Xcel Energy®

Monticello Nuclear Generating Plant
2807 W County Road 75
Monticello, MN 55362

April 2, 2010

L-MT-10-023
10 CFR 50.55a

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

Monticello Nuclear Generating Plant
Docket 50-263
Renewed Facility Operating License No. DPR-22

Subject: 10 CFR 50.55a Request No. 18: Alternative to Apply ASME Code Case N-705 to the Standby Liquid Control System Tank

Sodium pentaborate crystallization has been identified on the exposed lip of the American Society of Mechanical Engineers (ASME) Class 2 Standby Liquid Control (SLC) Tank base. Minute leakage was identified from one location. Applying several non-destructive evaluation (NDE) techniques, indications of radial cracking were identified in the SLC Tank bottom plate (transgranular stress corrosion cracking). The SLC Tank was determined operable by NDE examination and structural evaluation. Flaw evaluation by applying ASME Code Case N-705, "Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1," demonstrates the SLC Tank will retain its structural integrity well beyond the next refueling outage using the worst case flaw scenario.

The Northern States Power Company – Minnesota (NSPM) identified ASME Code Case N-513, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," as being potentially applicable. It was determined that while relevant, ASME Code Case N-513 was not applicable because it applied to piping and tubing, and not tanks. NSPM identified that ASME Code Case N-705, while not yet included within 10 CFR 50.55a, was similar to ASME Code Case N-513 and provided appropriate evaluation guidance.

NSPM pursuant to 10 CFR 50.55a, requests NRC authorization to apply ASME Code Case N-705 as an alternative to the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the degradation of the SLC Tank. Authorization is requested to apply this alternative through the next refueling outage, currently scheduled to begin in March 2011.

In accordance with the requirements of ASME Code Case N-705, NSPM will take the following actions:

1) NSPM will restore the Standby Liquid Control Tank in accordance with Section XI of the ASME Code by startup from the next refueling outage, currently scheduled to begin in March 2011.

2) Monitoring of Standby Liquid Control Tank leakage each day will be performed in accordance with Procedure 0000-J, "Operations Daily Log – Part J, Outplant" rounds until the tank is removed from service.

The 10 CFR 50.55a request is described in Enclosure 1 to this letter.

If you have any questions or require additional information, please contact Mr. Richard Loeffler at (763) 295-1247.

NSPM requests prompt authorization for this alternative.

Summary of Commitments

This letter proposes no new commitments and does not revise any existing commitments.

Timothy J. O'Connor
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC
Minnesota Department of Commerce

ENCLOSURE 1

MONTICELLO NUCLEAR GENERATING PLANT

10 CFR 50.55a REQUEST NO. 18

PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i) WHICH PROVIDES AN ACCEPTABLE LEVEL OF QUALITY OR SAFETY

ALTERNATIVE TO APPLY ASME CODE CASE N-705 TO THE STANDBY LIQUID CONTROL SYSTEM TANK

10 CFR 50.55a Request No. 18

**Proposed Alternative in Accordance With 10 CFR 50.55a(a)(3)(i)
Which Provides an Acceptable Level of Quality or Safety**

**Alternative to Apply ASME Code Case N-705 to the
Standby Liquid Control System Tank**

1.0 ASME Code Component(s) Affected

Code Class:	2
Component Numbers:	T-200
Examination Category:	C-A
Description:	Alternative to ASME Section XI, Section IWC-3120 for the Standby Liquid Control (SLC) System Tank

2.0 Applicable ASME Code Edition and Addenda

The Monticello Nuclear Generating Plant (MNGP) is currently in the fourth 10-year Inservice Inspection (ISI) Program interval and is committed to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," (ASME Section XI), 1995 Edition through 1996 Addenda. Additionally, for ultrasonic examinations, ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the 1995 Edition through 1996 Addenda is implemented, as required and modified by 10 CFR 50.55a.

3.0 Applicable Code Requirement

Section IWC-3120, "Inservice Volumetric and Surface Exams"

4.0 Reason for Request

While performing a periodic system walkdown, the system engineer identified sodium pentaborate crystallization at the bottom of the SLC Tank on the exposed lip of the tank base. Subsequent investigation identified degradation, i.e., indications of radial cracking in the SLC Tank bottom plate. There was also visible evidence of minute leakage at the tank base. The alternative proposed is to apply the evaluation criteria included in ASME Code Case N-705, "Evaluation

Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1." The proposed alternative provides an acceptable level of quality and safety.

