RESPONSE TO PUBLIC COMMENTS ON REGULATORY GUIDE 1.147, PROPOSED REVISION 14

COMMENT 1: Rick Swayne, Reedy Engineering

Case N-498-4 - This entry should be highlighted, as the limitations have been revised from R.G. 1.147, Rev. 13. The limitation has been eliminated for noninsulated Class 2 and 3 systems that operate during normal plant operation and have been in operation for 10 min to 4 hr. This reduced limitation is consistent with the current IWA-5213(a)(3).

Response to Comment 1:

The entry was not highlighted in proposed Revision 14 to Regulatory Guide (RG) 1.147 because the change was considered to be a clarification. The condition as listed in Revision 13 to the guide was, "The provisions of IWA-5213, 'Test Condition Holding Times,' 1989 Edition, are to be used." The condition was structured in this manner because the ASME Subcommittee on Nuclear Inservice Inspection had modified hydrostatic pressure testing requirements returning to the 1989 Edition. The NRC staff, however, received several inquiries requesting clarification after Revision 13 to the guide had been published. To resolve any confusion, the requirements of paragraph IWA-5213, 1989 Edition, were used in Proposed Revision 14 rather than merely referencing the paragraph. In the future, any clarifications will be noted.

COMMENT 2: Mike Gothard, EPRI, PDI Project Manager

First, let me applaud your efforts to include Code Case N-695 into RG 1.147 Rev. 14. One hundred percent of the US utilities are members in and use the Performance Demonstration Initiative (PDI) Program, as reflected in Code Case N-695, to qualify procedures, personnel, and equipment for examination of selected dissimilar metal piping welds. It is applicable to both boiling water reactors and pressurized water reactors. Its inclusion will reduce the burden associated with implementing large numbers of relief requests.

A companion Code Case, N-696, is applicable to the pressurized water reactors, but was not included. As above, one hundred percent of the US utilities are members in and use the Performance Demonstration Initiative (PDI) Program, as reflected in Code Case N-696, to qualify procedures, personnel, and equipment for examination of selected dissimilar metal piping welds from the inside surface. Again, its inclusion will reduce the burden associated with implementing large numbers of relief requests.

Response to Comment 2:

Proposed Revision 14 to Draft Regulatory Guide 1.147 addresses Code Cases published by the ASME through Supplement 6 to the 2001 Edition. Code Cases N-695 and N-696 were published in Supplement 10 to the 2001 Edition, which is outside of the scope of proposed Revision 14. Code Case N-695 was included in the draft guide to address compliance with

ASME Section XI, Appendix VIII, Supplement 10, "Qualification Requirements for Dissimilar Metal Piping Welds."

The Electric Power Research Institute - Performance Demonstration Initiative (PDI) developed a program to implement Appendix VIII, Supplement 10. During the development process, PDI identified implementation difficulties with certain aspects of Appendix VIII, Supplement 10. To overcome the implementation difficulties, PDI researched, tested, and demonstrated the effectiveness of an alternative to selected paragraphs of Appendix VIII, Supplement 10. PDI representatives presented the alternative before the appropriate ASME committees, and the alternative was approved as Code Case N-695. The NRC expedited the review of Code Case N-695 because compliance with Appendix VIII, Supplement 10, became mandatory for all licensees per 10 CFR 50.55a on November 22, 2002. Licensees had begun requesting use of Code Case N-695 in lieu of Appendix VIII, Supplement 10. To eliminate the need for licensees to continue to seek relief to use Code Case N-695, the NRC included Code Case N-695 in Revision 14 of the guide.

Unfortunately, Code Case N-696 cannot be included in the final version of Revision 14 to Regulatory Guide 1.147 without republishing the draft guide to permit public comment. The NRC plans to address Code Case N-696 in draft Revision 15 to the guide, which is to be published for public comment shortly after Revision 14 is published final.

COMMENT 3: Chuck Wirtz, Member ASME Subcommittee XI

Code Case N-546 was incorporated almost word for word into ASME Section XI, as paragraph IWA-2316, in the 1998 Edition. 10CFR50.55a has endorsed ASME Section XI through the 2000 Addenda and within 10CFR50.55a(b)(xviii)(B) provides limitations on the use of IWA-2316. It states that IWA-2316 may only be used to qualify personnel that observe for leakage during system leakage and hydrostatic tests conducted in accordance with IWA-5211(a) and (b). Thus, although the requirements of N-546 and IWA-2316 are basically the same, the conditions in DG-1125 and the limitations in 10CFR50.55a(b)(xviii)(B) are different. Furthermore, ASME Subcommittee XI has already taken action to incorporate the limitation's requirements into IWA-2316 and that action passed Subcommittee XI and Main Committee (refer to BC item number 04-463). Recommend the conditions placed on use of N-546 within DG-1125 be revised to be consistent with those of 10CFR50.55a(b)(xviii)(B).

