Entergy

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Otto W. Gustafson
Regulatory Assurance Manager

PNP 2014-030

March 9, 2014

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

SUBJECT: Second Supplemental Response to Request for Additional Information dated February 26, 2014, for Relief Request Number RR 4-18 – Proposed Alternative, Use of Alternate ASME Code Case N-770-1 Baseline Examination

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

References:

1. Entergy Nuclear Operations, Inc. letter PNP 2014-015, *Relief Request Number RR 4-18 - Proposed Alternative, Use of Alternate ASME Code Case N-770-1 Baseline Examination*, dated February 25, 2014

2. NRC Electronic Mail, *Request for Additional Information - Palisades - RR 4-18 - Proposed Alternative, Use of Alternate ASME Code Case N-770-1 Baseline Examination - MF3508*, dated February 26, 2014

3. Entergy Nuclear Operation, Inc. letter PNP 2014-021, *Response to Request for Additional Information dated February 26, 2014, for Relief Request Number RR 4-18 – Proposed Alternative, Use of Alternate ASME Code Case N-770-1 Baseline Examination,* dated March 1, 2014

4. Entergy Nuclear Operation, Inc. letter PNP 2014-028, Supplemental Response to Request for Additional Information dated February 26, 2014, for Relief Request Number RR 4-18 – Proposed Alternative, Use of Alternate ASME Code Case N-770-1 Baseline Examination, dated March 6, 2014

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (ENO) requested Nuclear Regulatory Commission (NRC) approval of the Request for Relief for a Proposed Alternative for the Palisades Nuclear Plant (PNP).

Reference 1 is associated with the use of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Code Case N-770-1, as conditioned by 10 CFR 50.55a(g)(6)(ii)(F)(1) and 10 CFR 50.55a(g)(6)(ii)(F)(3), dated June 21, 2011.

In Reference 2, the NRC issued a request for additional information (RAI). The ENO response to the RAI in Reference 3 stated that the calculations requested in RAI-1.13 would be provided in a supplemental RAI response letter.

In Reference 4, ENO provided the requested calculations in a supplemental response to RAI-1.13.

This second supplemental letter contains additional documents in support of the response to RAI-1.13 (Reference 4).

This submittal contains no proprietary information.

This submittal makes no new commitments or revisions to previous commitments.

Sincerely,

owg/jpm

Enclosures:

1. Structural Integrity Associates, Inc., Memorandum RLB-14-001, *Additional Evaluations of the Palisades Nuclear Plant Hot Leg Drain Nozzle for Primary Water Stress Corrosion Cracking,* dated March 9, 2014

2. Dominion Engineering, Inc., Letter L-4199-00-02, Rev. 0, *Initial Flaw Assumption for Alloy 82/182 Full-Penetration Branch Pipe Connection Weld at Palisades,* dated March 9, 2014

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE 1

Structural Integrity Associates, Inc. Memorandum RLB-14-001

Additional Evaluations of the Palisades Nuclear Plant Hot Leg Drain Nozzle for Primary Water Stress Corrosion Cracking

Dated March 9, 2014

9 Pages Follow

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MEMORANDUM

March 9, 2014
RLB-14-001

TO: William Sims

FROM: Richard Bax

SUBJECT: Additional Evaluations of the Palisades Nuclear Plant Hot Leg Drain Nozzle for Primary Water Stress Corrosion Cracking

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The original series of Structural Integrity (SI) calculations (SI Calculation No.'s 1200895.306, 1200895.307, and 1200895.308) was developed to justify that there is no structural integrity/safety issues resulting from circumferential and axial-radial flaws in the Alloy 182 small bore nozzle-to-main loop piping weld that were assumed to initiate at plant startup and grow due to Primary Water Stress Corrosion Cracking (PWSCC). The conclusions of these evaluations were that there is no safety issue in regards to structural failure.

However, during conference call with the Nuclear Regulatory Commission (NRC) staff on March 7, 2014, the NRC staff expressed concerns about the potential for leakage from an axial flaw. The NRC staff indicated that in addition to demonstrating reasonable assurance of structural integrity, a second criterion is to demonstrate reasonable assurance of leak tightness over the operating period covered by the relief request. Finally, the NRC staff indicated its preference that the residual stresses, assumed in the crack growth calculation, should reflect the presence of a substantial ID weld repair at the hot leg drain nozzle-to-hot leg piping weld.

