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SOUTHERN COMPANY
Energy to Serve Your World

July 31, 2009

Docket No.: 50-366

NL-09-1145

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant-Unit 2
Inservice Inspection Program
<u>Owner's Activity Report for Outage 2R20</u>

Ladies and Gentlemen:

Enclosed is the ASME Section XI Code Case N-532-4 OAR-1 Owner's Activity Report for the 2R20 Refueling Outage which includes:

- Table 1, Items with Flaws or Relevant Conditions that Required Evaluation for Continued Service, see Structural Integrity Associates, Inc report for the flaw evaluation of the Unit 2 Recirculation Inlet Nozzle (N2) G5 Nozzle-to-Safe End Weld Axial Indication that exceeded the Code acceptance criteria.

- Table 2, Abstract of Repairs, Replacement, or Corrective Measures Required for Continued Service which includes those repairs and replacements that occurred during operating cycle twenty (20) and Refueling Outage 2R20.

This report is for the second period of the 4th Interval ISI activities (Interval 4, Period 2, Outage 1).

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

Mark J. Ajluni

M. J. Ajluni
Manager, Nuclear Licensing

MJA/PAH/lac

Enclosure: OAR-1 2R20 Owner's Report

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. R. Madison, Vice President – Hatch
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RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
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Mr. J. A. Hickey, Senior Resident Inspector – Hatch

Enclosure

OAR-1 2R20 Owner's Report

FORM OAR-1 OWNER'S ACTIVITY REPORT

Report Number 2-4-2-1 (Unit 2, 4TH Interval, 2ND Period, 1ST Report)

Plant Edwin I. Hatch Nuclear Plant, 11028 Hatch Parkway North, Baxley, Georgia 31513

Unit No. 2 (if applicable) Commercial service date 9/5/79 Refueling outage no. 2R20

Current inspection interval 4TH (1ST, 2ND, 3RD, 4TH, other)

Current inspection period 2ND (1ST, 2ND, 3RD)

Edition and Addenda of Section XI applicable to the inspection plans ASME Section XI, 2001 Edition with 2003 Addenda

Date and revision of inspection plans 01/15/09, Revision 2

Edition and Addenda of Section XI applicable to repair/replacement activities, if different than the inspection plans Same

Code Cases used: N/A (if applicable)

CERTIFICATE OF CONFORMANCE

I certify that (a) the statements made in this report are correct; (b) the examinations and tests meet the Inspection Plan as required by the ASME Code, Section XI; and (c) the repair/replacement activities and evaluations supporting the completion of 2R20 (refueling outage number) conform to the requirements of Section XI.

Signed [signature] Owner or Owner's Designee, Title Date 7/28/09

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Georgia and employed by HSB CT of Hartford, CT have inspected the items described in this Owner's Activity Report, and state that, to the best of my knowledge and belief, the Owner has performed all activities represented by this report in accordance with the requirements of Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the repair/replacement activities and evaluation described in this report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

[signature] Inspector's Signature Commissions GA 675 National Board, State, Province, and Endorsements

Date 07/30/2009

Examination Category and Item Number	Item Description	Evaluation Description
B-F / B5.10	One indication was discovered during scheduled ISI examination (ultrasonic testing (UT)) of RPV nozzle to safe end weld for the Recirc inlet nozzle 2N2G weld 2B31-1RC-12AR-G-5 which exceeded the acceptance criteria of IWB-3514. The indication was axially oriented with a depth of .26 inches and a length of approximately .50 inches.	The fatigue crack growth analysis was performed based upon examination data and crack growth rates utilizing pertinent BWRVIP documents. The allowable flaw size evaluation was also based upon the guidelines of Section XI IWB-3600 and Appendix C. Following evaluation of the stress intensity factor, stress corrosion, and fatigue crack growth analyses in order to compare end of evaluation period flaw size to the allowable flaw size, it was concluded to be acceptable to operate for one cycle (2 years). Reference Plant Hatch Unit 2 2R20 OAR-1 Report, Table 1, Enclosure 1 for a copy of the flaw evaluation performed by Structural Integrity Associates.

