Xcel Energy®

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

June 2, 2016

L-MT-16-026
10 CFR 50.55a(z)(1)

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

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

Response to Request for Additional Information for Approval of an Alternative to Apply the BWRVIP Guidelines in Lieu of Specific ASME Section XI Code Requirements for Reactor Pressure Vessel Internals and Components Inspection (CAC No. MF7111)

References: 1) NSPM to NRC, "10 CFR 50.55a Request No. RR-010: Request for Approval of an Alternative to Apply the BWRVIP Guidelines in Lieu of Specific ASME Section XI Code Requirements for Reactor Pressure Vessel Internals and Components Inspection," (L-MT-15-083) dated November 20, 2015 (ADAMS Accession No. ML15324A305).

2) NRC e-mail to NSPM, "Draft Request for Additional Information RE: Monticello, RR-010, Relief Request to Implement BWRVIP (CAC MF7111)," dated April 19, 2016.

On November 20, 2015, in accordance with 10 CFR 50.55a(z)(1), the Northern States Power Company – Minnesota (NSPM), doing business as Xcel Energy, Inc., submitted a 10 CFR 50.55a request (Reference 1) for application of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Specifically, it was requested to use the Boiling Water Reactor Vessel and Internals Project (BWRVIP) guidelines in lieu of specific ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," requirements for inspection of the Monticello Nuclear Generating Plant (MNGP) reactor vessel internals.

On April 19, 2016, the U.S. Nuclear Regulatory Commission (NRC) requested additional information (RAI) from NSPM (Reference 2) to complete their review. The enclosure provides the requested information.

Summary of Commitments

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

Should you have questions regarding this letter, please contact Mr. Richard Loeffler at (763) 295-1247.

Peter A. Gardner
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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REQUEST FOR APPROVAL OF AN ALTERNATIVE TO APPLY THE BWRVIP GUIDELINES IN LIEU OF SPECIFIC ASME SECTION XI CODE REQUIREMENTS FOR REACTOR PRESSURE VESSEL INTERNALS AND COMPONENTS INSPECTION

(15 pages follow)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REQUEST FOR APPROVAL OF AN ALTERNATIVE TO APPLY THE BWRVIP GUIDELINES IN LIEU OF SPECIFIC ASME SECTION XI CODE REQUIREMENTS FOR REACTOR PRESSURE VESSEL INTERNALS AND COMPONENTS INSPECTION

By letter dated November 20, 2015, in accordance with 10 CFR 50.55a(z)(1), the Northern States Power Company – Minnesota (NSPM), doing business as Xcel Energy, Inc., submitted a 10 CFR 50.55a request (Reference 1) for application of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Specifically, it was requested to use the Boiling Water Reactor Vessel and Internals Project (BWRVIP) guidelines in lieu of specific ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," requirements for inspection of the Monticello Nuclear Generating Plant (MNGP) reactor vessel internals.

RAI 1

Table 1 of RR-010 compares the current ASME Code, Section XI examination category requirements with the current BWRVIP guideline requirements, as applicable to the MNGP. However, the acceptance standards of the two were not compared in the table. For ASME Item No. B13.20, the required VT-1 examination method could detect crack-like surface flaws on the RVI components, and the ASME Code requires, as one of the options, an analytical evaluation be performed for these components if the detected surface crack exceeds the allowable linear flaw standards of IWB-3510. Regarding disposition of detected flaws:

1. **identify the major differences in the flaw acceptance standard between the ASME Code and the applicable BWRVIP documents; and**

2. **discuss how RR-010 will change the disposition of detected flaws (using the B13.20 components as an example).**

Response to Sub-Item 1

There are no major differences between flaw acceptance standards of Section XI of the ASME Code and the applicable BWRVIP documents, although, there are some differences in evaluation reporting requirements and flaw re-inspection requirements.

The ASME Code and BWRVIP both allow flaw acceptance by analytical evaluation. All the components in Table 1 are B-N-1 and B-N-2 ASME components. Under Section XI of the ASME Code, B-N-1 and B-N-2 components containing relevant indications are evaluated in accordance with ASME Section XI IWB-3520.1, IWB-3520.2, and IWB-3430, as applicable. For B-N-1 and B-N-2 components, IWB-3520.1 and IWB-3520.2 require that actions to correct relevant conditions

meet the requirements of IWB-3142 prior to continued service. IWB-3142 allows acceptance of relevant indications by supplemental examination, corrective measures, repair/replacement activity or analytical evaluation. For analytical evaluation, IWB-3142.4 states:

> A component containing relevant conditions is acceptable for continued service if an analytical evaluation demonstrates the component's acceptability. The evaluation analysis and evaluation acceptance criteria shall be specified by the Owner. A component accepted for continued service based on analytical evaluation shall be subsequently examined in accordance with IWB-2420(b) and (c).

