

FINAL

TECHNICAL EVALUATION REPORT ON  
RESPONSE FROM  
WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
TO GENERIC LETTER 88-01  
PERTAINING TO THE  
WASHINGTON NUCLEAR PLANT NO. 2

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## ABSTRACT

This report contains an evaluation of the licensee (Washington Public Power Supply System) submittal for Washington Nuclear Plant No. 2 (WNP-2) which was submitted in response to the NRC Generic Letter 88-01 in which WNP-2 was requested to: (1) Furnish their current plans relating to piping replacement and other measures to mitigate IGSCC, inspection, repair, and leakage detection. (2) Indicate whether they plan to follow the NRC Staff positions, or propose alternative measures. WNP-2's plans are evaluated in Section 2 of this report in terms of compliance to NRC Staff positions. Section 3 contains an evaluation of an alternative position concerning a change to the Technical Specification on ISI.

## SUMMARY

The Licensee, Washington Public Power Supply System (WPN-2), submitted a response to the NRC Generic Letter 88-01 pertaining to the austenitic stainless steel piping in the Washington Nuclear Plant No. 2 (a BWR nuclear power plant). WNP-2's response was evaluated in terms of: (1) Their previous and planned actions to mitigate IGSCC to provide assurance of continued long-term service. (2) Their Inservice Inspection (ISI) Program. (3) Their Technical Specifications pertaining to ISI and their plans to ensure that leakage detection will be in conformance with the NRC Staff position. (4) Their plans to notify the NRC of significant flaws identified (or changes in the condition of the welds previously known to be cracked) during inspection and evaluation of such flaws.

WNP-2 endorses 12 of the 13 NRC Staff positions which are outlined in Generic Letter 88-01, although they applied two provisions. The first is that welds treated with IHSI prior to operation were not given pre-treatment or post-treatment inspections. The second is the requirement for plant shutdown when the increase in the rate of unidentified leakage exceeds 2 gpm over a 24 hour period (they apply a 4 hour period rather than 24 hours). They do not endorse or presently use HWC.

An extensive program of piping replacement, piping removal, corrosion resistant cladding, solution heat treating, and stress improvement was applied so that all welds within the scope of Generic Letter 88-01 are IGSCC Categories A and B. No additional mitigating activities are planned except to repair any welds that develop IGSCC.

WNP-2's ten year ISI program conforms with the NRC Staff position on schedules, methods and personnel, sample expansion, and reporting of flaws; however, WNP-2 provided an alternate proposal to the NRC Staff position requiring a change to the Technical Specifications on ISI.

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## 1. INTRODUCTION

Intergranular stress corrosion cracking (IGSCC) near weldments in Boiling Water Reactor (BWR) piping has been occurring for almost 20 years. Substantial efforts in research and development have been sponsored by the BWR Owners Group for IGSCC Research, and the results of this program, along with other related work by vendors, consulting firms and confirmatory research sponsored by the NRC, have permitted the development of NRC Staff positions regarding the IGSCC problems. The technical basis for NRC Staff positions is detailed in Reference 1, and further background is provided in Reference 2.

The results of these research and development programs prompted the NRC to issue Generic Letter 88-01 (see Reference 3) requesting all licensees of BWR's and holders of construction permits to:

- (1) Furnish their current plans relating to piping replacement, inspection, repair, and leakage detection.
- (2) Indicate whether they:
  - (a) Plan to follow the staff positions, or
  - (b) Propose alternative measures.

Specifically, Generic Letter 88-01 stated that an acceptable licensee response would include the following items:

- (1) Current plans regarding pipe replacement and/or other measures taken or to be taken to mitigate IGSCC and provide assurance of continued long-term piping integrity and reliability.
- (2) An inservice inspection (ISI) program to be implemented at the next refueling outage for austenitic stainless steel piping.

- (3) A change to the Technical Specifications to include a statement in the section on ISI that the inservice inspection program for piping will be in conformance with the staff positions on schedule, methods and personnel, and sample expansion.
- (4) Confirmation of plans to ensure that the Technical Specification related to leakage detection will be in conformance with the Staff position on leak detection.
- (5) Plans to notify the NRC, in accordance with 10CFR50.55a(o), of any flaws identified that do not meet IWB-3500 criteria of Section XI of the ASME Code for continued operation without evaluation, or a change found in the condition of the welds previously known to be cracked, and an evaluation of the flaws for continued used operation and/or repair plans.

