

**NRC Report
November 2009**

Presented By: Mr. Wally Norris, United States Nuclear Regulatory Commission

1. Amendment to 10 CFR 50.55a – ASME Code Edition/Addenda

A final rule was published in the *Federal Register* [73 FR 52730] on September 8, 2008, incorporating Section III and Section XI of the 2004 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code into Title 10, Part 50.55a, of the Code of Federal Regulations (10 CFR 50.55a). The effective date of the rule was October 10, 2008.

An amendment to the above rule was published in the *Federal Register* [73 FR 57235] on October 2, 2008, to correct several paragraph references.

A direct final rule was published in the *Federal Register* [74 FR 38890] on August 5, 2009. The rule revises the augmented examination requirements relative to Code Case N-729-1, and the percentage of axially oriented flaws for the specimen set. Paragraph 10 CFR 50.55a(g)(6)(ii)(D)(4)(ii) now reads "At least 20 percent and no more than 60 percent of the flaws shall be oriented axially." On October 19, 2009, a notice was published in the Federal Register [74 FR 53402] confirming the effective date of October 19, 2009, for the direct final rule.

The NRC staff has begun its review of the 2005 Addenda through the 2008 Addenda. These edition/addenda will be included in the next proposed rulemaking which is scheduled to be published for public comment early in 2010. The NRC staff plans to incorporate the comprehensive inspection requirements of ASME Code Case N-770 by reference into this proposed rule. The NRC staff also plans to provide guidance regarding "incorporation by reference" versus "requirements."

2. ASME Code Case Rulemaking/Regulatory Guides

On June 2, 2009, Draft Revision 35 to RG 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III," draft Revision 16 to RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," and draft Revision 3 to RG 1.193 "ASME Code Cases Not Approved for Use," were published in the Federal Register (74 FR 26303) for public comment. The guides address Code Cases from Supplement 2 to the 2004 Edition through Supplement 0 to the 2007 Edition (Supplement 0, 2007 Edition also serves as Supplement 12 to the 2004 Edition). The public comment period closed on August 17, 2009. Proposed responses have been drafted for all of the comments, and the draft final regulatory guides have been prepared. Office review of the draft final documents has begun. The draft final amendment to 10 CFR 50.55a to incorporate the guides by reference is under development. The final amendment and regulatory guides are scheduled to be published by the end of the year.

The NRC staff has completed its review of Supplements 1 - 8 to the 2007 Edition. Draft Revision 36 to RG 1.84, draft Revision 17 to RG 1.147, draft Revision 2 to RG 1.192, and draft Revision 4 to RG 1.193 have been reviewed by the cognizant NRC offices. The draft guides address Supplements 1 – 7 to the 2007 Edition. The goal is to publish these guides for public

comment shortly after Revision 35 to RG 1.84, Revision 16 to RG 1.47, and Revision 3 to RG 1.193 have been published as final guides.

The staff is considering addressing the issues raised by Raymond A. West in a petition for rulemaking dated December 14, 2007, and revised on December 19, 2007, in the proposed rulemaking for Revision 17 of Regulatory Guide 1.147.

3. Risk-Informed Activities

Draft Regulatory Guide 1.174

Proposed Revision 2 of Regulatory Guide 1.174 (Draft Regulatory Guide DG-1226, dated November 2002], "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis," was published for comment in August 2009 [ML091200100]. Comments are requested by November 3, 2009.

Draft Regulatory Guide 1.177

Proposed Revision 1 of Regulatory Guide 1.177 (Draft Regulatory Guide DG-1227, dated August 1998], "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," was published for comment in August 2009 [ML091200294]. Comments are requested by November 3, 2009.

Final Regulatory Guide 1.205

A public meeting was held on October 29, 2009, by the Office of Nuclear Reactor Regulation to present the proposed final disposition of public comments submitted regarding Draft Guide DG-1218 "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (Revision 1 to Regulatory Guide 1.205, ML092730314). A meeting with the ACRS Reliability and PRA Subcommittee on the final draft is scheduled for November 13, 2009, and a meeting with the full committee is scheduled on December 3, 2009. The NRC intends to issue Revision 1 after addressing any comments by the ACRS.