In response, SI has performed additional PWSCC based crack growth evaluations with increased hoop stresses, which are intended to bound the effects of any weld repairs that might be present in order to demonstrate reasonable assurance of leak tightness. The evaluations conservatively do not take credit for time to crack initiation or crack growth rate reductions due to Post Weld Heat Treatment (PWHT). The revised crack growth calculations also remove unnecessary conservatisms previously assumed with regard to operating temperature and the initial flaw depth.

Revised Evaluation Descriptions

A series of additional crack growth evaluations have been performed for the purpose of removing unnecessary conservatisms in regards to the current axial crack growth evaluation documented in SI Calculation 1200895.307. To that end the following inputs to the previously documented crack growth evaluation were modified:

Temperature

The original crack growth evaluation for the axial flaw used a hot leg temperature (T_{hot}) of 593°F, which was based NMC Document M-259, Rev. 18, "Piping Class Summary." The document and temperature in question is the plant design normal operating temperature, which was used for the design and safety calculations. This value does not represent the actual operating temperature as plants can operate at lower T_{hot} values.

NMC Calculation EA-FC-977-01, Revision 2 (page 6) indicates that a Pre-Uprate T_{hot} was 582.7°F, and the Post-Uprate T_{hot} is 583°F. Therefore, additional crack growth evaluations will be performed using 583°F. Additional analyses were performed at 580° to show the significant reduction in crack growth.

It should be noted, that per Palisades document *Reactor Head projected EDY at end of 1R24.doc* the reactor head temperature at the end of Cycle 9 (end of cycle: 2/6/1992) was 586.4°F, which is a difference of approximately (586.4 – 582.7) = 3.7°F between head and hot leg. During cycles 1 and 2 (12/31/1971 to 12/20/1975 and 5/91976 to 1/6/78) the head temperature was 569°F and 575°F, respectively. This would result in hot leg temperatures of approximately 565.3°F and 571.3°F, which are 17.7°F and 11.7°F less than was analyzed for the 583°F case. Considering these reduced temperatures during early operation, the crack growth evaluations for 580°F and 583°F will tend to be conservative as less crack growth would initially occur.

Reduced Initial Flaw Depth

The original crack growth evaluation for the axial flaw used an initial flaw depth of 0.1 inches. This initial flaw size was chosen arbitrarily as simply a small flaw. However, as documented in a letter by Dominion Engineering, Inc.[1], under the very conservative assumption of a flaw that has initiated immediately upon plant startup, an initial flaw depth of 0.025 inches may appropriately be assumed. Extensive laboratory PWSCC crack growth rate testing has demonstrated that long crack growth behavior is exhibited for flaws with depths of only 0.002 inches.

Note that for these additional axial flaw crack growth evaluations, the surface length will be held constant at 2 inches, which produced the lowest axial crack growth life of 34 years in SI Calculation No. 1200895.307. Considering the geometry of the hot leg drain nozzle and its

[1] Letter from G. White (Dominion Engineering, Inc.) to W. Sims (Entergy), "Initial Flaw Assumption for Alloy 82/182 Full-Penetration Branch Pipe Connection Weld at Palisades," DEI Letter L-4199-00-02, Rev. 0, dated March 9, 2014.

stress field, the assumed constant surface length of 2 inches is considered a conservative assumption, as the root of the hot leg drain nozzle-to-hot leg piping weld is approximately 0.5 inches wide, which leaves 1.5 inches of the flaw in the Alloy 600 nozzle body, which would have a slower PWSCC crack growth rate than the Alloy 182 weld material.

Modified Hoop Stress Profiles to Address the Possibility of a 50% Through Wall Weld Repair

During the NRC conference call, it was indicated that an independent residual stress evaluation had included an ID weld repair. The stresses at the ID were reported to have been reduced but the though wall stresses were about 5 ksi larger than that generated in SI Calculation No. 1200895.306.

