

August 12, 2011

MEMORANDUM TO: Timothy R. Lupold, Chief  
Piping and NDE Branch  
Division of Component Integrity  
Office of Nuclear Reactor Regulation

FROM: Jay W. Collins, Senior Materials Engineer */RA by MAudrain for/*  
Piping and NDE Branch  
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Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF PUBLIC MEETING BETWEEN THE NUCLEAR  
REGULATORY COMMISSION STAFF AND INDUSTRY  
REPRESENTATIVES ON IMPLEMENTATION OF ASME CODE  
CASE N-770-1

On July 12, 2011, the U.S. Nuclear Regulatory Commission (NRC) staff met with industry representatives in Rockville, Maryland to discuss pressurized water reactor licensee's implementation of American Society of Mechanical Engineer's Boiler and Pressure Vessel (ASME) Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities," in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(6)(ii)(F).

The meeting began with introductions and a brief summary of the final rule issued on June 21, 2011 to update 10 CFR 50.55a. Division of Component Integrity (DCI) staff provided a presentation explaining each condition on the use of ASME Code Case N-770-1 in 10 CFR 50.55a(g)(6)(ii)(F)(1) through (10). Of note, the staff explained that implementation of the requirements set forth in ASME Code Case N-770-1, as conditioned, were related to outage timing and the specific categorization of each weld. For welds mitigated with full structural weld overlays, optimized weld overlays, and the MSIP™ technique, licensees were required to implement the requirements of ASME Code Case N-770-1, as conditioned, by the first refueling outage that starts after August 22, 2011. For all other butt welds that rely on Alloy 82/182 for structural integrity, licensees were required to complete baseline inspections by the end of the first refueling outage that starts after January 20, 2012. DCI staff also explained that previously approved alternatives to ASME Code requirements regarding inspection frequency or coverage remained applicable during the duration authorized by the NRC. Further, that licensees may, if the examination was previously performed within the inspection frequency of Table 1 of ASME Code Case N-770-1, count these inspections as meeting the baseline inspection requirement of 10 CFR 50.55a(g)(6)(ii)(F)(3). If a licensee's previous inspection did not meet ASME Code Section XI, Appendix VIII requirements and the Code required examination volume of essentially 100%, then relief in accordance with 10 CFR 50.55a(a)(3) remained an option to count these exams as meeting the baseline examination requirement.

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The meeting attracted persons from various industry groups and organizations. The preliminary feedback from the attendees was that the meeting was productive and constructive. A list of meeting attendees is provided in Enclosure 1. The meeting was successful in helping to achieve a better understanding between the NRC and industry on the implementation of ASME Code Case N-770-1, as required under 10 CFR 50.55a(g)(6)(ii)(F). The presentation slides are provided in Agencywide Documents Access and Management System (ADAMS) Accession Number ML11189A220.

Questions were solicited prior to and during the meeting to ensure clear communications on the NRC's expectations for the implementation of ASME Code Case N-770-1, as conditioned. DCI staff addressed several questions during the meeting. In order to insure clarity on each issue, DCI staff summarized and answered in Enclosure 2 each question provided to the staff before, during, and, as time permitted, after the meeting.

Enclosures:

1. List of Attendees
2. Q&A Document

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DATE	08/03/2011	08/12/2011	08/11/2011	08/12/2011

\* per e-mail

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## LIST OF ATTENDEES

SUMMARY OF PUBLIC MEETING BETWEEN THE NUCLEAR REGULATORY COMMISSION  
(NRC) STAFF AND INDUSTRY REPRESENTATIVES ON IMPLEMENTATION OF ASME CODE  
CASE N-770-1, AS CONDITIONED  
July 12, 2011, in Rockville, Maryland

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NRC Public Meeting on ASME Code Case N-770-1 Implementation  
Questions and Answers

Implementation

Q 1. What does “implement the requirements” by this date mean? What constitutes implementation of the requirements of American Society of Mechanical Engineers (ASME) Code Case N-770-1? Does this mean that by August 22, 2011, licensees would need to include this requirement in their corrective action program, or include the requirements within their In-Service Inspection programs, or something else?

A 1. “Implementation of the requirements” for 50.55a(g)(6)(ii)(F)(1) means that a licensee is required, by regulatory authority, to meet the inspection requirements at the frequencies specified in Code Case N-770-1, with conditions as imposed in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(6)(ii)(F), by the first refueling outage starting after August 22, 2011.

It is the licensee’s burden to enact changes to their existing programs or initiate new programs to ensure these requirements are met. Licensees are given this time from the publication of a rule to a rule’s effectiveness date to allow for review and implementation within a licensee’s programs. There is no regulatory requirement that by the first refueling outage starting after August 22, 2011, all procedures that could be affected by this rulemaking be updated. However, if inspections are required to be performed during that outage, qualified procedures are required to be used according to the rule.

Q 2. The implementation timeline of 10 CFR 50.55a(g)(6)(ii)(F)(1) states that licensees shall implement the requirements of Code Case N-770-1, with conditions as specified in paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10), by the first refueling outage after August 22, 2011.

What are the implementation expectations for plants with refueling outages starting after August 22, 2011, but prior to the January 20, 2012, condition specified in the baseline requirement of 50.55a(g)(6)(ii)(F)(3)?

A 2. If a licensee has a refueling outage starting between August 22, 2011 and January 20, 2012, the implementation expectations for plants are to perform inspections of any welds mitigated by NRC approved full structural and optimized weld overlays and Mechanical Stress Improvement Process (MSIP™) in accordance with the requirements of 10 CFR 50.55a(g)(6)(ii)(F). Baseline examinations for Inspection Item A-1, A-2 and B welds are not required to be completed until the end of the first refueling outage that starts after January 20, 2012. As a licensee is not required to implement the requirements for baseline examinations of Inspection Item A-1, A-2, and B welds during a fall 2011 refueling outage, Nuclear Regulatory Commission (NRC) expects current industry inspection requirements will remain applicable until the first refueling outage that starts after January 20, 2012.

