INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
AEP.com

April 25, 2006

AEP:NRC:6055-03
10 CFR 50.55a

Docket No.: 50-315

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-001

Donald C. Cook Nuclear Plant Unit 1
PRESSURIZER SAFETY NOZZLE STAINLESS STEEL SAFE END
WELD CIRCUMFERENTIAL FLAW EVALUATION
REQUEST FOR ADDITIONAL INFORMATION (TAC No. MC7287)

References:
1. Letter from Daniel P. Fadel, Indiana Michigan Power Company (I&M) to U. S. Nuclear Regulatory Commission (NRC) Document Control Desk, "Donald C. Cook Nuclear Plant Unit 1, Pressurizer Safety Nozzle Stainless Steel Safe End Weld Circumferential Flaw Evaluation," Letter AEP:NRC:5055-06, dated June 3, 2005 (Accession Number ML051650266).

2. Communication from P. S. Tam, NRC, to M. K. Scarpello, I&M, "Cook Unit 1: Draft Request for Additional Information re: Weld 1-RC-9-01F Flaw Evaluation (TAC No. MC7287)," dated November 25, 2005.

In Reference 1, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant Unit 1, transmitted an evaluation for a flaw that had been identified in Unit 1 weld number 1-RC-9-01F (the pressurizer safety nozzle stainless steel safe end weld) during an ultrasonic examination following a repair to weld number 1-PRZ-23. The flaw did not meet the acceptance criteria of the American Society of Mechanical Engineers Code (ASME Code), Section XI, 1989 Edition, Table IWB-3514-2, and an evaluation in accordance with ASME Code, Section XI, 1989 Edition, Paragraph IWB-3640 was performed. The evaluation, which was performed by Westinghouse Electric Company personnel, determined that the flaw was acceptable and would experience negligible growth over the life of the plant (60 years).

Reference 2 transmitted a draft Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) regarding the flaw evaluation, and the required additional information was discussed by NRC and I&M personnel during a December 13, 2005, telephone conference. The attachments to this letter provide I&M's response to the NRC's RAI.

A047

This letter contains no new commitments. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Supervisor, at (269) 466-2649.

Sincerely,

Joseph N. Jensen
Site Vice President

RGV/jen

Attachments

1. Pressurizer Safety Nozzle Stainless Steel Safe End Weld Circumferential Flaw Evaluation - Response to Nuclear Regulatory Commission Request for Additional Information
2. Westinghouse Letter AEP-06-22, American Electric Power Donald C. Cook Unit 1, Responses to NRC Questions on Pressurizer Safety Nozzle Flaw Evaluation
3. Westinghouse Report WCAP-16428-NP, Revision 1, D. C. Cook Unit 1 Pressurizer Safety Valve Nozzle Safe-End Weld Overlay Repair
4. Drawings Illustrating the Weld Configuration and Flaw Location
5. Reactor Coolant System Design Transients – Projection to 60 Years
6. DIT-S-01504-00

c: R. Aben – Department of Labor and Economic Growth, w/o attachments
J. L. Caldwell – NRC Region III
K. D. Curry – AEP Ft. Wayne, w/o attachments
J. T. King – MPSC, w/o attachments
MDEQ – WHMD/RPMWS, w/o attachments
NRC Resident Inspector
P. S. Tam – NRC Washington, DC

Attachment 1 to AEP:NRC:6055-03

PRESSURIZER SAFETY NOZZLE STAINLESS STEEL SAFE END WELD CIRCUMFERENTIAL FLAW EVALUATION - RESPONSE TO NUCLEAR REGULATORY COMMISSION REQUEST FOR ADDITIONAL INFORMATION

In Reference 1, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Unit 1, transmitted an evaluation for a flaw that had been identified in Unit 1 weld number 1-RC-9-01F (the pressurizer safety nozzle stainless steel safe end weld) during an ultrasonic examination (UT) following a repair to weld number 1-PRZ-23. The flaw did not meet the acceptance criteria of the American Society of Mechanical Engineers Code (ASME Code), Section XI, 1989 Edition, Table IWB-3514-2, and an evaluation in accordance with ASME Code, Section XI, 1989 Edition, Paragraph IWB-3640, was performed. The evaluation, which was performed by Westinghouse Electric Company personnel, determined that the flaw was acceptable and would experience negligible growth over the life of the plant (60 years).