To account for a weld repair, a second hoop stress profile was also evaluated. The new profile was simply the original profile, increased uniformly by 5 ksi (tensile) and conservatively did not attempt to take credit for the lower ID stresses. In this manner, the new hoop profile conservatively bounds the potential presence of a large weld repair on the weld ID.

Flaw Depth Allowed to Grow to 93.125% versus 75%

The original crack growth evaluation for the axial flaw halted the growth evaluation at 75% of the nominal thickness (i.e. 3 inches). For the evaluations for T_{hot} equal to 583°F, the flaw will be allowed to grow to 3.725 inches (93.125% of nominal wall) instead of 3 inches. The limit of 3.725 inches is based the extent of the hoop stress field data that was extracted in SI Calculation 1200895.306 (see Figure 1). The originally assumed end point of a 75% through wall flaw corresponds to the maximum flaw depth allowed by an ASME Code, Section XI evaluation of an actual PWSCC flaw left in service. However, an axial flaw that is 93.125% through wall also meets the criterion of demonstrating leak tightness.

Crack Growth Evaluations

Thus a total of 4 crack growth evaluations were run: the two temperatures with the Original stress field, and the new flaw depth and the two temperatures with the revised stress field (original + 5 ksi) and the new flaw depth. The "Original" stress field is consistent with SI Calculation 1200895.306, Table 11.

In addition, the evaluations for the 583°F temperature will also include crack growth to a depth of 3.725 inches. The evaluations for the 580°F temperature will continue to grow out to a depth 3 inches, as was performed earlier in SI Calculation 1200895.306. Additional evaluations at the lower temperatures which occurred during early plant operation were not performed due to time constraints.

The methodology for the additional axial growth evaluations is identical that used in SI Calculation 1200895.307.

The evaluations files are tabulated as follows:

File Name	Description
SC-P0.DAT	***SmartCrack*** K input file for Original Stress
SC-P5.DAT	***SmartCrack*** K input file for Original Stress + 5 ksi
SC-P0.OUT	***SmartCrack*** K output file for Original Stress
SC-P5.OUT	***SmartCrack*** K output file for Original Stress + 5 ksi
Hoop-P0-580.pcf	**pc-CRACK** PWSCC growth input file for Original Stress, 580°F, 0.025 flaw to 3 inch depth
Hoop-P0-580.rpt	**pc-CRACK** PWSCC growth output file for Original Stress, 580°F, 0.025 flaw to 3 inch depth
Hoop-P5-580.pcf	**pc-CRACK** PWSCC growth input file for Original Stress + 5 ksi, 580°F, 0.025 flaw to 3 inch depth
Hoop-P5-580.rpt	**pc-CRACK** PWSCC growth output file for Original Stress + 5 ksi, 580°F, 0.025 flaw to 3 inch depth
Hoop-P0-583.pcf	**pc-CRACK** PWSCC growth input file for Original Stress, 583°F, 0.025 flaw to 3.725 inch depth
Hoop-P0-583.rpt	**pc-CRACK** PWSCC growth output file for Original Stress, 583°F, 0.025 flaw to 3.725 inch depth
Hoop-P5-583.pcf	**pc-CRACK** PWSCC growth input file for Original Stress + 5 ksi, 583°F, 0.025 flaw to 3.725 inch depth
Hoop-P5-583.rpt	**pc-CRACK** PWSCC growth output file for Original Stress + 5 ksi, 583°F, 0.025 flaw to 3.725 inch depth

Crack Growth Results

The results of the additional crack growth evaluations are provided in the following table:

Run #	Stress Field	Initial Flaw Depth (inches)	Temperature (°F)	Time (yrs) to crack to a given depth
0(3)	Original(1)	0.1"	593	34 to reach 75%
1	Original(1)	0.025"	580	53.8 to reach 75%
2	Original(1)	0.025"	583	54.8 to reach 93.125%
3	Original + 5 ksi(2)	0.025"	580	32.2 to reach 75%
4	Original + 5 ksi(2)	0.025"	583	33.3 to reach 93.125%

Note:
1) "Original" indicates the stress field generated in SI Calculation 1200895.306, Table 11.
2) "Original + 5 ksi" adds 5 ksi of tensile stress to the "Original" stress field results.
3) The original evaluation performed in SI Calculation 1200895.307.