Response to Comment 3:

Condition (1) for Code Case N-546 ["Qualify examination personnel by test to demonstrate knowledge of Section XI and plant specific procedures for VT-2 visual examination"] has been deleted.

No change to Condition (2) is believed to be required. Condition (2) ["This Code Case is applicable only to the performance of VT-2 examinations and may not be applied to other VT-2 functions such as verifying the adequacy of procedures and training VT-2 personnel"] is the "plain English version" of the requirement in 10 CFR 50.55a(b)(xviii)(B), which states "Paragraph IWA-2316 of the 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section, may only be used to qualify personnel that observe for leakage during system leakage and hydrostatic tests conducted in accordance with

IWA-5211(a) and (b), 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section."

***NOTE*:** **Comments 4–8 address the conditions for Code Case N-597-1. A single response is provided following Comment 8.**

COMMENT 4: Harold Crockett, Exelon Corporation

The following comments are in response to the proposed revision 14 to Regulatory Guide 1.147. Specifically, Table 2 lists ASME Code Case N-597-1 as being Conditionally Acceptable. The Code Case addresses evaluation of pipe wall thinning.

In response to industry events and NRC GL 89-08, domestic nuclear utilities established programs to monitor carbon steel piping that is susceptible to flow accelerated corrosion (FAC), formerly referred to as "erosion-corrosion." This has supported the owners' abilities to monitor and proactively replace or upgrade piping components that are thinning, prior to violating Code minimum requirements. Through EPRI's twice yearly meetings, the industry has continued to refine the practices and processes. EPRI NSAC 202L, Recommendations for an Effective Flow-Accelerated Corrosion Program, continues to be updated to stay abreast of issues. There have been no FAC related injuries since the Surry rupture in 1986 at domestic nuclear stations. It is tragic that the Mihama Station in Japan experienced the accident just three weeks ago, but indications are that there were no inspections on a line of similar service to the Surry event, FW Pump Suction. Moreover, they did not utilize the CHECWORKS predictive methodology. This accident appears to have been preventable.

Exelon has a track record of replacing degraded pipe at our 17 nuclear units. Each outage, we conduct NDE tests to assess the pipe wall thinning, and we communicate with the pipe stress analysts to ensure structural integrity of the piping. On occasions we find isolated UT thicknesses over a grid of generally 300 or more UT thickness readings. Through such methods as finite element analysis or Code Case N-597, it can be determined that the localized wear will not cause a loss of integrity for a specified projection of time, based on calculated wear rates. As noted earlier, it is our preference to replace the pipe, and not undergo the expense of detailed localized analysis. In a few cases, it is helpful to recognize the acceptance, in order to more effectively replace the component at an upcoming outage. This allows a more comprehensive assessment of how much piping to replace, as well as optimizing available resources.

I would like to focus on the five conditions associated with use of Code Case N-597:

1.) We are in agreement with the Reg. Guide reference to utilize EPRI NSAC 202L.

2.) This restriction only allows the use for pipe, bends, and elbows. It does not allow the use for other fittings such as reducers or tees. This requirement effectively eliminates the ability to characterize the degraded area delineated in 3622.2 and 3622.3. Therefore, this second requirement negates the usefulness of the Code Case.

3.) The restrictions placed on Class I piping in the condition do not even allow the pipe stress analyst to provide an updated minimum wall thickness calculation, which is what our program

historically has done for every component. This condition indicates that the Class 1 components cannot be below manufacturers tolerances, e.g. 87½% of nominal thickness. This third requirement also negates the usefulness of the Code Case.

4.) We are in agreement that rate of wall thickness must be determined, and it is determined for each examined component. The part of this condition that is a problem is that we only would use the Code Case when the current or projected thickness is below the pipe stress analyst minimum thickness calculation. That is to say, there would be localized thickness indications that are below the calculated minimum thickness. Therefore, the latter portion of this condition makes it impossible to ever use it.

5.) This condition restricts the use of the Code Case to FAC, due to the ability to predict wear rates. While this is helpful to the FAC engineer, if wear rates can be determined for MIC or other degradations, this should be available for those pipe wall thinnings. In either case, the wear rate would be prepared and reviewed by a knowledgeable person in that area. Therefore, we would prefer to be able to use this for any degradation that a wear rate could be calculated for.

