C RH/C CV/C	DETECT HIGH SUMP WATER LVL Initiate Switchover on Low RWST
WBN-1-LT -063-0183 CNTMT LEVEL MIN LEVEL	-G 1-LT RHR RECIR	-063-0183 -G 764 LOT 7	072	720' 2" IIR 71C62-54114-1	A A A A	1 WK 1 WK 1 WK 1 WK 1 WK	L MS/C FW/C RH/C CV/C	DETECT HIGH SUMP WATER LVL Initiate Switchover on Low RWST
WBN-1-LT -068-0320 RCS PRZR LEVEL	-F 1-LT	-068-0320 -F 764 Lot 7	120	730'10" IIR 71C62-54114-1	A A A A A	100D 100D 100D 1M0 1M0	L MS/C FW/C CV/C RH/C	ISOLATE RCS LETDOWN, CONTROL RCP SEAL WATER INJECTION, PAM- MUST BE MONITORED TO ENSURE PROPER RCS PRESS AND INVENTORY CONTROL DURING EACH EVENT.
АВN−1− <b>LT</b> −068-0335 RCS fr <b>Z</b> r Level	-E 1-LT	-068-0335 -E 764 Lot 7	085	732' 4" IIR 71C62-54114-1	A A A A	100D 100D 100D 100D 1M0 1M0	L MS/C ·FW/C CV/C RH/C	ISOLATE RCS LETDOWN, CONTROL RCP SEAL WATER INJECTION, PAM- MUST BE MONITORED TO ENSURE PROPER RCS PRESS AND INVENTORY CONTROL DURING EACH EVENT.
WBN-1-LT -068-0339 RCS PRZR LE/EL	-D 1-LT	-068-0339 -D 764 Lot 7	103	732' 8" IIR 71C62-54114-1	A A A A	100D 100D 100D 1MO 1MO	L MS/C FW/C CV/C RH/C	ISOLATE RCS LETDOWN, CONTROL RCP SEAL WATER INJECTION, PAM- MUST BE MONITORED TO ENSURE PROPER RCS PRESS AND INVENTORY Control During Each event.
GE A								<u>r / r 2 r 5</u>

PREPARER/DATE A.W. Lewis 9/23/86 wcg wcg wcg wcg wcg checked/date B.D. Meyer 9/23/86 HDR HDR E2.74-89 3-21-90 10-15-90 E2.71 3-3-89 3-21-90 10-16/10/90

t) OI	levation he React	s shown		TAI	CKED <u>/<i>RI</i></u> <u>8 A</u>	HOR	DATE <u>3</u>	<u>.3.89</u>	- · ·		
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t) OI	he React	s shown		NOT	res						
	utside t ent are	or Buil he Read	ding an tor Bui	nd <u>Floc</u> ilding	<u>or</u> elev . Actu	ations	for equ	ment loca nipment 1 for all	ocated		
	ee Page ents.	B-3 for	source	e of Ca	ategory	and Op	erating	, Time as	sign-		•
3. E	CN 5974	is relo	cating	these	transm	itters.	See (	)pen Item	1 No. 1.		
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BINDER NOBARTON 764	COMPL	UNIT(S)	DATE 5-22-86	ET OF R R
LOT 7 AND 4	CHECK	ED WAR	DATE 5/2/86	
	TAB B - CHECKLIST F	OR EVALUATIO	N OF	
	ENVIRONMENTAL	QUALIFICATIO	N	
	INCLUDING SUMMARY	AND CONCLUS	ION	
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			•	
				· .

LOT 7 AND 4	CHECKED BDM	DATE <u>9-23-86</u> <u>24112</u> 3-3-89	
A. DOCUMENTATION			
Equipment Description	Refer to TAB A		-
Vendor/Manufacturer	Westinghouse/Barton		-
Equipment Model No.(s)	764 Lot 7		-
	764 Lot 4		-
QUALIFICATION REPORTS	••••••••••••••••••••••••••••••••••••••		-
(1) Title/Number/Revisi	on WCAP-8687, Supp.	RIMS_NEB_840807_362	R1
<u>2-EQTR-E03A, Revisi</u>	on 2*	DATE 3/83	.
(2) Title/Number/Revisi	on WCAP-8587, Supp.		R1
<u>1-EODP-ESE-3A, Revi</u>	sion 4	DATE_11/83	
(3) Title/Number/Revisi	on <u>WCAP-8587</u>	NEB 840724 354	
<u>Methodology Revisio</u>	n_6	DATE_3/83	
OTHER (ANALYSIS, VENDOR	DATA, ETC.)		
(4) QRN 67142			
(5) QRN 68859	·		
(6) QRN 68872			
(7) QRN 68188			
(8) QRN 68284	•		
(9) QRN 68873			

PAGE B-2 R1

BINDER NO.	WBNEQ-XMTR-001 PLANT WBN UNIT(S) 1 SHEET 1A OF R 5 R	24
BINDER TIT	LE BARTON 764 COMPUTED AWL DATE 9-23-86 AUCH	~
LOT 7 AND	4 CHECKED BDM DATE <u>9-23-86</u> CEM	
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A. DOCUME		
OTHER	(ANALYSIS, VENDOR DATA, ETC.) (Continued)	
(10)	QRN 67149	
(11)	QRN 74904	
(12)	QRN 67151 .	
(13)	QRN 67150	
(14)	QRN 68857	
(15)	QRN 56177	
(16)	Auditable Link Document (B45 860521 351)	
(17)	Calculation EQP-02 (B71 860402 200)	
(18)	WBNNAL3-004 (B45 860205 235)	
(19)	WBNTSR-051 (B26 891129 202)	
(20)	Deleted	
(21)	Cat. and Oper. Time WBNOSG4-004 R11-System 1 (B18 900612 253)	
(22)	Cat. and Oper. Time WBNOSG4-005 R12-System 3 (B26 900824 201)	
(23)	Cat. and Oper. Time WBNOSG4-008 R16-System 30 (B26 900717 201)	
(24)	Cat. and Oper. Time WBNOSG4-014 R12-System 63 (B26 900713 212)	
(25)	Cat. and Oper. Time WBNOSG4-017 R11-System 68 (B18 900612 252)	
(26)	1-LT-3-038 (B26 900809 405)	
(27)	1-LT-63-180 (B18 900723 251)	
(28)	1-LT-3-43 (B18 900825 255)	
(29)	Setpoint Methodology (B26 890515 928)**	
(30)	1-LT-68-335 (B18 900918 254)	1
• •	WAC-310 L-LS-63-180 (B26 900823 413)	
**See	Open Item No. 4	
	• · · · · · · · · · · · · · · · · · · ·	

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BINDER TITLE BARTON 764 COMPUTED	AWL	DATE	R_ <u>9-23-8</u> 6	3 R ACT	
LOT 7 AND 4 CHECKED	BDM	DATE	<u>9–23–8</u> 6	6-15-90	
A. DOCUMENTATION	• •				
OTHER (ANALYSIS, VENDOR DATA, ETC.) (	Continue	d)			
(32) WAC-311					
(32) WAG- 16					
(34) WAC-21					1
(35) Demonstrated Accuracy Calculation 1-70	T-30-42 (	B1890	10 613 251	)	R
(36) WAC-23					
(37) WAC-28					
(38) WAC-26		~	•		
(39) WAC-29	,				
(40) WAC-27					
(41) WAC-95					
(42) WAC-72					
(43) Spec. Sheets 01410 - (NEB 840302	352 and	NEB 8	40302 3	153)	
(44) Spec. 955270 Rev 2 - (B45 850423	359)				
(45) Spec. 953328 Rev 3 - (B45 850508	351)				
(46) TVA-85-176 - (B70 850925 006)	• •				• *
(47) WAT-D-6354 (NEB 850201 609)	· •				
(48) WAT-EQ-001 (B71 860225 001)					
(49). WAT-EQ-010 (B71 860516 003)					
(50) Manual No. 86A2 (B26 881208 351)					•
(51) Dwg. 8765D45, R8					
(52) WCAP-8687, Supp. 2-E03A Addendum 1	1 (B45 85	1105	356)	•	
	• ,				[R]

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INDE	R NO.	. <u>WBNEQ-XMTR-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>1C</u> OF R 2 R 5	
INDE	R TII	TLE BARTON 764 COMPUTED/R1 WCG DATE 3/3/89 WCG w	cs
		3/21/90 ^	147. ' 9
<u>ot 7</u>	AND	4 CHECKED/R1 HDR DATE <u>3/3/89 HDR 6</u> 3/21/90 ~	<u>.</u> 710
<b>A.</b> <u>I</u>	OCUM	ENTATION	
C	THER	(ANALYSIS, VENDOR DATA, ETC.) (Continued)	
	7271	Environmental Data Drawing 47E235-42 R2	
ł	,237	(including DCA-P04104-05-0, -P04104-02-1, and -P04104-03-0)	
		Environmental Data Drawing 47E235-44 Rl	
(	.54)	Environmental Data Drawing 475255-44 ki	
(	(55)	Environmental Data Drawing 47E235-45 Rl (including DCA-PO4104-06-0)	
(	(56)	WCAP-8687 - Supp 2 - E21A R2 (B25 880812 006)	
(	(57)	Deleted.	
		- ·	
I			
		· · · · · · · · · · · · · · · · · · ·	
		$\cdot$	

Dete: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

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WBEP-0096Q

SINDER TITLE BARTON 764	$\underbrace{\text{COMPUTED} \underline{AWL}}_{\text{DATE}} DATE \underbrace{9-23-86}_{2-2\sqrt{-5}9} \underbrace{-1}_{2-2\sqrt{-5}9}$
	CHECKED BDM DATE <u>9-23-86</u> <del>2490</del> 3-3-89
B. <u>CONCLUSION OF REVIEW</u>	(Check only one block)
<u>    X                                </u>	alified
	atisfies All Requirements Except Qualified Istification of Replacement Schedule
Equipment Qu	alification Not Established by Documentation
Equipment No	ot Qualified Based on Test Failures
	FICATION DEFICIENCIES
<u>1. Relocate Transmit</u>	ter (NCR WBNEEB6172) R1
2. SCR WBNEEB8575	
3. Deleted	
4. Demonstrated and	Required Accuracy
5. NCR 6224	· · · · · · · · · · · · · · · · · · ·
COMMENTS/RECOMMENDATI	CONC.
CONTRACTO RECORDENDALI	
- <u> </u>	
•·····	

PAGE B-5 R1

L(	ER TITLE BARTON 764 COMPUTED AND DATE 5/22/86	
c.	QUALIFICATION CRITERIA	
÷	Criteria Used to Demonstrate Qualification is in Accordance with the Following (Indicate All Documents Which are Applicable):	
	X Components are Qualified to the Criteria of 10CFR50.49 and/or NUREG-0588 Category I (IEEE323-1974)	
	Components are Qualified to the Criteria of NUREG-0588 Category II or the DOR Guidelines of IE Bulletin No. 79- 01B (IEEE323-1971) (DOR Guidelines Applicable to only BFN)	
	JUSTIFICATION/COMMENTS	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	INDICATE OTHER REGULATORY DOCUMENTS AND/OR INDUSTRY STANDARDS MET	
	TRE 202 107/	
	<u>IEEE 323-1974</u>	· ·
	<u>IEEE 323-1974</u>	

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	ER TITLE BARTON 764 COMPUTED $\frac{BARTON 764}{T 7 \text{ AND } 4}$ DATE $\frac{5/22/86}{72}$
D.	<u>QUALIFICATION_METHODOLOGY</u> (Check only one block)
2	X Test of Identical Item Under Identical Conditions or Under Similar Conditions with Supporting Analysis
	Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS

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INDEF	R TI	TLE BARTON 764	COMPUTED <u>AWI</u>	DATE <u>5/22</u>	186 2-24-59
<u>0T 7</u>	AND	4	CHECKED WBK	DATE <u>5/22</u> ,	186 <u>1/191_</u> 7·3-89
E. <u>I</u>	EQUI	PMENT DESCRIPTION	<u></u>		
đ	iden	he equipment ident: tical to the plant /No/NA)? <u>Yes</u>			
			<u>Plant Device</u>	Qualification 	Reference
(	(1)	Equipment Type	<u>Transmitter</u>	Transmitter	
(	(2)	Manufacturer	Barton	Barton	See <u>Comments</u>
(	(3)	Model Number(s)	764	764	
			Lot 7	Lot 7	
			Lot 4	Lot 4	
(	(4)	Serial Number(s)	See	550	
			TAB C	853	
			Section A	854	
	(5)	Identify Component checksheet attache	-	<u>NA</u>	
	JUST	IFICATION/COMMENTS	Section 2, pag	te 2 of the test	report
<u>(</u>	(TAB	D) identifies the	tested units and	<u>l to what baselir</u>	<u>ne_configur</u> a-
1	tion	they were built.	Table 9, page 33	of the test rep	<u>port identi-</u>
1	fies	that the Auditable	e Link Document f	formally compares	s the plant
S	pec	ific purchased unit	s and their base	eline configuration	ion to the
<u>0</u>	<u>lual</u>	ification test unit	s. The Auditabl	le Link Document	is
<u>(</u>	cont.	ained in TAB C, Sec	tion A (Traceabi	lity) along with	<u>Table 1,</u>
ž	vhic	h shows the link for	com the equipment	in the field to	the test
1	cepo:	rt. Other support	ing documents are	also included i	in this
5	sect	ion. Transmitters	<u>1-LT-63-180,-181</u>	182. and -183	are Barton
N	loda	<u>1 764 transmitters</u>	with Model 251 -		TAB C, RI

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## PAGE B-8 R1

INDER TITLE BARTON	764 COMPUTED	AWL DATE <u>9-2</u>	R_5_R 3-86 NCJ 10/15/90
OT 7 AND 4	CHECKED	BDM DATE <u>9-2</u>	<u>3-86 BBM</u>
F. INSTALLATION INT	TERFACES		<b>,</b>
documentation an interface a requ	aces pertinent to EQ ind/or evaluation and r nirement for our appli equirement in QMDS, if	reference the sou cation (Yes/No)?	rce. Is the (Note below.
<u>Interface</u>	Identify Interface	Plant Requirement? <u>(Yes/No)</u>	Reference <u>Test Report</u>
Mounting Bolts	<u>NA</u>	NA	NA
External Process Connections	1/2" NPT/Female	Yes	Spec. 95332 Sec. 4.3.3, <u>TAB E, Sec</u>
Electrical Connections	<u>Per Dwg. 8765D45</u>	Yes	<u>TAB I</u> Note 2 of D
Connections Conduit Seals	Per Dwg. 8765D45	NA	TAB I - See Comments**
Connector Seals	<u>Per Dwg. 8765D45</u>	NA	See <u>Comments**</u>
Orientation	See comments***	<u>      Yes</u>	
Physical Configuration	Per Dwg. 8765D45	Yes	TAB I
Other	See Comments*		
binder WBNEQ-SP with a manufact exposed to tota report. This i	OMMENTS <u>*Raychem spli</u> LC-001. <b>**The Barton</b> urers seal (potting co 1 LOCA/HELB environmen nformation is contained -D-6985) (B71 860516 (	transmitters are ompound) which wa nts as described ed in Westinghous	supplied s tested and in the test e letter

		LE	ARTON 764 COM		<u>1/012</u> da 1/1/1/2 da	ATE <u>5/29/86</u>
G. <u>1</u>	EST	SEQU	ENCE			
· (	1)	acci	Sequence: Was the test s dent environment in accord /no/NA)? (note below)	lance wit	h IEEE-323	
		(a)	Equipment inspected for d	lamage _	Yes	<u>3.2 p.4</u>
		(b)	Baseline performance measurements taken		Yes	<u>3.2 p.4</u>
		(c)	Equipment aged:			
			Thermal	-	Yes	<u>3.1.1 p.3</u>
			Radiation	-	Yes	3.1.2 & .3.p.3
·			Wear		Yes	<u>3.1.1.p.3</u>
		(d)	Vibration/seismic testing conducted	3 -	Yes	4.2.3.p.7
		(e)	Design basis event (DBE) exposure	-	Yes	5.4,p.14
		(f)	Post-DBE exposure	-	Yes	5.4,p.14
		(g)	Final inspection and disassembly	-	Yes	<u>3.2, p.4</u>
(	2)	Was desci	the same piece of equipmen ribed in item (1) above (y	nt used t ves/no/NA	hroughout )? <u>Yes*</u>	the test sequence
(	3)	been	the test equipment, test appropriately documented erence <u>Table 2, 3, 4, and</u>	(yes/no/	NA)? <u>Yes**</u>	•
J	UST	IFICAT	TION/COMMENTS <u>*O-rings an</u>	d fill o	<u>il were re</u>	placed: see
<u>s</u>	ecti	ions 5	o.l and 7.1.			
*	*Cal	librat	ion data and test equipme	nt accur	acies_avai	lable for audit
a	<u>t We</u>	esting	house.			