- Q 3. What is the date that the rule invoking the use of Code Case N-770-1 becomes effective?
- A 3. The overall rule to update 10 CFR 50.55a that includes Code Case N-770-1 is effective on July 21, 2011
- Q 4. Please define the terms publication date and effective date.
- A 4. The publication date of the rule is June 21, 2011 and is used as a reference for the rule language in the *Federal Register*. The "effective date", typically is a specific day, usually 30 days after the publication date, when the rule becomes effective. However, for the specific requirements of the new section, 10 CFR 50.55a(g)(6)(ii)(F), which requires implementation of Code Case N-770-1 with conditions, the NRC extended the effective date to allow more time for the implementation of the requirements. The effective date for this section only is 60 days after the publication date, and since the inspections are required during refueling outages, the effective date is the first refueling outage to start after August 22, 2011.

#### Baseline Examination Requirements

- Q 5. Do the baseline examination requirements need to be completed when the rule becomes effective? If not, when do the baseline inspection requirements need to be completed?
- A 5. No, the baseline examinations are required to be completed by the end of the first refueling outage starting after January 20, 2012.
- Q 6. If a refueling outage starts before January 20, 2012, but does not finish before January 20, 2012, are the baseline examination requirements applicable to that outage?
- A 6. No, the baseline examinations are required to be completed by the end of the first refueling outage that starts after January 20, 2012.
- Q 7. The baseline examination requirement of 10 CFR 50.55a(g)(6)(ii)(F)(3) states that other previous examinations can be used to meet the baseline requirement provided NRC approval of alternate inspection requirements in accordance with paragraphs 10 CFR 50.55a (a)(3)(i) or (a)(3)(ii) is granted "prior to the end of the next refueling outage after January 20, 2012."

Slide 14 from the NRC public meeting on N-770-1 implementation states that NRC approval of alternate inspection requirements in accordance with paragraphs (a)(3)(i) or (a)(3)(ii) is granted "prior to the end of the next refueling outage starting after January 20, 2012."

Please confirm that a plant starting a refueling outage prior to January 20, 2012 and potentially completing that refueling outage after January 20, 2012 does not require NRC approval of alternate inspection requirements in accordance with paragraphs (a)(3)(i) or (a)(3)(ii) prior to the completion of that outage.



- A 7. The baseline examinations are required to be completed by the end of the first refueling outage that starts after January 20, 2012. Therefore, NRC approval of alternate baseline inspection requirements in accordance with paragraphs 10 CFR 50.55a(a)(3)(i) or (a)(3)(ii) is not required for a plant that started a refueling outage before January 20, 2012, regardless of the competition date of that outage.
- Q 8. Using an example where a plant has 4 Inspection Item B welds that have not been inspected in accordance with Section XI, Appendix VIII requirements, including examination volume of essentially 100%, would the baseline inspection require all 4 welds to be inspected volumetrically?
- A 8. Yes, Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), requires that all four (4) Inspection Item B welds referred to in the above question receive a baseline volumetric examination. Note also that 100% of Inspection Item B welds are required to be inspected by visual and volumetric examination methods. Sample inspection of Inspection Item B welds does not apply to either the baseline or periodic examinations.
- Q 9. Is it the Staff's position that a Licensee may credit a previously performed examination with limited coverage for meeting the baseline examination required under (g)(6)(ii) if it has been previously approved by the NRC under the provisions of (g)(6)(i)?
- A 9. Yes, the Licensee may credit a previously performed examination with limited coverage for meeting the baseline examination required under (g)(6)(ii) if such limited coverage examination has been previously approved by the NRC. See the response to question 10, below.

#### Prior NRC Approval of Section XI, Appendix VIII Examination Coverage

- Q 10. Do the requirements of Code Case N-770-1, with conditions as specified in paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10), negate the approval of coverage limitations previously approved by the NRC? In other words, if coverage was demonstrated to be impractical to the NRC and accepted by the NRC, does the weld need to be re-examined prior to the next scheduled examination as determined by Code Case N-770-1, or is an alternative required if a baseline examination meeting the requirements of  $\geq 90\%$  is not completed before the end of the first refueling outage that is after January 20, 2012?
- A 10. No, the requirements of (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10), do not negate the approval of coverage limitations previously approved by the NRC. Per the statements of consideration for the final rule, dated June 21, 2011, for condition (g)(6)(ii)(F)(4), "In all of these cases, the previously-approved alternative will continue to apply for the duration authorized by the NRC as the final rule does not revoke previous NRC-approved alternatives or relief requests." However, once the applicability of this relief request is completed, compliance with the coverage requirements of Code Case N-770-1 will be enforced and the licensee would be required to obtain essentially 100% coverage or would need to pursue NRC approval of alternative coverage requirements.

Requests for Approval of Alternative Inspection Requirements

Q 11. If relief is required for coverage, what are NRC expectations for submittal, i.e., before outage, during outage, or after outage?

A 11. Alternative inspection requirements to those contained in Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), should be submitted and authorized by the NRC pursuant to 10 CFR 50.55a(a)(3)(i) or (a)(3)(ii) prior to implementation. Implementation means crediting an examination to fulfill the requirements of the code case. If the code case requires a licensee to perform an examination during an outage and when the examination is performed, the code case required examination volume coverage is not obtained, then the NRC would expect the licensee to have an alternative authorized prior to exiting the outage.

Q 12. Examination in last interval to Section XI, Appendix VIII, did not obtain essentially 100% of the required examination volume for circumferential scan for axial flaws. We submitted for relief and it was approved. Does NRC expect relief to be submitted again before next outage in the spring of 2012?