Reference 2 transmitted a draft Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) regarding the flaw evaluation, and the required additional information was discussed by NRC and I&M personnel during a December 13, 2005, telephone conference. The following provides I&M's response to the NRC's RAI.

NRC Request 1(a)

Discuss the impact of the repair of weld 1-PRZ-23 on the crack growth in weld 1-RC-9-01F.

I&M Response to 1(a)

See Attachment 2, Page 2 and Attachment 3.

NRC Request 1(b)

Discuss the root cause and degradation mechanism of the flaw in weld 1-RC-9-01F and discuss the examination history of this weld.

I&M Response to 1(b)

The root cause of the flaw is believed to be the compressive stresses that were induced upon an original construction flaw (most likely slag/porosity/lack of fusion). The indication was observed at or near the downstream fusion line. The examiners who performed the non-destructive examination were not able to establish a connection to the ID surface regardless of transducer manipulation, even though the transducer was focused for the ID depth.

Though the indication presented flaw-like signals, the response can be compared to the technique used by the Electric Power Research Institute (EPRI) to induce crack-like flaws into

Performance Demonstration Initiative (PDI) qualification blocks. EPRI uses a Cold-Isostatic Processing (CIP) technique. The technique uses extremely high pressure to compress Electro Discharge Machining notches, thereby reducing the volume and sharpening the notch tips. Studies show the notches create UT and eddy current test responses closely representative of Primary Water Stress Corrosion Cracking. The compressive stresses induced during the weld overlay process are similar to the stresses induced by the CIP technique. The presence of a void (similar to slag/porosity/lack of fusion) would similarly be compressed with a resulting reduction in volume and likely create notch tip signals.

Weld 1-RC-9-01F received a pre-service examination in 1977 with 45- and 60-degree shear wave transducers and an insignificant indication was identified. However, the report did not elaborate on its location or extent. A review of the original construction radiograph revealed a density change in the area of the indication, but would not have been cause for rejection during original construction. An inservice examination during the 1997 refueling outage also used 45- and 60-degree shear wave transducers, but did not identify any recordable indications. The disparity between the two examinations is not unusual given the changes in techniques, recording criteria, and personnel discretion regarding the amount of detail required for indications below the recording levels of the procedure in use at the time of the examination.

NRC Request 1(c)

If the flaw was discovered the first time during the 2005 outage inspection, discussion why it was not detected in previous examinations.

I&M Response to 1(c)

See response to 1(b).

NRC Request 1(d)

Provide a drawing of weld 1-RC-9-01F, including the flaw location, with respect to the nozzle safe end and weld 1-PRZ-23.

I&M Response to 1(d)

Drawings showing weld 1-RC-9-01F and the flaw location are provided in Attachment 4.

NRC Request 2

The licensee's flaw evaluation is presented in a Westinghouse letter dated May 24, 2005. Westinghouse stated that the design transient cycles for a plant life of 40 years are the same as that for 60 years. Provide information (e.g., number of cycles for each of the transients) to show

that the design transients for 40 years of D.C. Cook Unit 1 are applicable for the 60-year plant life.

I&M Response to 2

The requested information is provided in Attachment 5. The information was reviewed by the NRC as part of CNP's license renewal application, Reference 3.

NRC Request 3

Westinghouse used the methodology in Appendix C to the 1989 edition of the ASME Section XI Code to calculate the crack growth. However, no calculation was presented in the submittal. Provide calculations. The calculations should contain information on how the final flaw depth of 0.145 inches was obtained. The calculations should include at a minimum the values for the following parameters used in Appendix C, such as R, n, K_I, C, Co, S; the allowable flaw depth and length; and membrane and bending stresses.

I&M Response to 3

See Attachment 2, Page 3.

NRC Request 4

Appendix C method specifies the calculation of maximum depth, a_f and maximum length, l_f. Discuss why flaw length was not considered or discussed in the flaw evaluation.

I&M Response to 4

See Attachment 2, Page 7.

NRC Request 5

Provide Reference 1 in Westinghouse's evaluation: AEP Design Information Transmittal (DIT) No. DIT-S-01505, dated 5/15/05, Subject: Provide Ultrasonic Data from Weld 1-RC-9-01F Examination for IWB-3600 Analysis.