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LOT	7 AN	CHECKED UMAN	DATE 5/748	·
H.	AGIN	2		
*	(1)	Was aging considered in the qualification pr (Yes/no/NA)? <u>Yes</u> (Reference <u>3.1.1, p. 3</u> ).		
		JUSTIFICATION/COMMENTS		
	(2)	Were the following effects considered in the	e aging prog	can:
		Aging Effect	<u>Yes/No/NA</u>	Reference
		Thermal aging	Yes	<u>3.1.1,p.3</u>
		Radiation exposure	Yes	<u>3.1.2&amp;3,p.3</u>
		Vibration (non-seismic) aging	Yes	5.3.5.p.14
		Operational (electrical/mechanical/process) stress aging	<u>Yes</u>	<u>5.1, p.9</u>
		JUSTIFICATION/COMMENTS <u>*See WCAP-8587, Appe</u>	endix B, Iter	<u>n 17 P.B-7 ir</u>
		Tab E. Section D for further justification.		
	(3)	Were all known synergistic effects which are significant effect on equipment performance program (yes/no/NA)? Yes (Reference See Com	considered :	
		JUSTIFICATION/COMMENTS This is addressed in	<u>Appendix B</u>	of
		WCAP-8587 (#21,P.B-8), Tab E, Section D.		
	(4)	Thermal Aging:		
		(a) Was thermal aging considered in the qua (yes/no/NA)? <u>Yes</u> (Reference <u>3.1.1, p.</u>		program
		JUSTIFICATION/COMMENTS	<u>*************************************</u>	

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	RTON 764 COMPUTED $AWA DATE \frac{5/22/86}{16}$
LOT 7 AND 4	CHECKED 12/2/86
H. <u>AGING</u> (C	ontinued)
(b)	Were the materials susceptible to thermal aging degradation identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference: <u>See Comments*</u> ).
	JUSTIFICATION/COMMENTS <u>*See Appendix D, Section 3, page D-5</u>
	of WCAP-8587 in Tab E, Sect. D. This is not for transmitters
	<u>only - applies to all Westinghouse NSSS.</u>
(c)	Was the basis for thermal aging identified in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u> ).
<b>^</b> .	JUSTIFICATION/COMMENTS See App. B, Section 7, p. B-2 and
	App. D. Sect. 3, p. D-5 of WCAP-8587 in Tab E. Section D.
(d)	Was the aging acceleration rate justified and the parameters of time and temperature identified in the qualification program (yes/no/NA)? Yes (Reference 5.1, p. 9).
	<u>Parameter</u> <u>Plant Maximum Normal</u> <u>Test</u> <u>Equivalent</u> Fan RM 1 - 101°F Fan RM 2 - 100°F Acc RM 3 - 92°F Acc RM 4 - 95°F
	TemperatureIIR = 75°F, Ann. = 110°F125° C104°FTime40 Years1673 Hrs10 Years
	JUSTIFICATION/COMMENTS <u>*See Tab C, Section B for plant</u>
	temperature calculation (EQP-02) supporting these temperatures.
(e)	Was the Arrhenius methodology used for accelerated aging (yes/no/NA)? <u>Yes</u> (Reference <u>5.1, p. 9</u> ).
· · · · · · · · · · · ·	JUSTIFICATION/COMMENTS
(f)	If activation energies were used for determining accelerated aging parameters, are they properly referenced to the source of the technical data (yes/no/NA)? Yes* (Reference <u>5.1, p. 9</u> ).
	JUSTIFICATION/COMMENTS <u>*Test_report_used_a_conservative</u>

BINDER TITLE	BA	$\frac{-\text{XMTR}-00^{1} \text{ PLANT} \qquad \text{WBN} \qquad \text{UNIT(S)} \qquad \frac{1}{23/84} \qquad \text{SHEET} \qquad \frac{10}{10} \text{ CF}$ $\frac{\text{RTON 764}}{10} \qquad \text{COMPUTED} \qquad \frac{10}{10} \text{ CF}$
	, 4	CHECKED //// DATE 5/29/86
H. AGING	<u> (</u> C	ontinued)
3 2	(g)	If a regression line was used for determining accelerated aging parameters, are test points or failure modes identified on the line (yes/no/NA)? <u>NA</u> (Reference).
		JUSTIFICATION/COMMENTS
	(1)	We the environment encoded during the thermal enirg
	(h)	Was the equipment operated during the thermal aging (yes/no/NA)? <u>Yes</u> (Reference <u>7.1, p. 17</u> ).
		JUSTIFICATION/COMMENTS
(5)	Radi	ation Aging Exposure:
	(a)	Was radiaton aging exposure considered in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>5.2, p. 10</u> ).
		JUSTIFICATION/COMMENTS
	(Ъ)	Were the materials susceptible to radiation degradation identified in the qualification program (yes/no/NA)? <u>No</u> (Reference <u>See Comments</u> ).
		JUSTIFICATION/COMMENTS App. C of WCAP-8587 in Tab E, Sec. D
	(c)	Was the basis for radiation aging exposure identified in the qualification program (yes/no/NA)? <u>Yes*</u> (Reference <u>3.1.2, p. 3 and 5.2, p. 10</u> ).
		JUSTIFICATION/COMMENTS <u>*The basis was further identified in</u>
		Section 6.7.1 (p. 6-3) and 6.7.4 (pages 6-6 through 6-9) of
		WCAP-8587 in Tab E, Section D.

INDER TITLE	BARTON 764 COMPUTED AWL	DATE <u>5-22-86 was</u>
OT 7 AND 4	CHECKED BDM	DATE <u>5-22-86</u> <u>249R</u> 3-3-89
H. <u>AGING</u> (Co	ontinued)	
(d)	Is the radiation test exposure de acceptable (Yes/No/NA)? <u>Yes</u> and 3.1.3, p. 3	(Reference: <u>5.2, p. 10</u>
···· · ·	Plant normal ambient radiation dose (rd)	7 2x10 (40 years-Gamma)
	Test exposure dose (rd)	<u>6.8x10</u> ⁷
	Test exposure dose rate (rd/hr)	
	Test exposure source type (e.g., Co-60 gamma)	<u>Co-60 Gamma</u>
	JUSTIFICATION/COMMENTS	
(6) Vibr	ation (non-seismic) Aging:	
(a)	Were the effects of non-seismic v normal and abnormal operation ado qualification program ¹ <u>Yes*</u> <u>See Comments</u>	dressed in the (Reference:  R1
	JUSTIFICATION/COMMENTS <u>*See App</u> WCAP-8587 in TAB E. Section D.	
(b)	Was the basis for vibration aging in the qualification program (Yes (Reference: <u>See Comments</u>	
	JUSTIFICATION/COMMENTS <u>*See App</u> WCAP-8587 in TAB E. Section D.	<u>. B Item 20, p. B8 of</u>
(7) Opera	tional Stress Aging:	
(a)	Were the effects of electrical, me operational stresses induced durin operation adressed in the qualific (Yes/No/NA)? Yes (Reference: S	ng normal and abnormal cation program
	JUSTIFICATION/COMMENTS <u>Section 5</u> , addresses the fact that operations	<u>.0 - Test procedure</u> al stresses were

<del>...</del>.

PAGE B-14 R1

	0. <u>WBNEQ-XMTR-001</u> PLANT <u>WBN</u> UNIT(S) <u>1</u> SHEET <u>12</u> OF R <u>1</u> R ITLE BARTON 764 COMPUTED AWL DATE <u>5-22-86</u> محمد محمد محمد محمد محمد محمد محمد محم	
LOT 7 AN	2-2-4-8-1	
H. <u>AGIN</u>	G (Continued)	
	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: See Comments)	
	JUSTIFICATION/COMMENTS <u>See App. B - Subprogram A.</u> Section 13-15, page B-6 of WCAP-8587 in TAB E, Section D.	
. (8)	Was the qualified life of the equipment and its basis defined in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>7.5, page 20</u>	
	Qualified life (Document in QMDS) <u>IIR=26.4 yrs.; Ann.=8.2 yrs.;</u> <u>Fan Rm. 1=10.9 yrs.; Fan Rm. 2=11.2 yrs.</u> <u>Acc Rm. 3=14.6 yrs.; Acc Rm. 4=12.8 yrs.</u>	
	JUSTIFICATION/COMMENTS <u>See TAB C. Section B for Qualified</u> Life Calculations.	
(9)	Were replacement intervals for the equipment or its components defined in the qualification program (Yes/No/NA)? Yes	
	(Reference: <u>7.5, page 20</u> )	
		R1
	JUSTIFICATION/COMMENTS	
	·	

PAGE B-15 R1

TINDE	ER 1	ITLE	<u>BA</u>	RTON	764		COMPUT	ED <u>AWL</u>	DATI	E <u>5-22-8</u>	6 <u>2.248</u> 2.248	9	
<u>)T 7</u>	7 <u>AN</u>	D 4					CHECKE:	D <u>WBK</u>	DATH	5 <u>-22-8</u>	6 <u>7491</u> 3-3-89	,	
	1ATE	RIAI	S AN	ALYSI	s								
Ę	and/	or R	adia	tion	Degra	dation		tible to ging (Use					
	Ma	teri	<u>a1/P</u>	roper	ty/Fu	nctio		tion <u>hold Ref</u> e				fere	<u>1Ce</u>
(	(a)	<u>EPT/</u>	<u>0-ri</u>	igs						.92eV	5.	<u>1, p</u>	.10
(	(Ъ)	<u>Sili</u>	cone	550/	<u>Fill</u>	0 <b>i</b> 1				.92eV	<u> </u>	<u>1, p</u>	.10
(	(c)	<u>Sili</u>	cone	702/	<u>Fill</u>	0il ((	<u>Capilla</u>	<u>ry)</u>		.92eV			.1 R1
1	(۵)							•					-
	(a)		<u></u>										
	(e)							clusion (					
) Y 1 1	(e) JUSI was temp	dete dete erat	ATIO rmin ure_ ve_t	N/COM ed_th selec he_ag	MENTS at th ted w ing t	<u>At</u> e into as too ime.	the con ernal 0 o high The 0-	clusion of -rings fa for the rings and	of the a ailed be internal 1 fill c	nging te ecause t 0-ring pil were	<u>sting</u> he_ag <u>s_mat</u> repl	, it ing erial aced	   
1 1 1 2	(e) JUST was temp to s and	CIFIC dete perat	ATIO rmin ure ve t for	N/COM ed th selec he ag 350	MENTS at th ted w ing t hours	<u>At</u> e into as too ime. at 1;	the con ernal 0 o high The 0- 25°C ba	clusion of -rings fa for the :	of the a ailed be internal 1 fill o 1 activa	aging te ecause t 0-ring oil were ation en	sting he_ag s_mat repl ergy	, it ing eria aced of	
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۱ ۲ ۱ ۲ ۲ ۲	(e) JUSJ was temp to s and .926	IFIC dete perat survi aged	ATIO rmin ure ve t for sed	N/COM ed th selec he ag 350 on th	MENTS at th ted w ing t hours e 0-r	<u>At</u> e into as too ime. at 1;	the con ernal 0 o high The 0- 25°C ba	clusion of -rings fat for the rings and sed on an	of the a ailed be internal 1 fill o 1 activa	aging te ecause t 0-ring oil were ation en	sting he_ag s_mat repl ergy	, it ing eria aced of	
۱ ۲ ۱ ۲ ۲ ۲	(e) JUSJ was temp to s and .926	IFIC dete perat survi aged	ATIO rmin ure ve t for sed	N/COM ed th selec he ag 350 on th	MENTS at th ted w ing t hours e 0-r	<u>At</u> e into as too ime. at 1;	the con ernal 0 o high The 0- 25°C ba	clusion of -rings fat for the rings and sed on an	of the a ailed be internal 1 fill o 1 activa	aging te ecause t 0-ring oil were ation en	sting he_ag s_mat repl ergy	, it ing eria aced of	
۱ ۲ ۱ ۲ ۲ ۲	(e) JUSJ was temp to s and .926	IFIC dete perat survi aged	ATIO rmin ure ve t for sed	N/COM ed th selec he ag 350 on th	MENTS at th ted w ing t hours e 0-r	<u>At</u> e into as too ime. at 1;	the con ernal 0 o high The 0- 25°C ba	clusion of -rings fat for the rings and sed on an	of the a ailed be internal 1 fill o 1 activa	aging te ecause t 0-ring oil were ation en	sting he_ag s_mat repl ergy	, it ing eria aced of	
۱ ۲ ۱ ۲ ۲ ۲ ۲ ۲	(e) JUSJ was temp to s and .926	IFIC dete perat survi aged	ATIO rmin ure ve t for sed	N/COM ed th selec he ag 350 on th	MENTS at th ted w ing t hours e 0-r	<u>At</u> e into as too ime. at 1;	the con ernal 0 o high The 0- 25°C ba	clusion of -rings fat for the rings and sed on an	of the a ailed be internal 1 fill o 1 activa	aging te ecause t 0-ring oil were ation en	sting he_ag s_mat repl ergy	, it ing eria aced of	

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PLUSEQ/96.1

DINUER I	ITLE <u>BARTON 764</u> $R = R _ R _ R _ R _ R _ R _ R _ R _ R _ $
LOT 7	AND 4 CHECKED Ban DATE 9-23-36
	QUIPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE PECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
	1) Acceptance Criteria: Does the report/analysis identify the limiting values of performance characteristics which would constitute failure not met (yes/no/NA)? Yes (Reference 3.2, page 4).
	Identify Acceptance Criteria: <u>Refer to Section 3.2 of the report</u> , <u>pages 4 and 5.</u>
(	2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verified before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference 3.2, p. 4, Tbls. 5,6,7,8,≪ Identify baseline and functional testing: See Section 6.0, page 6-1
	and Section 6.8, page 6-9 on WCAP-8587 in Tab E, Section D.
	JUSTIFICATION/COMMENTS
(,	3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>5.0, pages 10-14</u> ). JUSTIFICATION/COMMENTS