A 12. The licensee in this case may wish to take credit for the examination performed during the last interval for the baseline examination. This is an acceptable approach for performing the baseline examination provided that the next inspection, for example in the spring of 2012, is within the reinspection interval required for these welds.

In any case, for the next inspection in a new interval, the licensee is required to submit a new relief request (request for authorization of alternative examination requirements) to the NRC and obtain NRC authorization of the alternative examination requirements prior to implementation to be in compliance with the requirements of 10 CFR 50.55a and Code Case N-770-1.

Relief from inspection coverage requirements is only provided for a single examination as, previous to the requirements of Code Case N-770-1, examinations were only required once per interval. Relief from inspection coverage requirements cannot be carried forward to future inspections required by Code Case N-770-1 and the conditions imposed by 10 CFR 50.55a(g)(6)(ii)(F).

Q 13. Please clarify the need for submitting a relief request for coverage prior to performing the exam. If a utility performed the examination previously and obtained a specific percent coverage and NRC approved the alternative coverage, please confirm that as long as that specific percent coverage or greater was obtained, there would not be a need to submit a relief request after the examination was completed.

A 13. Alternative inspection requirements to those contained in Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), have to be submitted and approved by the NRC pursuant to 10 CFR 50.55a(a)(3)(i) or (a)(3)(ii) prior to implementation. If a licensee has obtained NRC authorization of alternative examination requirements prior to performing an examination and an equivalent or larger percentage of examination coverage, compared to the coverage authorized by the NRC, is obtained during the

actual examination, a relief request does not need to be submitted to the NRC to update the coverage obtained. Note that the inspection in question must have been performed within the approved alternative's duration of authorization.

On the other hand, if a licensee has obtained NRC authorization of alternative examination requirements prior to performing an examination and a lower percentage of examination coverage, compared to the coverage authorized by the NRC, is obtained during the actual examination, a relief request does need to be submitted to the NRC in writing and authorized by the NRC to be in compliance with the requirements of ASME Code Case N-770-1. The NRC staff is able to support processing of relief requests of this nature during refueling outages, in part, because of its ability to authorize alternative examination requirements verbally with a written safety evaluation provided at a later date.

Q 14. What if the baseline examination was performed by phased array and essentially 100% examination was completed, but the second examination was completed with conventional methods and did not meet the essentially 100%. What are the requirements for the licensee? Is a relief request approval required prior to plant startup? Can the plant startup under their corrective action process prior to relief request approval?

A 14 In the situation outlined in this question, if the licensee was unable to obtain the required examination coverage for the second examination, the licensee's actions would be dependent on when the second examination was performed. If the second examination was performed during the same refueling outage as a supplemental examination to aid in disposition of an indication, then no further action is required, as the baseline exam would meet the coverage requirements for that refueling outage. If the second examination was performed to meet the reinspection frequency of Table 1 of ASME Code Case N-770-1, the licensee has two options: repeat the examination and obtain the required coverage or submit a relief request to the NRC in writing and obtain authorization from the NRC within the timeframe of the reinspection frequency of Table 1 of Code Case N-770-1 to be in compliance. Any request for relief in this case would need to address why the technique that achieved essentially 100% coverage was not reapplied.

Regarding the question whether the plant can be started up under the plant's corrective action process prior to relief request approval, unless the inspection is required during the current refueling outage by either 50.55a(g)(6)(ii)(F) or Table 1 of ASME Code Case N-770-1, a licensee is free to use any method to track the completion of the required inspection. However, if the inspection is required to be completed during the current refueling outage, and the second examination did not meet the essentially 100% coverage requirement, the licensee would not meet the inspection requirements of the ASME Code, Section XI and thus would not meet the regulations in 10 CFR 50.55a. Thus, the suggestion to acknowledge this non-compliance, and to place the non-compliance in the corrective action system, is not an acceptable alternative.

Q 15. If the required coverage, i.e., > 90%, cannot be obtained, can relief be requested in accordance with 10 CFR 50.55a(g)(5)(iii)?

A 15 No, the requirements of 10 CFR 50.55a(g)(5) pertain to the inservice inspection (ISI) requirements of (g)(4) including those requirements that are updated on a 10-year ISI interval basis and do not pertain to implementation of augmented ISI programs that are applicable under (g)(6)(ii). As shown in the previous 10 CFR 50.55a rulemaking, the NRC staff removed the option for requesting relief under impracticability from (g)(6)(ii) for augmented ISI requirements. The NRC removed the following language from the statement of consideration for implementation of (g)(6)(ii)(D), "or impracticability must be shown under 10 CFR 50.55a(g)(6)(i)." This action is captured under Volume 73 Number 192 of the Federal Register dated October 2, 2008. Therefore, alternatives to the examination requirements of Code Case N-770-1, as conditioned in 10 CFR 50.55a(g)(6)(ii)(F), can only be authorized pursuant to 10 CFR 50.55a(a)(3)(i) or (a)(3)(ii).

Q 16. If the required coverage cannot be obtained, i.e. > 90%, will alternatives be considered under 10 CFR 50.55a(a)(3)?

A 16 Yes, alternatives will be considered under (a)(3)(i) and (a)(3)(ii).

Q17. Do requests for alternatives remain valid and examination of welds that would be within the scope of N-770-1 continue to be examined as described in the request for alternative until such time that the request for alternative expires? For some facilities, the request for alternative may have been approved for the duration of the initial operating license, or will the Staff amend the regulation similar to language in (g)(6)(ii)(A)(1) to rescind these approved alternatives?