10 CFR 50.46a Rule to Redefine the Large-Break LOCA

On August 10, 2009, the NRC published a revised proposed rule that would establish alternative, risk-informed regulations for emergency core cooling system performance during large-break loss-of-coolant accidents (LOCAs) (74 FR 40006, ML092250362, (www.regulations.gov)). The rule would also establish procedures and acceptance criteria for evaluating changes in plant design and operation based upon the results of the new analyses of ECCS performance. Licensees who perform LOCA analyses using the risk-informed alternative requirements could find that their plant designs are no longer limited by certain parameters associated with previous large break LOCA analyses. The new requirements could enable some licensees to propose a wide scope of design or operational changes up to the point of being limited by some other parameter associated with any of the required accident analyses.

On September 18, 2009, a *Federal Register* notice extending the comment period 120 days was published (ML091060581; 74 FR 40006). With this extension the comment period will expire on

January 22, 2010. This notice also includes an extension of 60 days to the comment period for the information collection aspects of the rulemaking so that the information collection comment period will expire on November 9, 2009.

4. Generic Activities on Material Degradation/PWR Alloy 600/182/82 PWSCC

In February 2008 NRC issued Temporary Instruction (TI-172) for regional staff to verify that all pressurized water reactors (PWRs) with dissimilar metal (DM) butt welds are implementing Materials Reliability Program (MRP)-139, "Primary System Piping Butt Weld Inspection and Evaluation Guidelines."

In 2006 ASME started the development of a Code Case for inspection of Alloy 82/182 butt welds. The Code Case was recently completed. The staff is preparing the next proposed update to 10 CFR 50.55a and plans to incorporate requirements that will impose Code Case N-770 with conditions. The NRC staff has provided comments on the Code Case related to these proposed conditions to cognizant ASME committees.

The NRC staff continues to monitor and evaluate operating experience to ensure that the current inspection schedules are adequate.

The NRC staff prepared a draft position paper (ADAMS No. ML092670398) detailing the requirements that are applicable to licensees that install weld overlays on welds in systems approved for "Leak-Before-Break" in accordance with the requirements of 10 CFR 50, Appendix A, General Design Criterion 4. The draft position paper addresses the regulatory requirements applicable to NRC staff review and approval of the leak-before-break (LBB) analyses that have to be updated to reflect the revised weld configuration of a weld overlay. The NRC staff held a public meeting on September 30, 2009, to discuss regulatory requirements for weld overlays in piping systems approved for LBB and the draft position paper [meeting summary dated October 8, 2009, ML092810075]. LBB has only been approved for piping systems in pressurized water reactors. The slides presented at the meeting can be found in ADAMS (ML092740051).

NEI representatives at the meeting indicated that industry participants had held a separate meeting on this topic and had prepared a handout. The handout lists the issues that industry representatives view as key to this subject (ADAMS No. ML092810068).

5. New Reactor Licensing Activities

The New Reactor Licensing public web-site [<http://www.nrc.gov/reactors/new-reactor-licensing.html>] has a list of expected new nuclear power plant applications, and an estimated schedule by fiscal year for new reactor licensing applications.

New Reactor Licensing Status

As of July 20, 2009, the status of new reactors licensing under 10 CFR Part 52 is as follows:

Design Certification

NRC has issued four design certifications to date (ABWR, System 80+, AP600, and AP1000). These are certified in 10 CFR Part 52, Appendices A, B, C, and D, respectively. The NRC is currently reviewing four design certifications:

- General Electric-Hitachi's ESBWR (first passive BWR)
- AREVA's EPR (evolutionary pressurized-water reactor)
- Mitsubishi Heavy Industries' US-APWR (advanced pressurized water reactor)
- AP1000 Revision 17 (first amended design certification)

Early Site Permits (ESP)

NRC has issued four ESPs to date (Clinton, Grand Gulf, North Anna and Vogtle). The NRC's issuance of the Vogtle ESP on August 26, 2009 is the first to be based on a specific technology (AP1000) and the first to include a limited-work authorization (LWA). To date, there have been no ESPs submitted for greenfield sites.