.	BINDER NO	WBNEQ_XMTR-00	1_ PLANTWBN	UNIT(S)	1 SHEET	<u>15 OF 24</u>
	BINDER TI	TLE BARTON 764	COMPUTED	AWT. DA	R_4	R
	LOT 7 ANI				5-3	w-90
		<u> </u>	CHECKED_	<u> </u>	TE <u>9–23–86 <i>b E</i></u> 8/30	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	PERI	IPMENT ELECTRICA FORMANCE SPECIFI itinued)	L CHARACTERISTIC CATIONS CAN BE S	S NECESSARY ATISFIED UND	TO ENSURE THE DER ACCIDENT (	<u>CONDITIONS</u>
	(4)	Do the applied operating cond	loads during ba itions (Yes/No/N	seline testi A)? <u>Yes</u> (	ng reflect no Reference:	ormal).
		JUSTIFICATION/	COMMENTS <u>See Co</u>	mments on 5c		
	(5)	Identify elect equipment perf	rical characteri ormance specific	stics necess ations can b	ary to ensure e satisfied.	the
	-	(a) <u>Parameter</u>	<u>Plant Normal</u>	Conditions	<u>Refere</u>	nce
		Voltage	See Comments		<u></u>	·
		Load	See Comments	5(b)		
		Frequency Accuracy	See TAB C,		TAB C, Pg C-462 & C	
		Other(s)		•		
		JUSTIFICA	CION/COMMENTS		· ·	
	(b)	Parameter	<u>Specific Accide</u>	ent Condition	ns <u>Refer</u>	ence
		Voltage	See Comments			
		Load	See Comments		·	
		Frequency	NA			
		Accuracy	See TAB C, Sect	ion F	TAB C, 1 <u>C-462 &amp;</u>	- 1071
		Other(s)				•
		the design proc	COMMENTS <u>Voltage</u> ess and will not they are power	: vary during	z accident	
					Hated power.	
.	·	······································				
_,1	8EP-0096Q		PAGE B18	R4		

BINDER TI	TLE_BARTON 7	64 COMPUTED AWL DATE <u>9-23-86 WCG</u> 2/24/3
LOT 7 AND	4	CHECKED BDM DATE <u>9-23-86 HDR</u> 3/3/8
PERF		CAL CHARACTERISTICS NECESSARY TO ENSURE THE FICATIONS CAN BE SATISFIED UNDER ACCIDENT CON
(5) (c)	Parameter	Demonstrated ConditionsReferen
2	Voltage	1.1.1 of 15-52V DC 1V ESE-3A
	Load	10-50 MA ESE-3A
• ·	Frequency	NA 1.1.2 of
	Accuracy	TAB C, Pg See TAB C, Section F C-462 & C
	Other(s)	
	JUSTIFICATIO	N/COMMENTS <u>Electrical characteristics are co</u>
	tained in EO	DP-ESE-3A and Specification 953328. Vendor st
•	<u>mits to West</u>	inghouse for approval the verification of
	<u>electrical</u> c	haracteristics to Spec. 953328. Verification
	<u>electrical c</u>	haracteristics on file at Westinghouse to be
	audited. Sp	ec. 953328 contained in TAB E, Section C;
	EQDP-ESE-3A	is contained in TAB D, Section D-1.

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	<u>7 AND</u>	0 4 CHECKED WBK DATE <u>5-22-86</u> <del>1/31</del> 3-3-89	
к.	REQU	IRED OPERATING ENVIRONMENT	
	Refe	erence Environmental Drawing No. <u>See Sheet 16A for Transmitt</u> . <u>Operating Environment - Norr</u> <u>&amp; Abnormal</u>	
	(1)	Normal Max (2) Abnormal Max	
		(a) Temperature (°F) <u>Sheet 16A</u> (a) Temperature (°F) <u>She</u> e	<u>et 1</u> (
		(b) Pressure (psig) <u>Sheet 16A</u> (b) Pressure (psig) <u>Shee</u>	<u>et 1</u> 0
		(c) Humidity (%) <u>Sheet 16A</u> (c) Humidity (%) <u>Shee</u>	<u>et 1</u> 0
		(d) Radiation (rd) <u>Sheet 16A</u> (d) Radiation (rd) <u>Shee</u>	<u>et l</u> (
	(3)	Process Interfaces: The transmitters are connected by impulines to the process systems which they are monitoring and located in instrument racks away from the process system so that they should not see any significant effect due to the process.	<u>are</u>
	(4)	State anticipated occurrence frequency and duration of about conditions: <u>These conditions could exist for up to eight hours per excursion and will occur less than 1% of the plan life.</u>	
	(5)	Accident (worst case for any combination of specified accid parameter including peak, duration, and profile):	lent
		(a) Temperature (°F) <u>327</u> Accident type <u>L, HELB</u>	
			1
·		(b) Pressure (psig) <u>11.2</u> Accident type <u>L</u>	
·		<pre>(b) Pressure (psig) <u>11.2</u> Accident type L (c) Humidity (%) <u>100</u> Accident type L, HELB 4.7x10⁸(beta)**</pre>	
		(c) Humidity (%) $100$ Accident type <u>L, HELB</u> 4.7x10 ⁸ (beta)** (d) Radiation (rd) $3.3x10^{7}$ (gamma)*Accident type <u>L</u>	
		(c) Humidity (%) <u>100</u> Accident type <u>L. HELB</u> 4.7x10 ⁸ (beta)** 7	

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BIND	ER TI	TLE	BARTON 764	COMPUTED	AWL	$  \underline{ \begin{array}{c} & & \\ & & \\ & & \\ & & \\ \end{array} } DATE   \underline{9-23-86}   \underline{w} $	<u>CG</u> 14
	7 AND					DATE <u>9-23-86 H</u>	
к.	REQU	IRED	OPERATING ENVIRON	MENT (refe	rence	also to TAB.C, se	ction
	Reference Environmental Drawing No. <u>47E235-42. Lower Containment</u>						
	(1) Normal Max (2) Abnormal Max						
		(a)	Temperature (°F)				
		(b)	Pressure (psig)	<u>0.3</u>	(b)	Pressure (psig)	0.3
		(c)	Humidity (%)	80	(c)	Humidity (%)	100
		(d)	Radiation (rd)	<u>2 x 10'</u>	(d)	Radiation (rd)	NA
ĸ.	REQU	IRED	OPERATING ENVIRON	MENT	-		
	Reference Environmental Drawing No. <u>47E235-45, IIR-Incore</u>						
	(1) Normal Max (2) Abnormal Max						
	(1)			(2)		rmal Max	
		(a)	Temperature (°F)	75	(a)	Temperature (°F)	<u>120</u>
	• .	<b>(b)</b>	Pressure (psig)	0.3	(b)	Pressure (psig)	0.3
		(c)	Humidity (%)	60	(c)	Humidity (%)	90
		(d)	Radiation (rd)	<u>3.5x10</u>	(d)	Radiation (rd)	NA
ĸ.	<u>REQU</u>	IRED	OPERATING ENVIRON	MENT			
•	Refe	rence	·Environmental Dra	awing No. 4	¥7E235	-44, Annulus	
	(1)	Norm	al Max	- (2)	Abno	rmal Max	
		(a)	Temperature (°F)		,- <b>-</b>	Temperature (°F)	120
		(b)	•	ATM(-)	·	Pressure (psig)	
		(c)	Humidity (%)	80			
		(d)		6			<u>90</u>
		(u) •	Radiation (rd)	<u>1x10</u>	(d)	Radiation (rd)	<u>NA</u>
			<u>, -</u> 1				
	•						

WBEP-0096Q

	TLE BARTON 764 COMPUTED AWL DATE $9-23-86$ $\frac{1}{2}$ $\frac{R}{2}$
	3-3-89
K. REQU	IRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>See page 17B and the Environmental Drawings</u> [R1]
·~.	listed in Section A of this TAB
(6)	
·	can affect the performance of the equipment under design basis accident conditions (Yes/No/NA)? <u>Yes</u> (Reference:
	Environmental Drawings 47E235-42, -44 and -45 ). R1
(7)	Subject to submergence (Yes/No/NA)? <u>No</u> (Reference: (See TAB A for elevation and Sheet 17A) *See Open Item  R1
	No. 1
	Identify initiation time and duration of submergence: <u>Na</u>
(8)	
	the total accident dose (Yes/No/NA)? Yes (Reference: <u>47E235-42, -44, -45</u> ).
	If yes, identify the fraction of the unattenuated free field
	beta dose to be added to the total dose and justify: R1
	$1.87 \times 10^{6}$ rads
(-)	
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No. R1
	See TAB B, Section A

BINDER NO. WBNEQ-XMTR-001 PLANT WBN UNIT(S) 1 SHEET 17A OF 24 R1
BINDER TITLE BARTON 764 COMPUTED AWL DATE 9-23-86
LOT 7 AND 4 CHECKED BDM DATE 9-23-86 2494 3-3-89
K. <u>REQUIRED OPERATING ENVIRONMENT</u> (Continued)

K. <u>Adorabb Orlaaring Myrayaari</u> (Continued)

(7) Comments: TAB A contains the exact elevation of the transmitters (from the field verification sheets contained in TAB F) which can then be compared to the following flood level:

1. IIR - elevation 717.7 ft. (47E235-45)

R1

- 2. FAN ROOM 1 717.7 ft. (47E235-42)
- 3. FAN ROOM 2 717.7 ft. (47E235-42)
- 4. ACC. ROOM 3 717.7 ft. (47E235-42)
- 5. ACC. ROOM 4 717.7 ft. (47E235-42)
- 6. ANNULUS NA

BINDER TITLE	BARTON 764	COMPUTE	D/KI ward		R	-
LOT 7 AND 4		CHECKED	IRI HOR	DATE <u>3-3-89</u>		
	·	<u></u>				
						-
	THIS PA	GE INTENTION	ALLY LEFT	BLANK		
					_	

Pages <u>B-24</u> thru <u>B-26</u> were deleted per revision <u>1</u>.



	LOWER CONTAINMENT AND INSTRUMENT ROOM (IIR)
was	emical Spray: The chemical composition of the containment spray s based on the following solutions which result in the most vere conditions:
1.	Ice Condenser - Quantity of Ice - 2.7195 x $10^6$ - Boron Concentration 1800 PPM B added as $Na_2B_40_710H_20$ .
2.	Boron Injection Tank - Volume - 900 GAL - Boron Concentration 2100 PPM B in the form of H ₃ BO ₃ .
3.	Cold Leg Injection Accumulators (4 Tanks) - Volume - 10,098 $FT^3$ -Boron Concentration: 2000 PPM B in the form of $H_3BO_3$ .
4.	Upper Head Injection - Volume - 1800 $FT^3$ - Boron Concentration: 2100 PPM B in the form of $H_3BO_3$ .
5.	Refueling Water Storage Tank - Volume - 375,000 GAL - Boron Concentration: 2100 PPM B in the form of H ₃ BO ₃ .
6.	Reactor Coolant System - Volume - 12,145 $FT^3$ - Maximum Boron Concentration: 2100 PPM B in the form of $H_3BO_3$ .
Res	sults: The solutions stated above yield a resulting concentration of .19 Molar H ₃ BO ₃ resulting in a pH of 8.3 at 25°C.

 $\overline{\phantom{a}}$ 

BINDER TI	TLE BARTON 764	COMPUTED AW	II. DATE 5-	R <u>1</u> R 22-86_vcr	<del></del>
			<u> </u>	2.44-89	
LOT 7 ANI	) 4	CHECKED WE	<u>BK</u> DATE <u>5-</u>	22-86 240K	
				3-3-89	
L. SUMM	ARY COMPARISON OF TEST	CONDITIONS 1	TO SPECIFIED C	ONDITIONS	
(1)	Comparison of worst-ca	se maximum p	parameters:		
	Parameter	<b>Specified</b>	Demonstrated		
				Fig 2, p 38	
				See TAB C,	Int
	Operating Time	100 Dama	15 Dama	Sect G for	R1
	Operating Time Temperature (°F)	<u>100 Days</u> 327	<u>15 Days</u> 420	<u>Compariso</u> n <u>Fig 2, p</u> 38	
	iemperature (r)	247	420	Fig 2, $p$ 38	
				Table 1 of	
	Pressure (psig)	11.2	57.6	EODP-3A	R1
				Fig 2, p 38	
				Table 1 of	
	Relative Humidity (%)	100	100	EQDP-3A	
			See Table 1		
	Objection 1. Comparent	See TAB C	of	10	
	Chemical Spray*	<u>Section I</u>	EQDP-ESE-3A		
				6.2, p 15 TAB E,	1
		5.49 x $10^7$	$6.8 \times 10^7$	Section G	R1
		(gamma +		Spec.	
	Radiation (rd)**	beta)***	beta)	<u>955270, р</u> б	
				See Section	1
				K(7), p 17	
	Submergence	NA	<u>NA</u>	<u>and 17A1</u>	R1
	*Includes spray concent	ration. flow	vrate, density	duration, and	ł
	pH.			, duración, an	-
*	*Enter 40-year integrat	ed normal do	se plus integ	rated accident	•
ر الدول	dose and specify type.				
, жи	*See TAB C, Section C.				R1
(2)	Comparison of worst-ca	se profiles	and margin as	sessment:	
	<i>.</i>	Test Pr Envelopes S			
	Parameter	<u> </u>	•	Reference	
				See TAB C	
	Temperature	Yes		Section H	
	Pressure	Yes		Fig 2, p 38	
				TAB D, Table 1	
	<b>.</b>			EQDP-ESE-3A,	
	Relative Humidity	Yes		<u>p 15</u>	
	Chaminal 2			TAB C,	
	Chemical Spray Submergence	Yes		Section H	
	oanmer Relice	NA			

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BINDER TI	TLE BARTON 764 COMPUTED AWL D		<u>1</u> R <u>2-2489</u>
LOT 7 AND	4 CHECKED WBK D	ATE <u>5-22-8</u> 6	3-3-89
	ARY COMPARISON OF TEST CONDITIONS TO SPECI tinued)	FIED CONDIT	TIONS
(3)	Were margins applied to the test paramete addressed in the test program to assure t and uncertainties are accounted for? (No Yes/No/NA).	hat normal	variation
	Suggested Margins per IEEE-323(74)	Margin <u>Applied</u>	Yes/No/NA
	Temperature: +15 degrees F	<u>+ 15°F</u>	Yes
	Pressure: +10% but no more than 10 psig	+ 10%	Yes
	Radiation: +10% of accident dose	+ 10%	Yes
	Time: +10% (or 1 hour + operating time per NUREG-0588)	+ 10%	Yes
	Voltage: ±10% of rated value	*	<u>No</u>  R1
	Frequency: ±5% of rated value		<u>NA</u>  R1
	Environmental Transient: the initial transient and the peak temperature applied twice	Same	Yes
	Vibration: +10% added to acceleration	** + 10%	<u>Yes</u>  R1
	JUSTIFICATION/COMMENTS		
	* Voltage must not exceed 52VDC ± 1VDC -	See Note 4	of drawing R1
	8765D45 in TAB I.		
	**See Seismic Section 5.3.5.		R1
		··· _···	·

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LOT	R TITL	$\begin{array}{c} \text{BARTON 764} \\ \text{ND 4} \\ \text{ND 4} \\ \end{array} \begin{array}{c} \text{CHECKED} & \overline{A} & \overline{A} & \overline{A} \\ \end{array} \end{array} \begin{array}{c} \text{DATE } \frac{5/22/86}{12} \\ \overline{A} & \overline{A} \\ \end{array} \end{array} \begin{array}{c} \text{R} & \underline{R} \\ \underline{R} & \underline{R} \\ $
		ABILITY TEST RESULTS
1	(1)	Identify the safety function(s) of this equipment: (Reference <u>Refer to Tab A</u> ). JUSTIFICATION/COMMENTS
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? Yes (Reference 7.4, p.18, Table 8, p. 32).
		JUSTIFICATION/COMMENTS
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>7.4, p. 18</u> ).
		JUSTIFICATION/COMMENTS
	(4)	Did the test demonstrate the operability requirements for the requir time interval for which the equipment is required to operate (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u> ).
		JUSTIFICATION/COMMENTS <u>See Tab C, Section B which demonstrates</u>
		that the transmitter operates for the required time interval.
	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u> ).
		JUSTIFICATION/COMMENTS See Sheet 20A.

