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BUTLER,W.R. Licensing Branch 2

SUBJECT: Clarifies request for amend to Tech Specs 3/4.6.4 re suppression chamber-drywell vacuum breakers.Analysis on opening time response completed.Tech Spec changes not effected.Amend request should be processed.

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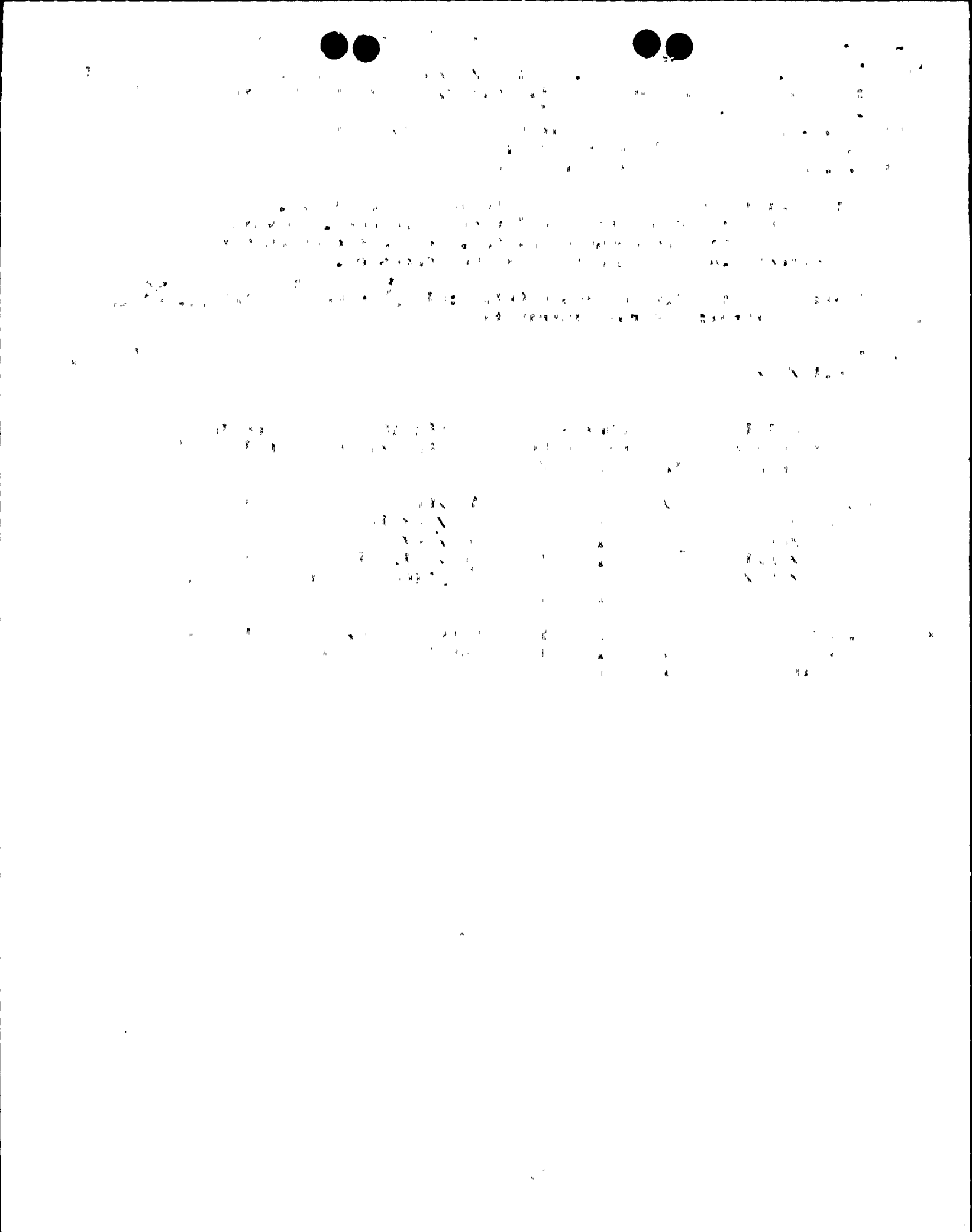

Washington Public Power Supply System
3000 George Washington Way P.O. Box 968· Richland, Washington 99352-0968 (509)372-5000

Docket No. 50-397

September 30, 1985
G02-85-656

Director of Nuclear Reactor Regulation
Attention: Mr. W. R. Butler, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Butler:

Subject: NUCLEAR PLANT NO. 2
OPERATING LICENSE NPF-21, CLARIFICATION OF REQUEST FOR AMENDMENT TO TECHNICAL SPECIFICATIONS FOR SUPPRESSION CHAMBER-DRYWELL VACUUM BREAKERS (3/4.6.4 VACUUM RELIEF)