This report contains a technical evaluation of the response which Washington Public Power Supply System (called WNP-2 or the Supply System in this report) submitted in response to the NRC Generic Letter 88-01 pertaining to the Washington Nuclear Plant No. 2 (hereafter called WNP-2).

## 2. EVALUATION OF RESPONSE TO GENERIC LETTER 88-01

This evaluation consisted of a review of the response to NRC Generic Letter 88-01 of January 25, 1988 by the Supply System pertaining to WNP-2 to determine if their performance and plans are in conformance with the NRC Staff positions or if proposed alternatives are acceptable. Proposed inspection schedules and amendments to the Technical Specification were included in the review.

## 2.1 Documents Evaluated

Review was conducted on the information pertaining to WNP-2 provided by the Licensee in the following documents.

- (1) "Nuclear Power Plant No. 2, Supply System's Response to NRC's Generic Letter 88-01," Docket No. 50-397, Washington Public Power Supply System, P.O. Box 968, 3000 George Washington Way, Richland, Washington 99352, July 26, 1988.
- (2) "Nuclear Power Plant No. 2, Supply System's Response to Generic Letter 88-01 Request for Additional Information," Docket No. 50-397, Washington Public Power Supply System, P.O. Box 968, 3000 George Washington Way, Richland, Washington 99352, July 20, 1989.

Hereafter, in this report, these documents will be referred to as WNP-2 Submittals No. 1 and No. 2, respectively, and collectively as the WNP-2 Submittals.

## 2.2 Review of WNP's Responses to Staff Positions and Implementation of Those Positions.

Generic Letter 88-01 outlines 13 NRC Staff positions pertaining to (1) materials, (2) processes, (3) water chemistry, (4) weld overlay, (5) partial replacement, (6) stress improvement of cracked weldments, (7) clamping devices, (8) crack evaluation and repair criteria, (9) inspection methods and personnel, (10) inspection schedules, (11) sample expansion, (12) leak detection, and (13) reporting requirements. Generic Letter 88-01 states that the licensee should indicate in their submittal whether they endorse these NRC Staff positions or propose alternative positions. Table 1, constructed from a similar table in WNP-2



Table 1

## Summary of WNP-2's Responses to Staff Positions

Staff Position	WNP-2 Accepts NRC Staff Position	WNP-2 Has/Will	
		Applied In Past	Consider for Future Use
1. Materials	yes	yes	yes
2. Processes	yes	yes	yes
3. Water Chemistry	no <sup>(a)</sup>	no <sup>(a)</sup>	yes <sup>(a)</sup>
4. Weld Overlay	yes	no	yes
5. Partial Replacement	yes	no	yes
6. Stress Improvement of Cracked Weldments	yes	yes <sup>(b)</sup>	yes
7. Clamping Devices	yes	no	yes
8. Crack Evaluation and Repair Criteria	yes	no	yes
9. Inspection Method and Personnel	yes	yes	yes
10. Inspection Schedule	yes <sup>(c)</sup>	yes	yes
11. Sample Expansion	yes	yes	yes
12. Leak Detection	yes <sup>(d)</sup>	yes <sup>(d)</sup>	yes <sup>(d)</sup>
13. Reporting Requirements	yes	yes	yes

(a) Alternate position proposed. Water chemistry guidelines of FTRI NP-4949-SR have been adopted, and the potential use of hydrogen water chemistry continues to be reviewed. See text for additional discussion.

(b) The "yes" for this item is taken from corresponding table in WNP-2 Submittal No. 2, but that response must be in error because no cracked weldments have been reported for WNP-2.

(c) Inspection schedules will comply with the NRC Staff positions, but WNP-2 applied the provisions that welds treated with IHSI prior to operation were not UT examined because the welds were not subjected to conditions conducive to IGSCC. See text for additional discussion.

(d) Provisions applied. See text for discussion.

Submittal No. 2, presents WNP-2's responses concerning their positions on the 13 items.