BIND	ER T	ITLE <u>BA</u>	RTON 764	COI	MPUTED_	AWL	_ DATE	<u>5-22-86 wa</u> 2-24	<u>77</u> <del>5</del> 9 —	
LOT	<u>7 AN</u>	D 4		СН	ECKED	WBK	_ DATE	<u>5–22–8</u> 6 <u>2/9</u> 3·3-8		
М.	<u>ope</u>	RABILITY	TEST RESU	LTS (Co	ntinued	)				
(5)	JUS	TIFICATIO	ON/COMMENT	S.						
;	tes res	t report olution.	(TAB D) f	or a dis r with t	cussion he reso	of the lution	anomal	17 thru 21 ies and th O-rings a	eir	
	1.		er O-rings ndation as					inghouse		
	2.	correcte		Lot 7 and	d 4 mod	el by a	manufa	ing has be cturing ch nnection.		
										R1
		· .								
										4

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	BINDE	R NO. WBNEQ-XMTR-001 PLANT WBN UNIT(S) 1 SHEET 21 OF 24 R TITLE BARTON 764 COMPUTED AND 4 DATE $5/22/86$ R 7 AND 4 CHECKED CHECKED DATE $42/86$
Y (	BINDE	R TITLE BARTON 764 COMPUTED AND DATE 5/22/86
	LOT	7 AND 4. CHECKED CHECKED CATE 92486
	N.	MAINTENANCE AND SURVEILLANCE
		Has the qualification program identified those surveillance, maintenance, and inspection parameters which are essential to maintain qualification and which aid in detecting degrading materials or equipment performance (yes/no/NA)? Yes (Enter all requirements in Section G of the EQC Binder - Qualification Maintenance Data Sheets).
		· · · · · · · · · · · · · · · · · · ·
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		PAGE B-32

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EQP085.41

BINDI	R TITLE BARTON 764 COMPUTED AND DATE 5/22	RR
	7 AND 4 CHECKED 10/14/02 DATE 5/22	
0.	SUMMARY OF REVIEW	Yes/No/NA
	(1) Documented evidence of qualification adequate (Have all assumptions, mathematical models, and all extrapolations of test data used in an- analysis been justified and documented)?	Yes
	(2) Any exceptions (i.e., sound reasons to the contrary) taken to the specified qualification level adequately justified?	<u>No</u>
	(3) Choice of qualification methodology adequately justified?	Yes
	(4) If analysis was performed, complete the following:	
	(a) Were equipment performance requirements identified?	<u>NA</u>
	(b) Were specific features and failure modes and effects analyzed?	NA
	(c) Were assumptions and mathematical models used together with appropriate justification for their use?	<u></u>
	(d) Were environmental parameters which affect equipment performance identified?	<u>_NA</u>
	(5) Adequate similarity between equipment and test specimen established?	Yes
	(6) Aging degradation evaluated adequately?	Yes
	(a) Mechanical and/or cycle aging addressed?	Yes
	(b) Equipment aged to end of life condition prior to application of DBE conditions?	Yes
	(c) Absence of preaging in test/analysis justified?	NA
	(d) Materials susceptible to thermal/radiation aging identified?	<u>_No*</u>

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BINDER TIT	LE BARTON 764 COMPUTED $\frac{SSL}{2}$ DATE $\frac{S/2}{2}$ ND 4 DATE $\frac{S/2}{2}$	' · ·
0. <u>SUM</u>	MARY OF REVIEW (Continued)	Yes/No/NA
:	(e) Normally operating state of device (e.g., normally energized) considered?	
(7)	Qualified life or replacement schedule established?	Yes
(8)	Criteria regarding temperature/pressure exposure satisfied?	Yes
	(a) Peak temperature adequate	Yes
	(b) Peak pressure adequate	Yes
	(c) Duration adequate	Yes
	(d) Required profile enveloped adequately	Yes
	(e) Steam exposure adequate	Yes
(9)	Criteria regarding test sequence satisfied?	Yes
(10)	Criteria regarding spray satisfied?	Yes
-	(a) Was the spray testing done while under the extremes of pressure and temperature?	Yes
	(b) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	<u>Yes**</u>
(11)	Criteria regarding submergence satisfied?	_NA
(12)	Criteria regarding radiation satisfied?	Yes
	(a) Was dose rate considered?	Yes
	(b) Was beta radiation considered?	Yes
(13)	Criteria regarding operability status/mode satisfied?	Yes
(14)	Criteria regarding test failures or anomalies satisfied?	Yes

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BIND	ER TIT	(LE <u></u>	BARTON 764	COMPUTED_	AWL	_ DATE <u>9-23</u>	<u>-86 wcza _</u> 3-3-54	
LOT	7 AND	4		CHECKED	BDM	DATE <u>9-23</u>	<u>-86 Hor</u> 3-3-89	
0.	SUMMA	ARY OF	REVIEW (Cont	inued)				
							<u>Yes/No/NA</u>	
	(15)	Crite	eria regarding	g functional t	esting:	satisfied?	Yes	
		(a)		: plan/report riteria for ec			Yes	·
		(b)		al base line t quired perform			cs? <u>Yes</u>	
		(c)	performance s (e.g., voltag	analyis demon specifications ge, load frequ maracteristics	and chuency, a	aracteristi nd other	cs Yes	
				- <u>·</u>	,		Open Item	
	(16)	Crit	eria regardin	ng instrument	accurac	y satisfied		R1
	(17)		duration man sfied?	gin (1 hour +	- functi	on time)	Yes	
		(a)	Is the minim least 1 hour	num specified	operati	ng time at	Yes*	
		(Ъ)		to the 1-hou en, was adequ			g <u>Yes **</u>	R1
	(18)	Crit	eria regardin	g synergistic	effect	s satisfied	? Yes	
		· .		g margins sat			Yes	
	(20)		tenance and s uately identi	urveillance r fied?	equirem	ents	Yes	
Ρ.	DISCU	ISSION	[					
	<u>* A</u>	<u>few o</u>	<u>f the transmi</u>	tters have a	minimum	specified	operating	-
	<u>ti</u>	<u>me of</u>	five minutes	•				_
	<u>** Se</u>	e Sec	tion 7.1.6 of	WCAP-8587 in	TAB E.	Section D	for	-
	<u>iu</u>	stifi	cation.					

4.2

DER NO. WBNEQ-XMTR-004 PLANT WBN UNIT(S) 1 SHEET 1 OF BINDER TITLE BARTON 763 COMPUTED AND DATE 4/23/86 R ____R CHECKED _____ DATE 425/82 _ LOT 7 Tab A - Identification of Equipment Comprising the Equipment Type PAGEA-+ EQP055.27





BINDER NO. : WBNEC-XMTR-MANUFACTURER : BARTON PAGE 1 OF 2

## WATTS BAR NUCLEAR PLANT TABA - EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBEB	DEVICE ID NO. AZHITH	LOCATION ELEY(1) BH/BAD CONIBACI	CAI OPER_IIME (2)	EYENI	SAEEIY_EUNCIION
WEN-1-PT -001-0009A -0 1-PT	-001-0009A -D	729' AC2	A 100D	MS/V	INITIATES FEEDWATER ISOL
SG2 MAIN STEAM HOR PRESS	763 Lot 7	71C62-54114-1	A 100D	FW/V	AND SAFETY INJECTION; PAM
WBN-1-PT -001-00098 -E 1-PT		729' AD2	A 100D	MS/V	INITIATES FEEDWATER ISOL
SG2 MAIN STEAM HDR PRESS		71C63-54114-1	A 100D	FW/V	AND SAFETY INJECTION; PAM
WBN-1-PT -OO1-OO2OA -D 1-PT	-001-0020A -D	729' AOZ	A 100D	MS/V	INITIATES FEEDWATER ISOL
SG3 MAIN STEAM HDR PRESS	763 Lot 7	71Co2-54114-1	A 100D	FW/V	AND SAFETY INJECTION; PAM
WBN-1-PT -001-0020B -E 1-PT	-001-00208 -E	729' AO2	A 100D	HS/V	INITIATES FEEDWATER ISOL
SG3 MAIN STEAM HDR PRESS	763 Lot 7	71C62-54114-1	A 1000	Fw/V	AND SAFETY INJECTION; PAM
LOOP 1 HOT LEG PRESS	-068-0063 -0 763 Lot 7	713' ADo 71C62-54114-1	A 1000 A 1M0 A 1N0 A 1N0 A 1N0 A 1N0	L AF AB RH/A CV/A	PAM
PAGE A2	·		AWL 9/23/8 BDM 9/24/8		R R R R R R R R R R R R R R R R R R R





BINDER NO. : WBNEQ-XMTR-004 MANUFACTURER : BARTON PAGE 2 OF 2

### WATTS BAR'NUCLEAR PLANT TABA-EQUIPMENT IDENTIFICATION MATRIX

EQIS_NUMBER DESCRIPTION	UNII_DEVICE_ID_NOAZHIIH HODEL_NUHBEP		CAI QPER_IIME (2)	EVENI SAEEIY_EUNCIION	· · · · · · · · · · · · · · · · · · ·
WBN-1-PT -068-0322 -G RCS PRZR PRESS	1-PT -068-0322 -G 077 763 Lot 7	731' 8" IIR 71C62-54114-1		L TRIP FUNCTION FOR BOT MS/C AND LOW PRESSURIZER P FW/C CV/C RH/C	
WBN-1-PT -068-0323 -F RCS PRZR PRESS	1-PT -063-0323 -F 120 763 Lot 7	732•10" IIR 71C62-54114-1	A SMIN A SHIN A SHIN A SHIN A SMIN C -NA-	L TRIP FUNCTION FOR BOT MS/C AND LOW PRESSURIZER P FW/C CV/C RH/C	
WBN-1-PT -068-0334 -E RCS PRZR PRESS	1-PT -068-0334 -E 092 763 Lot 7	734•10" IIR 71C62-54114-1	A 5MIN A 5MIN A 5MIN A 5MIN C -NA-	L TRIP FUNCTION FOR BOT MS/C AND LOW PRESSURIZER P FW/C CV/C RH/C	
WBN-1-PT -068-0340 -0 RCS PRZR PRESS	1-РТ -068-0340 -D 097 763 Lot 7	735' IIR 71C62-54114-1		L TRIP FUNCTION FOR BOT MS/C AND LOW PRESSURIZER P FW/C CV/C RH/C	

PREPARER/DATE AWL 9/23/86

PAGE E-H 75

BINDER NO. <u>WBNEQ-XMTR-00</u> 4	PLANT WBN UNIT(S)	<u>1</u> SHEET 1OF_1
BINDER TITLE BARTON 763	LOT 7 COMPUTED/RIACO	DATE <u>1-20-59</u>
	CHECKED / RI MOR	DATE 1-20-89
ч.		

#### NOTES

- 1. Elevations shown are <u>Actual</u> elevations for equipment located in the Reactor Building and <u>Floor</u> elevations for equipment located outside the Reactor Building. Actual elevations for all equipment are documented in TAB F.
- See Page B-1 for source of Category and Operating Time assignments.

PAGE A-4 RI

BINDER NO.WBNEQ-XMTR-004 PL BINDER TITLE BARTON 763 LOT 7	.ANT <u>WBN</u>	UNIT(S) <u>1</u> COMPUTED <u>AUL</u> CHECKED <u>Share</u>	SH DATE <u>4/23/86</u> DATE <u>4/23/86</u>	IEET <u>1</u> OF RR
	Iab B - Che	ecklist for Evalua	tion of	
•	Enviror	mental Qualificat	ion	
	Including	Summary and Concl	usion	
· •				
-	PAGEB	1		

A. DOC	UMENTATION	
	ipment Description <u>Pressure Transmitter</u>	
-	dor/Manufacturer Westinghouse/Barton	
Equ	ipment Model No.(s) 763 Lot 7	
	763 Lot 2 Upgrade	
QUA	LIFICATION REPORTS	
(1)	Title/Number/Revision <u>WCAP-8687, Supp.</u> RIMS <u>NEB 840</u>	807 35
	2-EQTR-EO1A, Revision 2 *. DATE March.	<u>1983</u>
(2)	Title/Number/Revision <u>WCAP-8587, Supp.</u> RIMS <u>NEB_840</u>	807 35
	<u>1-EQDP-ESE-1A, Revision 4.</u> DATE <u>March</u> , NEB 840	
(3)	-	
	"Methodology"DATE_March,	1983
OTH	ER (ANALYSIS, VENDOR DATA, ETC.)	
<u>(4)</u>	ORN 74911	
<u>(5)</u>	QRN 74962	
<u>(6)</u>	QRN 68872	
(7)	ORN 43423	
<u>(8)</u>	Auditable Link Document (B45 860521 351)	
(9)	WAC-33	<u></u>
<u>(10</u>	)) WAC-32	
	) WAC-34	

BINDER		ET <u>1A</u> OF 4R
BINDER	TITLE BARTON 763 LOT 7 COMPUTED AWL DATE 9/23/86	
	CHECKED BDM DATE 9/24/86	•
		127190
A. <u>DO</u>	UMENTATION (Continued)	
OTI	ER (ANALYSIS, VENDOR DATA, ETC.)	
(1:	2) Deleted	
· (1)	) Deleted	
	) Deleted	
-		
-	5) Deleted	_
(1	5) Category and Operating Time WBNOSG4-017 - System 68 R1 (B18 900612 252)	1
(1	7) Category and Operating Time WBNOSG4-004 - System 1 R11 (B18 900612 253)	
(1	3) ESI Calculation (1-PT-1-2A) - B18 900830 254	
(1	9) OE Calculation (1-PT-68-70) - (B18 900801 251)	
(2	)) Deleted	
(2	1) Setpoint Methodology Study (B26 890515 928)	
(2	2) Barton Upgrade Package (B70 851024 001)	
(2	3) WAC-354	
(2	4) WAC-312	
(2	5) WAC-35	
(2	6) TI-ANL-198 (B45 851001 236)	
(2	7) Deleted	
(2	8) Deleted	
(2	9) Spec. Sheet No. 01010	
(3	0) Spec. 955270 (B45 850423 359)	
(3	1) Spec. 953328 (B45 850508 351)	
(3	2) WAT-D-6467 (B45 850321 600)	