I&M Response to 5

The requested information is provided in Attachment 6. Note that the document number was changed to DIT-S-01504-00 following the Reference 1 submittal.

NRC Request 6

In its analysis, Westinghouse assumed an initial flaw size of 0.145 inches in depth and 0.30 inches in length. The staff assumes that the initial flaw size was based on the result of recent ultrasonic (UT) examination.

I&M Response to 6

The flaw size was based on the result of the UT examination.

NRC Request 6(a)

Discuss whether the UT method used was qualified per ASME Code Section XI, Appendix VIII (e.g., EPRI-Performance Demonstration Initiative [PDI] qualified technique) to detect or size indications at the location in the base metal or weld, considering the thickness of the weld overlay.

I&M Response to 6(a)

The procedure used for the examination is qualified for:

1. Detection and length sizing of fabrication flaws located in the weld overlay material or at the base material/overlay material interface.

2 Detection, length, and depth sizing of circumferentially-oriented base metal flaws, and detection and depth sizing of axially oriented base metal flaws.

The indication observed in 1-RC-9-01F is circumferentially oriented. Therefore, the procedure is qualified for detection and sizing.

NRC Request 6(b)

In absence of a qualified UT method, the staff believes that the flaw evaluation should include a bounding initial flaw (i.e., a flaw connects to the inside surface of the pipe) to account for examination uncertainties. Clarify whether the assumed initial flaw size is bounding.

I&M Response to 6(b)

See Attachment 2, Page 7 and Attachment 3.

References: 1. Letter from Daniel P. Fadel, Indiana Michigan Power Company (I&M) to U. S. Nuclear Regulatory Commission (NRC) Document Control Desk, "Donald C. Cook Nuclear Plant 1, Pressurizer Safety Nozzle Stainless Steel Safe End Weld Circumferential Flaw Evaluation," Letter AEP:NRC:5055-06, dated June 3, 2005 (Accession Number ML051650266).

2. Communication from P. S. Tam, NRC, to M. K. Scarpello, I&M, "Cook Unit 1: Draft Request for Additional Information re: Weld 1-RC-9-01F Flaw Evaluation (TAC No. MC7287)," dated November 25, 2005.

3. License Renewal Application, Donald C. Cook Nuclear Plant, dated October 2003 (Accession Number ML033070182).

Attachment 2 to AEP:NRC:6055-03

WESTINGHOUSE LETTER AEP-06-22,
AMERICAN ELECTRIC POWER DONALD C. COOK UNIT 1
RESPONSES TO NRC QUESTIONS ON PRESSURIZER SAFETY
NOZZLE FLAW EVALUATION

Westinghouse

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

Mr. Paul Donavin
American Electric Power
Donald C. Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Direct tel: 412-374-4378
Direct fax: 412-374-3451
e-mail: harschk@westinghouse.com
Purchase Order: 1500016 Release 3
Sales order: 33762
Our ref: AEP-06-22

March 10, 2006

AMERICAN ELECTRIC POWER
DONALD C. COOK UNIT 1
Responses to NRC Questions on Pressurizer Safety Nozzle Flaw Evaluation

Dear Mr. Donavin:

This letter formally transmits the attached responses to the NRC questions concerning the pressurizer safety nozzle flaw evaluation. The responses have been reviewed and accepted by D. C. Cook personnel.

If you have any specific questions regarding this transmittal, please contact Mr. Chris Ng of Westinghouse Piping Analysis and Fracture Mechanics at (724) 722-6030 or me at (412) 374-3829.

Very truly yours,

WESTINGHOUSE ELECTRIC COMPANY

* Electronically Approved in EDMS

DeLeah Lockridge (for Kyle Harsche)
Customer Projects Engineer

Attachment
Responses to NRC Questions on Pressurizer Safety Nozzle Flaw Evaluation, 6 pages

cc: Carl Lane AEP
Kyle Harsche Westinghouse
Chris Ng Westinghouse
AEP Letter Files

Responses to NRC Questions on Pressurizer Safety Nozzle Flaw Evaluation

References:

1. WCAP-16428-NP Revision 1, "D. C. Cook Unit 1 Pressurizer Safety Valve Nozzle Safe-End Weld Overlay Repair" May 2005
2. AEP Design Information Transmittal (DIT) No. DIT-S-01504 dated June 15, 2005, Subject: Provide Ultrasonic Data from Weld 1-RC-9-01F Examination for IWB 3600 Analysis.
3. AEP-05-50 Revision 2, "Pressurizer Safety Nozzle (SST Safe End Weld) Circumferential Flaw Evaluation, dated May 24, 2005.
4. James, L. A., and Jones, D. P., "Fatigue Crack Growth Correlations for Austenitic Stainless Steel in Air," in Predictive Capabilities in Environmentally Assisted Cracking," ASME publication PVP-99, December 1985.
5. AEP Design Information Transmittal (DIT) No. DIT-B-02976-00 dated April 25, 2005

Question (1): (a) Discuss the impact of the repair of weld 1-PRZ-23 on the crack growth in weld 1-RC-9-01F

Response to Question (1):

Structural weld overlay was applied to both the nozzle to safe end dissimilar metal butt weld (1-PRZ-23) and the safe end to pipe stainless steel butt weld (1-RC-9-01F). Finite element analysis for the resulting structural weld overlay was performed and the results are shown in WCAP-16428-NP [1]. The resulting residual stress distributions at weld 1-RC-9-01F are shown in Figures 5-6 and 5-7 of WCAP-16428-NP and indicated that the stress field in almost the entire original stainless steel weld is compressive. Based on the location of the indication identified in the Ultrasonic Examination Data [2], the centerline of the detected indication is located at 36% of the wall thickness from the inside surface and therefore is within the compressive stress field. With the lack of any significant thermal transients occurring at weld 1-RC-9-01F, the detected indication is not expected to propagate further through the stainless steel weld. This was demonstrated in the Reference 3 crack growth results, even without taking into consideration of the beneficial effects of the structural weld overlay, that the predicted crack growth is negligible. Therefore, the repair of weld 1-PRZ-23 does not have any adverse impact on the crack growth in weld 1RC-9-01F.

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Question (3) Westinghouse used the methodology in Appendix C to the 1989 edition of the ASME Section XI Code to calculate the crack growth. However, no calculation was presented in the submittal. Provide calculations. The calculations should contain information on how the final flaw depth of 0.145 inches was obtained. The calculations should include at a minimum the values for the following parameters used in Appendix C, such as R, n, KI, C, Co, S; the allowable flaw depth and length; and membrane and bending stresses.

Response to Question (3):

The following provides a discussion of the calculation performed to demonstrate how the final flaw depth was obtained.

Based on the ultrasonic examination data [2], the detected indication in the stainless steel weld 1-RC-9-01F can be considered as a circumferential subsurface flaw with an initial length of 0.30 inch and an initial half depth of 0.145 inch. The only crack growth mechanism for the detected indication is due to fatigue. The maximum allowable circumferential flaw depth assuming a 360° flaw is determined to be 75% of the wall thickness using the nozzle loadings from [5] and the Section XI flaw evaluation procedures. To determine the fatigue crack growth in the stainless steel weld region, the loadings used consist of piping reaction loads, pressure and thermal transient loads. It should be noted that the beneficial effect of the structural weld overlay was not taken into consideration in the fatigue crack growth results [3]. The analysis procedure involves postulating an initial flaw size based on the ultrasonic examination data and predicting the flaw growth due to an imposed series of loading transients [1]. The input required for a fatigue crack growth analysis is basically the information necessary to calculate the parameter ΔK (range of stress intensity factor), which depends on the geometry of the crack, its surrounding structure and the range of applied stresses in the crack area. This stress intensity factor expression for subsurface flaw is directly taken from Appendix A of Section XI and can be expressed in terms of the effective membrane and bending stress components as follows:

$$K_I = \left[\sigma_m M_m + \sigma_b M_b\right]\sqrt{\pi a / Q}$$

where

σ_m, σ_b	=	Membrane and bending stresses, in accordance with A-3200(a) of Code
M_m, M_b	=	Correction factors for the membrane and bending stresses.
a	=	One-half the axis of elliptical flaw
Q	=	Flaw shape parameter as defined in the Code

The effective membrane and bending stress components were calculated using a Westinghouse proprietary computer code based on the through-wall stress distribution determined for each thermal transient.