COMMENT 5: Lee F. Goyette, P.E., Pacific Gas and Electric Company

As a Principal Mechanical Engineer working for the past 18 years in the area of flow-accelerated corrosion (FAC) monitoring and mitigation at an operating nuclear power facility, I find the conditions imposed for the use of ASME Section Xi Code Case N-597-1 in DG-1 125 limiting to the point that the Case is of no use whatsoever. This is a surprising position, in that N-597-1 and its later revision 2 was developed as a voluntary consensus standard over the past 10 years, with NRC staff members voting on the Code Committees involved in the development, vetting and approval of the Case. To my knowledge, no negative votes were cast against the Case at any level Committee by a NRC member, in fact, the Case was well supported by NRC. A key element of the support the Case received stems from the fact that its rules are in full compliance with Construction Code requirements, design margins and concepts.

Prior to the issue of RG 1.147 Revision 13, licensees applied for and received relief for unencumbered use of the Case with but a single condition: the licensee FAC program must be based on strict alignment with the program requirements and conditions outlined in the "Recommendations for an Effective Flow-Accelerated Corrosion Monitoring Program," EPRI Document NSAC-202L. As NSAC-202L is the acknowledged industry standard for domestic -- and many (with a notable exception) international — utilities' FAC programs, this requirement was entirely appropriate and willingly fulfilled. Thus, licensees were empowered to apply the Case as needed without further approval.

With the June 2003 issue of RG 1.147 Rev. 13, all that changed. By my reading of the conditions imposed in Revision 13 and continued in the proposed Revision 14, NRC relief must be requested for each application of the Case, a process that could require more time than simply repairing or replacing the pipe, which itself may involve an extension of outage duration. Per internal NRC memorandum (RBEnnis to JWClifford, "Summary of July 22, 2003, Internal Meeting…," August 6, 2003) each relief request must be supported by detailed calculations and

discussions of FAC program bases, criteria, etc. Clearly, this is an onerous requirement for both licensee and regulator, and an abrupt change from the previous NRC posture.

COMMENT 6: Robert Brown, Tennessee Valley Authority

The proposed revision 14 to RG-1.147 continues to impose special limitation and condition number 2) on the use of ASME Section XI Code Case N-597-1, to wit: "Components affected by flow-accelerated corrosion to which this Code Case are applied must be repaired or replaced in accordance with the construction code of record and Owner's requirements or a later NRC approved edition of Section III of the ASME Code prior to the value of tp reaching the allowable minimum wall thickness, tmin, as specified in -3622.1(a)(1) of this Code Case. Alternatively, use of the Code Case is subject to NRC review and approval." The continued imposition of this condition is technically unnecessary and results in onerous costs to Licensees who wish to use the provisions of the Code Case.

The requirements imposed in N-597-1 and the associated technical evaluations were developed around the ASME Code concept of maintaining sufficient safety margin for the design basis conditions for a given piping system. In addition, in a recent (1999) revision to ASME Section II the allowable stresses for many Code grade materials were recognized as being unnecessarily stringent and were adjusted upward by an approximate factor of ~14%. This resulted in a decrease in the analyzed safety margins for typical ASME carbon steel piping material applications which are now based upon a factor of 3.5, rather than the original more limiting factor of 4.0, on the ultimate tensile strength. Thus, for carbon steel piping systems whose pressure design complies with older (pre 1999) Code editions, the current safety factor of 3.5 remains in place even with the degradation that would be allowed by the provisions of Code Case N-597-1. Additionally, the continued operation of piping under the degraded conditions is a temporary condition with repairs and/or replacements of the degraded components precipitated by the self limiting requirements of the Code Case. Most licensees also prefer to repair or replace degraded piping at the first available outage or opportunity where the activity can be properly planned and executed.

In addition to the technical justification for not continuing to impose this restriction on the Code Case's use, there is an inordinately high burden placed on the resources of the Licensee and the NRC Staff with the cost of the preparation, review, and approval of the documentation associated with any such request to use the Code Case. The imposed limitation negates the provision of a consensus standard alternative to the Code that is generally acceptable to the industry and one that adequately protects the safety and health of the public, while providing practical latitude to the operation of a nuclear power plant. Given the technical situation in the use of this Code Case, the added burden is unwarranted.