WBEP-0306Q-10

PAGE B-3 R4

.WBNEQ-XMTR-004	PLANT_	WBN	UNIT	(S)	1	SHEET_1B	_0F
ITLE BARTON 763	LOT 7	COMPUTED_	AWL	_ DATE	<u>9/23</u>	R <u>I</u> R /86-20-20-20-20-20-20-20-20-20-20-20-20-20-	· · · · · · · · · · · · · · · · · · ·
		CHECKED	BDM	_ DATE	9/24	186 74912 1-20-89	. <u></u>
<u> 1ENTATION</u> (Conti	nued)						
R (ANALYSIS, VE	NDOR DA	TA, ETC.)					
	•						
WAT (EQ)-001 (B	71 8602	.25 001)					
TVA-86-620 (B45	860804	612)					
Manual No. 87F1	(B45 8	50426 352)	I				
Dwg. 8765D46 Re	vision	5					
-							
		_					
WAT (EQ)-010 (E	71 8605	16 003)					
Environmental I	rawing)	No. 47E235	-45 R1		•		
Environmental I	rawing	No. 47E235	-56 R1				
Environmental I	rawing	No. 47E235	i→76 R3				
	ITLE <u>BARTON 763</u> <u>MENTATION</u> (Conti R (ANALYSIS, VE WAT (EQ)-001 (B TVA-86-620 (B45 Manual No. 87F1 Dwg. 8765D46 Re Deleted WAT (EQ)-010 (E Environmental E Environmental E	ITLE <u>BARTON 763 LOT 7</u> <u>MENTATION</u> (Continued) R (ANALYSIS, VENDOR DA WAT (EQ)-001 (B71 8602 TVA-86-620 (B45 860804 Manual No. 87F1 (B45 8 Dwg. 8765D46 Revision Deleted WAT (EQ)-010 (B71 8605 Environmental Drawing Environmental Drawing	ITLE BARTON 763 LOT 7 COMPUTED CHECKED CHECKED (CHECKED) CHECKED (ANALYSIS, VENDOR DATA, ETC.) WAT (EQ)-001 (B71 860225 001) TVA-86-620 (B45 860804 612) Manual No. 87F1 (B45 850426 352) Dwg. 8765D46 Revision 5 Deleted WAT (EQ)-010 (B71 860516 003) Environmental Drawing No. 47E235 Environmental Drawing No. 47E235	ITLE       BARTON 763       LOT 7       COMPUTED       AWL         CHECKED       BDM         MENTATION (Continued)         R (ANALYSIS, VENDOR DATA, ETC.)         WAT (EQ)-001 (B71 860225 001)         TVA-86-620 (B45 860804 612)         Manual No. 87F1 (B45 850426 352)         Dwg. 8765D46 Revision 5         Deleted	ITLEBARTON 763LOT 7COMPUTEDAWLDATECHECKEDBDMDATEMENTATION (Continued)R (ANALYSIS, VENDOR DATA, ETC.)WAT (EQ)-001 (B71 860225 001)TVA-86-620 (B45 860804 612)Manual No. 87F1 (B45 850426 352)Dwg. 8765D46 Revision 5DeletedWAT (EQ)-010 (B71 860516 003)Environmental Drawing No. 47E235-45 R1Environmental Drawing No. 47E235-56 R1	CHECKED BDM DATE 9/24 MENTATION (Continued) R (ANALYSIS, VENDOR DATA, ETC.) WAT (EQ)-001 (B71 860225 001) TVA-86-620 (B45 860804 612) Manual No. 87F1 (B45 850426 352) Dwg. 8765D46 Revision 5 Deleted WAT (EQ)-010 (B71 860516 003) Environmental Drawing No. 47E235-45 R1 Environmental Drawing No. 47E235-56 R1	R1 R         ITLE_BARTON 763_LOT 7       COMPUTED_AWLDATE $\frac{9/23/86}{r^{2}r^{2}}$ CHECKED_BDM       DATE $\frac{9/24/86}{r^{2}r^{2}}$ CHECKED_BDM       DATE $\frac{9/24/86}{r^{2}r^{2}}$ MENTATION (Continued)       R         (ANALYSIS, VENDOR DATA, ETC.)         WAT (EQ)-001 (B71 860225 001)         TVA-86-620 (B45 860804 612)         Manual No. 87F1 (B45 850426 352)         Dwg. 8765D46 Revision 5         Deleted         WAT (EQ)-010 (B71 860516 003)         Environmental Drawing No. 47E235-45 R1         Environmental Drawing No. 47E235-56 R1

|R1

R1

NOTE: Documents listed above are used throughout this binder for equipment qualification. The revision levels and Records & Information Management System (RIMS) numbers, as listed above, need not be repeated in other sections of the binder. This listing includes only those documents which are essential to qualification and accordingly should not be considered a complete listing of binder references.

PAGE B-4

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DIUDU	R TITLE BARTON 763 LOT 7 COMPUTED AWR DATE 9/23/86 ANCA 9-26-90	
	$CHECKED BDM DATE 9/24/86 \frac{f i n}{9/24/86}$	
в. <u>С</u>	ONCLUSION OF REVIEW (Check only one block)	
	X Equipment Qualified (Pending Resolution of Open Item)	
·	Equipment Satisfies All Requirements Except Qualified Life or Justification of Replacement Schedule	
_	Equipment Qualification Not Established by Documentation	
	Equipment Not Qualified Based on Test Failures	
0	PEN ITEMS AND QUALIFICATION DEFICIENCIES	_
	. SCR WBNEEB 8575 & ECN 6119 and 5974	_
2	. Deleted	
<u>3</u>	. Deleted	
4	. Deleted	_
<u>5</u>	. Valve Vault Flooding (SCR WBNEEB 8584)	_
<u>6</u>	. Deleted	
c	OMMENTS/RECOMMENDATIONS	
Ū	OFFIENTS/ RECOFFIENDATIONS	
		_
_		_
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PAGE B-5 R4

WBEP-0306Q-11

## WBNEQ-XMTR-004

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<u> </u>		LOT 7			ECKED			. 1	• <b></b> -	
		·····		<u>.</u>			=	/		· · · · · · · · · · · · · · · · · · ·
c.	OILAT TET	CATION CRIT	FDTA							
<b>.</b>				0.115		• • •	, , , , , , ,	• • •	. 1	
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		Components								
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	JUSTIFI	CATION/COMM	ENTS		•					
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	INDICAT	E OTHER REG	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	ARDS ME	 T	
		E OTHER REG 323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	 T	
	IEEE		ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	)ARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	RY STANI	DARDS ME	T	
	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	AY STANI	DARDS ME	T	
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	IEEE	323-1974	ULATORY D	OCUMENTS	AND/OR	INDUSTR	AY STANI	DARDS ME	T	

	DER TITLE BARTON 763 COMPUTED AT DATE $5/15/84$ R _ R _
	LOT 7 CHECKED 47 DATE 5/15/26
D.	<u>QUALIFICATION METHODOLOGY</u> (Check only one block) <u>X</u> Test of Identical Item Under Identical Conditions or Under Similar
	Conditions with Supporting Analysis X ^{**} Test of Similar Items with Supporting Analysis
	Analysis in Combination with Partial Type Test Data that Supports the Analytical Assumptions and Conclusions
	Experience with Identical or Similar Equipment Under Similar Conditions with Supporting Analysis
	JUSTIFICATION/COMMENTS <u>The lot 2 baseline configuration has been</u>
	compared with the lot 4 and lot 7 baseline configuration and differ-
	ences noted. The baseline comparison showed only revision level
	ences noted. The baseline comparison showed only revision level differences (not affecting qualification) of some piece parts and a
	differences (not affecting qualification) of some piece parts and a
	differences (not affecting qualification) of some piece parts and a solder modification. The Barton upgrade package is contained in TAB
	differences (not affecting qualification) of some piece parts and a solder modification. The Barton upgrade package is contained in TAB
	differences (not affecting qualification) of some piece parts and a solder modification. The Barton upgrade package is contained in TAB
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	differences (not affecting qualification) of some piece parts and a solder modification. The Barton upgrade package is contained in TAB

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BINDER NO. WBNEQ-XMTR-004PLANT	WBN UNIT(S) SHEET5 OF 24	-
BINDER TITLEBARTON 763	COMPUTED AN DATE 4/23/86 R R	
LOT 7	CHECKED DATE	-

## E. EQUIPMENT DESCRIPTION

TVA

Is the equipment identified in the qualification report identical to the plant equipment which requires qualification (yes/no/NA)? Yes____

ransmitter arton 63 Lot 7 63 Lot 2 pgrade ee Tab C ection A	<u>Transmitter</u> <u>Barton</u> <u>763 Lot 7</u>  001 <u>485</u> <u>471</u>	2.0 pg. See Tab See Tab Sect. G Table 1 Page 23
63 Lot 7 63 Lot 2 pgrade ee Tab C ection A	<u>763 Lot 7</u>	See Tab See Tab Sect. G Table 1
63 Lot 2 pgrade ee Tab C ection A	<u>001</u> 485	See Tab Sect. G Table 1
pgrade ee Tab C ection A	485	Sect. G
ee Tab C	485	Table 1
ection A	485	
ection A	485	
		Page 23
	471	
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B-9		
	ne Design Docum	

	A PLANT_	WBN	UNIT(S)_		_ SHEET <u>6</u>	OF <u>4</u>
					R <u>1</u>	R
SINDER TITLE BARTON 763	<u>3 LOT 7</u>	COMPUTED	AWL	DATE	9/23/86	WCG ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	<u></u>	CHECKED_	SP	DATE	9/24/86	/20/89 4/27/5

#### F. <u>INSTALLATION_INTERFACES</u>

List all interfaces pertinent to EQ identified in the qualification documentation and/or evaluation and reference the source. Is the interface a requirement for our application (Yes/No)? (Note below.) If yes, enter requirement in QMDS, if no, provide justification.

Interface	Identify Interface	Plant Requirement? (Yes/No)	Reference Test_Report
Incernace	<u>identity interrate</u>		
Mounting Bolts	<u>N/A</u>	N/A	<u>N/A</u> R4
External Process	1/2" NPT FEMALE	Yes	SPEC 953328 Sect. 4.3.3 TAB E
Connections			
Electrical Connections	PER DWG 8765 D46	<u>Yes</u>	TAB I
			Note 2 of DWG ** 8765 D46 - TAB I
Conduit Seals	PER_DWG_8765_D46	<u> </u>	See Comments
Connector Seals	PER DWG 8765 D46	N/A	See Comments**
Orientation	Horizontal	Yes	Instr. Manual <u>Sect. 3 TAB H</u>
Physical Configuration	DWG 8765 D46	Yes	TAB I
Other	See Comments*		

JUSTIFICATION/COMMENTS - *The panels each transmitter is installed in are tabulated in TAB C, Section D. Raychem splices will be qualified by binder WBNEQ-SPLC-001. **The Barton transmitters are supplied with |R4a manufacturer seal (potting compound) which was tested and exposed to total HELB environment as described in test report. This information is contained in Westinghouse letter WAT-EQ-010 (WAT-D-6985) (B71 860516 003) which is in TAB E, Section H.

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WBEP-0306Q-13

INDER TITI		ARTON 763			re <u>4/23/36</u> R R
	L	OT 7	CHECKED	DAT	re <u>4/23/96</u>
G. TESI	' SEQU	ENCE			
· · · ·		Sequence: Was the te	at acquine	o octoblishe	d to simulate the
(1)	acci	dent environment in ac	cordance w		
	(yes	/no/NA)? (note below)	l	Yes/No/NA	Reference
	(a)	Equipment inspected f	on damage	Yes	3.2 Pg. 4
			OF Gamage	·	
	(b)	Baseline performance measurements taken		Yes	<u>3.2 Pg. 4</u>
	(c)	Equipment aged:			
		Thermal		Yes	3.1.1 Pg.3
		Radiation		Yes	3.1.2 and 3.1.3 Pg. 3
		Wear		<u>    Yes</u>	<u>3.1.1 Pg. 3</u>
	(d)	Vibration/seismic tes conducted	sting	Yes	<u>3.1.4 Pg. 4</u>
	(e)	Design basis event (I exposure	)BE)	Yes	3.1.5 Pg. 4
	(f)	Post-DBE exposure		Yes	3.1.5 Pg. 4
	(g)	, <del>.</del> .		, - <u></u>	<u>3.1.5 Pg. 4</u> 2.8 & 2.9 Pg.11 of *** EQDP-ESE-1A
	(g)	disassembly		Yes	(Tab D)
(2)		the same piece of equi ribed in item (1) abov			the test sequence
(3)	Have	the test equipment, t	est equipm	ent accuraci	es and calibration d
	been	appropriately document erence Tables 2, 3, a	ited (yes/n		
		TION/COMMENTS <u>*O-ring</u>			
		10 and 18. <b>**</b> Calibrat for audit at Westingh			
test	; sequ	ences which the transm	itters wer	e subjected	to. Test
		are as specified in I is assumed that final			

BINDER	TITLE		uted <u>ANK</u> da 		6
H.	AGIN	3			
	(1)	Was aging considered in the qu (Yes/no/NA)? Yes (Refer JUSTIFICATION/COMMENTS	alification prog ence <u>3.1.1 Page</u>		).
	(2)	Were the following effects con	sidered in the a	ging progr	am:
		Aging Effect	<u>Y</u>	es/No/NA	Reference
		Thermal aging		Yes	3.1.1 Pg.3
		Radiation exposure	_	Yes	$\frac{3.1.2 \& 3}{Pg. 3}$
		Vibration (non-seismic) aging	·	_Yes*	5.3.5 Pg.14
		Operational (electrical/mechan stress aging	ical/process) _	Yes	<u>3.1.1 Pg. 3</u>
		JUSTIFICATION/COMMENTS *See	WCAP-8587 - App.	B Item 17	P. B-7 in
		Tab E, Section D for further j	ustification.		
	(3)	Were all known synergistic eff significant effect on equipmen program (yes/no/NA)? Yes	t performance con	nsidered i	
		JUSTIFICATION/COMMENTS Secti	on 21 (P. B8) -	Appendix B	of
		WCAP-8587 in Tab E Section D			······
	(4)	Thermal Aging:			
		(a) Was thermal aging conside (yes/no/NA)? Yes (R	red in the quali: eference <u>5.1 Pa</u>		
		JUSTIFICATION/COMMENTS			
				<u></u>	