5.0 Proposed Alternative and Basis for Use

In accordance with 10 CFR 50.55a(a)(3)(i), relief is requested by the Northern States Power Company – Minnesota (NSPM) from ASME Section XI, IWC-3120, "Inservice Volumetric and Surface Exams," to implement an alternative that allows acceptance of degradation in the SLC Tank, an ASME Class 2 atmospheric pressure component, in accordance with the guidance of ASME Code Case N-705.

ASME Code Case N-705 indicates that alternatives to the requirements of IWC-3120, as specified therein, may be used to accept degradation, including through-wall degradation, in a moderate energy ASME Code Class 2 tank for a limited time not to exceed the evaluation period, determined as defined in the code case.

NSPM requests relief from IWC-3120, to allow the use of an alternate methodology to evaluate and accept through wall flaws in moderate energy Class 2 tanks. This alternative allows characterization of flaws in accordance with the applicable sections of ASME Code Case N-705, e.g., Section 2.2, "Degradation Characterization," and Section 2.4, "Bounding Flaw Evaluation," to estimate the degradation in inaccessible or uninspectable region(s) of the SLC Tank.

Section 6, "Subsequent Examinations and Surveillance," of the code case requires: 1) daily monitoring for tank leakage, and 2) examination of the degradation to verify the predicted growth at one-half of the allowed operating time (unless the time at which the degradation reaches the allowable flaw size is determined to be twice the time to reach the end of the evaluation period). Monitoring of SLC Tank leakage each day in accordance with the operator rounds is proposed by NSPM to meet the first code case requirement (see Section 7.0 herein). NSPM has determined, based upon a flaw evaluation performed by Structural Integrity Associates, Inc. (see Enclosure 2), that the point in time where the limiting degradation reaches the allowable flaw size is far greater than twice the duration of the evaluation period,[1] 26 months, and hence examination before the March 2011 refueling outage is unnecessary. Therefore, this alternate methodology, as permitted in ASME Code Case N-705, would allow for a planned repair of the SLC Tank during the upcoming refueling outage in 2011, vice an unnecessary emergent shutdown and repair.

---

1. The evaluation period is the time to the next refueling outage – thirteen months.

NRC draft Regulatory Guide DG-1192, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," dated June 2009, identifies Code Case N-705 as one of the cases determined as an acceptable alternative to Section XI, for unconditional usage as indicated by its inclusion in Table 1, "Acceptable Section XI Code Cases," to this draft regulatory guide. A proposed rule revising 10 CFR 50.55a[(2)] to include the next revision of Regulatory Guide 1.147, i.e., Revision 16, which includes this code case, has been published in the Federal Register, and is awaiting publication as a Final Rule.

Use of ASME Code Case N-705 provides an acceptable level of quality and safety in accordance with 10 CFR 50.55a(a)(3)(i) for the evaluation and temporary acceptance of the degradation of the SLC Tank.

6.0 Duration of Proposed Alternative

NSPM is requesting authorization for use of this alternative through the next refueling outage, currently scheduled to begin in March 2011.

7.0 Interim Actions

Compliance with ASME Code Case N-705, Section 6, "Subsequent Examinations and Surveillance," requires the following action to be implemented.

- NSPM will restore the Standby Liquid Control Tank in accordance with Section XI of the ASME Code by startup from the next refueling outage, currently scheduled to begin in March 2011.

- Monitoring of Standby Liquid Control Tank leakage each day will be performed in accordance with Procedure 0000-J, "Operations Daily Log – Part J, Outplant" rounds until the tank is removed from service.

---

2. Federal Register: June 2, 2009 (Volume 74, Number 104, Proposed Rules), "Incorporation by Reference of Regulatory Guide 1.84, Revision 35, and Regulatory Guide 1.147, Revision 16, Into 10 CFR 50.55a," pages 26303-26310.

ENCLOSURE 2

MONTICELLO NUCLEAR GENERATING PLANT

10 CFR 50.55a REQUEST NO. 18

PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i) WHICH PROVIDES AN ACCEPTABLE LEVEL OF QUALITY OR SAFETY

ALTERNATIVE TO APPLY ASME CODE CASE N-705 TO THE STANDBY LIQUID CONTROL SYSTEM TANK

STRUCTURAL INTEGRITY ASSOCIATES, INC.

FLAW EVALUATION FOR THE MONTICELLO STANDBY LIQUID CONTROL TANK

SUMMARY REPORT

MARCH 24, 2010

(3 Pages Follow)

Structural Integrity Associates, Inc.