Note that WNP-2 does not presently use Hydrogen Water Chemistry (see Section 2.4.2. of this report for additional discussion). Also note that WNP-2 indicated acceptance of other 12 NRC Staff positions, although they applied provisions to two items (i.e., inspection schedules and leakage detection). Additional discussion is provided on these items in Sections 2.3 and 2.7, respectively.

### 2.3 Review of Classification of Welds, Previous Mitigating Actions, and Previous Inspections

#### 2.3.1 Summary of IGSCC Classification

WNP-2 Submittal No. 1 contains a summary of the IGSCC classifications that are assigned to the welds that are within the scope of Generic Letter 88-01. According to that submittal, WNP-2 contains 54 IGSCC Category A welds and 148 IGSCC category B welds for a total of 202 within the scope of Generic Letter 88-01. No IGSCC Category C, D, E, F, or G welds exist at WNP-2. This results from extensive programs conducted at WNP-2 to avoid IGSCC. Part of these were conducted prior to operation in 1983, and part were conducted during the first refueling outage in 1986. These are described in the following section of this report.

#### 2.3.2 Summary of Mitigating Actions

The large number of IGSCC Category A and B welds (and no welds of other classifications) is the result of extensive measures taken to mitigate IGSCC at WNP-2 as shown in Table

2. This table was constructed, in part, from information provided in WNP-2 Submittal No. 1 and, in part from a table in WNP-2 Submittal No. 2 which provides a weld-by-weld list of welds, their IGSCC classifications, their materials, and mitigating treatments.

Note that those measures include the use of low carbon material (from piping replacement), corrosion resistant cladding (CRC), solution heat treating (SHT), and induction heating stress improvement (IHSI) treatments. Many of these measures were taken prior to operation of WNP-2. Others were taken after the beginning of operation, but prior to two years of commercial operation. More detailed descriptions are quoted below from WNP-2 Submittal No. 1:

#### Pre-Operational Measures

"The core spray piping material outside the reactor pressure vessel (RPV) was changed from stainless steel to carbon steel. The piping inside the RPV is 304L."

"The ten reactor recirculation (RRC) inlet nozzle safe-ends were replaced with 316L material."

"Piping welds associated with the RRC safe-end change out were solution annealed and/or corrosion resistant clad (CRC)."

"Controls were placed on welding to reduce sensitization."

"Induction Heating Stress Improvement (IHSI) was performed on 113 welds made of non-conforming material. These welds were not UT examined after IHSI, because they had not been in service and not subject to IGSCC."

Table 2

Summary of IGSCC Classifications, Materials of Welds and Associated Components, and Mitigating Treatments

IGSCC Categ	Config.	Dia., inch	No. of Welds	Material for Indicated Comp.			No. with Indicated Treat.		
				1st.	Weld	2nd.	CRC	SHT	IHSI
A	Butt welds, Jet Pump Noz	4	2	508 <sup>a</sup>	In	336			
			2	336	non	non			
A	Butt welds, RPV Noz/SE	24	2	508 <sup>b</sup>	In	336			
A	Butt Welds, Riser Elbows	12	20	non	non	non			20
A	Sweep-O-Lets Riser/Header	16	8	non	non	non			8
A	Butt welds Noz/SE	12	10	508 <sup>a</sup>	In	316L			
A	Butt welds, Riser/SE	12	10	non	non	316L	10 <sup>c</sup>	10 <sup>c</sup>	
B	Butt welds	various	113	non	non	non	13 <sup>c</sup>	5 <sup>c</sup>	113 <sup>d</sup>
B	Sweep-O-Lets	various	12	non	non	non			12 <sup>e</sup>
B	Butt welds, Cross connect to RWCU	4	23	non	non	non			23 <sup>e</sup>

## Notes and abbreviations:

- a. Buttered with Inconel (type not given).
- b. Buttered with Inconel (type not given). Post weld heat treated.
- c. Treatment was on pipe side only. Five welds treated with CRC + SHT.
- d. Pre-service IHSI, no post-treatment UT inspection.
- e. IHSI within 2 years of operation. Pre- and Post-treatment UT.