As an example, the K values for the 3.725 inch crack depth cases, Runs 2 and 4, are shown in Figure 2 and their corresponding crack growth results shown Figure 3.

A direct comparison between Run 0 and Run 1 shows that the reduction of temperature and initial flaw size produces a beneficial effect on the crack growth time. Compared to the original analysis in SI Calculation 1200895.307, Run 0, to Run 1, the crack growth time increases from 34 years to 53.8 years.

A direct comparison of the "Original +5 ksi" stress field evaluation, Run 3, to Run 0 reduced the crack growth time, but not significantly, only reducing the original 34 years to 32.2 years. It should be noted that the use of a generic increase of 5 ksi across the entire original stress field is very conservative.

For the more accurate/realistic evaluations (i.e. actual operating temperature, and growth beyond 75%, Runs 2 and 4), the crack growth results exceeded the results for the 580°F, 75% through wall evaluations (Runs 1 and 3). The improvement is 54.8 years vs. 53.8 years for original hoop stress field and 33.3 years vs. 32.2 years for original + 5ksi hoop stress field. This is despite the fact that Runs 2 and 4 are evaluated at the slightly greater temperature of 583°F. It should again be noted that during the plants operation from 12/31971 to 1/6/1978, the hot leg temperatures where approximately 17.7°F and 11.7°F less than was analyzed. Inclusion of these lower temperatures for the given time periods would further increase the crack growth time.

It is also recognized that there is still an additional 0.275 inches of base material available to grow through, before onset of leakage that was not included in the Run 2 and 4 evaluations.

Extrapolating from Figure 3, for the Original Stress Field (Run 2), it is estimated that a total crack growth time of approximately 56 years is required to grow the flaw to 4 inches (i.e. through wall). For the Original Stress Field + 5 ksi (Run 4), it is estimated that a total crack growth time of approximately 34 years is required to grow the flaw through wall.

Conclusions

Using accurate operating conditions and a more appropriate initial flaw size and allowing the flaw to actually grow through wall, a crack growth evaluation was performed, which indicates that the total time to grow through wall is 56 years when using the hoop stress field generated in SI Calculation 1200895.306.

Since the SI generated hoop residual stress field did not include an ID weld repair and was less than the hoop stress per the NRC independent residual stress analysis, a second evaluation was performed with the hoop stress field uniformly increased by 5 ksi (tensile). Using this conservative stress field the total time to grow through wall is 34 years.

Finally, the resulting crack growth time is in terms of years of time during which the reactor is at operating pressure and temperature and not simply years since licensed to operate. Per Palisades document *Reactor Head projected EDY at end of 1R24.doc*, the total Effective Full Power Years (EFPY) at the end of the next refueling outage (1R24) is 27.61. As a result, there is 28.4 EFPY margin (56 EFPY-27.6 EFPY) for an axial flaw to leak based on the original stress field and a 6.4 EFPY margin (34 EFPY – 27.6 EFPY) for original + 5 ksi stress field.

The original analyses in SI Calculation 1200895.307 used an initial flaw size of 0.1 inches. Examination of the **pc-CRACK** output files for Runs 2 and 4 shows that for the Original + 5 ksi stress field evaluation (Run 4), it takes approximately 3.3 years to grow from 0.025 inches to 0.1 inches. For the Original stress field evaluation (Run 2), it takes 5.7 years. Therefore, if a 0.1 inch initial flaw is assumed the reduction in total growth time is 34 – 3.3 = 30.7 years for Original +5 ksi stress field (Run 4) and 56 – 5.7 = 50.3 years for the Original stress field (Run 2). Both results are still greater than the 27.6 EFPY, with a 22.7 EFPY margin (50.3 EFPY-27.6 EFPY) for an axial flaw to leak based on the original stress field and a 3.1 EFPY margin (30.7 EFPY – 27.6 EFPY) for original + 5 ksi stress field.