A17 Relief from the inspection coverage or frequency requirements of the ASME Code pertains to the requirements of the ASME Code of Record for a licensee's 10-year inservice inspection interval. Therefore, any proposed alternative regarding inspection coverage or frequency requirements authorized by the NRC is for the current or applicable 10-year inservice inspection interval only. For example, the NRC has approved full and optimized structural weld overlays for the life of the overlay or plant. However, the inspection coverage and frequency of the weld overlay are approved only for the specific 10-year ISI interval. If a licensee believes that an NRC authorization for a proposed alternative regarding inspection coverage or frequency is applicable for the remaining operating license beyond the current 10-year ISI inspection interval, please contact your NRC licensing project manager for clarification.

Q18. If the licensee has a risk informed program via an approved alternative and therefore does not have Examination Category B-F or B-J welds, nor does it have a risk informed program based on Appendix R (such as ASME Code Case N-716), is it the intent that the licensee delay implementation of Code Case N-770-1 and continue to implement the approved alternative for the risk program until the approved alternative expires?

A18. No, it is not the intent that the licensee delay implementation of ASME Code Case N-770-1. The inspections required by Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), are required to be satisfied even if these inspections necessitate the licensee to perform inspections in addition to the inspections defined by a currently NRC approved risk-informed ISI program. A risk-informed ISI program is a

living program that should adjust to changing developments in the identification of degradation mechanisms and risk factors. NRC inspection programs under 10 CFR 50.55a(g)(6)(ii) are augmented inspection programs, and licensees should adjust their risk-informed inservice inspection programs accordingly. (See Question 22)

- Q19. Does the need to obtain NRC approval via a request for alternative meeting 10 CFR50.55a(a)(3)(i) or (a)(3)(ii) only apply to coverage that is less than essentially 100%, or does it apply to all requirements of N-770-1 and the additional requirements of Section XI that are used in conjunction with N-770-1, like record keeping requirements of IWA-6000? If so, should these requests also be approved by the NRC prior to startup from an outage?
- A19. If a licensee is unable to meet any and all requirements of 10 CFR 50.55a(g)(6)(ii)(F), then relief is required for a proposed alternative to be submitted for NRC review and authorization in accordance with 50.55a(a)(3) prior to the required completion time of the requirement in question to be in compliance with 10 CFR 50.55a(g)(6)(ii)(F). A licensee must be in compliance with 10 CFR 55.a(g)(6)(ii)(F) or must obtain the NRC's approval of the relief request prior to startup from an outage
- Q20. Is it the Staff's position that while in the outage, that a revised alternative be prepared, submitted and approved, then the examination be re-performed, or is it acceptable to not credit the latest examination until the revised alternative is prepared, submitted, and approved? This eliminates examining the weld twice in the same outage or possibly delaying plant startup to reopen areas of the plant that have been secured for restart.
- A20. To be in compliance with 10 CFR 50.55a(g)(6)(ii)(F) during an ongoing outage, if an unexpected inspection coverage limitation is encountered, a proposed alternative must be submitted and approved in accordance with 50.55a(a)(3) prior to startup. Under these conditions, the NRC will accept proposed alternatives that credit examinations performed during the current refueling outage. Note however, that during the review of the alternative, the NRC may determine that additional actions are required to ensure an acceptable level of safety and quality is achieved.
- Q21. I was wondering if from the interpretation reached it has been concluded that all Code Case N-770-1 alternative examinations will require relief requests if they have cast austenitic material on one side even if full (essentially 100%) susceptible material coverage was gained from the non-cast side and the cast side required portion was scanned with non-Appendix VIII (such as Appendix III) UT methods?
- A21. Relief may not be required if 100% of the susceptible material volume was examined. (Note that -2500(b) does not include the term "essentially 100%") However, the licensee should have a sufficient basis to meet the coverage requirements of 10 CFR50.55a(g)(6)(ii)(F) for previous inspections to be counted as baseline inspections or to meet -2500(b) of ASME Code Case N-770-1. Appendix III procedures cannot be used to satisfy inspection coverage requirements for future ISI examinations (after baseline) without an NRC authorized alternative.

Risk-Informed Inservice Inspection and Category B-J Interval Percentages

- Q 22. Is it the intention of the rulemaking that Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), override currently approved risk-informed ISI programs for the current interval?
- A 22. A risk-informed ISI program is a living program that should be adjusted to changing developments in the identification of degradation mechanisms and risk factors. The inspection requirements under 10 CFR 50.55a(g)(6)(ii) are applicable to augmented inspection programs, and licensees should adjust their risk-informed inservice inspection programs accordingly. The inspections required by Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), are required to be satisfied even if these inspections necessitate the licensee to perform inspections, in addition, to the inspections defined by a currently NRC approved risk-informed ISI program. In many cases the mitigation activities addressed in Code Case N-770-1 could make some of the examinations done for a specific degradation mechanisms in a risk-informed (RI)-ISI program more difficult. However, in those cases where welds remain unmitigated or the RI-ISI program identifies degradation mechanisms other than primary water stress-corrosion cracking (PWSCC) that could affect either unmitigated or mitigated welds, the degradation mechanisms should still be considered in the RI-ISI program for examinations.
- Q 23. Many welds under the scope of Code Case N-770-1 were previously categorized ASME Class 1, Examination Category B-J welds, whose required inspections were distributed among the first, second and third ISI periods. With the issuance of the regulation imposing Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), a number of welds would be removed from the Section XI population of Examination Category B-J welds and thereby affect the ISI program distribution requirements. Can these welds continue to be counted as B-J welds for the remainder of the current interval to satisfy the population and distribution of inspections planned in the ISI program?
- A 23. Licensees are required to meet the requirements of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F). In order to finalize the percentages for Category B-J welds inspected in the current interval, licensees may continue to count welds within the scope of Code Case N-770-1 as B-J welds for the purpose of satisfying the population and distribution of inspections planned in the ISI program. However, for the next inspection interval, welds within the scope of Code Case N-770-1 are not to be included in the population of B-J welds in the ISI program because the inspections performed under N-770-1 are considered augmented inspection which is an addition to the routine inspection. Thus, the augmented inspection of the subject welds cannot be used to satisfy the population and distribution of inspections under the routine ISI program. (See Question 46)
- Q24 Is it possible to get relief from the requirements of Code Case N-770-1 until the next interval if there is only one outage remaining in the current interval in order to make finalizing interval percentages possible for category B-J welds which are either under the normal ISI program or part of a risk-informed program?