Structural Integrity Associates, Inc. CALCULATION PACKAGE	File No.: 0900257.301 Project No.: 0900257 Quality Program: ☒ Nuclear ☐ Commercial

PROJECT NAME:
Hatch Unit 2 Recirculation Inlet Nozzle G-5 Nozzle-to-Safe End Weld Flaw Evaluation

CONTRACT NO.:
Later

CLIENT:	PLANT:
Southern Nuclear Operating Company	Hatch Unit 2

CALCULATION TITLE:
Flaw Evaluation of the Hatch Unit 2 Recirculation Inlet Nozzle (N2) G-5 Nozzle-to-Safe End Weld Axial Indication

Document Revision	Affected Pages	Revision Description	Project Manager Approval Signature & Date	Preparer(s) & Checker(s) Signatures & Date
A	1 - 9	Initial Draft Issue	M. L. Herrera 2/23/09	S. S. Tang 2/23/09 M. L. Herrera 2/23/09
0	1 - 10	Initial Issue	[signature] M. L. Herrera 2/24/09	[signature] S. S. Tang 2/24/09 [signature] M. L. Herrera 2/24/09

1.0 INTRODUCTION

A flaw evaluation is performed to disposition an indication observed in the Hatch Unit 2 Recirculation Inlet Nozzle (N2) G-5 nozzle-to-safe end weld (2B31-1RC-12AR-G-5). The indication is axially oriented with a depth of 0.26 inches and a length of approximately 0.50 inches [1,2]. The indication based on inspection results is contained in the Alloy 182 weld. This weld is a dissimilar metal weld (Alloy 182) joining the stainless steel safe end and the low alloy steel (LAS) nozzle [2]. This location was stress mitigated using Induction Heating Stress Improvement (IHSI) [3].

This evaluation includes flaw evaluation to determine the acceptability of the observed indication for the next operating cycle.

2.0 TECHNICAL APPROACH

The evaluation consists of:

1. Crack growth analysis based on inspection data and crack growth rates using pertinent BWRVIP documents.
2. Allowable flaw size evaluation based on the guidelines of ASME B&PV Code, Section XI, IWB 3600 and Appendix C [4]. The allowable flaw size was determined using the tabular solutions as allowed by Appendix C of Section XI.
3. Evaluation of the stress intensity factor, stress corrosion and fatigue crack growth analyses to compare end of evaluation period flaw size to the allowable flaw size. The evaluation period is 1 operating cycle for a total of 2 years.

3.0 DESIGN INPUTS

The outside radius at the weld location is 7 3/16 inches (7.1875) Figure 1 [2]. The local wall thickness is 1.22 inches [1,2].

The safe end material is SA 182 Gr. F304 and the nozzle material is SA 508 Cl. 2 [2]. The weld material is Alloy 182 [2].

Since the flaw is an axial flaw, the only stress of interest is the hoop stress due to pressure. The design pressure stress is 1423 psi for the recirculation line [5].

4.0 ASSUMPTIONS

The following assumptions are used in the flaw evaluation:

1. Although this weld was subjected to IHSI, no credit is taken for the beneficial residual stress produced by the IHSI process.

2. The indication is in the Alloy 182 weld material.
3. Alloy 182 is assumed to have the same material properties as Alloy 600. Alloy 182 is the corresponding SMAW wire for Alloy 600 and the composition closely matches. Use of Alloy 600 properties for the Alloy 182 material is consistent with general industry practice.
4. The flaw is postulated to be an active stress corrosion flaw.
5. The crack is initially contained in Alloy 182 weld material, but growth into the stainless steel safe end cannot be ruled out. Also, growth to the low alloy steel nozzle interface is also possible.
6. The depth of the flaw is also calculated using the observed flaw depth and determining growth using stainless steel stress corrosion crack (SCC) growth rate.

Note that since the weld has been subjected to IHSI, using a residual stress for the as-welded condition with a maximum stress equivalent to the yield strength producing high stress intensity factors, is conservative (Assumption 1). It is likely that the IHSI process improves the residual stress with regards to intergranular stress corrosion cracking.

5.0 CALCULATIONS

5.1 Stress Corrosion Crack Growth Analysis

A crack growth analysis is performed for the observed indication to obtain the crack growth due to stress corrosion and fatigue. Hatch Unit 2 is currently injecting Hydrogen at sufficient levels to fully protect this weld location. Since crack growth into the safe end or nozzle cannot be ruled out due to growth in the length direction, crack growth (depth direction) for Alloy 182, stainless steel and low alloy steel must be considered. The crack growth rate for LAS is bounded by that for Alloy 182, thus the flaw depth determined for Alloy 182 will be conservatively applied to the LAS. Figure 2 illustrates the postulated flaw configuration that considers lengthwise growth of the flaw.