This margin is expected only to increase if PWSCC crack growth rate reduction, due to PWHT, or time to initiate a crack in PWHT material is included. As documented in a second letter by Dominion Engineering, Inc.[2], on the basis of laboratory PWSCC crack growth rate testing, French research investigators have developed a disposition equation that includes a factor of 2 reduction in the crack growth rate as a function of K for Alloy 182 that has been exposed to PWHT. Using such a factor would increase crack growth time to 112 years for the original hoop stress field and 68 years for the original + 5 ksi stress field, which is greater than the current operating license for Palisades. If credit were taking for time to initiate a crack for PWHT there is a low probability that a crack will even initiate and if it did many more years could be added to the EFPY margin to leakage. The analysis supports no leakage for the life of the plant.

In summary, the crack growth evaluations demonstrate reasonable assurance of leak tightness, in addition to reasonable assurance of structural integrity, for a period well beyond that covered by the relief request (i.e., one future cycle of operation).

[2] Letter from G. White (Dominion Engineering, Inc.) to W. Sims (Entergy), "Effect of Post-Weld Heat Treatment Applied to Alloy 82/182 Full-Penetration Branch Pipe Connection Welds at Palisades," DEI Letter L-4199-00-01, Rev. 0, dated February 25, 2014.

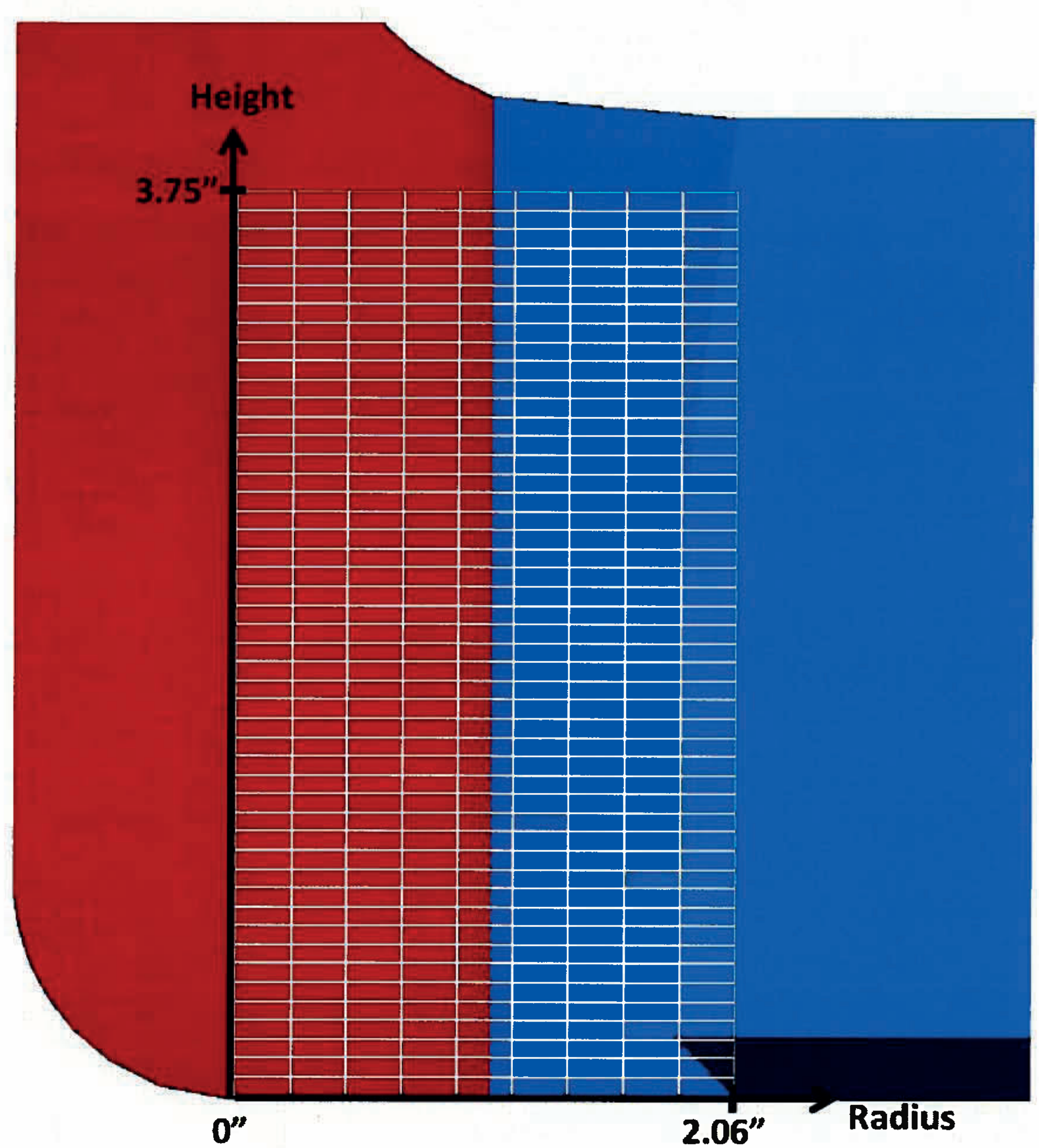

Figure 1 – Hoop Stress Extraction Grid for Axial Crack Growth Evaluation

(Figure is reproduced from SI Calculation 1200895.306, Figure 20)

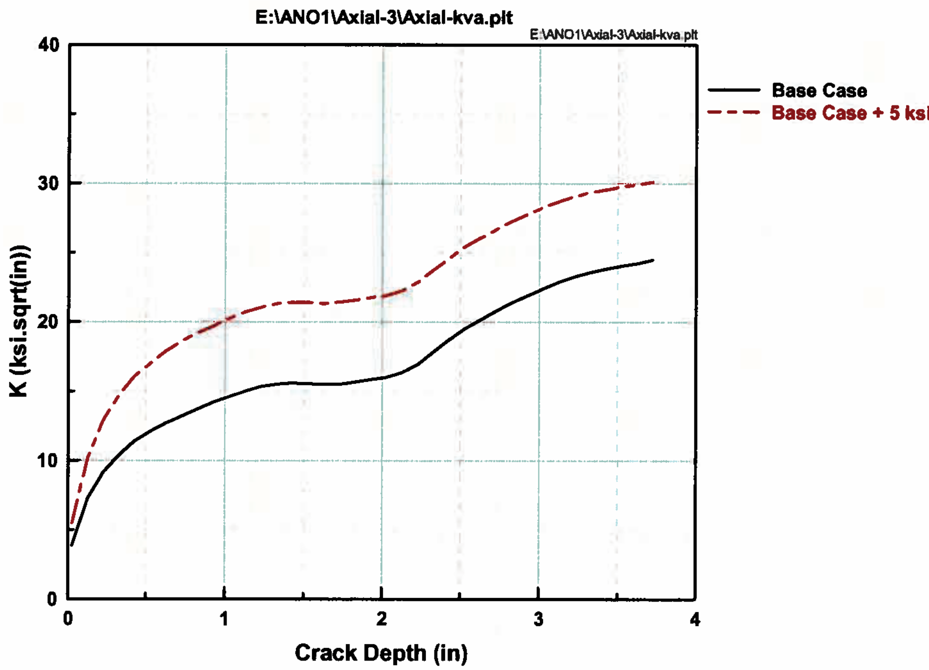

Figure 2 – ***SmartCrack*** Stress Intensity Factors for Axial Cracks (Runs 2 and 4)

(0.025 inch Initial Flaw, 583°F, Original or Original + 5 ksi Stress Field)