Components: Noz - nozzle, SE - safe end, Sw - Sweep-O-Let

## Materials:

- non - non-conforming material (either Type 304 or 316 S.S.).
- 336 - SA 336 F8 (contains 0.025% carbon).
- 508 - SA 508 Cl 2.
- In - Inconel (type not identified).

"The control rod drive recirculation line was deleted and the RPV nozzle capped with a carbon steel cap."

"The RRC bypass lines were capped with CRC stainless steel caps."

#### Post-Operational Measures

"During the first refueling outage, the 35 remaining four-inch and greater non-conforming welds received IHSI. This occurred ... 16 months after commercial operation. The welds were UT examined by EPRI certified examiners before and after IHSI. No cracking was detected."

"The two-inch RRC drain lines (15 welds) were replaced with 316L during the second refueling outage."

#### 2.3.3 Previous Inspection Programs

WNP-2 Submittal No. 2 contains a weld-by-weld listing of inspection histories and inspection plans which are summarized in Tables 3a and 3b in this report. These tables show the number of welds of various configurations and IGSCC classification that have been inspected during past inspections (Refueling Outage Nos. 1 through 4). They also contain similar summaries for future plans, and these plans are discussed in Section 2.5 of this report.

Note that none of the IGSCC Category A welds have been inspected. The 35 welds that were stress improved in 1986 were each inspected at that time. Aside from those inspections a total of 28 IGSCC Category B welds were inspected during Refueling Outage No. 2, 3, and 4. One of those welds was inspected twice, bringing the total number

Table 3a

Summary of Inspection Schedules for  
IGSCC Category A Welds at WNP-2

Config.	No. of Welds	No. Inspected/Scheduled During Indicated Outage												
		Past				Future								
		RF1	RF2	RF3	RF4	RF5	RF6	RF7	RF8	RF9	R10	R11	R12	R13
Butt welds, Jet Pup Noz	4						4							
Butt welds, RPV Noz/SE	2						2							
Butt welds, Riser Elbows	20					2		3						
Sweep-O-Lets Riser/Header	8					4			4					
Butt welds Noz/SE	10								10					
Butt welds, Riser/SE	10								2					
Totals	54					6	6	15	4					

Notes:

Requirements of Generic Letter 88-01 for IGSCC Category A welds:  
25% every 10 years (at least 12% in 6 years).

Refueling Outages dates:

RF #	Date	RF #	Date	RF #	Date	RF #	Date	RF #	Date
01	4/86	04	4/89	07	4/92	10	4/95	12	4/97
02	4/87	05	4/90	08	4/93	11	4/96	13	4/98
03	4/88	06	4/91	09	4/94				

Table 3b

Summary of Inspection Schedules for  
IGSCC Category B Welds at WNP-2

Config.	No. of Welds	No. Inspected/Scheduled During Indicated Outage												
		Past				Future								
		RF1	RF2	RF3	RF4	RF5	RF6	RF7	RF8	RF9	R10	R11	R12	R13
Butt welds SI in 1983	113		14		8	11	2	18	4			13		8
Sweepolets SI in 1986	12	12			3		1	2	3		2			3 <sup>a</sup>
Butt welds, Cross connect to RWCU	23	23		1	3			2	1		6		1	3
Totals	148	35	14	1	14	11	3	22	8		8	13	1	14

Notes:

- a. These 3 inspections are repeat inspections of welds scheduled during Refueling Outage No. 4.

Requirements of Generic Letter 88-01 for IGSCC Category B welds:  
50% every 10 years (at least 25% in 6 years).

Refueling Outages dates:

RF #	Date	RF #	Date	RF #	Date	RF #	Date	RF #	Date
01	4/86	04	4/89	07	4/92	10	4/95	12	4/97
02	4/87	05	4/90	08	4/93	11	4/96	13	4/98
03	4/88	06	4/91	09	4/94				

of weld-inspections during those three refueling outages to 29.

#### 2.3.4 Evaluation of Previous Mitigating Actions and Inspections

Approval of IGSCC classification of welds at WNP-2 is recommended. This recommendation is based on reasons given in the following paragraphs.