Reference: Letter, G02-85-278, G. C. Sorensen (Supply System) to W. R. Butler (NRC), same subject, dated May 30, 1985

The reference letter requested certain changes to Technical Specifications for the suppression chamber drywell vacuum breakers (3/4.6.4 vacuum relief). Subsequent to transmitting the amendment request, the Supply System performed an analysis to investigate the effect of wetwell to reactor building opening time response on containment negative pressure response. Since the study may have had an effect on the amendment request, the Supply System requested that a hold be placed on processing the amendment request. The analysis on opening time response has been completed and it is concluded that the basis for requesting the Technical Specification changes has not changed. Accordingly, the Supply System requests that the subject amendment request be processed and approved per the standard Technical Specification process.

A001
1/1

Should you have any questions, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

HLA/kjt
Attachments
cc: JO Bradfute - NRC
R. Barr - BPA
C. Eschels - EFSEC
JB Martin - NRC RV
E. Revell - BPA
NS Reynolds - BLCP&R
AD Toth - NRC Site

TI 1.1
Rev. 3

FSAR Change X
TECH SPEC Change See GO2-85-278
PTL REF # _____
LCL REF # _____

ORIGINAL

POC Date: _____
CNSRB Date: _____

DCP Page ____-____-____
SCN 85-204

WNP-2 SAR/TECHNICAL SPECIFICATION CHANGE NOTICE

1) SAR Section(s) Affected: FSAR Tables 6.2-19 and 6.2-19a

Tech. Spec. Affected: See Tech Spec change request (GO2-85-278)

2) Description of Change: Calculations were completed to allow 2 of the 9 drywell-wetwell vacuum breakers out for maintenance coupled with increased opening time for wetwell-Reactor Building vacuum breakers (12.0 seconds versus 5.0 seconds). These calculational results are acceptable and are shown on Tables 6.2-19 and 6.2-19a.

3) Reasons for Change: CSP-V-6 and -5 exceeded the design basis opening time of 5.0 seconds for negative containment pressurization and one additional drywell-wetwell vacuum breakers was assumed out for maintenance for operations flexibility

4) This SCN commits to the following: NONE

5) Unreviewed Safety Question: Yes ___ No X (Attach 10CFR50.59 Safety Evaluation Form if not part of a DCP.)

6) This change incorporates NRC questions. Yes ___ No X (If Yes, attach list of questions by number and applicable section.)

This SCN will be incorporated into Amendment No.: _____

Approvals: Signature indicates authorization to file the subject change into an amendment.

	Signature	Date	Remarks
Originated by: Loren Sharp / Loren Sharp		7/15/85	As Marked
Lead Technical Reviewer(s) LTRs:			
G. Gelnaus / M.L. Lightcap		8/1/85	as noted
CR Nalies / WG Conn	WG Conn 8/29/85	8/1/85	
MP Reis / M. Kipps	M. Kipps	8/1/85	RB-ww notation changed from ww-RB.
Generation Engineering	GN Kugler	8/29/85	Reviewed with WGC
Plant Technical Manager	KA Cowan	8/13/85	OK
Plant QA Manager		8-26-85	
WNP-2 Licensing Manager	8/28/85	9/3/85	

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

10CFR50.59 SAFETY EVALUATION

1. ☐ DCP NO. / ☐ FCR NO. | PAGE
1. PROCEDURE NO.
1. SPECIAL TEST NO.

3. TECH. SPEC REFERENCE	
SECTION	PAGE
3/4.6.4	3/4 6-33, 34
	B 3/4 6-4

☐ Not Addressed in Tech. Specs.

4. Does this Design Change, Procedure Revision, and/or Special Test constitute a change as described in the Final Safety Analysis Report?
☒ YES ☐ NO

5. Is a change in Technical Specifications involved?
☐ YES ☒ NO — See Tech Spec Change request GOZ-85-278

2. FSAR REFERENCE		
VOLUME	SECTION	PAGE
12	6.2.1.1.4	6.2-152
	6.2.1.1.4	6.2-152a

☐ Not Addressed in FSAR

IF YES

6. Complete Block No. 8 of this form Proceed to Block No. 7

7. Request and receive Nuclear Regulatory Commission authorization for change prior to implementation of the subject change. Refer to 10CFR50.90.