From Reference 6, BWRVIP-59-A, stress corrosion crack growth rates are obtained for Alloy 182. SCC growth rates are provided for Hydrogen Water Chemistry injection conditions depending on the stress intensity factor levels.

$$da/dt = 5\times10^{-6} \text{ in/hr} \qquad \text{for } K > 25 \text{ ksi}\sqrt{\text{in}} \qquad (1)$$
$$da/dt = 3.2\times10^{-10} K^3 \text{ in/hr} \qquad \text{for } K \leq 25 \text{ ksi}\sqrt{\text{in}} \qquad (2)$$

For purposes of this evaluation, the crack growth rate for a K greater than 25 ksi$\sqrt{\text{in}}$ will be conservatively used.

Crack growth in the Alloy 182 over the next operating cycle (2 years) is:

$$\Delta a = 365(24)(2)(5\times10^{-6}) = 0.09 \text{ inches.}$$

The final flaw depth in the Alloy 182 after two years is:

$$a_f = a_o + \Delta a = (0.26) + 0.09 = 0.35 \text{ inches}$$

where Δa = change in flaw depth
a_o = initial flaw depth
a_f = final flaw depth

This depth is equivalent to 0.35/1.22 = 0.287 or 28.7% of the pipe wall. This depth will be used to determine the acceptability of the flaw in the Alloy 182 and low alloy steel nozzle material since Alloy 182 crack growth rates bound those for low alloy steel.

Although the flaw is not identified as being in the stainless steel, crack growth into the safe-end is also considered. For stainless steel in the Hydrogen Water Chemistry environment, a constant crack growth rate of $1.1\text{x}10^{-5}$ in/hr [7] can be used. This results in a crack growth in the stainless steel material of 0.193 inches in 2 years:

$$\Delta a = 365(24)(2)(1.1\text{x}10^{-5}) = 0.193 \text{ inches.}$$

$$a_f = a_o + 0.193 \text{ inches} = (0.26) + 0.193 = 0.453 \text{ inches}$$

This depth is equivalent to 0.453/1.22 = 37% of the pipe wall.

The flaw growth in length (along the longitudinal axis of the nozzle/pipe) over the next operating cycle (2 years) will be conservatively estimated using $5\text{x}10^{-5}$ in/hr [6] at each end of the axial flaw. Therefore, the final length (ℓ_f) is

$$\ell_f = 0.5 \text{ inches} + (5\text{x}10^{-5}(365)(24)(2)(2)) \text{ inches} = 2.25 \text{ inches}$$

This gives a $\ell_f/\sqrt{(R_m t)} = 2.25/\sqrt{(6.5775*1.22)} = 0.79$. This is conservative since the flaw would grow to the interface of the low alloy steel and essentially arrest. However, for purposes of this evaluation, this calculated length will be used.

5.2 Screening Criteria

Although the flaw is fully contained in the Alloy 182 material, this calculation also considers the potential for lengthwise growth into the stainless steel safe end and low alloy steel nozzle. Note that growth into the LAS will be small compared to that in the Alloy 182. Thus for purposes of this evaluation, the flaw depth predicted in the Alloy 182 will be used for the low alloy steel. Figure 2 illustrated the flaw configuration.

The failure mode is determined according to Article C-4000 per Figure C-4210-1 (for austenitic piping) and C-4220.1 (for ferritic piping). For austenitic piping, Article 6000, "Flaw Evaluation for Ductile Fracture using EPFM Criteria" can be used for the Alloy 182 flux weld [4] and stainless steel piping. It is assumed that the weld is a flux weld in this evaluation.

For the ferritic steel (nozzle), the failure mode for an axial flaw is determined based on the screening criteria SC defined as follow:

$$SC = K_r'/S_r' \qquad (3)$$
$$K_r' = [1000K_I^2/(E'J_{IC})]^{0.5} \qquad (4)$$

$S_r' = (pR_m/t)/\sigma_\ell$ (5)
$K_I = (pR_m/t)(\pi a/Q)^{0.5}F$ (6)
$Q = 1 + 4.593(a/\ell)^{1.65}$ (7)
$F = 1.12+0.053\alpha+0.0055\alpha^2+(1.0+0.02\alpha+0.0191\alpha^2)(20-R_m/t)^2/1400$ (8)
$\alpha = (a/t)/(a/\ell)$ (9)
$\sigma_\ell = \sigma_y\{[1-(a/t)]/\{1-(a/t)/M_2]\}$ (10)
$M_2 = [1+(1.61/(4R_m t))\ell^2]^{0.5}$ (11)
$E' = E/(1-v^2)$ (12)