Fifty-four welds either contain resistant material or have been clad (with corrosion resistant cladding) or have been solution heat treated. These welds are correctly classified as IGSCC Category A. Thirty-five welds were treated with IHSI and given pre-treatment and post-treatment UT inspections so that they qualify for classification as IGSCC Category B welds. The remaining 113 welds, were given pre-operational IHSI treatments and also qualify as IGSCC Category B welds even though they were not UT inspected after the IHSI treatments. The justification for these classifications is discussed in the remainder of this section.

Concerning pre-IHSI and post-IHSI inspections of welds treated prior to operation, Section 5.3.1.7 of NUREG 0313, Revision 2 states:

"Stress improved welds that were not inspected after the SI treatment are considered to be Category G weldments until the post-SI inspection has been performed."

In addition, foot note # 1 in Table 1 of NUREG 0313, Revision 2 (the same table is included as Table 1 in Generic Letter 88-01) states:



"All welds in non-resistant material should be inspected after a stress improvement process as part of the process. Schedules shown should be followed after this initial inspection."

WNP-2 takes exception to these statements for welds that were treated prior to operation. Specifically, they stated:

"The Supply System takes exception to the requirement of note 1, Table 1 of Generic Letter for welds receiving stress improvement prior to operation. The purpose of the UT examination is to detect IGSCC. Prior to operation, the welds are not subjected to the conditions conducive to IGSCC. Requiring a UT examination to detect IGSCC after a pre-service stress improvement (SI) would not increase the piping integrity or reliability."

Clearly, WNP-2 is justified in their position since the requirement for post-IHSI is intended to apply only to welds treated after commercial operation as indicated in the following statement, quoted from Section 5.3.1.2 of NUREG 0313, Revision 2:

"IGSCC Category B Weldments are those not made of resistant materials but have had an SI performed either before service or within two years of operation. If the SI is performed after plant operation, a UT examination after SI to ensure that they are not cracked is required."

#### 2.4 Current Plans for Mitigation Actions

The only plans presented by WNP-2 for additional mitigating actions

are: (a) Perform repairs as needed. (b) Use controlled water chemistry (not HWC). These plans are discussed below.

#### 2.4.1 Repairs or Replacements

WNP-2 Submittal No. 1 contains the following statement:

"In the event it becomes necessary to repair or replace any additional stainless steel piping, the Supply System will incorporate appropriate state-of-the-art measures delineated in the NRC staff positions listed on page 2 of the Generic Letter."

#### 2.4.2 Water Chemistry

WNP-2 Submittal No. 1 contains the following statements pertaining to water chemistry:

"The Supply System has reviewed the use of HWC at WNP-2 and has concluded that this method of IGSCC mitigation will not be implemented at WNP-2 at this time. The Supply System will continue to monitor industry experience with HWC as it has all IGSCC issues by continued participation in appropriate industry committees and workshops and by review of published literature."

"The Supply System has adopted the BWR Normal Water Chemistry Guidelines, EPRI NP-4949-SR, for its chemistry control program at WNP-2."

#### 2.4.3 Evaluation of Conformance to Staff Position and Recommendation

Since extensive mitigation actions have already been applied

at WNP-2 with the result that all welds within the scope of Generic Letter 88-01 are IGSCC Categories A and B, acceptance of the WNP-2 position on additional mitigation activities is recommended.

## 2.5 Current Inservice Inspection Plan

### 2.5.1 Summary of Inspection Schedule

WNP-2 Submittal No. 1 contains the following statement:

"At least 25% of the 148 Category B welds and 12% of the 54 Category A welds will be examined within the next six years. Within ten years of the next refueling outage at least 50% of the Category B welds and at least 25% of the Category A welds will be examined. This augmented ISI program will be implemented at the next scheduled refueling outage (Spring, 1989). This schedule complies with the staff position on inspection schedules, except for post SI UT as described ..."

As previously indicated, WNP-2 Submittal No. 2 contains a list of inspections planned (on a weld-by-weld basis) for Refueling Outages Nos. 5 through 13 (1990 through 1998), although they stated that this schedule may be modified by substituting welds or changing the outage in which they are examined. Tables 3a and 3b of this report contain summaries of those inspection schedules along with summaries of previous inspection schedules and the requirements for inspection of IGSCC Categories A and B welds as delineated in Generic Letter 88-01.