BINDER TITLE BA	RTON 763	COMPUTED ANL	S	, к <u> </u>
LC	DT 7	CHECKED	DATE <u>5/15/86</u>	
H. <u>AGING</u> (C	Continued)			
(b)	Were the materia identified in th (Reference: <u>5.1,</u>	ls susceptible to thermal e qualification program ( page 9* ).	aging degr yes/no/NA)?	radation ? <u>Yes*</u>
	JUSTIFICATION/CO	MMENTS <u>*See Appendix D</u> ,	Section 3,	pg D-5 of
	WCAP-8587 in Tab	E, Section D. This is f	or generic	Westing-
	<u>house NSSS equip</u>	ment.		
(c)	Was the basis fo program (yes/no/	or thermal aging identifie 'NA)? <u>Yes</u> (Reference	d in the qu	ualification
	JUSTIFICATION/CO	MMENTS See WCAP-8587, Ap	ppendix B, S	Section 7,
	page B-2 in Tab	E, Section D.		<u></u>
(b)	time and tempera	celeration rate justified ature identified in the qu <u>des (Reference 5.1, pa</u>	alification	n program
				•
	Parameter	Plant Maximum Normal		• Equivalent
	<u>Parameter</u> Temperature Time		<u>Test</u>	Equivalent
	Temperature Time	<u>Plant Maximum Normal</u> IIR=75°F, PENT. RM (A6)= <u>104°F NSVVR(A2)=130°F</u>	<u>Test</u>	Equivalent 104°F
(e)	Temperature Time JUSTIFICATION/CO Was the Arrheniu (yes/no/NA)?	<u>Plant Maximum Normal</u> IIR=75°F, PENT. RM (A6)= <u>104°F NSVVR(A2)=130°F</u> <u>40 years</u> DMMENTS <u>See Tab C, Section</u> Is methodology used for action (Reference <u>5.1, page</u> )	Test 1 125°C 1673hrs on B.	Equivalent <u>104°F</u> <u>10 yrs</u> aging
(e) (f)	Temperature Time JUSTIFICATION/CO Was the Arrheniu (yes/no/NA)?Y JUSTIFICATION/CO If activation en aging parameters of the technical	<u>Plant Maximum Normal</u> IIR=75°F, PENT. RM (A6)= <u>104°F NSVVR(A2)=130°F</u> <u>40 years</u> DMMENTS <u>See Tab C, Section</u> as methodology used for act <u>res</u> (Reference <u>5.1, pa</u> DMMENTS mergies were used for deter s, are they properly refer 1 data (yes/no/NA)? <u>Yes *</u>	<u>Test</u> <u>125°C</u> <u>1673hrs</u> on B. ccelerated age 9 ) ermining acc cenced to t	Equivalent <u>104°F</u> <u>10 yrs</u> aging •
. •	Temperature Time JUSTIFICATION/CO Was the Arrheniu (yes/no/NA)?Y JUSTIFICATION/CO If activation en aging parameters of the technical (Reference <u>5.1</u> ,	Plant Maximum Normal IIR=75°F, PENT. RM (A6)= 104°F NSVVR(A2)=130°F 40 years DMMENTS See Tab C, Section as methodology used for action (Reference 5.1, particular) DMMENTS mergies were used for deter as, are they properly refer 1 data (yes/no/NA)? Yes * page 9).	<u>Test</u> <u>125°C</u> <u>1673hrs</u> on B. ccelerated age 9 ) ermining act	Equivalent <u>104°F</u> <u>10 yrs</u> aging • celerated he source
. •	Temperature Time JUSTIFICATION/CO Was the Arrheniu (yes/no/NA)?Y JUSTIFICATION/CO If activation en aging parameters of the technical (Reference <u>5.1</u> , JUSTIFICATION/CO	<u>Plant Maximum Normal</u> IIR=75°F, PENT. RM (A6)= <u>104°F NSVVR(A2)=130°F</u> <u>40 years</u> DMMENTS <u>See Tab C, Section</u> as methodology used for act <u>res</u> (Reference <u>5.1, pa</u> DMMENTS mergies were used for deter s, are they properly refer 1 data (yes/no/NA)? <u>Yes *</u>	Test 1 <u>125°C</u> <u>1673hrs</u> on B. ccelerated a age 9 ) ermining act cenced to the ed a conser	Equivalent <u>104°F</u> <u>10 yrs</u> aging • celerated he source vative

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TVA

	BARTON 763LOT 7COMPUTEDAWLDATE $9/23/86$ $4-62^{2}$ CHECKEDBDMDATE $9/24/86$ $7/972$ I-20-89
H. <u>AGING</u> (Co	ntinued)
(g)	If a regression line was used for determining accelerat aging parameters, are test points or failure modes identified on the line (Yes/No/NA)? <u>NA</u> (Reference:
	JUSTIFICATION/COMMENTS Regression lines were not used.
	Was the equipment operated during the thermal aging (Yes/No/NA)? <u>Yes</u> (Reference: <u>5.1, page 9</u>
	JUSTIFICATION/COMMENTS
(5) Radi	ation Aging Exposure:
(a)	Was radiation aging exposure considered in the qualific program ¹ (Yes/No/NA)? <u>Yes</u> (Reference: <u>5.2, page 11</u>
	JUSTIFICATION/COMMENTS
(b)	Were the materials susceptible to radiation degradation identified in the qualification program (Yes/No/NA)? <u>Na</u>
	JUSTIFICATION/COMMENTS Not required. Assembled device
	irradiated to required dose.
(c)	Was the basis for radiation aging exposure identified : the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>5.2, page 11</u>
	JUSTIFICATION/COMMENTS See WCAP-8587 for further basis
	(Sections 6.7.1, pg 6-3, and 6.7.4, pg 6-4) in TAB E,
	Section D.
	ication program refers to the test report and any supple- documentation including TVA analyses in TAB C of the

	E BARTON 763 COMPUTED AND DATE 9/23/36 R
<u> </u>	LOT 7 CHECKED DATE
H. AGIN	<u>G</u> (Continued)
	(d) Is the radiation test exposure dose and dose rate acceptable (yes/no/NA)? <u>Yes</u> (Reference <u>5.2, pg 11/3.1.3, pg 3</u> ).
	Plant normal ambient radiation dose (rd) <u>2 x 10⁷(40 years)</u>
	Test exposure dose (rd) $6.8 \times 10^7$
	Test exposure dose rate (rd/hr) 2.0 to 3.0 M
	Test exposure source type (e.g., Co-60 gamma) <u>Co-60 gamma</u>
	JUSTIFICATION/COMMENTS
(6)	Vibration (non-seismic) Aging:
	(a) Were the effects of non-seismic vibration induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u> ).
	JUSTIFICATION/COMMENTS See Appendix B, item 17, pg B-7 of
	WCAP-8587, Tab E. Also see 5.3.5, pg 14.
	(b) Was the basis for vibration aging identified and justified in the qualification program (yes/no/NA)? Yes* (Reference 5.3.5, pg 14).
	JUSTIFICATION/COMMENTS <u>*See Appendix B, items 17 and 20,</u>
	pgs B-7 and B-8 of WCAP-8587, Tab E, Section D.
(7)	Operational Stress Aging:
	<ul> <li>(a) Were the effects of electrical, mechanical, and process operational stresses induced during normal and abnormal operation addressed in the qualification program (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u>).</li> </ul>
	JUSTIFICATION/COMMENTS Section 5.1, pg 9. Test Procedure
	addresses the fact that operational stresses were induced in

TVA	19537	(OE-3-86)
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	CHECKED <u>BDM</u> DATE <u>5/15/86</u> 
H. <u>AGIN</u>	G (Continued)
(7)	(b) Was the basis for stresses induced during operational aging identified and justified in the qualification program (Yes/No/NA)? Yes (Reference: See Comments)
	JUSTIFICATION/COMMENTS <u>See Appendix B, Subprogram A,</u>
	Section 13-15, pg B-6 of WCAP-8587, TAB E, Section D.
(8)	Was the qualified life of the equipment and its basis define in the qualification program (Yes/No/NA)? <u>Yes</u> (Reference: <u>7.5, pg 21</u>
	$IIR-26.4 \text{ yrs,}$ $PENT. Rm(A6)=9.9 \text{ yrs.}$ $Qualified life (Document in QMDS) \frac{NSVVR(A2) = 4.4 \text{ yrs.}}{See TAB C. Section B. and TAB G.}$
(9)	Were replacement intervals for the equipment or its componend defined in the qualification program (Yes/No/NA)? Yes (Reference: 7.5, pg 22
·	
	JUSTIFICATION/COMMENTS Although not a replacement part, the
	potentiometer (Lot 2) is recommended to be exercised at all
	calibration cycles See (MDS in TAB G.

BINDER	NO. WBNEQ-XMTR-004 PLANT WE	_ COMPUTED	AWE DA	TE <u>5/9/86</u>	R R
	LOT 7	CHECKED	GH DA	TE <u>5/15/86</u>	
I. <u>MA</u>	TERIALS ANALYSIS				
Ra	entification of Materials Su diation Degradation and Agir terials Analysis)				
	Material/Property/Function		Reference		
(a	) <u>EPT/0-rings</u>	• ••••••		<u>.92e</u> V	<u>5.1, p 10</u>
(Ъ	)				
(c	)				
(d	)	. <u></u>	<u></u>		
(e	)	•			
J	USTIFICATION/COMMENTS At th	ne conclusior	of the agi	ng testing,	it was
	etermined that the O-rings f			•	
	-rings were replaced and age				
_	ion energy of .92eV. This 1				
	-rings. See Section 7.1 on				
	11 other components were cor				
	iii other components were con	ISERVALIVELY	assigned an		_energy_or_
	5 . 17				
	5eV.				
	5eV			~~~~	
	<u>5e</u> <b>V</b> .				
	<u>5e</u> ♥.		······································		
	<u>5e</u> ♥.		· · · · · · · · · · · · · · · · · · ·		
	5e♥.		· · · · · · · · · · · · · · · · · · ·		
	<u>5e</u> ♥.		· · · · · · · · · · · · · · · · · · ·		
	5e♥.				
	5e♥.			· · · · · · · · · · · · · · · · · · ·	

LOT 7       CHECKED	BIND	ER TIT	LE BARTON 763 COMPUTED Star DATE 2/23/36 R R
<pre>SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS (1) Acceptance Criteria: Does the report/analysis identify the limitin values of performance characteristics which would constitute failur not met (yes/no/NA)? Yes (Reference). Identify Acceptance Criteria: Refer to Section 3.2 of the test repor</pre>			LOT 7 CHECKED BOM DATE 4-24-86
<pre>SPECIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS (1) Acceptance Criteria: Does the report/analysis identify the limitin values of performance characteristics which would constitute failur not met (yes/no/NA)? Yes (Reference). Identify Acceptance Criteria: Refer to Section 3.2 of the test repor</pre>			
<pre>values of performance characteristics which would constitute failur not met (yes/no/NA)? Yes (Reference3.2, pg 4). Identify Acceptance Criteria: <u>Refer to Section 3.2 of the test repor</u> (2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verif; before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes (Reference 3.2, pg 4/Table 5, 6, 7, 8, and 1) Identify baseline and functional testing: <u>See Section 6.0, pg 6-1 and Section 6.8, pg 6.9 on WCAP-8587 in Tab E, Section D.</u> JUSTIFICATION/COMMENTS (3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference <u>Section 5.0, pg 9-15_</u>). JUSTIFICATION/COMMENTS </pre>	J.	EQU: SPE	IPMENT ELECTRICAL CHARACTERISTICS NECESSARY TO ENSURE THE PERFORMANCE CIFICATIONS CAN BE SATISFIED UNDER ACCIDENT CONDITIONS
(2) Performance Characteristics: Does the report/analysis provide the performance characteristics for the equipment which should be verif; before, after, and periodically during the test to judge equipment performance (yes/no/NA)? <u>Yes</u> (Reference 3.2, pg 4/Table 5. 6, 7, 8, and 1) Identify baseline and functional testing: See Section 6.0, pg 6-1 and Section 6.8, pg 6.9 on WCAP-8587 in Tab E, Section D. JUSTIFICATION/COMMENTS		(1)	values of performance characteristics which would constitute failure
<pre>performance characteristics for the equipment which should be verif: before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes</pre>			Identify Acceptance Criteria: <u>Refer to Section 3.2 of the test repor</u>
<pre>performance characteristics for the equipment which should be verif: before, after, and periodically during the test to judge equipment performance (yes/no/NA)? Yes</pre>			
Section 6.8, pg 6.9 on WCAP-8587 in Tab E, Section D		(2)	performance characteristics for the equipment which should be verifi
JUSTIFICATION/COMMENTS			Identify baseline and functional testing: See Section 6.0, $pg_{6-1}$ and Section 6.8, $pg_{6-9}$ on WCAP-8587 in Tab F. Section D.
<pre>(3) Does the qualification report/analysis describe loads (or load combinations) applied during DBE test (yes/no/NA)? Yes (Reference Section 5.0, pgs 9-15_). JUSTIFICATION/COMMENTS</pre>			eccerci de de la solo de mori objer in lab E, seccion D.
<pre>combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Section 5.0, pgs 9-15</u>). JUSTIFICATION/COMMENTS</pre>			JUST IFICATION/COMMENTS
<pre>combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Section 5.0, pgs 9-15</u>). JUSTIFICATION/COMMENTS</pre>			
<pre>combinations) applied during DBE test (yes/no/NA)? <u>Yes</u> (Reference <u>Section 5.0, pgs 9-15</u>). JUSTIFICATION/COMMENTS</pre>			
	·	( <u>3</u> )	combinations) applied during DBE test (yes/no/NA)? Yes
			JUSTIFICATION/COMMENTS
· · · ·			
· · · ·			
· · · · · · · · · · · · · · · · · · ·			
			PAGE <u>B-18</u>

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				-20-89
PEI		ICE SPECIFICA	CHARACTERISTICS NECESSARY TO TIONS CAN BE SATISFIED UNDER	
(4)			oads during baseline testing ions (Yes/No/NA)? <u>Yes</u> (Re	
	JUST	CIFICATION/CO	MMENTS <u>See comment under Se</u>	ction 5(b).
(5			.cal characteristics necessar	
	-		mance specifications can be <u>Plant Normal Conditions</u>	Reference
		Voltage	15-30.5VDC	See Comments for 5(b)
		Load	<u>10-50 MA</u>	See Comments for 5(b)
		Frequency	NA	See Comment: for 5(b)
		Accuracy	See TAB C, Section F See Open Item #6	See Comment: for 5(b)
		Other(s)		
		JUSTIFICATI	ION/COMMENTS	·····
		, - <del></del>		
·				

		TLE <u>BARTON 7</u>	<u>63 LOT 7</u> COMPUTED <u>AWL</u> DATE <u>97</u> CHECKED <u>BDM</u> DATE <u>97</u>	<u>23/86</u> <u>-24/86</u> <u>1-20-89</u>
J.	PERF		CAL CHARACTERISTICS NECESSARY TO EN FICATIONS CAN BE SATISFIED UNDER AC	
	(b)	Parameter	Specific Accident Conditions	Referenc
		Voltage	NA	See Comme
		Load	NA	
		Frequency	<u>NA</u>	- <u></u>
	•		See TAB C, Section F	
		Accuracy	See Open Item 6	·····
		Other(s)		
		JUSTIFICATION	N/COMMENTS	·
		with fixed lo	itters are powered from regulated p oads, and connected with qualified cal characteristics on which qualif	cable. The
	(c)	with fixed lo only electric based is accord		cable. The ication is ply are
	(c)	with fixed lo only electric based is accu accounted for	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-LA</u>
	(c)	with fixed lo only electric based is accu accounted for <u>Parameter</u>	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations 	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1 <u>of ESE-1A</u>
	(c)	with fixed lo only electric based is accu accounted for <u>Parameter</u> Voltage	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations <u>Demonstrated Conditions</u> <u>15-52 VDC</u> <u>10-50 MA</u> <u>NA</u>	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1
	(c)	with fixed lo only electric based is accu accounted for <u>Parameter</u> Voltage Load	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations <u>Demonstrated Conditions</u> <u>15-52 VDC</u> <u>10-50 MA</u>	cable. The ication is ply are
	(c)	with fixed 10 only electric based is accu accounted for <u>Parameter</u> Voltage Load Frequency	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations <u>Demonstrated Conditions</u> <u>15-52 VDC</u> <u>10-50 MA</u> <u>NA</u> See TAB C, Section F	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1
	(c)	with fixed 1 only electric based is accuracy accounted for <u>Parameter</u> Voltage Load Frequency Accuracy	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations <u>Demonstrated Conditions</u> <u>15-52 VDC</u> <u>10-50 MA</u> <u>NA</u> See TAB C, Section F <u>See Open Item 6</u>	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1
	(c)	<pre>with fixed 1c only electric based is accu accounted for <u>Parameter</u> Voltage Load Frequency Accuracy Other(s) JUSTIFICATION Electrical ch specification approval the specification istics is on fication 9533</pre>	oads, and connected with qualified cal characteristics on which qualif uracy. Variations in the power sup r in the loop accuracy calculations <u>Demonstrated Conditions</u> <u>15-52 VDC</u> <u>10-50 MA</u> <u>NA</u> See TAB C, Section F <u>See Open Item 6</u>	cable. The ication is ply are <u>Referenc</u> Sect. 1.1 <u>of ESE-1A</u> Sect. 1.1