IWB-3430 specifies that the analytical evaluation of planar surface flaws meet the provisions of IWB-3600 for applicable materials.

Similar to Section XI of the ASME Code, the BWRVIP program allows flaws to be accepted by analytical evaluation. However, under the BWRVIP program, flaw evaluation analysis and evaluation acceptance criteria are specified by the BWRVIP rather than the Owner. The BWRVIP guidance requires that utilities evaluate inspection results according to the information contained in the latest revision of the applicable BWRVIP guidelines, and associated correspondence, as approved by the BWRVIP Executive Committee. The BWRVIP also requires that when new BWRVIP guidance approved by the Executive Committee includes changes to NRC approved BWRVIP guidance that are less conservative than those approved by the NRC, this less conservative guidance shall be implemented only after NRC approves the changes. The applicable BWRVIP technical guidance often invokes the use of ASME Section XI flaw evaluation techniques and acceptance criteria or references the applicable section of ASME Section XI for use in flaw evaluations. Upon approval of this alternative, NSPM would use the applicable BWRVIP acceptance standard for flaw evaluations.

For example, BWRVIP-48-A, "BWR Vessel and Internals Project, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines," (Reference 2) and BWRVIP-38, "BWR Vessel and Internals Project, BWR Shroud Support Inspection and Flaw Evaluation Guidelines," (Reference 3) are the applicable BWRVIP documents for inspection and evaluation of B13.20 and B13.30 ASME Section XI components as indicated in Table 1 of the alternative request. BWRVIP-48-A requires flaw evaluations to be performed in accordance with ASME Section XI as described later, herein (see RAI-1 Sub-Item 2).

For components under BWRVIP-38, the flaw evaluation invokes use of ASME Section XI structural margins for flaw evaluation acceptance criteria, Section XI flaw proximity rules, and use of Section XI IWB-3600 for the applicable materials. BWRVIP-38 also notes that the generic flaw evaluations, which are also to be used to perform detailed plant specific evaluations, provide flaw tolerance estimates for

each of the shroud support configurations in accordance with ASME Section XI requirements.

The re-inspection requirements for ASME Section XI and the BWRVIP are somewhat different, but both require re-inspection of components accepted by evaluation. ASME Section XI IWB-3142.4 states that components accepted by evaluation must be inspected in accordance with IWB-2420(b) and (c). IWB-2420(b) and (c) state:

> (b) If a component is accepted for continued service in accordance with IWB-3132.3 or IWB-3142.4, the areas containing flaws or relevant conditions shall be reexamined during the next three inspection periods listed in the schedule of the Inspection Program of IWB-2400. Alternatively, acoustic emission may be used to monitor growth of existing flaws in accordance with IWA-2234.
>
> (c) If the reexaminations required by IWB-2420(b) reveal that the flaws or relevant conditions remain essentially unchanged for three successive inspection periods, the component examination schedule may revert to the original schedule of successive inspections.

In accordance with the MNGP site procedures for the BWRVIP, relevant indications are re-inspected in accordance with the inspection schedule of the component or the interval specified in the flaw evaluation, whichever is shorter. For example, if a flawed component evaluation states that the component is acceptable by evaluation for 6 years and the component requires inspection every 10 years, the component and relevant indication would be reinspected every 6 years.

As previously noted, there are differences between ASME Section XI and the BWRVIP for evaluations that require submittal to the NRC. ASME Section XI IWB-3144 states:

> Evaluation analyses of examination results as required by IWB-3142.4 shall be submitted to the regulatory authority having jurisdiction at the plant site.

As such, for ASME Section XI exams that accept flaws in components for continued service by analytical evaluation, NSPM is required to submit the evaluations to the NRC.

The BWRVIP guidance differs from this ASME Section XI requirement since the BWRVIP evaluations of in-scope components are submitted to the NRC only if the evaluation deviates from the BWRVIP technical guidance. Flaw evaluations may also be submitted to BWRVIP if required by the applicable BWRVIP guidelines. In both cases, however, evaluation results are available to the regulatory authority for information. Upon approval of this alternative request, NSPM would submit evaluations in accordance with BWRVIP guidance and continue to make the

evaluation results available for information to the regulatory authority, that being the NRC.