IF NO

8. UNREVIEWED SAFETY QUESTION EVALUATION: Answer the following questions with a "yes" or "no", and provide specific reasons justifying the decision:

A. Can the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report be increased?

☐ YES ☒ NO Because: Analysis supports safe plant operation with two drywell-wetwell vacuum breakers out for maintenance and with slower (12.0 sec) opening time for the wetwell-reactor building vacuum breakers

B. Can a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report be created?

☐ YES ☒ NO Because: All potential accident scenarios with single failure criteria have been evaluated to ensure safe plant operation with two drywell-wetwell vacuum breakers out for maintenance and with slower opening times (12.0 sec) for wetwell-reactor bldg vacuum breakers

C. Is the margin of safety as defined in the basis for any technical specification reduced?

☐ YES ☒ NO Because: Considerable conservatism exists in the negative containment pressurization analysis to allow two drywell-wetwell vacuum breakers out for maintenance and slower wetwell-reactor building opening times (12.0 seconds) without reducing the technical specification safety margin basis for vacuum breaker operation. Failure of a 3rd WW-DW vacuum breaker is bounded by a single operator error or external valve failure.

Any Answer (8A, B, C) ☐ YES · ☒ All Answers (8A, B, C) NO

AUTHORIZATION RECEIVED → Initiate Design Change, Procedure Change and/or Special Test Implementation.

* If answer in Block No. 4 is YES, then the change is reportable under 10CFR50.59b and description of the change will be included in the Annual Report. The individual initiating the Design Change, Procedure Revision, and/or Special Test is responsible for submitting FSAR changes to the Plant Licensing Manager.

9. [signature] PREPARED BY — 7/15/85 DATE

10. D.L. Whitcomb APPROVED BY — 8/1/85 DATE

6.2.1.1.4 Negative Pressure Design Evaluation

The limiting transient for the wetwell-to-drywell (WW-DW) vacuum breaker system is simultaneous operation of both drywell spray loops after large break LOCA. The limiting transient for the reactor building to wetwell (RB-WW) vacuum breakers is a small break LOCA followed by actuation of one or two drywell spray loops. These have been determined to be more severe than inadvertent drywell spray actuation during normal operating conditions.

The analysis performed for the case of simultaneous operation of both drywell loops after a small LOCA made the following conservative assumptions:

a. Drywell spray flow of 7,900 gpm from one or two loops. This flow corresponds to runout flow for the RHR pumps.

b. 100% spray efficiency.

c. 50 F spray temperature.

d. All non-condensible gases are purged into the wetwell as a result of the LOCA.

e. The drywell is full of steam at a pressure corresponding to wetwell pressure plus the hydrostatic head corresponding to the downcomer submergence.

f. Single failures assumed in these analyses were:

1. Operator error (high drywell temperature).

2. Operator error (actuation of both drywell sprays rather than only one)

3. Failure of an external vacuum breaker

Each of the above was assumed by itself, i.e., not in combination with any of the others.

The initial conditions used in the analysis are provided in Table 6.2-19. A summary of results is provided in Table 6.2-19a.

Drywell spray is not required to maintain the primary containment below design pressure nor is it required for containment cooling. If following a small LOCA all the noncon-

Failure of an internal vacuum breaker was not considered since the consequences ~~of a~~ are bounded by an operator error or external vacuum breaker failure.

densible gases are purged into the wetwell, actuation of one of the two drywell sprays will rapidly depressurize the drywell. Actuation of the second drywell spray with the drywell full of steam is neither necessary nor desirable and represents the limiting transient for the vacuum breaker systems.

The total $A/\sqrt{k}$ for the RB-WW vacuum breaker system is 3.705 (for 3 vacuum breakers), and for the WW-DW vacuum breaker system it is 9.063 (for 9 vacuum breakers). Even after allowing for two WW-DW vacuum breaker valve failures and an additional failure of either a RB-WW or a ~~third WW-DW vacuum breaker valve~~ an operator error, the resulting pressure differentials - reactor building to drywell, reactor building to wetwell, and wetwell to drywell are all less than 2.0 psid and within the design values stated in 6.2.1.1.2(c).

Multiple valve failure is not expected. Two additional WW-DW vacuum breaker valves failures are allowed above the single active component failure criteria to preclude unnecessary shutdowns should the testing mechanism on up to two WW-DW vacuum breakers fail. Failure of the testing mechanism is considered more probable than failure of the check valve to open on an opening differential pressure.

6.2.1.1.5 Suppression Pool Bypass Effects

6.2.1.1.5.1 Protection Against Bypass Paths

The pressure boundary between drywell and suppression chamber including the vent pipes, vent header, and downcomers is fabricated, erected, and inspected by nondestructive examination methods in accordance with the applicable ASME Codes (see 3.8.2). This special construction, inspection, and quality control ensures the integrity of this boundary. The design pressure differential for this boundary was established at 25 psid which is substantially greater than conditions during a DBA. Actual peak accident differential pressure across this boundary is provided in Table 6.2-5.

All penetrations of this boundary except the vacuum breaker seats and vacuum breaker to downcomer flange are welded. All penetrations are available for periodic visual inspection.

All potential bypass leakage paths (such as the purge and vent system) have been considered. Every path has at least two isolation valves in the leakage path. These valves are high quality leaktight containment isolation valves which are all normally closed.