Where: a = crack depth
ℓ = crack length
σ_y = yield strength
R_m = mean pipe radius
t = pipe wall thickness
E = Young's modulus
v = Poisson's ratio
F = parameter for axial flaw stress intensity factor

Using the material properties per Table C-8322-1 for an axial flaw in ferritic steel, J_{IC} = 300 in-lb/in^2 is used for temperature ≥ upper shelf temperature.

Using a = 0.35 inch, ℓ = 2.25 inch, σ_y =42.38 ksi, E=25.45x10^6 psi and v=0.3 for SA-508 Class 2 [8] at 575 °F, the followings were calculated:

$a/t = 0.2869$
$a/\ell = 0.1556$
$\alpha = 1.8437$
$Q = 1.2133$
$F = 1.4044$
$M_2 = 1.1198$
$\sigma_\ell = 40.6314$
$S_r' = 0.1888$
$E' = 27967$ ksi
$K_I = 10.2574$
$K_r' = 0.112$
$SC = 0.5931$

Per Figure C-4220-1 [4], when 0.2 ≤ SC ≤ 1.8, EPFM failure criteria in Article C-6000 is used.

5.3 Stress Ratio

To use the allowable flaw tables in Appendix C, a stress ratio is necessary as well as the flaw length. As defined on Table C-6410 of Appendix C of the ASME Code, the stress ratio is given as:

$$SR = \sigma_h / \sigma_f \quad (13)$$

Where: σ_h = hoop stress from pressure
σ_f = flow stress = $(S_y+S_u)/2$
S_y = yield strength
S_u = tensile strength

Note that for this particular evaluation, the design pressure will be applied to the normal/upset (A/B) allowable flaw tables. This is conservative as the normal and upset conditions require higher safety factors than the emergency and faulted conditions (C/D).

The membrane stress is a result of the pressure, P and direct load using the nominal dimensions is:

$$\sigma_h = PR_m/(t) = 1423((7.1875+5.9675)/2)/1.22 = 7.67 \text{ ksi} \quad (14)$$

The yield and tensile strength of Alloy 182, SA 508 Class 2 and SA 182 Grade F304 at the design temperature of 575°F are obtained from Reference 8 and summarized in Table 1 along with the flow stresses and stress ratios.

5.4 Allowable Flaw Size

Appendix C of the ASME Code, Section XI [4], provides the procedure for determining the allowable flaw sizes in piping requiring a determination of the failure mode as provided in Article C-4000 per Figure C-4210-1. Article C-6400 provides the approach for calculating the allowable axial flaw size using EPFM criteria.

Based on the stress ratios presented in Table 1 for the different materials, the end of evaluation period allowable flaw sizes for service levels A and B conditions are obtained from Table C-6410-1 (since EPFM failure mode governs for all materials present) and summarized in Table 2.

Based on the final flaw depth to thickness ratio of 0.287 in the stainless steel and 0.37 in the low alloy steel and Alloy 182, and the $\ell_f/\sqrt{(R_m t)}=0.79$, this is well below the allowable flaw size of 75% of wall.

In Table C-6410-1, it is noted $J_{IC} \geq 600$ in-lb/in^2 in the CL direction. In the screening criteria, the J_{IC} is taken as 300 in -lb/in^2 per Table C-8322-1. Using a higher J_{IC} in the screening criteria does not change the failure mode for evaluation.

5.5 Fatigue Crack Growth

Fatigue crack growth for the next operating cycle is not significant due to a limited number of cycles that result in significant stress. For the purpose of this evaluation a representative calculation for the Alloy 182 material is performed. For this evaluation, 5 startup/shutdown cycles per year will be assumed (10 cycles total over 2 years), which conservatively bounds actual plant experience. Even with a ΔK of 50 ksi$\sqrt{\text{in}}$, the fatigue crack growth rate in the Alloy 182 exposed to the water environment is estimated to be 3.75×10^{-3} inches/cycle using data from Reference 9. Note that this conservatively uses a high range of stress intensity factor and does not include the beneficial effect of HWC on the fatigue crack growth rate as mentioned in Reference 9. This is also conservative since no credit is taken for the beneficial compressive residual stress caused by IHSI. Fatigue crack growth in stainless steel and low alloy steel would result in similar conclusions. Thus, fatigue crack growth, even with the conservative assumption on the number of significant cycles, is small and does not change the final flaw depth significantly.