	ER TI	TLE	BARTON 76	<u>3 LOT 7</u>	COMPUTED_	AWL	DATE	4/23/8	6 40 4 -
					CHECKED	BDM	DATE	4/23/8	6 <u>76R</u> 1-20-89
K.	REQU	IRED	<u>OPERATING</u>	ENVIRON	MENT				
	Refe	rence	Environm	ental Dr	awing No.	<u>Accid</u>	1 & Abnoi ent: 471 Room	mal: 235-45	<u>See Sheet</u> Instru-
	(1)	Norm	al Max		(2) See	Аbno	rmal Max		See
		(a) '	Temperatu	re (°F)	<u>Sheet 1</u> 6A	(a)	Temperatu	ıre (°F	
		(b)	Pressure	(psig)	See <u>Sheet 1</u> 6A	(Ъ)	Pressure	(psig)	See <u>Sheet 1</u>
		(c)	Humidity	(%)	See <u>Sheet 1</u> 6A	(c)	Humidity	(%.)	See <u>Sheet 1</u>
		(d)	Radiation	(rd)	See <u>Sheet 1</u> 6A	(d)	Radiation	n (rd)	See <u>Sheet</u> 1
	(3)	Proc	ess Inter	faces:	The transm	nitter	s are con	nected	by implu
		<u>loca</u> that	ted in in	strument	systems wh racks awa see any si	nich t av fro	m the pro	ocess s	<u>vstem so</u>
	(4)	<u>loca</u> <u>that</u> <u>temp</u> Stat	ted in in they sho erature. e anticip	strument uld not	systems wh racks awa	nich t ny fro ignigi	<u>m the pro</u> <u>cant effe</u> cy and du	ocess s ect due	<u>ystem so</u> to proce
	(4)	<u>loca</u> <u>that</u> <u>temp</u> Stat cond	ted in in they sho erature. e anticip	strument uld not ated occ 1% of th	systems wh racks awa see any si currence fr ae plant li	nich t ny fro ignigi	<u>m the pro</u> <u>cant effe</u> cy and du	ocess s ect due	<u>ystem so</u> to proce
	(4) (5)	loca that temp Stat cond hour Acci	ted in in they sho erature. e anticip itions: s per exc dent (wor	strument uld not ated occ 1% of th ursion. st case	systems wh racks awa see any si currence fr ae plant li	nich t ay fro ignigi requen ife an	m the pro cant effe	ect due aration exist u	<u>ystem so</u> to proce of abnor p to 8
		loca that temp Stat cond hour Acci	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc	strument uld not ated occ 1% of th ursion. st case luding p	systems wh racks awa see any si currence fr e plant li for any co	requentife an	tion of s	pcess s ect due mration exist u specifi ile):	<u>ystem so</u> to proce of abnor p to 8 ed accide
		loca that temp Stat cond hour Acci para (a)	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc Temperat	strument uld not ated occ 1% of th ursion. st case luding p ure (°F)	systems wh racks awa see any si currence fr de plant li for any co beak, durat	nich t ay fro ignigi requent ife an ombina	tion of s and profi	specifi le): type	<u>ystem so</u> <u>to proce</u> of abnor <u>p to 8</u> ed accide <u>L</u>
		loca that temp Stat cond hour Acci para (a) (b)	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc Temperat	strument uld not ated occ 1% of th ursion. st case luding p ure (°F) (psig)	systems when a constraint of the systems when a constraint of the system	nich t ny fro ignigi requen ife an ombina ion,	tion of s and profi	specifi type type	<u>ystem so</u> <u>to proce</u> of abnor <u>p to 8</u> ed accide <u>L</u>
		loca that temp Stat cond hour Acci para (a) (b)	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc Temperat Pressure	strument uld not ated occ 1% of th ursion. st case luding p ure (°F) (psig) (%)	systems when the racks away see any since the plant line plant line plant line plant line plant line see any constraints of the second	requentife and ombination,	m the pro- cant effect acy and du d could e tion of s and prof: Accident Accident	specifi type type type	<u>ystem so</u> <u>to proce</u> of abnor <u>p to 8</u> ed accide <u>L</u> <u>L</u>
		loca that temp Stat cond hour Acci para (a) (b) (c)	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc Temperat Pressure	strument uld not ated occ 1% of th ursion. st case luding p ure (°F) (psig) (%)	systems where racks aware see any since see any	requentife and ombination,	m the pro- cant effect acy and du d could e tion of s and prof: Accident Accident	specifi type type type	<u>ystem so</u> <u>to proce</u> of abnor <u>p to 8</u> ed accide <u>L</u> <u>L</u>
		loca that temp Stat cond hour Acci para (a) (b) (c) (d)	ted in in they sho erature. e anticip itions: <u>s per exc</u> dent (wor meter inc Temperat Pressure Humidity	strument uld not ated occ 1% of th ursion. st case luding p ure (°F) (psig) (%) (%)	systems when the racks away see any since the plant line plant line plant line plant line plant line see any constraints of the second	requentife and the second seco	m the pro- cant effect acy and du d could e tion of s and prof: Accident Accident Accident	specifi type type type type	<u>ystem so</u> <u>to proce</u> of abnor <u>p to 8</u> ed accide <u>L</u> <u>L</u>

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	TITLE BARTON 763 LOT			
		_ CHECKED	<u>_BDM</u> DATE <u>9/24/86</u> <del>2/2</del> 1-29	
к. <u>R</u>	EQUIRED OPERATING ENVIR	ONMENT		
R	eference Environmental	Drawing No.	47E235-56, 713-RM-A6 Penetration Room	
(1	) Normal Max	(2)	Abnormal Max	
	(a) Temperature (°F)	104	(a) Temperature (°F) <u>11</u>	.0
	(b) Pressure (psig)	<u>ATM(-)</u>	(b) Pressure (psig) AT	<u>M(-</u>
	(c) Humidity (%)	80	(c) Humidity (%) <u>90</u>	)
	(d) Radiation (rd)	<u>2.2 x 1</u> 0 ⁶	(d) Radiation (rd) <u>NA</u>	<u> </u>
К. <u>R</u>	EQUIRED OPERATING ENVIR	<u>ONMENT</u>		
R	eference Environmental	Drawing No.	47E235-45 Instrument Ro	oom
(1	) Normal Max	(2)	Abnormal Max	
	(a) Temperature (°F)	75	(a) Temperature (°F) <u>12</u>	20
	(b) Pressure (psig)	0.3	(b) Pressure (psig) <u>O</u> .	3
	(c) Humidity (%)	<u>60</u>	(c) Humidity (%) <u>90</u>	)
	(d) Radiation (rd)	<u>3.5 x 1</u> 0 ⁵	(d) Radiation (rd) <u>NA</u>	L
K. <u>R</u>	EQUIRED OPERATING ENVIR	ONMENT		
R	eference Environmental	Drawing No.	47E235-76, 729-RM A2 NS	SVVF
(1	) Normal Max.	• (2)	Abnormal Max	
	(a) Temperature (°F)	<u>130</u>	(a) Temperature (°F) <u>14</u>	+0
	(b) Pressure (psig)	ATM(-)	(b) Pressure (psig) Al	M(-
	(c) Humidity (%)	50	(c) Humidity (%) <u>10</u>	0
	(d) Radiation (rd)	$1.8 \times 10^{3}$	(d) Radiation (rd) <u>NA</u>	<u> </u>

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BINDER TI	TLE BARTON 763 LOT 7 COMPUTED AWL DATE 9/23/86 4000
	CHECKED BDM DATE <u>9/24/86</u>
K. <u>REQU</u>	JIRED OPERATING ENVIRONMENT (Continued)
	Comments (duration/peak/profile/spray composition and pH, margin, etc.): <u>See pages 17A, B, C, D, E, F and G.</u>
	·
(6)	Is the equipment subject to moisture or liquid intrusion wh can affect the performance of the equipment under design ba accident conditions (Yes/No/NA)? <u>Yes</u> (Reference:
	Environmental drawings 47E235-45, -56 and -76; notes 5, 16
	16 respectively.
(7)	Subject to submergence (Yes/No/NA)? <u>Yes</u> (Reference: <u>She</u>
	17A and Open Item
	Identify initiation time and duration of submergence: <u>NA</u> -
	See Sheet 17A and Open Item
(8)	Is the equipment subject to a beta radiation contribution the total accident dose (Yes/No/NA)? <u>Yes</u> (Reference: <u>47E235-45</u>
	If yes, identify the fraction of the unattenuated free fiel beta dose to be added to the total dose and justify: <u>See</u>
	TAB C. Section C
(9)	Special environmental calculations (temp., rad., etc.)
	Type RIMS No.
	See Section A this TAB

BINDER TI	TLE BARTON 763 LO		1-24-89	
	·····	CHECKED <u>BDM</u>	DATE <u>9/24/86</u> HDR 1-20-8	<u>62m</u> +-11-90
K. <u>REQU</u>	JIRED OPERATING ENVI	RONMENT (Continued)		
(7)		contains the exact eleved of the second seco		red
а.	1. IIR - elevatio	on - 717.7 ft. (47E235-	-45, note 5)	
	2. North Steam Va (47E235-76, no	alve Vault Room (A2) - ote 62)	731.5 ft.	R
	3. Penetration Ro Table 1).	oom (A6) - 713 ft. 1 in	nch (47E235-56,	
• . • •	flooded, but S	1-PT-1-9A and 1-PT-1-20 SCRWBNEEB 8584 has been he Valve Vault Room. (	n written against	the
•.		o the SCR to resolve the transmitters above the		ECN
•.				
•	issued to move <u>ID#</u> 1-PT-1-9A 1-PT-1-9B	e transmitters above th <u>ACTUAL ELEV</u> 731'2" 733'5"	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5'	[ 
÷	issued to move <u>ID#</u> 1-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B	e transmitters above th <u>ACTUAL ELEV</u> 731'2" 733'5" 731'4" 733'5"	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5'	[ 
•.	issued to move <u>ID#</u> 1-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322	e transmitters above th <u>ACTUAL ELEV</u> 731'2" 733'5" 731'4"	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' *	[ 
•.	issued to move <u>ID#</u> 1-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323	E transmitters above th <u>ACTUAL ELEV</u> 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10"	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' * 731.5' * 731.5' 713.1' 717.7' 717.7'	[ 
•	issued to move <u>ID#</u> 1-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322	e transmitters above th <u>ACTUAL ELEV</u> 731'2" 733'5" 731'4" 733'5" 717'6" 731'8"	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' * 731.5' * 731.5' 713.1' 717.7'	[ 
	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-323 1-PT-68-334	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	[ 
•	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-334 1-PT-68-340	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	[ 
	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-334 1-PT-68-340	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	[ 
	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-334 1-PT-68-340	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	[ 
	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-334 1-PT-68-340	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	[ 
	ID# I-PT-1-9A 1-PT-1-9B 1-PT-1-20A 1-PT-1-20B 1-PT-68-63 1-PT-68-322 1-PT-68-323 1-PT-68-334 1-PT-68-340	ACTUAL ELEV 731'2" 733'5" 731'4" 733'5" 717'6" 731'8" 732'10" 734'11" 735	he flood level). <u>FLOOD ELEV</u> 731.5' * 731.5' 731.5' * 731.5' 713.1' 717.7' 717.7' 717.7'	<u>[</u> r ·

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## WBNED-XMTR-004





Pages  $\underline{B-25}$  thru  $\underline{B-31}$  were deleted per revision  $\underline{1}$ .

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BINDER N	O. <u>WBNEQ-XMTR-00</u> 4 PLANT	WBN UN	IT(S) <u>1</u>	SHEET <u>18</u> 0F <u>24</u> R 1 R
BINDER T	TTLE BARTON 763 LOT 7	COMPUTED AWL	DATE <u>9/23</u>	/86 and H
		<u>.</u>		105 040
		CHECKED BDM	DATE <u>9/24</u>	<u>186_2222</u> 1-20-89
L. SUM	MARY COMPARISON OF TEST	CONDITIONS TO	SPECIFIED CON	DITIONS
(1)				
	oomparison or worde ou			
1	Parameter	<u>Specified</u>	Demonstrated	See TAB C
	Operating Time	<u>100 Days</u>	15 Days	Sect. H <u>for Comp</u> 3.1.5
	Temperature (°F)	<u>327, 535****</u>	420	pg. 4 Figure 2
	Pressure (psig)	11.2	57.6	<u>Page 38</u> R1 Tb1 1,
				Pg. 16 EQDP-TAB D
	Relative Humidity (%)	100	100	<u>Sect. B</u> Tbl 1,
			0500	Pg. 16
	Chemical Spray*	2000 ррт <u>pH 8.2</u>	2500 ррт <u>рН 10.7</u>	EQDP-TAB D Sect. B
		1.035x10 ⁷ ***	$6.8 \times 10^{7}$	6.2, Pg. 16
		_	8	TAB C,
	Radiation (rd)** 4.7	7x1 <u>0 (BETA)*</u> ** See	<u>9x 10^{.°}</u> See	Sect. C
	Submergence	Sheet 17A	Sheet 17A	
	<pre>*Includes spray concent pH. **Enter 40-year integrat dose and specify type. ***Based on information of 1 x 10⁷, normal - 3.5 ***The temperature result Steam Valve Vault Room</pre>	ed normal dose contained in se $x \ 10^5$ . ting from a Mai	e plus integra	ted accident dent -  R1
(2)	) Comparison of worst-ca	ase profiles an	nd margin asse	essment:
		Test Prof		
	Parameter	Envelopes Spe (Yes/No/	<u>/NA)</u>	<u>Reference</u>
	Temperature	Yes	<u> </u>	Tig. 2 2g. 38
	Pressure	Yes	E	Fig. 2 P <u>g. 38</u> Tbl 1, Pg. 2
	Relative Humidity	Yes	E	CODP-ESE-1A CAB C
1	Chemical Spray	Yes See Sheet 17A		Section K  R1
	Submergence			