Response to Sub-Item 2 (request repeated here for convenience)

discuss how RR-010 will change the disposition of detected flaws (using the B13.20 components as an example).

Upon approval of this alternative, flaws detected on ASME Section XI B-N-1 and B-N-2 components will be evaluated in accordance with the applicable BWRVIP flaw evaluation guidelines. For example, ASME Section XI B13.20, components will be inspected and relevant indications evaluated applying BWRVIP-48-A. Flaws identified in B13.20 components will be dispositioned in accordance Section 3.3 of BWRVIP-48-A which states:

> For any of the bracket attachment inspection flaw indications, the defect can be dispositioned based on the following:
>
> - The inspection acceptance criteria specified in IWB-3520 of ASME XI for examination category B-N-2, or
>
> - A structural evaluation and determination of the suitability of the bracket attachment for continued plant operation following the approach described in Section 4.3 of this report

Section 4.3 of BWRVIP-48-A requires that relevant indications must either satisfy the criteria in ASME Section XI IWB-3510, or apply IWB-3520.1, IWB-3142 and IWB-3600 to evaluate the indications, where applicable. If the components were to remain managed under the ASME Section XI, any relevant indications would have to satisfy the criteria under IWB-3510 or use IWB.3520.1, IWB-3142 and IWB-3600 to evaluate the indications. In the case of ASME Section XI B13.20 components, the BWRVIP guidance is identical to the ASME Section XI requirements. Upon approval of this alternative, the flaw evaluation process for the B13.20 components does not change since the BWRVIP-48-A flaw evaluation requirements invoke the use of ASME Section XI flaw evaluation requirements.

RAI 2

1. **The application references the BWR Vessel and Internals Inspection Summaries for Spring 2013 Outages dated April 11, 2014 (ADAMS Accession No. ML14125A303). The NRC staff reviewed this report and noted that although Table 1 of RR-010 showed both the ASME examination requirements and the alternative BWRVIP examination requirements for the ASME Code Item B13.10, "Reactor Vessel Interior," the April 11, 2014, report showed no inspection record for this item. Given that the most recent outage**

report did not contain these inspection results, describe if or how RR-010 will change the recording and reporting of RVI inspection results.

The spring 2013 Refueling Outage (RFO) was the first of two outages in Period 1 of the 5th ISI Interval, and no B-N-1 examinations were scheduled or performed during the refueling outage. Therefore, no examination results were available for inclusion.

During the second outage in Period 1 (2015 RFO), B-N-1 category examinations were performed concurrently with examinations on the core shroud support plate between jet pump assemblies, including the access hole cover regions. Only one condition, a small, round "BB size" piece of foreign material (weld slag, or spatter) that had settled on the shroud support plate near Jet Pump 01 (JP01) was identified and removed using a vacuum. No other B-N-1 conditions were identified.

As discussed in Section E.1 of the proposed alternative, conditions on reactor vessel internal components are reported under the BWRVIP reporting process (described in Section E.2), including deviations from BWRVIP guidelines. The format of the current BWRVIP Vessel Internals Inspection Summaries report, include the component, date, inspection method, a summarized description of the component or area, results, corrective actions, or special notations, as needed, and will not be changed.

Approval of this alternative will change how NSPM reports acceptance of vessel internal components requiring analytical analysis to demonstrate acceptable continued service. ASME Section XI IWB-3144(b) requires submittal of these evaluations to the regulatory authority, i.e., the NRC, for review. ASME Section XI Code Case N-532-5, "Repair / Replacement Activity Documentation Requirements and Inservice Inspection Summary Report Preparation and Submission, Section XI, Division 1," (Reference 4), reports these items in Table 1 of the Owner's Activity Report (OAR-1) that is submitted to the NRC.

Under the BWRVIP reporting process, analytical evaluations performed in accordance with the BWRVIP Inspection and Evaluation Guidelines are not submitted to the NRC, and as the alternative to ASME Section XI for reporting, they will not be included in the OAR-1, Table 1. The analytical evaluations will, however, be provided to the Authorized Nuclear Inservice Inspector (ANII). If an evaluation deviates from the BWRVIP guidance (e.g., the assumptions, methods, acceptance criteria, etc.), these analyses, including any subsequent revisions, are submitted to the NRC and BWRVIP, as well as the ANII.

2. **The April 11, 2014, inspection summaries indicate that flaws were detected in the core shroud, shroud support, core spray piping, and jet pump assembly. For the NRC staff to determine the adequacy of applying the BWRVIP for these detected flaws:**

   (a) provide a brief discussion of evaluation of the worst detected flaw (the one with the least margin) in each of the four components.