6.0 CONCLUSIONS

A flaw evaluation has been performed assuming that the flaw is an active stress corrosion flaw for an operating period of 2 years. Fatigue crack growth was also evaluated and was determined to be very small. Results of this evaluation demonstrate that growth of the observed flaw, will remain less than the allowable flaw size of 75% of the pipe wall. Therefore, the required safety factors will be maintained during operation with this flaw over the next operating cycle.

7.0 REFERENCES

1. GE-Hitachi Examination Summary Sheet, Report No. H2R20-APR-014, SI File 0900257.202.
2. E-mail, Robin Dyle to Marcos Herrera, Subject RE:2B31-1RC-12AR-G-5, February 21, 2009, 3:23pm. SI File 0900257.201.
3. E-mail, Robin Dyle to Marcos Herrera, Subject RE:2B31-1RC-12AR-G-5, February 22, 2009, 5:30pm. SI File 0900257.205.
4. ASME, Boiler and Pressure Vessel Code, Section XI, 2001 Edition with 2003 Addenda.
5. Combustion Engineering Inc. Report CENC-1232, April 1975, "Analytical Report for Hatch No. 2 Reactor Vessel for Georgia Power Company". SI File 0800742.215.
6. BWRVIP-59A, BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Nickel Base Austenitic Alloy in RPV Internals,' EPRI Report TR-108710, Palo Alto, CA 1998.
7. BWRVIP-14A, BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Stainless Steel RPV Internals (BWRVIP-14-A), EPRI Report TR-105873-A, Final Report, March 2003.
8. ASME, Boiler and Pressure Vessel Code, Section II, Part D, 2001 Edition with 2003 Addenda.
9. NUREG/CR-6721, "Effects of Alloy Chemistry, Cold Work, and Water Chemistry on Corrosion Fatigue and Stress Corrosion Cracking of Nickel Alloys and Welds," U.S. Nuclear Regulatory Commission (Argonne National Laboratory), April 2001.

Table 1: Stress Ratio Results

	Alloy 182	SA 508 Class 2	SA 182 Grade F304
Temperature (°F)	575	575	575
Stress Intensity S_m (ksi)	23.3	26.7	16.83
Yield Strength S_y (ksi)	30.0	42.38	18.65
Tensile Strength S_{ut} (ksi)	80.0	80.0	59.2
Flow Strength S_f (ksi)	55.0	61.19	38.93
$\sigma_h = PR_m/t$ (ksi)	7.67	7.67	7.67
Stress Ratio σ_h / S_f	0.1395	0.1253	0.1970

Table 2: Allowable End of Evaluation Period Flaw Depth to Thickness Ratio (a/t) for Axial Flaws

Material	Stress Ratio	Allowable a/t			End of Cycle a/t
		Nondimensional Flaw Length $\ell_f/\sqrt{(R_m t)}$			
		0.6	0.8	0.79	
Alloy 182	0.1395	0.75	0.75	0.75	0.28
SA 508 Class 2	0.1253	0.75	0.75	0.75	0.28
SA 182 Grade 304	0.1970	0.75	0.75	0.75	0.37