The failure of a third WW-DW vacuum breaker valve is also acceptable since the resulting pressure differential is bounded by the failure of either a ~~WW-DW~~ RB-WW vacuum breaker valve or an operator error.

MPR

TABLE 6.2-19

Assumptions and initial conditions employed in Negative Pressure Design Evaluation

A. Containment preincident conditions used for sizing internal vacuum breakers (wetwell to drywell)

	Drywell (DW)	Suppression Chamber (WW)
1. Pressure, psig	0	0
2. Temperature, °F	150	50
3. Relative Humidity, %	100	100

B. Containment preincident conditions used for sizing external vacuum breakers (reactor building to wetwell)

Case 1

(1 DW spray, ~~8~~ 7 DW-WW vacuum breakers, 3 ~~WW-RB~~ RB-WW vacuum breakers)

	Drywell (DW)	Suppression Chamber (WW)
1. Pressure, psig	0	0
2. Temperature, °F	150	50
3. Relative Humidity, %	30	100

Case 2

(1 DW spray, ~~8~~ 7 DW-WW vacuum breakers, 2 ~~WW-RB~~ RB-WW vacuum breakers)

	Drywell (DW)	Suppression Chamber (WW)
1. Pressure, psig	0	0
2. Temperature, °F	135*	50
3. Relative Humidity, %	100	100

*150°F for case 2A

Case 3

(2 DW sprays, ~~8~~ 7 DW-WW vacuum breakers, 3 ~~WW-RB~~ RB-WW vacuum breakers)

	Drywell (DW)	Suppression Chamber (WW)
1. Pressure, psig	0	0
2. Temperature, °F	135	50
3. Relative Humidity, %	100	100

TABLE 6.2-10a
LIMITING CONDITIONS FOR MAXIMUM NEGATIVE PRESSURE DIFFERENTIALS APPLIED TO WNP-2 SPECIFICATIONS

RB-WW RB-WW

Hypothetical Event	No. of DW-WW VBs	No. of ~~WW-RB~~ VBs***	No. of DW Sprays	Maximum Negative Pressure Differential, psid DW-WW	~~WW-RB~~	DW-RB	Remarks
(1) Inadvertent Spray Activation	~~8~~ 7	3	N/A*	-	-	-	Not possible due to need for containment high pressure interlock first
(2) Small Pipe Break - Steam or Liquid**							
(2A) liquid	7 ~~8~~	3	1	0.62 ~~0.65~~	1.28 ~~1.5~~	1.80 ~~2.0~~	Operator error - high drywell temperature
steam	7	3	1	0.71	1.33	1.85	Use of 1 spray No VB failure
(2B) liquid	7 ~~8~~	2	1	0.61 ~~0.63~~	1.19 ~~1.1~~	1.69 ~~1.7~~	No Operator error
steam	7	2	1	0.70	1.28	1.77	1 VB failure Use of 1 spray
(2C) liquid	7 ~~8~~	3	2	0.65 ~~0.75~~	1.18 ~~1.4~~	1.79 ~~2.0~~	Operator error - use of 2 sprays
steam	7	3	2	0.80	0.70	1.21	No VB failure VBs adequate
(3) DBA	~~8~~ 7	2	1	0.84 ~~1.18~~	0.79 ~~0.71~~	1.11 ~~0.8~~	RB-WW 1 ~~WW-RB~~ VB failure
	~~8~~ 7	3	2	~~1.18~~ 0.94	~~0.71~~ 0.94	~~0.8~~ 1.39	Use of two sprays No VB failure VBs adequate
(4) Vented Drywell with a Small Steam Leak	~~8~~ 7	3	N/A*	-	-	-	Included in Small Pipe Break Event (2)
(5) Normal Heating and Cooling Cycles	~~8~~ 7	3	N/A*	-	-	-	Controlled with the Primary Containment Cooling System

* Not Applicable

** Values listed for this event are for spray initiation at 14.7 psia and thus disregard the high containment pressure electrical interlock signal required for any spray initiation. Also, they reflect 100% relative humidity in the drywell rather than 40-55% which is expected to be maintained during normal operation. Including increased pressure to trip the interlock and decreased RH would reduce the values listed. In addition, based on the stress-strain behavior of the foam insulation between the containment vessel and biological shield, an additional (-)0.5 psid margin beyond (-)2.0 psid is present in the WNP-2 design (References 19 and 20).

*** All RB-WW ~~WW-RB~~ vacuum breakers are assumed to have opening times no greater than 12.0 seconds for this analysis. WNP-2 valve surveillance procedures periodically check the RB-WW ~~WW-RB~~ vacuum breaker opening times to ensure they are ~~less~~ no greater than 12.0 seconds.