Combined License (COL) Applications

NRC is currently reviewing 17 COL applications (27 new reactor units):

- 1 ABWR South Texas Project 3 and 4
- 7 AP1000 Bellefonte 3 and 4, William S. Lee Station 1 and 2, Shearon Harris 2 and 3, Vogtle 3 and 4, V.C. Summer 2 and 3, Levy County 1 and 2, and Turkey Point 5 and 6
- 5 ESBWR North Anna 3 and Grand Gulf 3*, River Bend 3*, Victoria County 1 and 2*, Fermi 3
- 3 EPR Calvert Cliffs 3, Nine Mile Point 3, Bell Bend
- 1 US-APWR Comanche Peak Units 3 and 4

- * The reviews of the FSARs for these COL applications are on hold pending possible selection of another standard design.

NRO Quality and Vendor Branch Activities

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NRO Vendor Inspection

The NRO vendor inspection program is described in Inspection Manual chapter (IMC) 2507, "Construction Inspection Program, Vendor Inspection." This IMC will be implemented by various Inspection procedures (IPs) including:

- IP 43002: Routine Inspections of Nuclear Vendors;
- IP 43003: Reactive Inspections of Nuclear Vendors;
- IP 43004: Inspection of Commercial-Grade Dedication Programs;
- IP 43005: NRC Oversight of Third Party Organizations Implementing Quality Assurance Requirements; and
- IP 36100: Inspection of 10 CFR Parts 21 and 50.55(e) Programs for Reporting Defects and Noncompliance.

FY 10 Vendor Inspection Plans

- Commercial Grade Dedication organizations
- Forgings suppliers for AP1000, EPR
- Manufacturing for SG tubes AP1000 and EPR
- Manufacturing for ESBWR reactor pressure vessel
- Manufacturing for valves (all new reactor Design Centers)
- STP alternate Vendor & ABWR component fabrication in Japan
- Modular Construction Facilities

Vendor Inspection Reports completed, issued and planned inspections

- Flowserve Raleigh, Raleigh, NC, July 2009 – issued
- JSW, Muroran Japan, July 2009 – issued
- Toshiba, Japan, July 2009 – issued
- Anderson Greenwood Crosby, Wrentham, MA, July 2009 - issued
- Creusot Forge, Le Creusot, France, July 2009 – issued
- Tioga Pipe, Easton, PA, August 2009 – issued
- Sargent and Lundy, Chicago, IL, September 2009 – completed
- Sumitomo Metals, Japan, September 2009 – completed
- Curtiss-Wright EMD, Cheswick, PA, October 2009 – completed
- Namco Controls, SC, October 2009 – completed
- Energy Steel & Supply, La Peer, MI, October 2009 - completed

Vendor Inspections continue to identify findings related to commercial grade dedication activities and inadequate Part 21 programs for evaluating and reporting of defects that could cause a substantial safety hazard.

Previously issued NRC inspection and trip reports can be located at

<http://www.nrc.gov/reactors/new-licensing/quality-assurance.html>

Proposed Interim Staff Guidance

The NRC staff is soliciting public comment on its Proposed Interim Staff Guidance (ISG) DC/COL-ISG-020 titled “Interim Staff Guidance on Implementation of a Seismic Margin Analysis for New Reactors Based on Probabilistic Risk Assessment,” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092650342). This ISG supplements the guidance provided to the staff in Section 19.0 of NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants,” issued March 2007 and DC/COL-ISG-03, “Probabilistic Risk Assessment Information to Support Design Certification and Combined License Applications,” dated June 11, 2008 (ADAMS Accession No. ML081430087) concerning the review of probabilistic risk assessment (PRA) information and severe accident assessments submitted to support design certification (DC) and combined license (COL) applications. The NRC staff intends to incorporate the final approved DC/COL-ISG-020 into the next revision of SRP Section 19.0 and Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition),” June 2007.

Transitioning from ASME Section III to XI for New Reactors Under Construction

The NRC staff has been discussing with NEI and industry representatives the regulatory requirements governing when new reactors under construction are required to transition from the ASME Code, Section III (for design/construction) to Section XI (operation). The question arose of whether ASME Code, Section III or Section XI applies during the period following piping system completion (e.g., signing of the N-5 Data Report and application of the N-stamp) until the plant fuel load date.