   (b) identify whether any of the flawed components are ASME Code components but were inspected and evaluated in accordance with the BWRVIP reports. If such components exist and the BWRVIP report inspection and evaluation methodologies for them are more relaxed than the corresponding ASME Code, Section XI methodologies, confirm whether requests for alternative were submitted for prior ISI intervals.

   (c) confirm that a plant-specific leakage assessment was performed, as required by BWRVIP-18 (core spray), BWRVIP-41 (jet pump assembly), and BWRVIP-76 (core shroud) or the ASME Code, Section XI for operability. If confirmed, provide a discussion of the margin between the calculated leakage and the allowable leakage based on adequate core cooling to maintain peak clad temperature within allowed limits during postulated loss of coolant accidents. If not confirmed, provide justification for not performing the required leakage assessment.

Response to Sub-Item (a) (request repeated here for convenience)

(a) provide a brief discussion of evaluation of the worst detected flaw (the one with the least margin) in each of the four components.

Core Shroud

NSPM performed inspection of the core shroud using VT-3 in accordance with the requirements of ASME Section XI and no indications were identified. NSPM also performed inspection of the core shroud using UT in RFO27 (2015) in accordance with the requirements of the BWRVIP program. The UT inspection identified indications in core shroud horizontal welds, H1 through H6 and core shroud vertical welds V2 and V3. The MNGP core shroud indications were evaluated using the methodology outlined in BWRVIP-76 R1-A, "BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines," (Reference 5). BWRVIP-76 R1-A provides generic plant acceptance criteria and guidance for performance of plant specific evaluation for welds where the remaining ligament configuration and/or fluence exceeds the assumptions in the generic plant acceptance criteria. Those welds that require plant-specific analysis are more limiting than those welds that were accepted under the generic acceptance criteria

either by percentage of the inspected weld found flawed, weld fluence, inspection coverage or a combination of all three factors. Core shroud flaw evaluations determine whether the given ligament configuration for each core shroud weld satisfies the plant structural safety margins rather than evaluating each flaw on the core shroud individually. Welds requiring plant specific analysis are evaluated using one or more of three methodologies, listed in BWRVIP-76-R1-A; limit load, linear elastic fracture mechanics (LEFM) and elastic plastic fracture mechanics (EPFM). The methodologies are similar to those described in ASME Section XI Appendix C. The core shroud plant specific evaluations identify the required structural margin for normal/upset (Service Level A/B) and emergency/faulted (Service Level C/D) conditions for each weld in the form of a minimum safety margin for limit load and LEFM, allowable crack length for limit load and maximum applied tearing modulus (Tapp) for EPFM. The results of the evaluation for each weld requiring plant-specific evaluation are shown below in Tables A, B, C.

Table A: Summary of Limiting Shroud Horizontal Weld Evaluation Results

Shroud Weld	Evaluation Method	Service Level A/B		Service Level C/D	
		Results	Acceptance Criteria	Results	Acceptance Criteria
H1	Limit Load	SF = 51.18	SF > 2.77	SF = 27.87	SF>1.39
	EPFM	N/A	N/A	N/A	N/A
H3	Limit Load	SF = 36.28	SF > 2.77	SF = 19.78	SF>1.39
	EPFM	T_{app} = 0.112	T_{app} < 59	T_{app} = 0.092	T_{app} < 71
H4	Limit Load	SF = 34.19	SF > 2.77	SF = 18.31	SF > 1.39
	EPFM	T_{app} = 0.141	T_{app}<30	T_{app} = 0.123	T_{app} <32

Table B: Summary of Shroud Vertical Weld Limit Load Evaluation Results

Shroud Weld	Evaluation Method	Service Level A/B		Service Level C/D	
		Bounding Crack Size	Allowable Crack Length	Bounding Crack Size	Allowable Crack Length
V3	Limit Load	20.17 in.	85.24 in.	20.17 in.	84.59 in.
V4	Limit Load	20.17 in.	85.24 in.	20.17 in.	84.59 in.

Table C: Summary of Shroud Vertical Welds LEFM Evaluation Results

Shroud Weld	Evaluation Method	Service Level A/B		Service Level C/D	
		Calculated Stress Intensity Factor	Allowable Stress Intensity Factor	Calculated Stress Intensity Factor	Allowable Stress Intensity Factor
V3	LEFM	22.40 ksi-$in^{0.5}$.	112.0 ksi-$in^{0.5}$	27.49 ksi-$in^{0.5}$	112.0 ksi-$in^{0.5}$.
V4	LEFM	22.40 ksi-$in^{0.5}$.	112.0 ksi-$in^{0.5}$.	27.49 ksi-$in^{0.5}$	112.0 ksi-$in^{0.5}$.

