

**Timothy S. Rausch**  
Sr. Vice President & Chief Nuclear Officer

**PPL Susquehanna, LLC**  
769 Salem Boulevard  
Berwick, PA 18603  
Tel. 570.542.3445 Fax 570.542.1504  
tsrausch@pplweb.com



**AUG 25 2009**

Rulemaking and Directives Branch  
Mail Stop: TWB-05-B01M  
Office of Administration  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

6/2/09  
74FR 26440

19

RECEIVED

SEP 11 PM 4:35

RULES AND DIRECTIVES  
SECTION  
1500

**SUSQUEHANNA STEAM ELECTRIC STATION  
COMMENTS ON DRAFT REGULATORY GUIDES  
DG-1191, DG-1192 AND DG-1193  
PLA-6550**

**Docket Nos 50-387  
and 50-388**

The following are PPL Susquehanna, LLC's (PPL) comments on draft Regulatory Guides DG-1191, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III" (proposed Revision 35 to Regulatory Guide 1.84), DG-1192, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (proposed Revision 16 to Regulatory Guide 1.147) and DG-1193, "ASME Code Cases Not Approved for Use" (proposed Revision 3 to Regulatory Guide 1.193) as requested in the June 2, 2009 *Federal Register*.

PPL does not have any comments on draft Regulatory Guides 1191 and 1193.

Below are PPL's comments on draft Regulatory Guide DG-1192. Specifically, the comments are on the proposed conditions for Code Cases N-416-4, N-504-4, N-638-4 and N-661-1.

Our review was conducted using the latest version (dated June 2009) of the Draft Regulatory Guides. Except for Code Case N-661-1 in DG-1192, which will be discussed later, our review found no differences between the April 2009 and June 2009 versions.

- **Code Case N-416-4** *"Alternative Pressure Test Requirement for Welded or Brazed Repairs, Fabrication Welds or Brazed Joints for Replacement Parts and Piping Subassemblies, or Installation of Replacement Items by Welding or Brazing, Classes 1, 2, and 3, Section XI, Division 1,"* January 12, 2005.

The NRC proposes a condition to require that when using Code Case N-416-4, nondestructive examination shall be performed on welded or brazed repairs and fabrication and installation joints in accordance with the methods and acceptance criteria of the applicable subsection of the 1992 Edition of Section III.

SUNSI Review Complete  
Template = ADM-013

ERIDS = ADM-013  
Add = M. Bayssie (mrb1)  
W. Nassir (Wen)

The NRC basis for the condition is that some Construction Codes are less rigorous than others, depending on when the provisions were developed. The NRC position is that to compensate for the substitution of a system leakage test for the hydrostatic test, additional non-destructive examinations (NDE) should be required in instances where components subject to the provisions of older codes are not required to receive the same amount of NDE as Section III. The NRC's position is that a system leakage pressure test does not provide an equivalent level of safety as a hydrostatic pressure test. The higher pressure of the hydrostatic pressure test would make any potential leakage more evident than if a system leakage test was performed, particularly in the case of smaller defects.

PPL disagrees with this position. This Code Case should be accepted in DG-1192 with no conditions, and then placed in Revision 16 of Regulatory Guide 1.147 for unrestricted use by the industry.

When Code Case N-416-1 was developed and approved by ASME on February 15, 1994, some 15 years ago, it eliminated the requirement for the hydrostatic test. The justification presented at the time of the change was that the difference in the ability to identify leakage during a hydrostatic test as compared with a system leakage test was negligible. An analytical comparison of the two tests was presented which showed that the increased stress from the hydrostatic test was extremely unlikely to cause a subsurface defect to grow to a through-wall defect and then to show leakage during the test. For those defects that were already through-wall, the stresses involved in a hydrostatic test were similarly unlikely to show leakage in a flaw that would otherwise not show leakage at system pressure.

The ASME Committee on Nuclear Inservice Inspection, Section XI, during deliberation of Code Case N-416-1, also conducted an industry survey of historical test results that identified only one case in which a small amount of leakage occurred at the hydrostatic test pressure and not at the lower system leakage test pressure. The survey results, though not totally definitive, largely confirmed the results of the analysis presented. It was therefore concluded that the hydrostatic pressure test, which creates a significant hardship in an operating nuclear power plant, could be suitably replaced by a system pressure test. The hardship is not compensated for by the slight increase in assurance of leak-tightness of the weld or brazed joint due to the higher hydrostatic test pressure.