As can be seen through an examination of Tables 3a and 3b, the statement quoted from WNP-2 Submittal No. 1 is confirmed

by the actual inspection schedules. Note that 57% of the IGSOCC Category A welds are scheduled for inspection during the next four refueling outages. Note also that 61% of the IGSOCC Category B welds are scheduled for inspection during the 10 year period covered by Refueling Outages Nos. 4 through 13 (1989 through 1998) with 39% scheduled for the first six years of that 10 year period. These percentages exceed the requirements of Generic Letter 88-01.

#### 2.5.2 Inaccessible Welds

WNP-2 Submittal No. 2 states:

"All welds within the Generic Letter scope are UT inspectable."

#### 2.5.3 Methods and Personnel

Inspections will be performed in accordance with requirements of Generic Letter 88-01 and NUREG 0313, Revision 2 as indicated in the following statement from WNP-2 Submittal No. 1:

"The examinations performed under the scope of the Generic Letter will comply with the requirements of ASME Section XI as committed to by the WNP-2 Inservice Inspection Program Plan. The applicable Edition and Addenda is the 1900 Edition, Winter 1980 Addenda. This Code requirement has been augmented by the requirement to qualify the detailed procedure, equipment and examination personnel by the formal program conducted in accordance with the NRC/EPRI/BWROG Coordination Plan at the EPRI NDE Center in Charlotte, North Carolina. This complies with the staff position on methods and personnel."

#### 2.5.4 Sample Expansion

WNP-2 plans to comply with the NRC Staff position on sample expansion. Specifically, WNP-2 Submittal No. 1 states:

"If one or more cracked welds are found in Category A, B or C during a sample inspection, an additional sample of welds will be examined during that outage. The sample will contain the approximate same number of welds as the original sample."

"Unless there exists a technical reason to select a different distribution, the additional sample will be similar in distribution (pipe size, system and location) to the original sample. If additional cracked welds are found, all welds in that IGSCC category will be examined unless the sample was chosen on a technical basis. In that case all the IGSCC category welds that meet that technical basis will be examined. This complies with the staff position on sample expansion. Although WPN-2 does not have any Category E or F welds at this time, the Supply System will comply with the staff's position on increased sample provisions if the situation becomes applicable."

#### 2.5.5 Evaluation and Recommendation

Since WNP-2's positions on inspection schedules, methods and personnel, and sample expansion comply with the NRC Staff positions, acceptance of WNP-2's positions is recommended.

## 2.6 Changes in the Technical Specification Concerning ISI

WNP-2 proposed an alternative position to the NRC Staff position concerning a change to the Technical Specification. This alternative position is discussed in Section 3 of this report.

## 2.7 Confirmation of Leak Detection in the Technical Specification

### 2.7.1 WNP-2's Position

The WNP-2 Submittal states the following.

"The Supply System leakage criteria per Technical Specification 3.4.3.2 is in agreement with the staff position on leak detection for Category A and B welds. In the event Category D, E, F, or G welds develop at WNP-2, the leak detection criteria will be evaluated for compliance with the staff position."

Additional information concerning leakage detection is presented in Table 4 which was constructed from a similar table in WNP-2 Submittal No. 2 which contains the following explanatory notes:

#### Concerning the Technical Specification

"WNP-2 is a NUREG-0123 Standard Technical Specification Plant."

#### Concerning Leakage Limits

"The interval used to limit leakage to less than

Table 4

Licensee Positions on Leakage Detection<sup>(a)</sup>

<u>Position</u>	<u>Already Contained in TS</u>	<u>TS will be Changed to Include</u>	<u>Alternate<sup>(a)</sup> Position Proposed</u>
1. Conforms with Position C of Regulatory Guide 1.45	yes	-	-
2. Plant shutdown should be initiated when:			
(a) within any period of 24 hours or less, an increase is indicated in the rate of unidentified leakage in excess of 2 gpm, or	yes <sup>(a)</sup>	-	-
(b) the total unidentified leakage attains a rate of 5 gpm.	yes	-	-
3. Leakage monitored at four hour intervals or less.	yes <sup>(a)</sup>	-	-
4. Unidentified leakage includes all except:			
(a) leakage into closed systems, or	yes	-	-
(b) leakage into the containment atmosphere from sources that are located, do not interfere with monitoring systems, or not from throughwall crack.	yes	-	-
5. Provisions for shutdown within 24 hours due to inoperable measurement instruments in plants with Category D, E, F, or G welds.		Not applicable - WNP-2 does not have any IGSOCC Category D, E, F, or G welds.	