As shown in the tables above, the evaluation process differs between vertical and horizontal welds in accordance with BWRVIP-76 R1-A. Qualitatively, the H4 weld also has the deepest flaw that extends through half of the shroud thickness (0.88

inches deep or 50% through-wall). For the vertical welds, V3 and V4 both have identical structural margin based on the flaw evaluation results. For all the core shroud welds, the structural margin is acceptable for at least 10 years in accordance with BWRVIP-76 R1-A.

Shroud Support

NSPM has inspected all accessible areas of the H8 and H9 welds from both the topside and the underside of the shroud support plate. All locations on the underside of the H8 and H9 welds that were inspected contained indications. No indications have been identified on the topside of the H8 and H9 welds. NSPM has inspected all fourteen shroud support leg H10 welds. All fourteen shroud support leg H10 welds contain indications. The flaws in the H8, H9 and H10 welds are considered to be the worst detected flaws in the shroud support structure based on bounding crack profiles assumed for the respective structural evaluations. Two bounding crack profiles were assumed for the H8 and H9 welds in order to evaluate the indications. For crack profile 1, the evaluation demonstrates that 87% of the H8 and H9 welds can be completely cracked through-wall, and the remaining 13% can be assumed to be cracked 2/3 of the way through wall, and the ASME Code requirement for structural margin (SF=1.4) is still met. For crack profile 2, the H8 and H9 welds are assumed to be cracked 100% circumferentially and 75% through-wall and the welds still meet the ASME Code requirement for structural margin. There is no evidence of through-wall cracking on the H8 and H9 welds based on the visual inspection of both the topside and bottom side of the welds. The flaws in the H8 and H9 welds are not expected to propagate through more than approximately 66% of the weld material due to the compressive weld residual stress (WRS) distribution, the favorable water chemistry conditions and the negligible contribution of fatigue crack growth. Since there is no evidence of through-wall cracking and the flaws are not expected to propagate more than 66% through-wall, both crack profile cases are bounding of the current known condition of the H8 and H9 welds. The evaluation of the H8 and H9 welds remain acceptable provided that the condition of the H8 and H9 welds remain bounded by the assumed crack profiles in the evaluation.

Similar to the H8 and H9 welds, the H10 weld indications were evaluated using a bounding crack profile. The bounding crack profile assumes that all of the H10 welds are cracked to 31.2% of the weld length and demonstrates that the calculated structural safety margin meets the ASME Code required structural safety margin. There is no evidence that any of the welds have reached 31.2% of the weld length for any of the H10 welds based on visual inspection indicating the evaluation assumption significantly bounds the weld condition. The evaluation of the H10 welds remains acceptable provided the condition of the H10 welds remain bounded by the assumed crack profile in the evaluation.

Table D provides a summary of the calculated structural safety margin and the required structural safety margin for the H8, H9 and H10 welds.

Table D: Summary of Shroud Support Weld Flaw Evaluation Results

Shroud Support Weld	Evaluation Method	Service Level A/B		Service Level C/D	
		Calculated Structural Safety Margin	Allowable Structural Safety Margin	Calculated Structural Safety Margin	Allowable Structural Safety Margin
H8/H9 (Crack Profile 1)	Limit Load	17.38	2.4	1.48	1.4
H8/H9 (Crack Profile 2)	Limit Load	58.03	2.4	4.93	1.4
H10	Limit Load	6.13	2.4	1.40	1.4

The above summary demonstrates that adequate structural safety margin exists for all shroud support welds.

Core Spray Piping

The MNGP has one flaw in the core spray piping system. Other indications discovered early in plant life in the core spray piping have since been dispositioned as fabrication induced weld anomalies and are no longer tracked by the program as relevant indications. The one flaw is located in the P3A weld which is a core spray piping tee-box to piping weld on the "A" downcomer at the 90 degree vessel azimuth location. This flaw was originally identified in 1993. In 1994, NSPM installed mechanical clamps at the core spray tee-box location to ensure the structural integrity of the tee-box to piping welds. Both the P3A weld flaw and the repair clamp are inspected every outage to validate structural integrity.