Once ΔK is calculated for each thermal transient, the growth due to a particular stress cycle can be calculated using the crack growth reference curve for stainless steel from ASME Code Section XI Appendix C. This incremental growth is then added to the original crack size, and the analysis proceeds to the next cycle or transient. The procedure is continued in this manner until all of the analytical transients known to occur in the remaining plant life have been analyzed.

The crack growth reference curve has the equation:

$$\frac{da}{dN} = CS\Delta K^n$$

where:

$\frac{da}{dN}$ = crack growth rate, inches per cycle

C = material coefficient ($C = 10^{[-10.009 + 8.12E-04T - 1.13E-06T^2 + 1.02E-09T^3]}$)

T = temperature in degrees F, $T \leq 800°F$

R = K_{min}/K_{max}

S = R ratio correction coefficient $\begin{cases} S = 1 \text{ for } R \leq 0 \\ S = 1 + 1.8R \text{ for } 0 < R \leq 0.79 \\ S = -43.35 + 57.97R \text{ for } 0.79 < R < 1.0 \end{cases}$

n = material property slope (≈3.3)

ΔK = stress intensity factor range, ksi $\sqrt{in}$

This equation first appeared in Section XI, Appendix C (1989 Edition) for the air environment and its basis is provided in Reference [4]. This crack growth reference curve was used in the fatigue crack growth evaluation.

The fatigue crack growth was then calculated using Westinghouse proprietary computer code for a period of 10, 20, 30 and 40 years. In order to illustrate the calculation process, Table 1 shows the crack growth parameters calculated at the last iteration during the 20th year and Table 2 shows similar information at the last iteration during the 40th year. The membrane and bending stresses were calculated internally by the computer code to determine the crack tip stress intensity factor (K) and therefore are not readily available for tabulation in Tables 1 and 2. However, the magnitude of the stress intensity factors (K) tabulated in Tables 1 and 2 can provide an assessment of the magnitude for the membrane and bending stress for each thermal transient. The R ratio for each load pair can simply be calculated using the data in Tables 1 and 2 as follows:

$$R = K_{min} / K_{max} = (K_{max} - \Delta K) / K_{max}$$

The resulting fatigue crack growth due to each thermal transient is summarized in Table 3. As illustrated in Tables 1 to 3, the fatigue crack growth is negligible at the stainless steel weld and the crack depth essentially remains unchanged at 0.145 inch at the end of 40 years.

Table 1
Crack Growth Parameters Calculated at the Last Iteration during the 20th year

Thermal Transient	Initial Half Flaw Depth, a (in)		Max. Crack Tip Stress Intensity Factor, K_{max} (ksi-in$^{1/2}$)	Crack Tip Stress Intensity Factor Range, ΔK (ksi-in$^{1/2}$)	Crack Growth, Δa (in)
Heatup/Cooldown	0.145	Pt 1	10.476	6.005	1.26E-07
	0.145	Pt 2	9.522	5.116	7.70E-08
Unit Loading	0.145	Pt 1	10.517	0.39	6.22E-09
	0.145	Pt 2	9.577	0.267	1.87E-09
Unit Unloading	0.145	Pt 1	10.524	0.049	7.42E-12
	0.145	Pt 2	9.58	0.058	1.31E-11
Step Load	0.145	Pt 1	10.574	0.303	1.01E-09
	0.145	Pt 2	9.617	0.237	4.59E-10
Loss of Load	0.145	Pt 1	10.553	0.047	2.27E-13
	0.145	Pt 2	9.621	0.054	3.64E-13
Loss of Power	0.145	Pt 1	10.672	0.165	1.39E-11
	0.145	Pt 2	10.257	0.69	1.21E-09
Loss of Flow	0.145	Pt 1	10.567	0.281	3.83E-11
	0.145	Pt 2	9.611	0.241	2.30E-11
Inadvertent Spray	0.145	Pt 1	10.634	0.26	2.99E-11
	0.145	Pt 2	9.685	0.227	1.90E-11
OBE	0.145	Pt 1	5.258	0.787	5.19E-10
	0.145	Pt 2	4.963	0.557	2.26E-10
Leak Test	0.145	Pt 1	10.657	0.818	1.01E-09
	0.145	Pt 2	9.673	0.688	5.87E-10

Note:
Pt 1: Crack Tip closest to the free surface
Pt 2: Crack Tip farthest away from the free surface

Table 2
Crack Growth Parameters Calculated at the Last Iteration during the 40th year