COMMENT 7: D. Rick Graham, Southern Nuclear

Comment: Request for NRC approval to apply Code Case N-497 limits the effective licensee use of the Case and should be removed.

Discussion: Should the licensee discover a locally-thinned pipe due to FAC late in an outage, one that the rules of N-597 finds acceptable for continued service, the licensee is left scrambling for NRC relief without any assurance of success. The first choice in a thinned

component situation would be replacement. However, where a replacement is difficult or impossible, then a N-597 evaluation would be utilized.

The Code Case was developed through the ASME Section XI Code Committee with participation by members of the NRC. It is believed that the committee applied sound engineering principles in the development of the Code Case. Additionally, the NRC participated in the development of these rules. Consequently, the NRC should remove the requirement on the licensee to seek additional NRC review and approval for use of the Case.

COMMENT 8: Dave Grabski, Individual

Specific Comment: Please clarify Condition No. 4. As currently written, Condition 4 could be interpreted to only permit repair and replacement of piping when the tmin is exceeded. The purpose for Code Case N-597-1 was to allow analytical evaluation of pipe thinning below tmin. Condition 4 seems to imply that repairs and replacements are the only options when tmin is exceeded, i.e., no analytical evaluation.

General Comment: The conditions stipulated for the use of this code case, particularly Condition 2 regarding NRC review and approval, are unreasonably burdensome and effectively void any reason for utilities to implement it.

Response to Comments 4–8:

Commenters generally objected to Conditions 2–5 placed on Code Case N-597-1, arguing that the conditions essentially negate the usefulness of the Code Case. Although the conditions do not allow the Code Case to be used unconditionally, the NRC does not believe that the conditions negate the usefulness of the Code Case. The NRC is not discrediting the technical merits of the Code Case, but rather is objecting to the extent to which the Code Case may be applied. For example, in -3223(a), "Acceptance by Engineering Evaluation," the Code Case states that for Class 1 piping, the evaluation of wall-thinning shall be conducted in accordance with evaluation methods and criteria developed by the Owner. Similarly, in -3223(b), the Code Case states that for Class 2 and 3 piping, alternative evaluation methods and criteria may be specified by the Owner. If the NRC allowed unconditional use of the Code Case, these two provisions would allow Owners to specify wall-thinning treatments that go beyond the scope of the Code Case and use criteria other than those specified in the Code Case. Furthermore, the NRC believes that judicious use of the Code Case is paramount to its success. In this regard, the NRC believes that application of the Code Case may be permitted to allow piping wall thickness to deviate to some degree below the Code allowable minimum wall thickness, but, it is unclear at this time to what extent that degree should be absent sound technical reasoning and experience that justifies reasonable application of the Code Case for wall thinning caused by flow-accelerated corrosion. Thus, the NRC will continue to place these conditions on the Code Case and will evaluate licensee's requests to use Code Case N-597-1 on a case-by-case basis.

With regard to the comments from Mr. Graham that "the Code Case was developed through the ASME Section XI Code Committee with participation by members of the NRC," as stated in the NRC's letters to the ASME nominating NRC staff to a committee, "Agency representatives participating on standards developing groups will, to the extent, possible, ascertain the views of

the agency on matters of interest and will express views that are consistent with established agency views." However, as stated in Office of Management and Budget (OMB) Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*, "Agency participation in voluntary consensus standards bodies does not necessarily connote agency agreement with, or endorsement of, decisions reached by such organizations."

COMMENT 9: Robert Hermann, Individual; Robin Dyle, Southern Nuclear

The NRC has conditioned code Case N-638-1 as follows:

> N-638-1 *Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1*
> 8-9/01E
>
> **NRC Condition**
>
> UT volumetric examinations shall be performed with personnel and procedures qualified for the repaired volume and qualified by demonstration using representative samples which contain construction type flaws. The acceptance criteria of NB-5330 in the 1998 Edition through 2000 Addenda of Section III apply to all flaws identified within the repaired volume.

It is my view that the condition applied to this code case is unnecessary and unwarranted for the following reasons:

- Inadequate guidance is provided as to the nature and scope of the demonstration desired. The workmanship standards contained in NB-5300 do not provide appropriate criteria for establishing a performance demonstration.

- The condition does not appear to be consistent with the back fitting requirements of 10CFR50.109 in that a safety enhancement would be achieved by the demonstration required in the condition. The automatic GTAW process for ambient temperature temper bead welding receives one of the most stringently qualified welding processes in terms of both process and personnel qualification. The process uses no flux which eliminates any concern for entrapped slag. The fracture toughness of the weldment and heat-affected zone is demonstrated as a part of the procedure qualification. Bead overlap and heat input are carefully controlled as part of the qualification and in field use to assure that adequate tempering is achieved. NDE of the repair is delayed for 48 hours to identify any postulated delayed hydrogen cracking for this extremely low hydrogen weld.