Jet Pumps

All MNGP jet pump indications are either in adjusting set screw tack welds, beam bolt retainer tack welds or on the jet pump secondary riser braces. All set screw tack welds and beam bolt retainer tack welds were either repaired and/or dispositioned as having no safety or structural impact. The MNGP jet pumps have two sets of riser braces, a primary and a secondary riser brace. The secondary riser braces, including any indications, are not required and will not affect the operation of the jet pumps.

Response to Sub-Item (b) (request repeated here for convenience)

(b) identify whether any of the flawed components are ASME Code components but were inspected and evaluated in accordance with the BWRVIP reports. If such components exist and the BWRVIP report inspection and evaluation methodologies for them are more relaxed than the corresponding ASME Code, Section XI methodologies, confirm whether requests for alternative were submitted for prior ISI intervals.

The components that are included in the ASME Section XI program as B-N-1 and B-N-2 components are listed in Table 1 of the request for an alternative, RR-010. Additional line-items are proposed to be added to Table 1 and are provided in Table 1a, that is included as Attachment 1 to this enclosure. NSPM currently performs inspections and evaluations of these components at the MNGP in accordance with both the applicable ASME Section XI and BWRVIP requirements, therefore no alternative under 10 CFR 50.55a(z)(1) has been previously necessary.

Response to Sub-Item (c) (request repeated here for convenience)

(c) confirm that a plant-specific leakage assessment was performed, as required by BWRVIP-18 (core spray), BWRVIP-41 (jet pump assembly), and BWRVIP-76 (core shroud) or the ASME Code, Section XI for operability. If confirmed, provide a discussion of the margin between the calculated leakage and the allowable leakage based on adequate core cooling to maintain peak clad temperature within allowed limits during postulated loss of coolant accidents. If not confirmed, provide justification for not performing the required leakage assessment.

No leakage assessment is necessary for the MNGP jet pumps because none of the indications in the jet pump components are part of the pressure boundary of the jet pumps and no leakage pathway exist for loss of flow.

NSPM has not observed through-wall flaws in the core shroud. The deepest flaw in the MNGP shroud is 0.88 inches deep which is 50% through-wall. In accordance with BWRVIP-76 R1-A, leakage from cracking must be considered only when through-wall cracking is observed by inspection. No leakage assessment of the indications in the core shroud welds is required.

A plant specific leakage assessment was performed for the crack in the P3A weld in the core spray piping system in accordance with BWRVIP-18 R1-A. The total leakage from core spray piping flaws, including the consideration for hidden weld leakage is 25.6 gpm. The total assumed leakage for the core spray piping system is 108.8 gpm which includes leakage from core spray vent holes and the core spray tee-box repair. The core spray piping system has 12.2 gpm of remaining margin to

support adequate core cooling to maintain peak clad temperature within allowed limits during postulated loss of core cooling accidents.

RAI-3

RR-010 states under Section E, Footnote 4, "The inspection guidance of BWRVIP-25: BWR Core Plate Inspection and Flaw Evaluation Guidelines, is not applicable since in Reference 2, NUREG-1865 (Safety Evaluation Report for the MNGP license renewal), Section 4.8, "Stress Relaxation of Rim Holddown Bolts," an analysis was approved for MNGP. However, BWRVIP-25 is included for potential, future applicability."

Contrary to the information in Footnote 4, the approval of the MNGP plant-specific analysis for the rim holddown bolts in NUREG-1865 has simply resolved a major action item in the September 6, 2000, SE for BWRVIP-25 and, because of this, NSPM can apply BWRVIP-25 to MNGP. To not perform the required inspections on the core plate under ASME Section XI, Examination Category B-N-2, "Integrally Welded Core Support Structures," MNGP needs to apply BWRVIP-25 in the 5th ISI interval as an alternative, regardless of which option in BWRVIP-25 NSPM chooses to follow. Because the use of the analysis described in NUREG-1865 would require the application of BWRVIP-25, clarify if the subject components are covered by the requested relief or would be subject to the requirements of the ASME Code if the request relief were granted.

Response

The core plate is an ASME Code component and the accessible surfaces of the core plate are inspected under the ASME Section XI program for B-N-2/B13.40 when the fuel cells are vacated. NSPM has performed the inspections required by ASME Section XI to date.