Transient	Initial Half Flaw Depth, a (in)		Max. Crack Tip Stress Intensity Factor, K_{max} (ksi-in$^{1/2}$)	Crack Tip Stress Intensity Factor Range, ΔK (ksi-in$^{1/2}$)	Crack Growth, Δa (in)
Heatup/Cooldown	0.145	Pt 1	10.476	6.005	1.26E-07
	0.145	Pt 2	9.522	5.116	7.70E-08
Unit Loading	0.145	Pt 1	10.518	0.39	6.23E-09
	0.145	Pt 2	9.578	0.267	1.87E-09
Unit Unloading	0.145	Pt 1	10.525	0.049	7.42E-12
	0.145	Pt 2	9.58	0.058	1.31E-11
Step Load	0.145	Pt 1	10.575	0.303	1.01E-09
	0.145	Pt 2	9.618	0.237	4.59E-10
Loss of Load	0.145	Pt 1	10.554	0.047	2.27E-13
	0.145	Pt 2	9.622	0.054	3.64E-13
Loss of Power	0.145	Pt 1	10.673	0.165	1.39E-11
	0.145	Pt 2	10.257	0.69	1.21E-09
Loss of Flow	0.145	Pt 1	10.568	0.281	3.83E-11
	0.145	Pt 2	9.612	0.241	2.30E-11
Inadvertent Spray	0.145	Pt 1	10.634	0.26	2.99E-11
	0.145	Pt 2	9.686	0.227	1.90E-11
OBE	0.145	Pt 1	5.258	0.787	5.19E-10
	0.145	Pt 2	4.964	0.557	2.26E-10
Leak Test	0.145	Pt 1	10.657	0.818	1.01E-09
	0.145	Pt 2	9.674	0.688	5.87E-10

Note:
Pt 1: Crack Tip closest to the free surface
Pt 2: Crack Tip farthest away from the free surface

Table 3
Total Crack Growth for 40 years For Each Thermal Transients

Transient	Crack Growth, Δa (in)
Heatup and Cooldown	2.03E-05
Unit Loading	8.15E-07
Unit Unloading	2.07E-09
Step Load	1.47E-07
Loss of Load	7.09E-11
Loss of Power	9.78E-10
Loss of Flow	2.45E-09
Inadvertent Spray	7.98E-09
OBE	1.22E-07
Leak Test	1.86E-08

Question (4) Appendix C method specifies the calculation of maximum depth, a_f and maximum length, l_f. Discuss why flaw length was not considered or discussed in the flaw evaluation.

Response to Question (4):

Based on the Ultrasonic Examination Data of the detected indication[2], the aspect ratio of the embedded circumferential flaw (1/a) is about two, where "1 (0.30 inch)" is the length and "a (0.145 inch)" is the half depth of the embedded indication. Both flaw depth and flaw length was considered in the flaw evaluation with the aspect ratio of 2.0 assumed to remain unchanged as the crack propagates. With the lack of any significant thermal transients occurring at weld 1-RC-9-01F, the detected indication is not expected to propagate further through the weld as illustrated in [3]. Therefore, maximum depth and length are expected to remain unchanged for future plant operations.

Question (6) (b) In absence of a qualified UT method, the staff believes that the flaw evaluation should include a bounding initial flaw (i.e., a flaw connects to the inside surface of the pipe) to account for examination uncertainties. Clarify whether the assumed initial flaw size is bounding.

Response to Question (6):

Based on the Ultrasonic examination performed, there is no evidence indicating that the detected indication is inside surface connected. Therefore an embedded flaw configuration was assumed in the flaw evaluation. Even though the beneficial effects of the structural weld overlay was not taken into consideration, the resulting crack growth can still be shown to be negligible for the embedded flaw configuration [3]. With the compressive residual stress field through the original stainless steel weld resulting from the structural weld overlay, as illustrated in Figures 5-6 and 5-7 of WCAP-16428-NP, and the lack of any significant thermal transients occurring at the weld, it is expected that the resulting crack growth for an assumed inside surface connected flaw would be negligible. Therefore, the conclusion on the structural integrity of the stainless steel weld based on the crack growth results [3] for an embedded flaw configuration, without taking credit of the structural weld overlay, would remain valid for an assumed inside surface flaw in the overlaid stainless steel weld configuration.