- A24. As noted in response to the previous question, licensees are required to meet the requirements of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F). In order to finalize the percentages for Category B-J welds, licensees may continue to count welds within the scope of Code Case N-770-1 for an interval in which ISI inspections have already been performed. However, for the next inspection interval, welds within the scope of Code Case N-770-1 are not to be included in the population of B-J welds under the normal ISI program or in the risk-informed ISI program.

#### Pre-MSIP™ Inspections

- Q25 Does ASME Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), require that a qualified ultrasonic examination be performed on welds prior to applying the mechanical stress improvement process (MSIP™)?
- A 25 Yes, in order to categorize welds as Code Case N-770-1, Inspection Items D or E, welds mitigated by stress improvement, the welds are required by 10 CFR 50.55a(g)(6)(ii)(F)(2) to satisfy the criteria of Appendix I of the Code Case. Welds categorized in Inspection Items D or E, must satisfy the pre-MSIP™ examination requirements in Note 12 of Code Case N-770-1.

Note 12 requires that volumetric exams be performed on these welds before the MSIP™ is applied, with one exception as follows: for reactor vessel nozzle welds at cold leg temperatures requiring the core barrel to be removed to perform the examination, the volumetric examinations are not required prior to application of the MSIP™. If the pre-MSIP™ examination is not performed, a post-MSIP™ preservice surface and volumetric examination shall be performed after removal of the core barrel. If these examinations do not detect cracks, the weld may be considered uncracked and be subject to the examination requirements of Inspection Item D. Other details are provided in Note 12 on the required examination surface and volume. This exception applies only to reactor vessel nozzle Alloy 82/182 welds at cold leg temperatures that require the core barrel to be removed to perform the weld examination.

The NRC approved this aspect of Code Case N-770-1 based on favorable operating experience with welds at cold leg temperatures and the burden of removing core internals to perform these examinations on some plants. If operating experience with these welds changes, the NRC may reconsider this exception.

Welds Mitigated Prior to Being Placed in Service

- Q 26. If a nickel alloy weld has a layer of Alloy 52 weld on the inner diameter and the fill was made with Alloy 82/182 material, and the Alloy 82/182 material has never come into contact with the reactor coolant (this could be the case for a SG replacement weld), does this code case apply to that weld?
- A 26. Yes, 10 CFR 50.55a(g)(6)(ii)(F)(2) requires that "... for ISI frequencies, all other butt welds that rely on Alloy 82/182 for structural integrity shall be categorized as Inspection Items A-1, A-2 or B until the NRC staff has reviewed the mitigation..."

Therefore, NRC regulations require Alloy 82/182 welds with Alloy 52 inlays, onlays, or root passes to be examined in accordance with Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), regardless of when the Alloy 52 inlay, onlay, or root pass was applied.

- Q 27. Wouldn't Alloy 82/182 welds "mitigated" during initial construction, before being placed into service, with inlays/onlays be exempt from Code Case N-770-1 requirements per Code Case N-770-1 subparagraph -1100(e)? Please confirm that no relief request would be required?
- A 27. NRC regulations require Alloy 82/182 welds with Alloy 52 inlays or onlays to be examined in accordance with Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), regardless of when the Alloy 52 inlay or onlay was applied. The NRC will not exempt these welds from the requirements of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F).

Preservice Examination for a Weld Overlay

- Q 28. Does the preservice inspection for a weld overlay satisfy the baseline examination requirements for Code Case N-770-1? Is the PSI examination defined in the weld overlay relief request and approved by the NRC still acceptable for the baseline examination?
- A 28. Full structural weld overlays are considered under paragraph 10 CFR 50.55a(g)(6)(ii)(F)(2) to be categorized as Inspection Item C or F, as appropriate. As indicated in Code Case N-770-1 subparagraph -2200, Baseline Examination, for Inspection Items C and F, the preservice examination requirements of subparagraph -2220, Preservice Examination After Repair/Replacement Activities or Stress Improvement, establish the baseline examination. The preservice examination defined in the weld overlay relief request and approved by the NRC is acceptable for the baseline examination.



Approval to Recategorize as Inspection Items G-K

- Q 29. What are the NRC's expectations for a licensee to include in a request to re-categorize welds mitigated by techniques similar to cladding, inlay or onlay mitigation?
- A 29 ASME Section XI has been working on draft Code Case N-766, "Nickel Alloy Reactor Coolant Inlay and Onlay for Mitigation of PWR Full Penetration Circumferential Nickel Alloy Dissimilar Metal Welds of Class 1 Items." This Code Case has not been approved by ASME, pending resolution of comments from the NRC. The outstanding NRC comments deal with flaw analysis to include stress corrosion cracking calculations and eddy-current qualifications.