The NRC notes that the regulations in 10 CFR 50.55a require that new reactors under construction and licensed under the Part 52 process are required to meet Section III requirements until fuel load. ASME Code, Section XI and OM requirements are required to be met, but only after the 52.103(g) finding is made (i.e., after fuel load). In addition, the design certification rules in Appendices A, B, C, and D to 10 CFR Part 52 require that licensees referencing any of these certified standard plant designs may not depart from ASME Code, Section III requirements until after fuel load without NRC approval.

The NRC staff met with the ASME Code’s Subgroup on Industry Practice for New Reactors during ASME Boiler Week in Memphis, Tennessee on August 10, 2009 to obtain ASME’s informal views and feedback. The NRC staff also held a public meeting with NEI and external stakeholders on August 20, 2009 to discuss this issue in greater detail (The August 20, 2009 meeting summary is available in ADAMS at ML092380143). The August 20, 2009, meeting summary provides NEI’s and NRC’s views on this issue.

Multinational Design Evaluation Programme (MDEP) Codes and Standards Working Group

MDEP is a multinational initiative to develop innovative approaches to leverage the resources and knowledge of mature, experienced national regulatory authorities who will be tasked with the regulatory design review of new reactor plant designs. One of the issue-specific working groups established under the MDEP organization is the Codes and Standards Working Group (CSWG) whose goal is to achieve harmonization of Code requirements in this area.

Harmonizing pressure-boundary Codes used by member countries would ensure a consistent level of quality and safety in the design of pressure-boundary components such as the reactor vessel, piping, pumps, and valves and allow components manufactured in other countries to be used in member countries with a relatively minor review and reconciliation of Code differences. Such an approach would simplify the licensing of nuclear power plants and reduce the burden on the regulatory authorities on an international scale significantly.

The MDEP/CSWG has been working with standards development organizations (SDOs) from several countries (i.e., U.S., Japan, Korea, France) for the past year to compare each countries' pressure-boundary Code requirements for Class 1 vessels (e.g., reactor pressure vessel) to the requirements of the ASME Boiler and Pressure Vessel Code, Section III. Similarities and differences have been identified and the source of the differences is described in a database table. Code-comparison results have been completed for the pressure-boundary design codes from Korea and Japan. The French Code is expected to be complete by October 2009. The SDOs from these countries plan to meet at the NRC offices on November 18, 2009 to present the final results to the MDEP/CSWG. The next step is to complete the Code-comparisons for Class 1 piping, pumps and valves. In addition, Canada and possibly Russia plan to complete its Code-comparison effort for Class 1 vessels in the next year.

6. LICENSE RENEWAL ACTIVITIES

There are several on-going activities in license renewal. Current status of applications and approvals is:

Current status of applications, staff reviews and approvals is:

- 55 units approved (TMI Unit 1 issued October 21)
- 13 applications (20 units) under review
 - 2 (2 units) awaiting final approval (Pilgrim and Vermont Yankee)
 - 3 (6 units) completed ACRS full committee (Beaver Valley 1 & 2, Indian Point 2 & 3, Susquehanna 1 & 2)
 - 1 (2 units) completed ACRS subcommittee (Prairie Island 1 & 2 planned 12/09)
 - 5 (7 units) awaiting ACRS subcommittee (Kewaunee 4/10, Cooper 5/10 and Duane Arnold 5/10, Crystal River 6/10, Palo Verde 9/10, Salem 10/10 and Hope Creek 12/10)
- 8 applications with scheduled application dates
 - October–December 2009 – STARS
 - January 2010 – Columbia
 - April-June 2010 – Seabrook
 - August 2010 – Davis-Besse
 - October-December 2010 – South Texas Project 1 & 2
 - July 2011 – Grand Gulf
 - September 2011 – Limerick 1 & 2
 - October 2011 - Callaway
 - Others staggered out to 2017

Two plants have entered the operating period beyond 40 years, Oyster Creek as of April 9 and Ginna as of September 19, 2009.