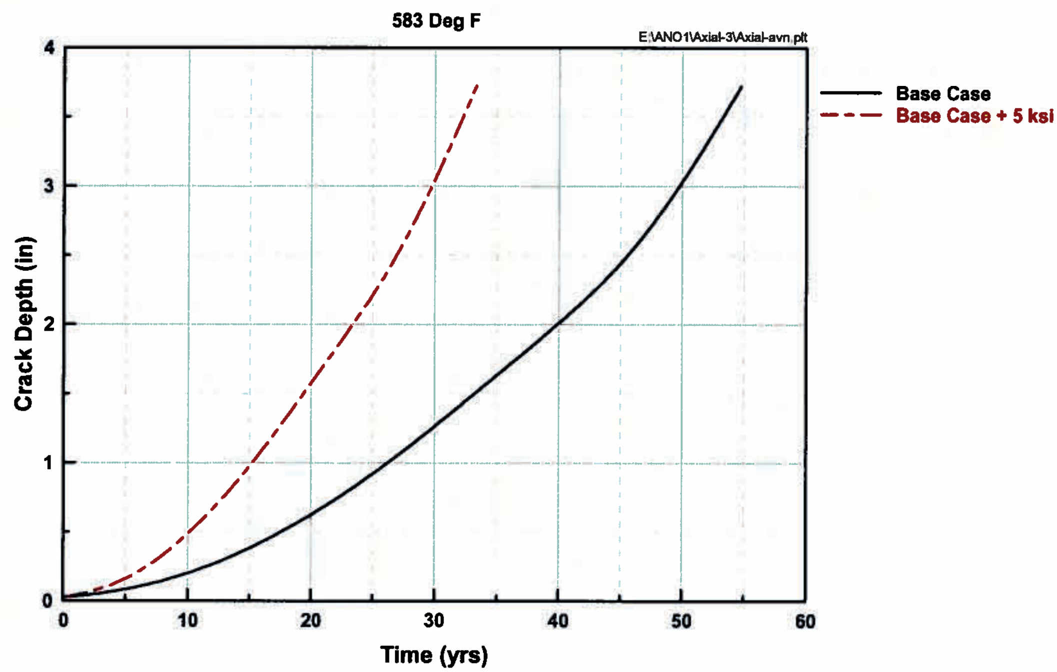

Figure 3 – Crack Depth vs. Time for the Growth of Axial Cracks (Runs 2 and 4)

(0.025 inch Initial Flaw, 583°F, Original or Original + 5 ksi Stress Field, 3.725 inch depth)

ENCLOSURE 2

Dominion Engineering, Inc., Letter L-4199-00-02, Rev. 0

Initial Flaw Assumption for Alloy 82/182 Full-Penetration Branch Pipe Connection Weld at Palisades

Dated March 9, 2014

3 Pages Follow

Dominion Engineering, Inc.

March 9, 2014
L-4199-00-02, Rev. 0

Mr. William Sims
Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213

Subject: Initial Flaw Assumption for Alloy 82/182 Full-Penetration Branch Pipe Connection Weld at Palisades

Dear Mr. Sims:

The purpose of this document is to provide the technical basis for the initial flaw depth assumed in crack growth calculations performed for a hypothetical PWSCC flaw located on the wetted surface of the Alloy 82/182 full-penetration branch pipe connection weld of the hot-leg drain nozzle at Palisades. An initial flaw depth of 0.025 inch has been selected on the basis of the technical considerations described below.

Introduction

Typically, the initial flaw depth that is assumed for a crack growth calculation for a hypothetical PWSCC flaw is the detectability limit for the type of NDE performed at the most recent inspection. It is conservative to assume that a flaw with a depth at the detectability limit was left in place after the inspection was performed. However, in the case that a growing PWSCC flaw is assumed to have been present upon initial startup, the flaw depth detectable via NDE is not relevant. Instead, the initial assumed flaw should be based on the size flaw that would exhibit long crack growth behavior that can be modeled using linear elastic fracture mechanics (LEFM) and the calculated stress intensity factor (K).

Experimental Work Investigating the Transition to Long Crack Growth Behavior for PWSCC of Alloys 600/82/182

The question of the flaw depth at the transition to long crack growth behavior (from short crack growth behavior) has been experimentally investigated for the PWSCC mechanism:

- In 1992, Boursier et al. [1] discussed results of constant extension rate tests (CERT), reverse U-bend (RUB), and constant load tests of Alloy 600. These tests indicated that the transition from short crack behavior occurred at about 80 microns (0.003 inch) and that the crack growth rate increased about a factor of 10 at that transition.

- Over the last 10 years or so, Andresen has reported on the results of an extensive program of PWSCC crack growth rate tests performed using compact tensile specimens of Alloy 600 and its weld metals Alloy 82 and 182 (e.g., ([2], [3]). Based on his results, Andresen has concluded that the transition from short crack growth behavior to long crack growth behavior occurs at crack depths of about 10 to 50 microns (0.0004 to 0.002 inch). Andresen [2] concluded that a mature chemistry forms in a crack of depth less than 50 microns (0.002 inch). Once this threshold for long crack growth behavior was reached, the flaw was reported to grow at a nearly constant rate.