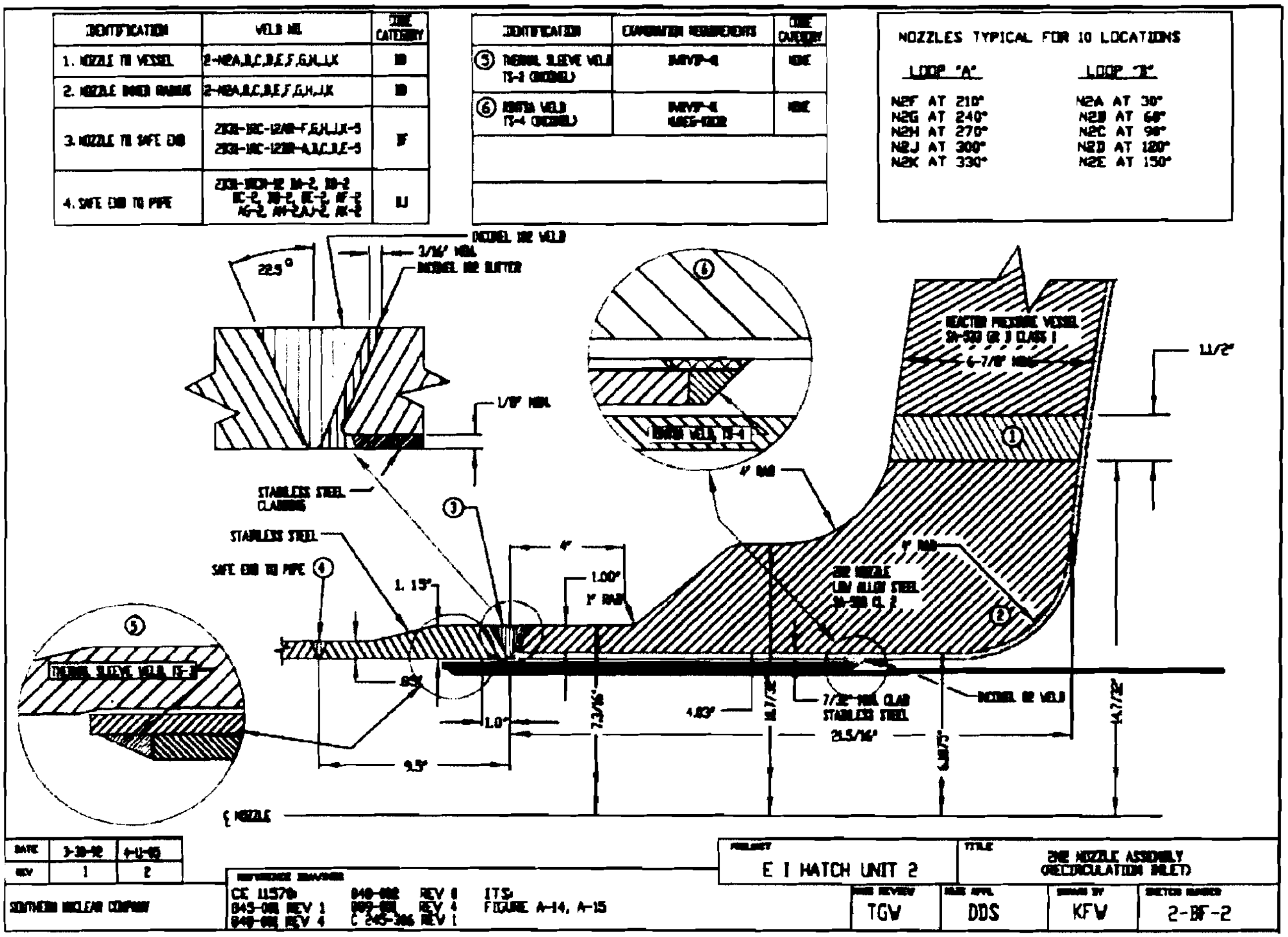

Figure 1: Recirculation Inlet Nozzle 2B31-1RC-12AR-G-5 Configuration

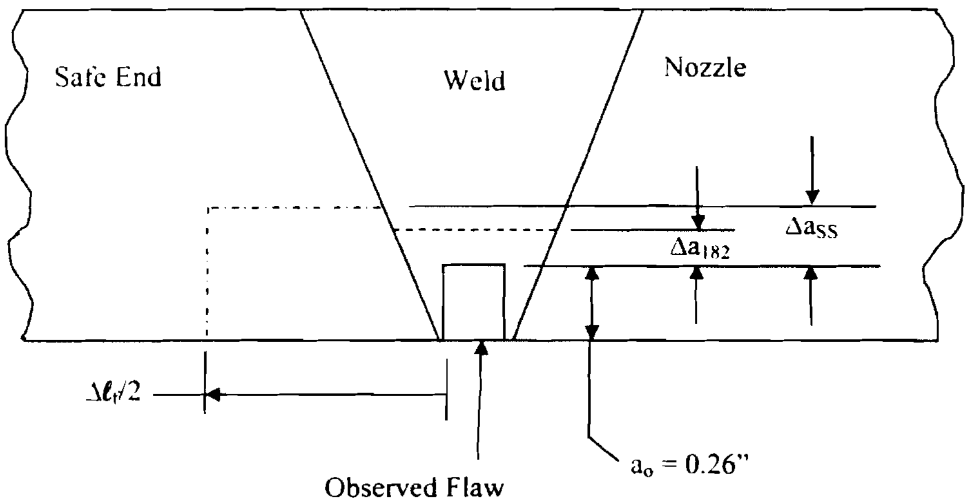

Figure 2: Predicted Crack Growth Configuration

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	SRV Tee Quencher Su	Replaced all 44 SRV tee quencher support bolts within the Torus due to failure of 2 bolts. Failure mechanism was determined to be hydrogen embrittlement and was exacerbated by stress with misalignment contributing (at least at one connection). Reference CR 2009101926 and 2009101935. MPL 2T23.	No	3/10/2009	2090432101
2	Replacement	Pipe Hanger U-Bolt	Replaced broken u-bolt on hanger due to adjacent broken support 2E11-RHR-H82. Support was broken due to system transient. Reference CR 2009101161.	No	3/10/2009	2090380901

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
2	Replacement	Pipe Hanger	Replaced hanger struts, base plates, end attachments, and pins due to discovered failed condition of support 2E11-RHR-H82. Reference CR 2009101161. The failure is due to a system transient, likely a dynamic event due to gas voiding at a piping high point without venting.	No	3/11/2009	2090342901
3	Repair	14" Check Valve	Machined valve body hinge pin holes for RHRSW discharge check valve 2E11-F005D to facilitate the addition of bushings. The bushings are being added to compensate for the larger hole being machined due to excessive wear between the hinge pin and valve body. The addition of bushings is not a design change and is permissable per vendor manual SX25652, page 194. The max depth for boring to not encroach upon threaded area of hinge pin plugs or be greater than 1/4" radially.	No	11/20/2008	2081399701

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	RHRSW 18" Piping S	Modified support 2E11-RSW-R15 per improved design in accordance with DCP 2080663404 due to failure. Failure was caused due to vibrational loads of RHRSW piping due to operational conditions caused by flow control valves and operation of multiple pumps in single loop of RHRSW piping. Acceptable per IWA-4223.	No	5/29/2008	2080663404