The NRC states that it is the NDE requirements not being performed by various other acceptable Construction Codes which is the concern.

Requiring the use of the Section III NDE methods and acceptance criteria in lieu of normally used Construction Code requirements, which have been approved for use at older plants to offset the proposed reduction in test pressure by not performing a hydrostatic test, is not warranted. Although there was not a sound basis for adding the additional Section III examination requirements in the 1999 Addenda when the Case was

first incorporated into Section XI, it was done as a compromise only to satisfy the aforementioned NRC concerns. In retrospect, those additional requirements were considered to be over-conservative, and have since been removed. However, the NRC continues to mandate the use of Section III NDE methods and acceptance criteria as conditional requirements in this Case and in 10 CFR 50.55a on later Editions and Addenda of Section XI. These conditional requirements are not necessary and should not be applied to Code Case N-416-4 or to the regulation.

- **Code Case N-504-4**     *“Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1,” July 14, 2006*

Code Case N-504-3 was conditionally accepted in Revision 15 of Regulatory Guide 1.147. The NRC has determined that Code Case N-504-4 is acceptable with the same condition. Revision 15 of Regulatory Guide 1.147 states:

“The provisions of Section XI, Nonmandatory Appendix Q, “Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments, must also be met.”

However, the proposed conditions that are now in DG-1192 for the use of Code Case N-504-4 are more extensive than what was in Revision 15 of Regulatory Guide 1.147 in that they now include the following:

In addition, to requiring the use of Nonmandatory Appendix Q the following conditions shall be met: *“(a) the sum of laminar flaw length in any direction shall be less than 10% of the overlay with a total reduction in area equal to or less than Table IWB-3514-3; (b) the finished overlay surface shall be 250 micro-in (6.3 micrometers) root mean square or smoother; (c) the surface flatness shall be adequate for ultrasonic examination; and (d) radiography shall not be used to detect planar flaws under or masked by laminar flaws.”*

The condition on N-504-4 requiring the use of Nonmandatory Appendix Q is unnecessary, and should be removed for the following reasons.

N-504-3 was first listed in Regulatory Guide 1.147, Revision 15, as a conditionally acceptable Code Case. The limitation requires that Section XI, Nonmandatory Appendix Q, “Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments,” must also be met. This is the same limitation that was imposed on N-504-2 in Revision 14 of the Regulatory Guide. In prior revisions of the Regulatory Guide, N-504-2 was acceptable without condition.

During 2004, the ASME Committee incorporated Code Case N-504-2 into Section XI Non-Mandatory Appendix Q. A number of changes from N-504-2 were incorporated into Appendix Q including, prohibiting the use of submerged arc welding, limiting the use of weld overlays to the correction of stress corrosion cracking, and adding new acceptance criteria for laminar flaws in the weld overlay, including how to address uninspectable volumes in the weld overlay. In parallel with this action, Code Case N-504-2 was revised to incorporate the restriction on submerged arc welding and the new acceptance criteria for laminar flaws.

The following is an excerpt from ‘The Evaluation of Code Cases in Supplement 12 to the 1998 Edition and Supplement 1 Through Supplement 6 to the 2001 Edition’ (ADAMS Accession No. ML040480074):

“The ASME Code permits defects to be reduced to a flaw of acceptable size through mechanical means (by grinding for example). Code Case N-504-2 is an alternative whereby a defect in austenitic stainless steel piping may be reduced to a flaw of acceptable size through the placement of weld overlays on the outside of the pipe. The American Society of Mechanical Engineers Subcommittee on Nuclear Inservice Inspection (SC XI) recently passed Appendix P, “Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments,” which addresses the repair and examination of austenitic stainless steel piping that has experienced stress corrosion cracking. These repairs are performed through weld overlays on the outside surface of the pipe. SC XI also recently passed some important revisions to Code Case N-504-2 to incorporate some of the provisions contained in Appendix P. Thus, the Code case is out of date. The NRC could propose to “correct” the Code case by adding many of the provisions of the appendix to the regulatory guide. However, the appendix should be available to the public during the public comment period for the guide. Hence, a more straightforward approach would be to condition the use of the Code case on also meeting the provisions of Appendix P.