This request for an alternative, RR-010, should also have specified BWRVIP-25, "BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guidelines," (Reference 6), within Table 1. A line-item for BWRVIP-25 is proposed to be added to Table 1. This new line-item is provided in Table 1a, included as Attachment 1 to this enclosure. An analysis and evaluation similar to the guidance of BWRVIP-25, Appendix A, was performed on the MNGP core plate hold-down bolts. This analysis provided the basis for not performing the inspections required in BWRVIP-25 and was accepted by the NRC in NUREG-1865, "Safety Evaluation Report Related to the License Renewal of the Monticello Nuclear Generating Plant," (Reference 7). NSPM requests to include BWRVIP-25 within the scope of this alternative request. Upon approval of this alternative, the core plate will be managed in accordance with BWRVIP-25 and will continue to credit the evaluation in lieu of the inspections as described in NUREG-1865.

RAI-4

Regarding BWRVIP-41, Revision 3 and BWRVIP-47-A, RR-010 states under Section E, Footnote 5, "However, none of the components are B-N-1 or B-N-2 components as defined by ASME Section XI and are outside of the scope of this 10 CFR 50.55a(z)(1) request for an alternative." Consistent with your approach of not listing irrelevant BWRVIP reports (such as BWRVIP-42, Revision 1 and BWRVIP-139-A) in the list of Section E.1 of RR-010, please explain the inclusion of BWRVIP-41, Revision 3 and BWRVIP-47-A or consider deletion from the list to avoid confusion.

Further, Section 8 of BWRVIP-183 has a footnote, indicating that the examinations recommended by the guidelines in BWRVIP-183 do not supersede the requirements of the ASME Code. Please confirm that NSPM' s inspections of top guide beams in the future do not supersede the ASME Code requirements. As such, please explain the inclusion of BWRVIP-183 in the list of Section E.1 of RR-010 or consider deletion from the list. Ensure the footnotes related to the list of Section E.1 of RR-010 are updated as necessary.

Response

NSPM intended to include each of the guidelines for use with this proposed alternative request submitted as RR-010.

BWRVIP-41, Revision 3, "BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," (Reference 8) and BWRVIP-47-A, "BWR Vessel and Internals Project, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines," (Reference 9) are listed in Table 1 of the alternative request for ASME Item B13.10, and are applicable for providing overview exams during Jet Pump and Lower Plenum inspection activities as the alternative to B13.10 requirements. BWRVIP-47-A is also provided as applicable to the Control Rod Guide Tubes (CRGTs). Further discussion of BWRVIP-47-A for the CRGTs is provided below.

With regard to Footnote 5, NSPM would like to clarify that Footnote 5 was intended to describe the Cast Austenitic Stainless Steel (CASS) components that fall within the BWRVIP-41, Revision 3 and BWRVIP-47-A guidelines, which are the Jet Pump inlet elbow, diffuser collar, mixer flare, mixer flange, and riser transition piece in BWRVIP-41, Revision 3 and the orificed fuel support in BWRVIP-47-A.

A revised Footnote 5 to clarify the CASS components (see underlined below), and that supersedes the prior footnote, is provided below:

> NUREG-1865 (Reference 2), Subsection 3.0.3.1.8, "Thermal Aging & Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program," summarizes the inspection of MNGP CASS components. For the purpose of

condition monitoring the inspection schedule is managed in accordance with the guidance for B-N-1 and B-N-2 components under ASME Section XI. However, none of the CASS components are B-N-1 or B-N-2 components as defined by ASME Section XI and are outside of the scope of this 10 CFR 50.55a(z)(1) request for an alternative.

BWRVIP-183, "BWR Vessel and Internals Project, Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines," (Reference 10), provides for examination of the Top Guide, namely the grid beams. Although BWRVIP-183 is used for inspection of the Top Guide for the BWRVIP program for MNGP, the Top Guide is not a specified component in the MNGP ASME XI ISI Program, therefore, the footnote in Section 8 of BWRVIP-183 is not applicable for MNGP.

In addition to BWRVIP program inspections performed per BWRVIP-183, inspections of the Top Guide assembly are also performed under BWRVIP-26-A, "BWR Vessel and Internals Project, BWR Top Guide Inspection and Flaw Evaluation Guidelines," (Reference 11). BWRVIP-26-A was included in Section E.1 and Table 1 of the alternative request, as one of the proposed BWRVIP guidance documents that will provide overview exams as an alternative for Item No. B13.10. Because BWRVIP program inspections performed on the Top Guide components for BWRVIP-183 can provide information similar to BWRVIP-26-A that was proposed as an alternative for Item No. B13.10, NSPM intends to keep BWRVIP-183 in the list of applicable referenced BWRVIP guidelines in Section E.1 of RR-010, and proposes to add the guideline to Table 1 as an alternative guideline applicable for Item No. B13.10 exam. As part of this RAI response, NSPM is supplementing Table 1 of the alternative request with a line-item adding BWRVIP-183 to the table under ASME Item No. B13.10. This new line-item is provided in Table 1a, included as Attachment 1 to this enclosure.