CHECKEDEDMDATE 4/23/86_dde /-3/87 L. SUMMARY COMPARISON OF TEST CONDITIONS TO SPECIFIED CONDITIONS (Continued) (3) Were margins applied to the test parameters or otherwise addressed in the test program to assure that normal variation and uncertainties are accounted for? (Note margin applied, Yes/No/NA). <u>Suggested Margins per IEEE-323(74)</u> Applied Yes/No/NA Temperature: +15 degrees F 2 +15°F Yes Pressure: +10% but no more than 10 psig 2 +10% Yes Radiation: +10% of accident dose 2 +10% Yes Time: +10% (or 1 hour + operating time per NUREG-0588) 2 +10% Yes Voltage: ±10% of rated value NA NA Environmental Transient: the initial transient and the peak temperature Same Yes applied twice Vibration: +10% added to acceleration 2 +10% Yes ⁴ JUSTIFICATION/COMMENTS * Voltage must not exceed 30.5VDC + IVDC See Note 4 on Drg. 8765 D46 in TAB I. * See Section 5.3.5 on page 14.				. <u>WBNEQ-XMTR-OO</u> 4 PLANT <u>WBN</u> UNIT(S) TLE <u>BARTON 763 LOT 7</u> COMPUTED <u>AWL</u> D	R_ ATE 4/23/86	EET <u>19</u> OF <u>2</u> R
<pre>(Continued) (3) Were margins applied to the test parameters or otherwise addressed in the test program to assure that normal variation and uncertainties are accounted for? (Note margin applied, Yes/No/NA)</pre>					ATE <u>4/23/8</u> 6	HOR
addressed in the test program to assure that normal variation and uncertainties are accounted for? (Note margin applied, Yes/No/NA). <u>Suggested Margins per IEEE-323(74)</u> Applied Yes/No/NA Temperature: +15 degrees F > +15°T Yes Pressure: +10% but no more than 10 psig > +10% Yes Radiation: +10% of accident dose > +10% Yes Radiation: +10% of accident dose > +10% Yes Time: +10% (or 1 hour + operating time per NUREC-0588) > +10% Yes Voltage: ±10% of rated value No* Frequency: ±5% of rated value NA NA Environmental Transient: the initial transient and the peak temperature Same Yes applied twice Vibration: +10% added to acceleration > +10% Yeg* JUSTIFICATION/COMMENTS * Voltage must not exceed 30.5VDC + - IVDC - See Note 4 on Dwg. 8765 D46 in TAB I. * See Section 5.3.5 on page 14.					FIED CONDIT	IONS
Suggested Margins per IEEE-323(74)       Applied       Yes/No/NA         Temperature:       +15 degrees F       > +15° F       Yes         Pressure:       +10% but no more than 10 psig       > +10%       Yes         Radiation:       +10% of accident dose       > +10%       Yes         Radiation:       +10% of accident dose       > +10%       Yes         Radiation:       +10% of accident dose       > +10%       Yes         Time:       +10% (or 1 hour + operating time per NUREG-0588)       > +10%       Yes         Voltage:       ±10% of rated value       No*       NA         Frequency:       ±5% of rated value       NA       NA         Environmental Transient:       the initial transient and the peak temperature Same Yes       applied twice         Vibration:       +10% added to acceleration       > +10%       Yes*         JUSTIFICATION/COMMENTS       * Voltage must not exceed 30.5VDC +       1VDC - See Note 4 on Dwg. 8765 D46 in TAB I.         * See Section 5.3.5 on page 14.			(3)	addressed in the test program to assure t and uncertainties are accounted for? (No	hat normal	variation
Pressure: +10% but no more than 10 psig > +10%       Yes         Radiation: +10% of accident dose       > +10%       Yes         Time: +10% (or 1 hour + operating time per NUREG-0588)       > +10%       Yes         Voltage: ±10% of rated value       No*         Frequency: ±5% of rated value       NA       NA         Environmental Transient: the initial transient and the peak temperature       Same       Yes         applied twice       Vibration: +10% added to acceleration       > +10%       Yes*         JUSTIFICATION/COMMENTS * Voltage must not exceed 30.5VDC +       1VDC - See Note 4 on Dwg. 8765 D46 in TAB I.       * See Section 5.3.5 on page 14.		·		Suggested Margins per IEEE-323(74)	-	<u>Yes/No/NA</u>
Radiation: +10% of accident dose       > +10% Yes         Time: +10% (or 1 hour + operating time per NUREG-0588)       > +10% Yes         Voltage: ±10% of rated value       No*         Frequency: ±5% of rated value       NA         Environmental Transient: the initial transient and the peak temperature Same Yes applied twice       Vibration: +10% added to acceleration > +10% Yes*         JUSTIFICATION/COMMENTS       * Voltage must not exceed 30.5VDC +         IVDC - See Note 4 on Dwg. 8765 D46 in TAB I.       * See Section 5.3.5 on page 14.				Temperature: +15 degrees F	<u>&gt; +15°F</u>	Yes
Time: +10% (or 1 hour + operating time per NUREG-0588) > +10% Yes Voltage: ±10% of rated value NA NA Frequency: ±5% of rated value NA NA Environmental Transient: the initial transient and the peak temperature Same Yes applied twice Vibration: +10% added to acceleration > +10% Yes* JUSTIFICATION/COMMENTS * Voltage must not exceed 30.5VDC + - 1VDC - See Note 4 on Dwg. 8765 D46 in TAB I. * See Section 5.3.5 on page 14.				Pressure: +10% but no more than 10 psig	> +10%	Yes
per NUREG-0588)       > ±10% Yes         Voltage: ±10% of rated value       No*         Frequency: ±5% of rated value       NA         Environmental Transient: the initial transient and the peak temperature       Same       Yes         applied twice       Vibration: ±10% added to acceleration       > ±10% Yes       Yes         JUSTIFICATION/COMMENTS       * Yoltage must not exceed 30.5VDC ±       1VDC - See Note 4 on Dwg. 8765 D46 in TAB I.       *         * See Section 5.3.5 on page 14.				Radiation: +10% of accident dose	> +10%	Yes
Frequency:       ±5% of rated value       NA       NA         Environmental Transient:       the initial transient and the peak temperature       Same       Yes         applied twice       Vibration:       +10% added to acceleration       > +10%       Yes*         JUSTIFICATION/COMMENTS       * Voltage must not exceed 30.5VDC +       1VDC - See Note 4 on Dwg. 8765 D46 in TAB I.       *         * See Section 5.3.5 on page 14.		•			>_+10%	Yes
Environmental Transient: the initial transient and the peak temperature <u>Same Yes</u> applied twice Vibration: +10% added to acceleration > +10% Yes* JUSTIFICATION/COMMENTS * Voltage must not exceed 30.5VDC + <u>IVDC - See Note 4 on Dwg. 8765 D46 in TAB I.</u> * See Section 5.3.5 on page 14.		-		Voltage: ±10% of rated value	·	<u>No*</u>
transient and the peak temperature <u>Same</u> <u>Yes</u> applied twice Vibration: +10% added to acceleration <u>&gt; +10%</u> <u>Yes*</u> JUSTIFICATION/COMMENTS <u>* Voltage must not exceed 30.5VDC +</u> <u>IVDC - See Note 4 on Dwg. 8765 D46 in TAB I.</u> * See Section 5.3.5 on page 14.				Frequency: ±5% of rated value	NA	<u>NA</u>
JUSTIFICATION/COMMENTS <u>* Voltage must not exceed 30.5VDC +</u> <u>IVDC - See Note 4 on Dwg. 8765 D46 in TAB I.</u> * See Section 5.3.5 on page 14.				transient and the peak temperature	Same	Yes
1VDC - See Note 4 on Dwg. 8765 D46 in TAB I.           * See Section 5.3.5 on page 14.				Vibration: +10% added to acceleration	> +10%	Yes*
* See Section 5.3.5 on page 14.				JUSTIFICATION/COMMENTS <u>* Voltage must no</u>	t exceed 30	<u>.5VDC + ·</u>
				<u> 1VDC - See Note 4 on Dwg. 8765 D46 in TAB</u>	<u>    I.                                </u>	
				* See Section 5.3.5 on page 14.	•	
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PAGE B-33 RI	<b>L</b>			······································		

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BIND	ER TIT	LE BARTON 763 COMPUTED $HK$ DATE $5/9/86$ R R
		LOT: 7 CHECKED DATE
M.	OPER	ABILITY TEST RESULTS
3	(1)	Identify the safety function(s) of this equipment: (Reference <u>See Tab A</u> ).
		JUSTIFICATION/COMMENTS NA
	(2)	Did the equipment perform its intended function during the simulated design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Section 7.4 Page 20</u> ).
		JUSTIFICATION/COMMENTS NA
	(3)	Did the equipment perform its intended function during the simulated post-design basis accident exposure (yes/no/NA)? <u>Yes</u> (Reference <u>Section 7.4 Page 20</u> ).
		JUSTIFICATION/COMMENTS <u>NA</u>
	(4)	Did the test demonstrate the operability requirements for the required time interval for which the equipment is required to operate (yes/no/NA)? Yes (Reference 7.4 Page 20).
		JUSTIFICATION/COMMENTS See Tab C Section H
·	(5)	Abnormal Conditions: Were abnormal conditions or anomalies properly addressed and resolved (yes/no/NA)? <u>Yes</u> (Reference <u>See Comments</u> ).
		JUSTIFICATION/COMMENTS See Sheet 20A.

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DIMDI	ER NO	.WBNEQ-XM	<u>CR-004</u> PL	ANT <u>WI</u>	BN	_ UNIT	(S) <u>1</u>		_
BINDI	ER TI	TLE <u>BARTON</u>	1 763 LOT	_7 COM	IPUTED <u>A</u>	WL	_ DATE		<u>2</u> R <u>4.C.1</u>
	·			CHE	ECKED <u>SF</u>	P/DLK_	DATE	ء <u>5/20/8</u> 6 مُ	<u>KEN</u> 1/29/09
м.	OPER	ABILITY TH	ST RESUL	<u>IS</u> (Cont	inued)			-	
	(5)	JUSTIFICA	TION/COM	1ents s	бее Арре	ndix A	and Se	ctions 7	7.1 th
		7.4 on pa							
		discussio				_			
		with the							
		during HE							
		1. The c			being	replace	ed per	Westingh	nouse
			mendation	-	_	-	-		
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			2 <u>XII. <u>III</u> - <del>I</del>I <del>I</del>I.</u>				10,2 10,210		
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		BARTON 763	•	COMPLITED	ANIZ	DATE	4/23/86	ET R	R
BINDER		LOT 7		COMPUTED CHECKED	GH	UAIE	N23/26	<u></u>	
•		LOI /		CHECKED		UAIE			
N.	MAINTE	NANCE AND SURVEI	LLANCE						
	and in: which a	e qualification spection paramet aid in detecting o/NA)? Yes	ers which degradir	n are essen ng materia	ntial to Ls or eq	o mainta luipment	in quali perform	ficatio ance	on and
	Binder	- Qualification	Maintena	ince Data :	Sheets).	. Dect			,
	JUSTIF	ICATION/COMMENTS					· · · · · · · · · · · ·		
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BINDER TIT	LE BARTON 763	COMPUTED A	V DATE: 44	23/86
	LOT 7	CHECKED:	1 DATE: 4	2 3/ 57
0. <u>SUM</u>	MARY OF REVIEW			Yes/No/NA
(1)	Documented evidence of (Have all assumptions all extrapolations of analysis been justifi	s, mathematical mo 5 test data used i	dels, and n an	Yes
(2)	Any exceptions (i.e., s taken to the specifie adequately justified?	ed qualification l	÷	<u>No</u>
(3)	Choice of qualification justified?	n methodology adeq	uately	Yes
(4)	If analysis was perform	ned, complete the	following:	
	(a) Were equipment perf identified?	formance requireme	nts	NA
	(b) Were specific featu effects analyzed?		odes and	NA
	(c) Were assumptions an together with app their use?	nd mathematical mo propriate justific		NA
	(d) Were environmental equipment perform	-	affect	NA
(5)	Adequate similarity bet specimen established?		d test	Yes
(6)	Aging degradation evalu	ated adequately?		Yes
•	(a) Mechanical and/or o	cycle aging addres	sed?	Yes
	(b) Equipment aged to e application of DE		ion prior to	Yes
	(c) Absence of preaging	g in test/analysis	justified?	NA
	(d) Materials susceptib aging identified?		iation	No#

PAGE 8-3	7
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BINDER TITLE	BARTON 763 COMPUTED $A \times C$ DATE $\frac{9/2}{2}$	3/86
	LOT 7 CHECKED BAM DATE 9-24	4-86
0. <u>SUMMAR</u>	Y OF REVIEW (Continued)	Yes/No/NA
(e	) Normally operating state of device (e.g., normally energized) considered?	Yes
(7) Qu	alified life or replacement schedule established?	Yes
(8) Cr	iteria regarding temperature/pressure exposure satisfied?	Yes
(a	) Peak temperature adequate	Yes
(Ъ	) Peak pressure adequate	Yes
(c	) Duration adequate	Yes
(a	) Required profile enveloped adequately	Yes
(e	) Steam exposure adequate	Yes
(9) Cr	iteria regarding test sequence satisfied?	Yes
(10) Cr	iteria regarding spray satisfied?	Yes
(a	) Was the spray testing done while under the extremes of pressure and temperature?	Yes
(Ъ	) Does the spray concentration, flow rate, density, duration, and pH used in tests meet or exceed those to be used for the plant?	Yes**
(11) Cr	iteria regarding submergence satisfied?	Open Item Sheet
(12) Cr	iteria regarding radiation satisfied?	Yes
( a	) Was dose rate considered?	Yes
(1	) Was beta radiation considered?	Yes *
(13) Cr	iteria regarding operability status/mode satisfied?	Yes
(14) Cr	iteria regarding test failures or anomalies satisfied?	Yes
Westingh **Due to t	ification 955270 (Tab E, Section B) section 6.0 page nouse letter WAT(EQ)-001 (Tab E, Section F). See Also the test chamber configuration being small, the flow the in regard to the plant's requirements.	o TAB C, Section

TVA	19537	(OE-3-86)	

EQP0 55.27

				·			COMPUT					6 240R	
				<u></u>								1-26-89	سرچي مارين ا
	0.	SUMMA	RY O	F REVII	SW (Co	ontinu	ed)						
						•						<u>Yes/No/</u>	<u>NA</u>
	4	(15)	Crit	eria re	gardi	ing fu	nctiona	l test	ing sa	tisfi	ed?	Yes	
			(a)				an/repo ria for				ned?	<u>Yes</u>	
			(b)				ase lin ed perf				istics	? <u>Yes</u>	
			(c)	perfor (e.g.,	mance volt	e spec age,	lyis de ificati load fr	ons an equenc	d char y, and	acter: l other	:		
				electi	ical	chara	cterist	ics) c	an be	ensure	ed?	<u>Yes</u>	
		(16)	Cri	teria 1	egard:	ling i	nstrume	nt acc	uracy	satisi	ied?	0pen It <u>#6</u>	em
		(17)		t durat isfied?		argin	(1 hou	r + fu	nction	time)	).	Yes	·
			(a)	Is th least			specifi	ed ope	rating	; time	at	<u>No</u>	
			(b)		was t		the 1- was ad					Yes *	-
		(18)	Cri	teria i	egard:	ling s	ynergis	tic ef	fects	satisf	ied?	Yes	
		(19)	Cri	teria 1	egard:	ling m	argins	satisf	ied?			Yes	
		(20)		ntenand quately			eillanc d?	e requ	iremen	ts		Yes	
	P.	DISCU	SSIO	1									
		<u>* See</u>	Sect	tion 7.	1.6 0	f WCA	<u>P-8587</u>	contai	ned in	TAB F	. Sec	tion D.	
				<u> </u>			<u></u>	•••					 . '
·								- <i></i> .			·····	· · · · · · · · · · · · · · · · · · ·	<u> —.</u>
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