  Further performance demonstration is not required for ultrasonic fabrication examinations performed in accordance with the construction code (ASME BP&V Code, Section III) endorsed for use in NRC regulations. The condition being applied to the code case is essentially a back fit to the regulations that is establishing something

similar to Appendix VIII, Section XI that has been applied to pre-service and in-service UT of welds.

- The NRC has approved the use of this code case for applications over 100 sq. in. without a specific performance demonstration. Further in applications where this code case is used for overlays of dissimilar weldments, UT performed is required to be qualified by procedure and personnel qualification under the PDI program incorporated by reference in 10 CFR50.

- UT examination of components fabricated for use such as pressure vessels and piping has been highly successful in producing highly reliable, safe products. In many countries of the world, UT examination is the required NDE method of acceptance for fabricated boiler and pressure vessel nuclear components. Specific performance qualification is not required.

- ASME is currently developing rules for UT examination use for ASME, Section III fabrication. If performance demonstration is thought to be needed by the NRC, they should pursue the necessary rulemaking when endorsing the code change.

If possible, could you please provide a copy of the back analysis or evaluation that supports conditioning the use of this code case?

Response to Comment 9:

The condition is being clarified in the final guide. The commenters interpreted the condition as requiring a PDI-type performance demonstration. Criterion IX of 10 CFR Part 50, Appendix B, requires the use of qualified procedures and personnel. It should be noted that the "demonstration" being referred to in the draft guide and reflected in the final guide, is an approach consistent with that found in Section III, Code Case N-659.

As noted in the *Evaluation of Code Cases* for the proposed rule, Code Case N-638 was listed in Table 1, "Acceptable Section XI Code Cases," in Revision 13 to RG 1.147. After further consideration however, the NRC determined that Section III acceptance criteria for nondestructive examination must be used. The Code Case specifically states that repair of Class 1 components for certain materials may be made "without the nondestructive examination requirements of the Construction Code," provided certain requirements are met. Thus, the Code Case permits the use of Section XI acceptance criteria for nondestructive examination. The NRC believes that this is not appropriate. The Section XI nondestructive examination requirements are directed at detecting operationally induced flaws, not fabrication flaws. In addition, Section XI examinations typically examine the inner one-third of the component and not the entire weld. Hence, it was determined that the Code Case would be acceptable, provided that the Section III acceptance criteria for nondestructive examination are used.

Thus, the condition in the final guide is "UT examinations shall be demonstrated for the repaired volume using representative samples which contain construction type flaws. The acceptance criteria of NB-5330 of Section III edition and addenda approved in 10 CFR 50.55a apply to all flaws identified within the repaired volume."

COMMENT 10: Rick Swayne, Reedy Engineering

Code Case N-416-3
The staff's proposed technical bases for the limitation on this Code Case are incorrect. In addition, the proposed limitation is unclear.

There are three methods of replacing vessels in a nuclear power plant.
1. Replacement of a vessel wholly fabricated at a fabricator's facility.
2. Replacement of a vessel partially fabricated at a fabricator's facility and shipped to the nuclear power plant site in two or more parts.
3. Replacement of only a part of a vessel, using a part fabricated at a fabricator's facility (e.g., RSG internals with top or bottom half of shell).
It appears that the proposed limitation is intended to apply only to Case 2 above, but might be read to apply also to Case 3.

In Case 1, above, the vessel girth weld is hydrostatically tested by the fabricator, after welding blind flanges onto each nozzle. Current and proposed vessel replacements are probably all constructed in accordance with either Section III or VIII and N or U stamped. Both Sections III and VIII require a hydrostatic test. The nozzle-to-piping welds made during installation would be subjected to a system leakage test in accordance with Code Case N-416-3, at nominal operating pressure. The proposed limitation would have no effect on Case 1.

In Case 2, above, the requirements depend on the Construction Code used for construction of the original vessel. There are three possible conditions in current U.S. plants.

1. If the vessel is N-stamped, Section XI requires the replacement to be N-stamped. In this case, Section III requires the vessel to be hydrostatically tested in accordance with Section III, prior to application of the Code Symbol Stamp. Code Case N-416-3 does not permit an exception to this Section III hydrostatic test requirement.