There are four substantial technical differences between Appendix P and Code Case N-504-2. (1) Appendix P restricts weld overlays to the repair of flaws caused by stress corrosion cracking (SCC). Code Case N-504-2 has no such restriction. (2) The acceptance standards of Appendix P contain preservice examination standards for laminar flaws. Laminar flaws resulting from the welding process such as lack-of-fusion, slag, and porosity can result in uninspectable volumes. The appendix contains provisions to address these circumstances while the Code case does not. (3) The appendix does not permit the submerged

arc welding (SAW) method to be used for weld overlays. SAW is a high heat input method that can sensitize the pipe making it more susceptible to cracking. The Code case does not restrict the welding method. (4) For weldments with four or fewer axial flaws, each less than 1.5 inches, the appendix requires a design analysis to ensure that Construction Code stress limits for primary local and bending stresses, secondary, and peak stresses are satisfied. Laminar flaws in the weld overlay are to be evaluated to ensure that load redistribution satisfies the Construction Code stress limits. The Code case does not require an evaluation for weldments with four or fewer axial flaws.

Proposed condition: The provisions of Section XI, Appendix P, "Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments," must also be met."

(Note that the action incorporating N-504-2 was prepared assuming the non-mandatory appendix was to be lettered as Appendix P, it was however issued as Appendix Q.)

As mentioned in the NRC's evaluation, Code Case N-504-2 had been revised to incorporate some of the provisions in the appendix. Specifically, of the four issues mentioned by the NRC in their evaluation, Code Case N-504-3 addresses the second and third issues (the new laminar acceptance criteria and the prohibition on submerged arc welding).

The initial issuance of Appendix Q did limit the use of weld overlays to the correction of stress corrosion cracking. However, during the development of Code Case N-740, the need to correct and clarify Appendix Q became apparent. Changes to Q-1000 and Q-3000 were approved to address the use of weld overlay repair of defects other than stress corrosion cracking (SCC). Code Case N-504-2 was not restricted to the correction of stress corrosion cracking. While the majority of the applications of weld overlays have been to address SCC, this repair technique has been used to address fatigue cracks as well. The design and implementation requirements of Case N-504-2 and Appendix Q are appropriate for addressing defects from both SCC and fatigue. Appendix Q no longer restricts the use of weld overlays to the correction of stress corrosion cracking.

The NRC's assertion that Appendix Q requires a design analysis to ensure that Construction Code stress limits for primary local and bending stresses, secondary, and peak stresses are satisfied for weldments with four or fewer axial flaws, each less than 1.5 inches, is incorrect. Neither Appendix Q, nor the Code Case, requires such an analysis. The last sentence of paragraph Q-3000(a)(5) clearly indicates that no design analysis is required except in the case where the end transition slope of the overlay exceeds 45 degrees. This provision is consistent with the guidance in NUREG 0313, paragraph 4.4.2 as well as the technical basis document for Code Case N-504, EPRI Report NP-7103-D, section 2.2. The basis of this provision is that the pipe wall has been

proven structurally adequate “as is” with these small axial flaws, and application of the two layer overlay is only to provide a barrier against leakage.

Therefore, PPL believes that the condition to meet Nonmandatory Appendix Q is not required.

Additionally, Code Case N-504-4 as listed in DG-1192 includes conditions being proposed that are not mentioned in the Proposed Rule. There should be some explanation to the public for the additional conditions imposed by the Proposed Rule. However, none of the new proposed conditions are necessary and should be removed for the following reasons.

In regards to the new added condition “*(a) the sum of laminar flaw length in any direction shall be less than 10% of the overlay with a total reduction in area equal to or less than Table IWB-3514-3.*” – This condition appears to be related to a change made to Code Case N-740 during committee discussions. There is no technical need to impose this condition on N-504-4. The limitations imposed on laminar flaw size, and the acceptance criteria of the assumed planar flaw below the laminar flaw, are more conservative than the proposed limitation. Code Case N-504-4 requires that the assumed planar flaw meet the inservice acceptance criteria of Table IWB-3514-2. This requirement effectively restricts the maximum size of the laminar flaw to a relatively small size. In comparison, in N-740, where the wording of this proposed limitation first appears, the assumed flaw may be evaluated for acceptability in accordance with IWX-3600. Using the flaw evaluation procedures of IWX-3600 would permit a larger assumed planar flaw to be acceptable, and therefore permit larger laminar flaws in the weld overlay. The N-504-4 requirement for the assumed planar flaw to meet the inservice acceptance criteria of Table IWB-3514-2 makes the proposed limitation unnecessary.