<sup>(a)</sup> See text for notes.

2 gpm is based on a 4 hour interval and part of NUREG-0123, LCO 3.4.3.2."

Concerning Frequency of Leakage Measurements

"WNP-2 continuously records the leak rate and performs a channel check on a 12 hour interval."

2.7.2 Evaluation and Recommendation

Although WNP-2 Submittal No. 1 states that the WNP-2 Technical Specification on leakage detection is in compliance with the NRC Staff position, one deviation does exist. That deviation pertains to limiting the rate of increase in unidentified leakage. The WNP-2 Technical Specification requires plant shutdown when, within a period of 4 hours (rather than 24 hours or less, as required by Generic Letter 88-01), an increase in the rate of unidentified leakage in excess of 2 gpm is indicated. This is less restrictive than the NRC Staff requirement, so rejection of the WNP-2 position on this item is recommended. It is further recommended that WNP-2 should amend their Technical Specification on leakage detection to comply with the NRC Staff position on limiting the rate of increase of unidentified leakage in accordance with the requirements delineated in Generic Letter 88-01.

Acceptance of the remaining portions of the WNP-2 Technical Specification on leakage detection is recommended, since those positions comply with the NRC Staff position. However, in the event that any welds are reclassified to IGSCC Categories D, E, F, or G, WNP-2 should (as they promised) change their Technical Specification to comply with the NRC Staff requirement for operability of leakage monitoring instruments.



2.8 Plans for Notification of the NRC of Flaws  
and Evaluation of Flaws

2.8.1 WNP-2's Position on Flaw Evaluation

WNP Submittal No. 1 states the following:

"The Supply System will use ASME Section XI Section IWB-3600 of the 1986 Edition of ASME Boiler and Pressure Vessel Code for methods and criteria for crack evaluation and repair."

WNP-2 Submittal No. 2 states:

"The Supply System has adopted the method suggested in the Generic Letter 88-01 for determining the crack growth rate."

2.8.2 WNP-2's Position on Reporting of Flaws

WNP-2 Submittal No. 1 states that they comply with the staff position on reporting requirements. Specifically, that submittal states:

"The Commission will be notified if a flaw is found that does not meet Section XI, IWB-3500 criteria for continued operation without evaluation. Prior to resuming operation, an evaluation of the flaw justifying continued operation and/or the repair plans will be submitted to the Commission for approval. Resumption of operation will not be allowed until Commission approval has been granted. This complies with the staff position on reporting requirements."

### 2.8.3 Evaluation and Recommendation

WNP-2 positions on crack evaluation and reporting of flaws are in conformance with the NRC Staff position, so acceptance of these positions is recommended.

## 3. ALTERNATIVE POSITION

### 3.1 Alternative Position Concerning ISI in the Technical Specification

#### 3.1.1 WNP-2's Position

WNP-2 Submittal No. 1 contains the following statement:

"The Supply System does not see a need to revise the WNP-2 Technical Specification as recommended. The WNP-2 Inservice Inspection Program Plan is a detailed, comprehensive document containing all inservice inspection requirements. This document contains Section XI requirements, augmented NRC requirements and Supply System augmented requirements. This document has been submitted for NRC review and approval has been received. The Inservice Inspection Program for Generic Letter 88-01 has been revised to include all augmented requirements as committed to by this response. The revised program will be submitted to the NRC upon acceptance of this response to Generic Letter 88-01."