5215 Hellyer Ave.
Suite 210
San Jose, CA 95138-1025
Phone: 408-978-8200
Fax: 408-978-8964
www.structint.com
amiessi@structint.com

March 24, 2010
Report No. 1000413.401.R0
Quality Program: ☒ Nuclear ☐ Commercial

Mr. Jim Bridgeman
Xcel Energy
Monticello Nuclear Power Plant
2807 W COUNTY ROAD 75
Monticello, MN 55362-9601

Subject: Flaw Evaluation for Monticello Standby Liquid Control Tank

References:

1. ASME Boiler and Pressure Vessel Code, Section XI, Division 1, Code Case N-705, "Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks."

2. Xcel Energy, Monticello Nuclear Generating Plant, SBLC Tank T-200 Indication Worksheet.

Dear Jim:

This summary report serves as a technical basis to support continued operation of the Monticello Standby Liquid Control (SBLC) tank until the next refueling outage under the provisions of ASME Code Case N-705 [1].

The results summarized herein are based on verified scoping analyses which utilize many conservative assumptions. The conclusions of acceptability for continued operation are not expected to change with the final analyses.

INTRODUCTION

Leakage was detected at the SBLC tank during a walkdown. Subsequent inspections revealed that the leakage was emanating from a through-wall flaw in the base plate of the tank. The flaw extends radially across the base plate and appears to continue beneath the fillet weld on the outside of the cylindrical shell [2]. In addition, 16 other indications were found along the circumference of the base plate. However, only one flaw was completely through the thickness

of the base plate. It should also be noted that only five of the 17 indications span the width across the external face of the base plate. No indication was observed in the cylindrical shell.

Since the through-wall flaw at the location of the leakage extends past the attachment fillet weld, it was assumed that the flaw could be both in the base plate and also in the cylindrical shell attachment. Thus, in addition to evaluating the flaw in the base plate, a postulated circumferential flaw in the cylindrical shell is evaluated also.

TECHNICAL APPROACH

The evaluation was performed in accordance with the structural requirements of ASME Section XI Code Case N-705 which has been approved by ASME but currently not approved in regulatory Guide 1.147. Allowable through-wall flaw sizes are calculated for the observed indications in the base plate and a postulated circumferential flaw in the cylindrical shell of the tank. In addition, a stress corrosion crack growth evaluation is performed to ensure that the flaws would not reach the allowable flaw size within the next operating period.

RESULTS

Allowable Flaw Evaluation

The bounding indication in the base plate is modeled as a through-wall flaw extending radially from the OD of the circular plate towards the center of the tank. The hoop stresses in the tank shell are conservatively applied to the base plate. Using the provisions of the structural requirements in Code Case N-705, the allowable flaw was calculated to be 85 inches.

For the tank shell, the evaluation was performed assuming a circumferential planar through-flaw in the cylindrical shell. Using the provisions of the structural requirements in Code case N-705, the allowable circumferential flaw in the tank shell was calculated to be 5.6 inches.

Stress Corrosion Crack Growth Analysis

A flaw growth evaluation was also performed assuming transgranular stress corrosion cracking per the guidelines of Code Case N-705. An initial 2.7 inches long flaw (approximately twice the length from the OD of the base plate to the toe of the fillet weld inside the tank) is assumed for the crack growth analysis. This initial crack size assumption is based on postulating a leak path from the ID of the vessel through the two fillet welds and the shell wall. It was determined that it will take at least 40 years for this initial flaw to reach 3.1 inches. Based on the small crack growth, it is expected that all the indications are well below the allowable flaw sizes.

Similarly, the stress corrosion crack growth performed for the postulated circumferential through-wall flaw in the tank cylinder shows that it will take at least 18 years for a 0.35 inches long through-wall flaw to reach the allowable flaw size. No indications were observed in the vertical cylindrical shell during the current inspection. This does not imply that an indication does not exist in the vertical cylindrical shell.

CONCLUSIONS

Based on this evaluation, it is concluded that the observed indications in the base plate of the Monticello Standby Liquid Control tank are acceptable for operation until the next scheduled outage which is approximately one year away.

A postulated circumferential through-wall flaw in the cylindrical was also found to meet the acceptance criteria in Code Case N-705 for continued operation until the next scheduled outage. Note that, per the requirements of Code Case N-705, daily monitoring is required to ensure that the leakage is within acceptable limits.

The removal of a small boat sample at the edge of the base plate, away from the fillet weld of the cylindrical shell, for metallurgical examination will not impact the conclusions of this evaluation.

Please contact us if you have any questions. Thank you.

Prepared by:	*Reviewed by:*	*Approved by:*
G. A. Miessi	S. S. Tang, P.E.	G. A. Miessi
Associate	Associate	Associate