Despite the issues that NRC has with this draft Code Case, draft ASME Code Case N-766 provides useful guidance for preparing a request for alternative categorization to Inspection Items G–K of Code Case N-770-1. Any request to the NRC for alternative categorization should address the following items at a minimum:

- pre-inlay/onlay examinations performed including eddy current examination and acceptance criteria followed,
- repairs performed and any fillers materials used,
- inlay/onlay materials used, including chromium content and the method used to determine the as-deposited weld bead chromium content,
- methods used to identify the dissimilar metal weld fusion zones and the accuracy of the methods used,
- qualifications of the weld procedure specifications, welders and welding operators,
- pre- and post-weld heat treatment or temper bead welding requirements followed,
- design and analysis requirements used, in detail,
- preservice and inservice inspections performed since installation of the inlays/onlays,
- ASME Code Editions and Addenda associated with requirements used, where applicable, and figures, as applicable, to assist in describing the information submitted in conjunction with the request for alternative categorization
- thickness of inlay/onlay
- flaw evaluation to show adequate thickness against stress corrosion cracking.
- for primary water stress corrosion crack growth rates for Alloy 52/152 weld materials, at this time, NRC recommends using the Alloy 182 crack growth rate curve provided in MRP-115, with an improvement factor (IF) of 100 for Alloy 52 welds and an IF of 10 for Alloy 152 welds.

Visual Examination Requirements in ASME Code Case N-722-1 versus Code Case N-770-1

- Q 30. Are there any differences in the visual inspection requirements between Code Case N-770-1 and Code Case N-722-1, and what is to be done by the licensee if there are differences?
- A 30 There are no differences in the visual inspection requirements. For both Code Cases a volumetric examination can be credited for a visual examination.

Examination of Cast Stainless Steel

- Q 31. Is it acceptable to examine cast base material adjacent to Inspection Item A-1, A-2 and B dissimilar metal welds using ASME Code approved Appendix III examination techniques as required by ASME Section XI to supplement the coverage obtained by the qualified dissimilar metal weld techniques? If yes and the total coverage is calculated to be essentially 100%, would a relief be required?
- A 31 If a licensee chooses to use previous examinations to meet the baseline inspection requirement, then yes, Appendix III examination techniques are acceptable. Under 50.55a(g)(6)(ii)(F)(3) a licensee may use an Appendix III procedure under the requirements of Appendix VIII to meet the ASME Code required examination volume of essentially 100 percent to credit previous examinations as baseline inspections.

However, all other required inspections under 10 CFR 50.55a(g)(6)(ii)(F) for inspection of or through cast stainless steel items require the licensee to meet the inspection coverage requirements of -2500(b) of ASME Code Case N-770-1. Subparagraph -2500(b) states that, "For cast stainless steel items for which no supplement is available in Appendix VIII, the required examination volume shall be examined by Appendix VIII procedures to the maximum extent practical including 100% of the susceptible material volume (non-stainless steel volume)." This wording requires that Appendix VIII procedures, not Appendix III procedures, be used for the examination of the entire weld, including the adjacent cast stainless steel material, which is part of the required examination volume. Research conducted by the NRC Office of Nuclear Regulatory Research on inspection of cast stainless steel demonstrated that the Appendix III ultrasonic test (UT) techniques are inadequate when applied to cast materials. In accordance with Code Case N-770-1, subparagraph -2500(b), cast stainless steel adjacent to welds within the scope of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), are required to be examined by Appendix VIII procedures to the maximum extent practical, including 100% of the susceptible material volume (non-stainless steel volume). Subparagraph -2500(b) requires that Appendix VIII procedures be used for the required examination volume of welds with adjacent cast stainless steel. If 100% of the susceptible material volume (non-stainless steel volume) is examined with a qualified Appendix VIII procedure and the cast stainless steel portion of the required examination volume is examined to the maximum extent practical using an Appendix VIII procedure, the Code Case would be satisfied and a relief request would not be needed. Note in this case that the wording of the Code Case in the preceding sentence is "100%

of the susceptible material volume (non-stainless steel volume)” and not “essentially 100%.”

- Q 32. When a licensee examines a weld adjacent to a cast stainless steel material, the licensee will always be getting less than essentially 100% coverage. Would the NRC be interested in reviewing a generic relief request for cast stainless steel examinations.
- A 32. The NRC staff would be interested in reviewing a generic basis document (e.g., a topical report) for relief requests for cast stainless steel examinations, provided that such a basis document would benefit multiple licensees that have highly similar weld configurations, materials, and inspection access. It should be noted that NRC review and approval of a generic basis document could form the technical basis for a licensee relief request submittal. However, NRC regulations do not provide for NRC approval of relief requests on a generic basis.

#### Delayed Implementation of Appendix VIII

- Q 33. In relation to Slide 7 and the implementation of Code Case N-770-1, if a utility is updating their ISI Program to the 2007 Edition and 2008 Addenda provisions of the ASME Code, Section XI, Appendix VIII, as allowed by 10 CFR 50.55a, and this encompasses the first outage after August 22, 2011, how does this requirement relate to the delayed implementation of Appendix VIII (18 month implementation)?
- A 33. The NRC amended 10 CFR 50.55a(g)(4)(ii) to permit a licensee whose ISI interval commences during the 12 through 18 month period after July 21, 2011 to delay the update of their Appendix VIII program by up to 18 months after July 21, 2011.

With respect to the implementation of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), licensees may use their current Appendix VIII program until the Appendix VIII program is required to be updated by 10 CFR 50.55a(g)(4)(ii).