3	Replacement	4" Gate Valve	Replaced valve 2P41-F1158 due to internals degradation noted during 42IT-TET-012-2 examination. Reference CR 2007102073. Acceptable per IWA-4223(a).	No	2/28/2009	2070532501

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	4" Gate Valve	Replaced valve 2P41-F1176 due to noted degradation noted during internals examination per OE 16653. Reference CR 2007102086. Acceptable per IWA-4224.1(a).	No	3/7/2009	2070523301
3	Repair	18" Check Valve	Repaired body gasket seating surface of valve 2P41-F311D due to erosion caused by normal inservice conditions. Reference CR 2006110988.	No	4/23/2009	2062407201

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	PSW Strainer	Replaced bolting in PSW strainer to backwash piping flange due to noted degradation due to normal inservice conditions. Acceptable per IWA-4224.1(a). Reference CR 2009102285. MPL 2P41-D001B.	No	3/9/2009	2061671601
3	Replacement	Pipe and AOV, 3"	Replaced valve 2P41-F036A and adjacent piping due to erosion in valve body and corrosion products in piping. Reference CR 2007110914. Acceptable per IWA-4223(a) and IWA-4224.1(a).	No	12/12/2007	2050001804

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	Rigid Strut, 18" Piping	Replace rigid strut 2E11-RSW-R25 which has broken paddle. Reference CR 2004106672 for documentation of broken paddle, and CR 2007106393 for lost WO package. Acceptable per IWA-4223(a).	No	6/23/2004	2041499601
3	Replacement	Ball Valve, 3"	Replaced valve to end piece bolting (studs/nuts) for valve 2P41-F1191B due to corrosion. New bolting to be corrosion resistant. Reference ED 1071287701 and CR 2004100584.	No	10/5/2007	2040852001

Code Class	Repair Replacement Corrective Measure	Item Description	Description of Work	Flaw or Relevant Condition Found during Scheduled Section XI Examination or Test (Yes/No)	Date Complete	Repair/ Replacement Plan Number
3	Replacement	3" Ball Valve	Replace body to end piece bolting (studs and nuts) for valve 2P41-F1191A due to corrosion. New bolting material selected due to being corrosion resistant. Reference CR 2004100584 and ED 1071287701. Acceptable per IWA-4224.1(a).	No	11/9/2007	2040152901