#### 3.1.2 Evaluation and Recommendation

WNP-2's ISI program including the incorporation of the augmented requirements is excellent, and the continuance

of this program is recommended. However, this does not adequately fulfill or substitute for the requirement specifically delineated in Generic Letter 88-01 to change the Technical Specification to include a statement that the section on ISI will conform with the NRC Staff position on schedule, methods and personnel, and sample expansion. Thus rejection of the WNP-2 position is recommended. WNP-2 should amend the Technical Specification to include a statement that their ISI program will conform with the NRC Staff positions on inspection schedules, methods and personnel, and sample expansion as delineated in Generic Letter 88-01.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

Concerning the thirteen NRC Staff positions as delineated in Generic Letter 88-01: WNP-2 endorsed twelve of the thirteen NRC Staff positions (i.e., those pertaining to materials, processes, weld overlay, partial replacement, stress improvement of cracked weldments, clamping devices, crack evaluation and repair criteria, inspection method and personnel, inspection schedule, sample expansion, leakage detection, and reporting requirements), although they applied provisions to those on inspection schedules and leakage detection. They do not endorse or presently use (or intend to use) hydrogen water chemistry, although they do follow EPRI guidelines for water chemistry.

WNP-2 supplied a list of welds that are covered in the scope of Generic Letter 88-01 which shows materials and mitigating treatments for each weld. Their program for mitigating IGSCC has included piping replacement, solution heat treating, corrosion resistant cladding, and induction heating stress improvement (IHSI). Consequently, all welds are classified as IGSCC Categories A and B. No additional mitigating actions are planned except to repair welds (if the need arises) and to perform inspections. They will continue to use

controlled water chemistry, per industry standards.

A ten year Inservice Inspection Program (ISI) has been developed for WNP-2 which complies with the requirements of Generic Letter 88-01 pertaining to schedule, methods and personnel, sample expansion, and plans for reporting flaws. Their provision to their endorsement of the NRC Staff position on inspection schedules is that 113 of the welds were treated with IHSI prior to operation, and these welds were not given pre-IHSI or post-IHSI inspections. This is an acceptable provision, and those welds still qualify for the IGSCC Category B classifications.

WNP-2 declined to change the Technical Specification on ISI. Rather they proposed to rely on their Inservice Inspection Program. Such a position has already been considered and rejected by the NRC Staff position in the formulation of Generic Letter 88-01.

WNP-2 stated that the Technical Specification pertaining to leakage detection is in compliance with NRC Staff positions on leakage. However, there is actually one deviation. WNP-2 requires plant shutdown whenever any measuring instrument indicates an increase in the rate of unidentified leakage of 2 gpm in a four hour period (rather than in a 24 hour period, or less as required by Generic Letter 83-01). The WNP-2 position is less restrictive than that required by Generic Letter 88-01. Since WNP-2 does not currently have any IGSCC Category D, E, F, or G welds, they are exempt from the requirements for operability of monitoring instruments that are detailed in Generic Letter 88-01. However, WNP-2 stated that if any welds are reclassified as IGSCC Category D, E, F, or G in the future, they will make required changes to the Technical Specification at that time.

As a result of this technical evaluation, the following recommendations are made.

- (1) Acceptance of WNP-2's classification of welds into IGSCC Categories A and B. Also, acceptance of WNP-2's position on their program for mitigating IGSCC is recommended.
- (2) Acceptance of WNP-2's ten year ISI program, including their positions on inspection schedules, methods and personnel, and sample expansion.
- (3) Rejection of WNP-2's position concerning a change to the Technical Specification on ISI. WNP-2 should amend their Technical Specification to include a statement that their ISI program will comply with the NRC Staff position on inspection schedules, methods and personnel, and sample expansion as delineated in Generic Letter 88-01.
- (4) Acceptance of WNP-2's position concerning leakage detection, except for that portion concerning the requirements for plant shutdown when an increase in the rate of unidentified leakage occurs. The WNP-2 Technical Specification should be amended to require that plant shutdown should be initiated when, within any period of 24 hours or less (rather than 4 hours as currently required by WNP-2), an increase is indicated in the rate of unidentified leakage in excess of 2 gpm.
- (5) Acceptance of the remaining portions of the WNP-2 Submittal.

## 5. REFERENCES

1. "Technical report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," NUREG 0313, Revision 2, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, January, 1988.
2. "Investigation and Evaluation of Stress-Corrosion Cracking in Piping of Light Water Reactor Plants," NUREG 0531, U. S. Nuclear Regulatory Commission, February, 1979.
3. "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping," Generic Letter 88-01, U.S. Nuclear Regulatory Commission, January 25, 1988.