2. If the vessel is U-stamped, Section XI requires the replacement to be U-stamped or N-stamped. In this case, Section VIII or III requires the vessel to be hydrostatically tested in accordance with Section VIII or III, respectively, prior to application of the U or N Stamp. Code Case N-416-3 does not permit an exception to this Section III or VIII hydrostatic test requirement.

3. In the vessel is not Code-stamped, the replacement vessel need not be Code-stamped. In this case, the pressure testing of the field girth weld must satisfy only the Owner's requirements and the FSAR. The Owner may specify a pressure test at nominal operating pressure, unless a higher pressure is specified in the FSAR. This condition probably applies only to a few reactor vessels, and not to any of the vessels currently being replaced. In this case, Code Case N-416-3 would not be used for pressure testing of the girth weld.

In each of the above three cases, the nozzle-to-piping welds made during installation would be subjected to a system leakage test in accordance with Code Case N-416-3, at nominal operating pressure. The staff's proposed limitation on Code Case N-416-3 would not have any effect on any of these possible conditions.

In Case 3, above, the girth weld is made as an installation weld by the Owner. This weld is subject to the provisions of Code Case N-416-3. In this case, Code Case N-416-3 permits pressure testing of the girth weld at nominal operating pressure, along with the nozzle-to-piping welds also made during installation. I believe that most of the steam generator replacements that have been made in the last ten years have been made by using Code Case N-416-1 or -2, and both the girth welds and the nozzle-to-piping welds have been subjected to a system leakage test at nominal operating pressure, rather than a hydrostatic test.
The purpose of Code Case N-416 has always been to allow a reduction in the test pressure for installation of such replacement material, parts, and components in a nuclear power plant. Although it does not appear that the staff intended to apply the limitation to Case 3, above, it is the only case in which the limitation would have any effect. Therefore, I will address the balance of my comments to Case 2.

The staff has already endorsed installation of replacement material, parts, and components using only a system leakage test. This has been done through endorsement of Cases N-416-1 and -2, as well as the endorsement of IWA-4540(a) in both the 2000 Addenda and the 2003 Addenda. The proposed limitation on Code Case N-416-3 is inconsistent with the staff's prior positions. The ASME Committee has been studying for many years the issue of the value of the hydrostatic test. The ASME Committee long ago concluded that the Section III and VIII hydrostatic test did nothing to assure structural integrity, because the pressure is too low to effectively challenge the structural integrity. It provides a slightly higher degree of assurance of leak tightness, but no assurance of structural integrity. Structural integrity is assured by the combination of requirements for material strength, design, and nondestructive examination.

Further, the staff states that the "attachment piping is usually not connected to such components when they are replaced. Therefore, typical hardship issues… do not apply." If the attachment piping is not connected to the vessel, the vessel nozzles are probably open, in which case, they would all have to be sealed to perform a pressure test. In the past, the test has been performed after making the nozzle-to-piping welds, in which case the hardship issues do apply. If the staff is proposing that all of the openings should be blanked for performance of a hydrostatic test, that would result in material damage from welding (partially offset by PWHT), and a lot of outage time to weld the covers, PWHT the welds, remove the covers, and remachine the weld preps, for no added safety benefit. I think that constitutes a hardship.

In conclusion, the staff limitation would almost never apply, would not apply to the situation for which it is intended, and would not result in any increase in safety.

Response to Comment 10:

The staff had proposed to condition the Code Case based on a concern emanating from a draft Section XI action. In describing the current Code requirements and practices regarding fabrication and replacement of vessels, the commenter has addressed the staff's concerns. Accordingly, Code Case N-416-3 has been unconditionally approved in final Revision 14 to Regulatory Guide 1.147.

COMMENT 11: Rick Swayne, Reedy Engineering

Code Case N-504-2
The staff's proposed reference to Section XI, Appendix P is inappropriate.

While the proposed nonmandatory appendix was assumed by the ASME Code Committee volunteers to end up as Appendix P, the action was delayed by negative votes during the normal review by the Code Committee. As a result, a different appendix was published as Appendix P in the 2004 Edition. The action incorporating Code Case N-504-2 will probably be published as Appendix Q (or perhaps R) in the 2005 Addenda. It will not be published in time for the staff to reference it in this rule.

The staff might be able to make an agreement with the ASME Staff to publish the ASME-approved action on the ASME website in a publically-accessible area, so the staff can reference it. Otherwise, the staff should add the appropriate limitations to RG1.147.

I have no objection to the proposed limitations, as they are obviously supported by the ASME Committee. My only objection is to the way the staff has proposed to reference them.