#### Essentially 100% of the Required Examination Volume

- Q34. Would one be able to avoid removal of weld crown metal necessary to meet Code, Section XI, Appendix VIII, requirements?
- A 34. Code Case N-770-1, Table 1, states that ultrasonic volumetric examinations shall be used and shall meet the applicable requirements of Appendix VIII. The ASME Code, Section XI, Appendix VIII, Article VIII-2100, Procedure Requirements, lists essential variables that examination procedures must specify. One of these essential variables is surface preparation requirements. ASME Code, Section XI, Appendix VIII, Supplement 10, Qualification Requirements for Dissimilar Metal Piping Welds, applies to butt welds within the scope of Code Case N-770-1. The generic Performance Demonstration Initiative (PDI) procedure for outside diameter ultrasonic examination, PDI-UT-10, contains a limitation on the maximum deviation from a flat surface condition for the surfaces over which the probes travel. The surface condition is allowed to

deviate from a flat surface condition by no more than 1/32 inch over 1 inch. It is the NRC's understanding that vendor proprietary Supplement 10 procedures for outside diameter examination contain the same or a similar flatness limitation. PDI-UT-10 was qualified on specimens that satisfy the 1/32 inch over 1 inch flatness limitation. If an actual weld in the field does not satisfy this surface flatness limitation of the qualified procedure, the examination performed is not considered a qualified examination and it is the NRC's understanding that the performance of the procedure on such welds is not known. Therefore, since the performance of the UT procedure on weld surfaces that do not meet the procedural limitation on surface flatness is not known, it is difficult to understand the basis for NRC to approve a request using alternative surface flatness conditions. Without more details available for the particular weld(s) in question, it appears that the licensee in such a case(s) would have to either remove the weld crown or requalify the UT procedure for the existing surface condition.

Q35 Is the examination coverage requirement to have essentially 100% of the required inspection volume examined, or is it to have essentially 100% of the inspection volume for axial flaws and essentially 100% of the inspection volume for circumferential flaws?

A35 Volumetric examinations shall obtain essentially 100% of the ASME Code required examination volume.

Q36. Why is the examination coverage being differentiated between axial flaws and circumferential flaws? Why is it not acceptable to just achieve essentially 100% inspection coverage of the overall weld, considering that the examination for the ASME Code, Section XI, Appendix VIII, require the weld to be examined in 4 directions?

A36. Subparagraph -2500(c) of N-770-1 allows for a reduction in the required examination coverage for axial flaws.

-2500(c) For axial and circumferential flaws, examination shall be performed to the maximum extent practical using qualified personnel and procedures. If 100% coverage of the required volume for axial and circumferential flaws cannot be met, but essentially 100% coverage for circumferential flaws (100% of the susceptible material volume) can be achieved, the examination for axial flaws shall be completed to achieve the maximum coverage practical, with any limitations noted in the examination report. The examination coverage requirements shall be considered to be satisfied.

This subparagraph used the phrase "essentially 100% coverage for circumferential flaws," which led to questions related to coverage being differentiated between axial flaws and circumferential flaws. NRC condition 10 CFR 50.55a(g)(6)(ii)(F)(4) prevents the use of subparagraph -2500(c) to reduce the required inspection coverage for axial flaws. Volumetric examinations shall obtain essentially 100% of the ASME Code required examination volume. No new requirements are being established for the term essentially 100% coverage.

Q37. What is the intent of the revised rule regarding coverage? In the comment section of the rule (page 36245) it states that, "*Previous examinations of these welds can be credited*

*for baseline examinations if they were performed using Section XI, Appendix VIII requirements and met the Code-required volume for axial and circumferential flaws of essentially 100 percent.*” Other sections in the rule refer to coverage as “essentially 100% of the Code required volume.” The first statement implies that the coverage for axial flaws and circumferential flaws would have to be calculated separately and each would have to be greater than 90%. The second statement suggests that coverage would be calculated in the traditional manner using the composite coverage obtained by both the axial and circumferential scans. This composite coverage value has always been reported as one number in relief requests. If this composite value is greater than or equal to 90% (essentially 100%) then a relief request would not be required even if less than 90% is obtained in one scan direction or the other. During the MRP-139 assessments, coverage calculations were performed for each scan direction in order to determine if it satisfied the requirements, however MRP-139 did not supersede the Code requirements.

- A37 Subparagraph -2500(c) of N-770-1 allows for a reduction in the required examination coverage for axial flaws. This subparagraph used the phrase “essentially 100% coverage for circumferential flaws,” which led to questions related to coverage being differentiated between axial flaws and circumferential flaws. 10 CFR 50.55a(g)(6)(ii)(F)(4) prevents the use of subparagraph -2500(c) to reduce the required inspection coverage for axial flaws.

Volumetric examinations shall obtain essentially 100% of the ASME Code required examination volume. No new requirements are being established for the term essentially 100% coverage.

- Q38 Is the definition of essentially 100% of the required examination volume the same as that defined in ASME Code Case N-460, i.e. the coverage is > 90%?
- A 38 Yes, no new requirements are being established for the term essentially 100% coverage. However, subparagraph -2500(c) of Code Case N-770-1 shall not be used to reduce axial examination coverage pursuant to 10 CFR 50.55a(g)(6)(ii)(F)(4).
- Q 39. If a licensee cannot meet the coverage requirements for a weld examination, i.e. the coverage is < 90%, will the amount of coverage obtained be considered when evaluating alternatives from the requirements? In other words, the less the coverage that can be obtained, will the NRC expect the licensee to do an increasing amount of analysis or potentially more frequent examinations to accept the limited coverage as an alternative?
- A 39. The NRC will review alternatives on a case-by-case basis under the requirements of 10 CFR 50.55a(a)(3)(i) or (a)(3)(ii). The NRC will authorize a proposed alternative based on either an acceptable level of quality and safety or hardship without a compensating increase in the level of quality and safety.
- Q40 Will the NRC consider a relief request for a weld examination, for which less than essentially 100% UT coverage would be expected, and for which significant base metal removal, wall thickness reduction, interference clearance, and/or manrem exposure would be required to increase the percentage coverage, under a hardship justification?