During review of RAI-4, NSPM determined that additional information should be provided in Table 1 of the alternative request for ASME Item B13.40 and the applicability of BWRVIP-47-A. NSPM includes the CRGTs in the 5th Interval ISI Plan as welded core support structures for examination under ASME Item B13.40, if they become accessible when a fuel cell is vacated. The guideline was included in Section E.1 of the alternative request but an entry was not included for the CRGTs under ASME Item No. B13.40 in Table 1 of the request. NSPM is supplementing Table 1 with a line-item adding BWRVIP-47-A to the table under ASME Item No. B13.40 for CRGTs. This new line-item is provided in Table 1a, included as Attachment 1 to this enclosure.

REFERENCES

1. Letter from NSPM to NRC, "10 CFR 50.55a Request No. RR-010: Request for Approval of an Alternative to Apply the BWRVIP Guidelines in Lieu of Specific ASME Section XI Code Requirements for Reactor Pressure Vessel Internals and Components Inspection," (L-MT-15-083), dated November 20, 2015

2. BWRVIP-48-A: "BWR Vessel and Internals Project, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines," dated June 2004

3. BWRVIP-38: "BWR Vessel and Internals Project, BWR Shroud Support Inspection and Flaw Evaluation Guidelines," dated September 1997

4. ASME Section XI Code Case N-532-5, "Repair / Replacement Activity Documentation Requirements and Inservice Inspection Summary Report Preparation and Submission Section XI, Division 1," dated January 4, 2011

5. BWRVIP-76, Revision 1-A: "BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines," dated April 2015

6. BWRVIP-25: "BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guidelines," dated December 1996

7. NUREG-1865, "Safety Evaluation Report Related to the License Renewal of the Monticello Nuclear Generating Plant," dated October 2006

8. BWRVIP-41, Revision 3, "BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," dated September 2010

9. BWRVIP-47-A: "BWR Vessel and Internals Project, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines," dated June 2004

10. BWRVIP-183: "BWR Vessel and Internals Project, Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines," dated December 2007

11. BWRVIP-26-A: "BWR Vessel and Internals Project, BWR Top Guide Inspection and Flaw Evaluation Guidelines," dated November 2004

TABLE 1a: MNGP Comparison of ASME Examination Category B-N-1 and B-N-2 Requirements With BWRVIP Guidance Requirements (Note 1)

Component	ASME Examination Requirements				BWRVIP Examination Requirements			
	ASME Item No. (Table IWB 2500-1)	**ASME Exam Scope**	**ASME Exam Type**	**ASME Frequency**	**Applicable BWRVIP Document**	**BWRVIP Exam Scope**	**BWRVIP Exam**	**BWRVIP Frequency**
Reactor Vessel Interior	B13.10	Accessible areas	VT-3	Each Period in a 10-Year Interval	BWRVIP-183	Overview examination of components during BWRVIP examinations meets the intent of the Code VT-3 inspection requirements.		
Welded Core Support Structure – Core Plate (when accessible, fuel cells vacated)	B13.40	Accessible surfaces	VT-3	Each 10-Year Interval	BWRVIP-25 Section 3.2.2 Table 3-2	Rim Hold-down Bolts	UT or EVT-1	See Note 6.
Welded Core Support Structure – Control Rod Guide Tubes (CRGTs), Interior (when accessible, fuel cells vacated)	B13.40	Accessible surfaces	VT-3	Each 10-Year Interval	BWRVIP-47-A Section 3.2.2 Table 3-3	CRGT-1, Sleeve to alignment lug weld	VT-3	10% in the first 12-years with 5% min. in first 6 years
						CRGT-2 Body to Sleeve Weld, CRGT-3 Base to Body Weld	EVT-1	
						FS/GT-APRIN-1 Guide Tube and Fuel Support Alignment Pin-to-Core Plate Weld, and Pin Itself	VT-3	

NOTES ([Notes 1 through 5 occur in Table 1. To align with this table being appended to Table 1 included in the alternative request, Note 6 is the next available number.)

1. This Table provides only an overview of the requirements. For more details, refer to ASME Section XI, Table IWB-2500-1, and the appropriate BWRVIP document.

6. An analysis performed for License Renewal (see NUREG-1865) provided an alternative to the inspection requirements of BWRVIP-25.