Response to Comment 11:

Per the commenter's suggestion, ASME staff were contacted and agreed to post the appendix on the ASME public Web site. Regulatory Guide 1.147 lists Code Case N-504-2 in Table 2, "Conditionally Acceptable Section XI Code Cases," and directs users to the appropriate location on the Web site. Specifically, it is Section XI, Nonmandatory Appendix Q, "Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments," and the appendix is available at: http://cstools.asme.org/csconnect/CommitteePages.cfm?Committee=O10000000

RESPONSE TO PUBLIC COMMENTS ON REGULATORY GUIDE 1.193, PROPOSED REVISION 1

COMMENT 1: Rick Swayne, Reedy Engineering

Case N-595-3- The reason for the lack of acceptability contains inaccurate statements. ASME has not approved incorporation of Case N-595-3 into Section III, Division 3. That proposal failed to gain approval of the BPVSC. Instead, the BPVSC agreed to publish a new Case N-717 that will contain those same provisions. This proposal has not yet been approved by the BNCS. A proposal to incorporate Case N-717 into Section III, Division 3 has not yet been considered by the ASME Committees.

Response to Comment 1

The following guidance, provided in Regulatory Guide 1.193 for Code Cases N-595, N-595-1, and N-595-2, also currently applies to Code Case N-595-3: "Regulatory approval for the use of multipurpose casks is presently addressed by the NRC Spent Fuel Project Office Interim Staff Guidance No. 4, Rev. 1 (ISG-4, Rev. 1). The interim staff guidance provides a framework to ensure that the cask system, as designed, and when fabricated and used in accordance with the conditions specified in its Certificate of Compliance, meets the requirements of 10 CFR Part 72." In addition, Regulatory Guide 1.193, Proposed Revision 1, stated that, "The ASME has recently approved the incorporation of the provisions of Code Case N-595-3 into Section III, Division III, 'Containment Systems for Storage and Transport Packagings of Spent Nuclear Fuel and High Level Radioactive Material and Waste.' Thus, the Code case is no longer required."

As indicated by the commenter, the action to incorporate Code Case N-595-3 into Section III, Division 3, failed to gain final approval, and Code Case N-717 will replace N-595-3. Thus, Code Case N-595-3 will be retained in Regulatory Guide 1.193 in the final version of Revision 1 to the guide. The NRC staff will review Code Case N-717 for inclusion in Regulatory Guide 1.84 when it is published by the ASME.

COMMENT 2: Rick Swayne, Reedy Engineering

[*NOTE*: The following comment referred to Code Case N-595-3. However, Section XI Paragraph IWA-6350 is referenced in Condition Number (1) for Code Case N-532-2. The commenter was contacted, and it was acknowledged that this comment should have been submitted on Code Case N-532-2, rather than N-595-3.]

Case N-532-2 - The reason for the lack of acceptability contains an inaccurate statement. Concern (1) is inaccurate because IWA-6350 was added in the 2003 Addenda. Concern (2) is not clearly stated. Perhaps some discussion between the NRC and SC XI members could resolve the staff's difficulty with the footnote and the table.

Response:

The clarification relative to Concern (1) is appreciated. The need to delete this item was overlooked when the draft guide was published for public comment [i.e., the Code Case was approved by the ASME Board on Nuclear Codes and Standards on July 23, 2002, and IWA-6350 was added to the ASME Code subsequent to the NRC staff review].

Relative to Concern (2), the NRC staff has communicated its concerns to the ASME Section XI Working Group on General Requirements (WGGR). Administrative changes were made to Code Case N-532-2 to reflect editorial changes and paragraph renumbering in the 2001 Edition and 2002 Addenda. The NRC staff review raised certain questions. Footnote 1 states that "all references to IWA-4000 and IWA-6000 used in this Case refer to the 1998 Edition with the 2000 Addenda. For use with other Editions and Addenda of Section XI, refer to Table 4…" It was not clear why the provisions of the Code Case continued to be based on the 1998 Edition with the 2000 Addenda and had not been updated to later Code edition and addenda. Also as previously indicated, Table 4, 2002 Addenda column, references IWA-6350, which did not exist in the 2002 Addenda. These concerns raised questions relative to the accuracy and intent of the Code Case. A decision was made to reject the Code Case and work with the cognizant ASME committees to "clean up" the Code Case.