For the new added conditions “*(b) the finished overlay surface shall be 250 micro-in (6.3 micrometers) root mean square or smoother.*” and “*(c) the surface flatness shall be adequate for ultrasonic examination.*” – These proposed conditions are redundant to existing requirements. Code Case N-504-4 identifies “Grinding and machining of the as-welded overlay surface may be used to improve the surface finish for such examinations...” and these words would apply to ultrasonic test (UT) examinations. Additionally, since the September 22, 1999 revisions of 10 CFR50.55a, licensees are required to follow the Performance Demonstration requirements of Appendix VIII. This included implementing Supplement 11, 'Qualification Requirements for Full Structural Weld Overlaid Wrought Austenitic Piping Welds,' by November 22, 2001. The weld overlay examination procedures qualified through the Electric Power Research Institute Performance Demonstration Initiative program contain the appropriate surface finish and flatness requirements. Therefore, the proposed limitations are already addressed by the Appendix VIII qualified UT procedure which would be used following application of a Code Case N-504-4 weld overlay.

For the last added new condition, “(d) radiography shall not be used to detect planar flaws under or masked by laminar flaws.” – There is no technical basis for restricting the use of radiographic examination (i.e., the Construction Code approved volumetric examination for deposited weld metal) used to verify the absence of construction type flaws in the deposited weld metal of the overlay. The radiographic method is extremely effective in detecting radial planar flaws in welds. This examination is not being used to find or accept inservice type flaws and is only an alternative to assuming radial planar flaws that might be masked by a laminar flaw in the weld overlay. This provision was added to N-504-4 because assuming a planar flaw in the uninspectable volume below a laminar flaw was very conservative and represented a very large penalty for a structurally insignificant flaw. The conditional restriction against using the radiographic examination method, accepted by the Construction Code for examination of weld metal, should not be imposed on Code Case N-504-4.

Therefore, PPL believes that the original condition that was placed on the use of Code Case N-504-3 to use Nonmandatory Appendix Q should not be retained for N-504-4, and the newly added conditions to Code Case N-504-4 are not required and should be removed from DG-1192. This Case should then be included in Revision 16 of Regulatory Guide 1.147 for unrestricted use by the industry.

- **Code Case N-638-4**     *“Similar and Dissimilar Metal Welding Using Ambient temperature machine GTAW Temper Bead Technique, Section XI, Division 1,”* October 5, 2006

Code Case N-638-1 was conditionally accepted in Revision 15 of Regulatory Guide 1.147. The NRC has determined that Code Case N-638-4 is acceptable with the same condition.

PPL disagrees with the NRC proposal to retain this condition for N-638-4.

N-638-1 was first listed in Regulatory Guide 1.147, Revision 14, as a conditionally acceptable Code Case. Revision 14 of Regulatory Guide 1.147 states:

“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.”

The following is an excerpt from ‘The Evaluation of Code Cases in Supplement 12 to the 1998 Edition and Supplement 1 Through Supplement 6 to the 2001 Edition’ (ADAMS Accession No. ML040480074):

“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 has 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, the NRC has determined that the Code case is acceptable provided that the Section III acceptance criteria for nondestructive examination are used.”

As indicated in the NRC’s evaluation, the concern with N-638, and N-638-1, was those cases required the use of Ultrasonic examination in accordance with ASME Section XI. In particular, the Section XI exam volume and acceptance criteria was not appropriate for the weld repair. The NRC required that the nondestructive examination cover the entire repair volume and meet the Section III acceptance criteria.

Case N-638-4 addresses this NRC concern, so the condition is no longer necessary. Case N-638-4, Paragraph 4(a), requires the examination of the repair be performed and meet the acceptance criteria of the Construction Code or Section III.

Therefore, PPL believes that the original condition placed on the use of Code Case N-638-1 should not be retained for N-638-4, and should be removed from DG-1192. This Case should then be included in Revision 16 of Regulatory Guide 1.147 for unrestricted use by the industry.

If you have any questions, please contact Mr. Cornelius T. Coddington at 610/774-4019.

T. S. Rausch



Copy: NRC Region I  
Mr. R. R. Janati, DEP/BRP  
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector  
Mr. B. K. Vaidya, NRC Project Manager