The test data show that PWSCC, once it reaches about 50 microns (0.002 inch), generally exhibits long crack growth behavior and can be modeled using K and LEFM once the crack depth reaches that value.

It is also instructive to consider the stress intensity factor corresponding to a flaw with a depth of 0.025 inch. Given the 4.0-inch wall thickness of the subject component, a flaw with this depth can conservatively be modeled as an edge crack in a semi-infinite plate subject to a remote tensile stress. Assuming a remote tensile stress of 15 ksi (103 MPa), the stress intensity factor for this case ($K = 1.12\sigma\sqrt{\pi a}$ [4]) is 4.7 ksi√in (5.2 MPa√m). Laboratory crack growth rate testing performed for Alloy 182 with K in the range of ~8 to ~16 MPa√m (7.3 to 14.6 ksi√in) has shown crack growth rates well below the MRP-115 [6] disposition line for this K range [5].

Finally, it is noted that MRP-115 [6] concluded that there is convincing experimental evidence that hot and ductility-dip weld defects do not play a significant role in PWSCC initiation and propagation, and that the assumed initial depth of 0.025 inch is substantially greater than the depth of any surface cold-worked layer due to grinding (i.e., 0.004 to 0.008 inch [7]).

Conclusion

An initial flaw depth of 0.025 inch is a conservative assumption for the purpose of the crack growth calculations being performed for the Alloy 82/182 full-penetration branch pipe connection weld of the hot-leg drain nozzle at Palisades. The assumption of a growing PWSCC flaw present at plant startup is a conservative assumption given the time required for the PWSCC initiation process, especially given the large effect on crack initiation time expected due to the post-weld heat treatment (PWHT) applied to this component [8].

If you have any questions regarding this topic, please do not hesitate to contact me at (703) 657-7315 or gwhite@domeng.com, or Mr. John Broussard at (703) 657-7316 or jbroussard@domeng.com.

Sincerely,

Glenn A. White, P.E.
Principal Engineer

References

1. J. M. Boursier, O. de Bouvier, J. M. Gras, D. Noel, R. Rios, and F. Vaillant, "SCC of Alloy 600 in High Temperature Water: A Study of Mechanisms," *Proceedings : Specialist Meeting on Environmental Degradation of Alloy 600,"* held in Warrenton, VA, April 6-9, 1993, EPRI, Palo Alto, CA: 1996. TR-104898. [freely available for download at www.epri.com]

2. P. L. Andresen, "Principal Characteristics of Initiation and Growth of SCC," *Quantitative Micro-Nano (QMN-2) Approach to Predicting SCC of Fe-Cr-Ni Alloys – Initiation of SCC*, June 12-17, 2011, Sun Valley, Idaho, Staehle Consulting, 2012.

3. P. L. Andresen, "SCC Initiation Scoping Tests Using Blunt Notch CT Specimens of Alloy 690," presented at *EPRI Alloy 690 Research Collaboration Meeting*, November 2012, Tampa, FL.

4. T. L. Anderson, *Fracture Mechanics: Fundamentals and Applications*, Second Edition, CRC Press, 1995, p. 56.

5. *Materials Reliability Program: Low Stress Intensity Factor Crack Growth Rate Testing for Alloys 82, 182 and 600 (MRP-304)*, EPRI, Palo Alto, CA: 2011. 1022647.

6. *Materials Reliability Program: Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Alloy 82, 182, and 132 Welds (MRP-115)*, EPRI, Palo Alto, CA: 2004. 1006696. [freely available for download at www.epri.com]

7. P. Scott, et al., "Comparison of Laboratory and Field Experience of PWSCC in Alloy 182 Weld Metal," *Proceedings of the 13th International Conference on Environmental Degradation of Materials in Nuclear Power Systems*, paper 25, CNS, 2007.

8. Letter from G. White (Dominion Engineering, Inc.) to W. Sims (Entergy), "Effect of Post-Weld Heat Treatment Applied to Alloy 82/182 Full-Penetration Branch Pipe Connection Welds at Palisades," DEI Letter L-4199-00-01, Rev. 0, dated February 25, 2014.