COMMENT 3: Jim O'Sullivan, Procon1, LLC

The comments below were received on Code Cases N-561, N-561-1, N-562, and N-562-1. For reference, following is the basis provided in Regulatory Guide 1.193, Revision 1, for the disapproval of the Code Cases: "Neither the ASME Code nor the Code Case have criteria for determining the rate or extent of degradation of the repair or the surrounding basemetal. Reinspection requirements are not provided to verify structural integrity since the root cause may not be mitigated."

The comments received are: "The reasons for NRC disapproval do not appear pertinent to published Code Cases N-561-1 and N-562-1, both of which contain the following specific requirements:

3.1(d) The predicted maximum degradation of the overlaid piping and the overlay over the design life of the restoration shall be considered in the design. The predicted degradation of the piping shall be based on in-situ inspection and established data for similar base metals. If the weld overlay is predicted to become exposed to the corroding medium, the predicted degradation of the overlay shall be based upon established data for base metals or weld metals with similar chemical composition to that of the filler metal used for the weld overlay.

6.0 (d) Follow-up inspection shall be scheduled as necessary to confirm any design assumptions relative to rate or extent of future degradation.

Considering that the reasons for disapproval in Regulatory Guide 1.193 appear to be resolved by the latest published Code cases, it is requested that Code Cases N-561-1 and N-562-1 be included in Revision 14 to Regulatory Guide 1.147.

Response:

The NRC does not believe that the latest published Code Cases resolve its concerns. There are two concerns with the paragraphs cited by the commenter. The first concern emanates from the language employed. Paragraph 3.1(d) requires only that the predicted maximum degradation be **considered** in the design. Users of the Code Case are not required to apply the predicted maximum degradation results in designing the overlay. For example, the industry has used EPRI National Safety Analysis Center Report 202L, "Recommendations for an Effective Flow-Accelerated Corrosion Program," for the analytical evaluation of pipe wall thinning to develop methods for predicting the rate of wall thickness loss and the value of the predicted remaining wall thickness. The second concern is that in Paragraph 6.0(d), followup inspections are not required and left to the discretion of the licensee. The NRC believes that periodic inspections are required to ensure that the repair was properly performed and that the assumptions relative to rate of wall thickness loss of the repair were valid; especially since the standalone Code Case does not require the performance of a root cause evaluation but requires only that **consideration** be given to the cause of the degradation. In addition, no guidelines are provided for doing so. The NRC believes that a root cause evaluation is required.

The NRC staff has been working with the cognizant ASME Section XI committees to resolve these concerns.

COMMENT 4: Ray West, individual

These vessel-welded attachments (vessel support skirt welds) that are the subject of Code Case N-323-1, and the current ASME Code Section XI, Table IWB-2500-1, Examination Category B-K requirements for inservice inspection, are robust in design, and have demonstrated a low failure potential by satisfactory performance without any degradation for over 30 years of nuclear plant operating experience. In fact, these welds, although subject to a perceived high consequence of failure, if a failure would occur, because they are attached to major plant components (i.e., Boiling Water Reactor (BWR) Reactor Pressure Vessels, Pressurized Water Reactor (PWR) Pressurizers and Combustion Engineering (CE) Steam Generators) are of little concern due to their excellent service history. For at least one of the designs covered by these requirements the vessel's pressure boundary integrity could be challenged if a crack were to occur and go completely through the vessel wall, but this is highly unlikely and the surface examination requirements contained in this Code Case and the ASME Code would identify this problem before it could occur. This is because such potential propagation would be very slow requiring years. Thus, these welds do not warrant the increased level of examination (i.e., a volumetric examination) that is being forced on the industry by the NRC Staff and have not warranted such an examination since the development of Code Case N-323-1. Due to this extensive operating experience which has been recognized by the ASME Code, the unacceptability status of Code Case N-323-1, and the limitation in the regulations for these same welds under 10CFR50.55a(b)(2)(xxi)(C) does not provide a substantial increase in the level of public health and safety, but increases the burden on Licensees in costs and personnel radiation exposure, and therefore should both be removed.

Response:

The commenter has provided a good deal of information on the operating experience of vessel welded attachments. The operating experience indicates excellent performance and the absence of any observed degradation using examinations capable of detecting flaws in the attachment welds. The staff agrees with the commenter's conclusion that continuing to perform surface examinations on both sides of the weld or a volumetric examination of the weld is a burden on licensees and does not provide a substantial increase in public health and safety. Thus, Code Case N-323-1 has been removed from Regulatory Guide 1.193, Revision 1, and has been listed as acceptable in the final version of Regulatory Guide 1.147, Revision 14.