- A40. NRC will consider any request for relief in accordance with 10 CFR 50.55a(a)(3).
- Q41. For unmitigated butt welds, is it the intent of 10 CFR 50.55a(g)(6)(ii)(F)(3) and 10 CFR 50.55a (g)(6)(ii)(F)(4) that examination coverage be essentially 100% of the volume C-D-E-F of Fig.1 of Code Case N-770-1 to be credited as a baseline examination?
- A41. Yes
- Q42. Would an examination of a wrought stainless steel pipe to carbon steel elbow Alloy 82/182 weld that examined 100% of the Alloy 82/182 material (i.e. susceptible material) for both axial flaws and circumferential flaws but less than essentially 100% of the Fig. 1 C-D-E-F volume comply with 10 CFR 50.55a (g)(6)(ii)(F)(3) and 10 CFR 50.55a (g)(6)(ii)(F)(4)?
- A42. No, the postulated examination coverage does not comply with 10 CFR 50.55a (g)(6)(ii)(F)(3) and 10 CFR 50.55a (g)(6)(ii)(F)(4)

#### Role of Leak-Before-Break in Assessing Alternative Examination Requirements

- Q 43. How does the issue of leak-before-break come into play with the assessment of alternatives for limited examination coverage? If a weld is in a piping segment that we evaluated for leak-before-break, will the requirements for accepting an alternative change, and if so, how?
- A 43. Alternatives will be assessed on the basis of providing an acceptable level of quality and safety or a compensating increase in the level of quality and safety to achieve the inspection requirement, regardless if the leak-before-break technology was applied to the weld. As described in Regulatory Issue Summaries 2008-25 and 2010-07, augmented examinations of Alloy 82/182 dissimilar metal butt welds in the primary coolant systems at U.S. pressurized water reactors provide a reasonable basis for continuing to assume an extremely low probability of rupture in these components in light of potential primary water stress corrosion cracking in the Alloy 82/182 butt welds. However, if these limited coverage examinations are not as effective as examinations with complete inspection coverage, the NRC will assess this impact for all welds regardless of leak-before-break applicability.

#### NRC Inspection Procedure

- Q 44. Will there be an inspection procedure developed for Regional inspection personnel?
- A 44. At this time, the NRC plans to develop a temporary inspection procedure beyond the ISI inspection procedure 71111.08 to address baseline examination compliance with 10 CFR 50.55a(g)(6)(ii)(F).

Use of Code Case N-770-1 Figure 1

- Q45. If a plant has a RPV Nozzle to Safe-end Alloy 600 groove weld [and] has an Alloy 690 ID-onlay that was welded during construction, and the wetted surface of the onlay extends beyond points F and E shown on CC N-770-1, FIG. 1. In this case is the Code Case N-770-1, FIG. 1 examination volume acceptable?
- A45. For a plant that has an Alloy 690 ID-onlay which is still categorized as Inspection Item A-1, A-2 or B inspection in accordance with Code Case N-770-1, FIG 1 is appropriate. When examining in accordance with FIG 1, only the section between F and E needs to be examined. Once the NRC has reviewed the mitigation and authorized an alternative code case Inspection Item the inspection requirements would change. The examination volume of an onlay is A-B-C-D-E-F of Figure 4 of ASME Code Case N-770-1. However, in Figure 4, the locations of B and C are within the dimensions identified for locations A and D. Further, the locations of B and C were identified to ensure the thickness of the onlay material is included in the examination volume. Therefore, the NRC clarifies that the examination volume of a weld mitigated by onlay, Inspection Item H or K, whose onlay extends beyond location A and D of Figure 4 of ASME Code Case N-770-1, will be A-D-E-F of Figure 4, plus any volume of the onlay material between locations A-D of Figure 4. Note that the surface examination remains the same as identified in Figure 4 regardless of the extent of the onlay

Category B-J and B-F Weld Populations

- Q46. Is it the intent of the Staff that licensees remove welds that are under the scope of N-770-1 from the current B-J and B-F populations and submit relief if this action causes the ISI program to become noncompliant or to prevent performing additional examinations to meet Section XI, or for the current and subsequent intervals, can the N-770-1 welds also remain as part of the ISI Examination Category B-J and B-F population and examinations required by N-770-1 also be credited for meeting the Section XI program?
- A46. Licensees are required to meet the requirements of Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F). In order to finalize the percentages for Category B-J and B-F welds inspected in the current interval, licensees may continue to count welds within the scope of Code Case N-770-1 as B-J or B-F welds, as appropriate, for the purpose of satisfying the population and distribution of inspections planned in the ISI program. However, for the next inspection interval, welds within the scope of Code Case N-770-1 are not to be included in the population of B-J or B-F welds in the ISI program. (See Question 23)

Rulemaking (36248)

- Q47. Does the NRC clarification contained in the rulemaking (36248) allow the alternative to be performed prior to approval as long as it is not credited until the NRC has reviewed and approved the request?

- A47. The NRC clarification contained in the rulemaking (36248) allows the alternative inspection to be performed prior to approval as long as the inspection is not implemented (credited to satisfy the inspection requirement) until the NRC has reviewed the alternative inspection and approved the relief request for the alternative inspection.

IWA-2420 Requirements

- Q48. Is it the Staff's position that the requirements of IWA-2420 are not required to be met as part of the implementation date of "by the first refueling outage after August 22, 2011" as stated in 10 CFR 50.55a(g)(6)(ii)(F)(1)?
- A48. As stated in response to Q1 "Implementation of the requirements" for 50.55a(g)(6)(ii)(F)(1) means that a licensee is required, by regulatory authority, to meet the inspection requirements at the frequencies specified in Code Case N-770-1, with conditions as imposed in 10 CFR 50.55a(g)(6)(ii)(F), by the first refueling outage starting after August 22, 2011.

It is the licensee's burden to enact changes to their existing programs/schedules described in IWA-2420 or initiate new programs to ensure these requirements are met. Licensees are given this time from the publication of a rule to a rule's effectiveness date to allow for review and implementation within a licensee's programs. There is no regulatory requirement that by the first refueling outage starting after August 22, 2011, all procedures that could be affected by this rulemaking be updated. However, if inspections are required to be performed during that outage, qualified procedures are required to be used according to the rule.