Revision of Generic Aging Lessons Learned (GALL) Report (NUREG-1801)

NRC has an on-going internal activity to develop an update of the GALL report and the License Renewal Standard Review Plan (SRP). This revision is comprehensive in nature, including consideration of aging management programs (AMPs), aging management review (AMR) line items from the GALL tables, and the SRP. Sources of information for the proposed revisions are:

- Interim Staff Guidance documents
- Comments from the industry (Nuclear Energy Institute)
- Plant operating experience (generic communications, etc.)
- Lessons learned and precedents from LRA reviews
- The NRR RES Proactive Materials Degradation Assessment (PMDA).

NRC staff will modify the GALL Report to address concerns raised by ASME about use of Section XI Code Editions, Relief Requests, and Code Cases for license renewal, consistent with the summary of the NRC-ASME teleconference held on August 10 (see (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092440512, available on the NRC web site [<http://www.nrc.gov>]).

The tentative schedule is:

- December 2009 – documents available on web
- April 2010 – draft GALL and SRP available for public comment and public workshop
- December 2010 – final revised GALL and SRP issued

Status and schedule can be tracked at:

<http://www.nrc.gov/reactors/operating/licensing/renewal/guidance/updated-guidance.html>

Technical Issues

Recent reviews and plant operating experience have identified issues in the following areas:

- Neutron Absorbers
 - Interim Staff Guidance (ISG) is under development for Boral and other neutron absorber materials; Information Notice to be issued.
- Buried Piping
 - Recent operating experience, including tritium releases. NRC has initiated on-going interactions with NEI, EPRI, INPO and NACE (last meeting October 22).
- Socket Welds
 - Consideration of the need for non-visual examinations to ensure integrity of these welds.

- Metal Fatigue
 - Additional information routinely requested for NRC reviews (dissolved oxygen, cycle counting, etc.). RIS 08-030 describes need to use six stress components instead on one to assure conservative fatigue calculations.
- Containment Liner
 - Corrosion identified at several plants; need for examination methods to detect outer wall corrosion from liner inner surface.
- Concrete Containment
 - Delamination at tendon thickness location identified at one plant. Possibility of similar conditions at other plants.
- Medium Voltage Cables
 - Cables in submerged environment not qualified for continuous submergence.

7. Buried Piping

Recent leaks from buried piping at nuclear power plants have caused the NRC to undertake a focused look at how underground piping is designed, maintained, and inspected to ensure structural integrity and to prevent leaks that could harm the environment. These leaks generated significant stakeholder interest, including inquiries from several congressmen. The NRC's Chairman directed the staff to review current regulations, codes and standards, and industry activities as they relate to buried piping. An action plan will be transmitted to the Commission by December 3, 2009. The staff has met twice with industry groups and with one standards body NACE International (originally known as "The National Association of Corrosion Engineers"). The staff intends to work with ASME to ensure Code Cases in Sections III and XI are given adequate attention. Additionally, if the staff identifies areas related to management of degradation of buried piping that we believe should be addressed in the ASME Code, we will propose appropriate changes to the Code.

A new Code Case N-XXX is under development to address underground piping systems. The staff has identified several areas that are not yet addressed, or require significant additional detail. The staff has provided its comments to Section III.

With regard to Code Case N-755 regarding the use of high density polyethylene piping for underground systems, the staff has identified issues to Section III related to design life, joining, and non-destructive examination that will need to be addressed for the staff to endorse the Code Case.

8. BWRVIP-181

On September 22, 2009, the NRC found that EPRI Topical Report, TR-1013403, "BWR Vessel and Internals Project, Steam Dryer Repair Design Criteria (BWRVIP-181)" as modified and clarified to incorporate the staff's comments, was acceptable [ADAMS Accession Number ML092670064]. The report provides guidance on the design criteria for steam dryer repairs/replacements, for the selection of the materials that are to be used for steam dryers, and for establishing fabrication, installation, and inspection requirements for the steam dryers.

9. MRP-228

On September 28, 2009, EPRI submitted to the NRC a copy of a non-proprietary report, *Materials Reliability Program. Inspection Standard for PWR Internals (MRP-228 Non-Proprietary Version)*.

10. POD Curves for Application in xLPR

The Office of Nuclear Regulatory Research (RES), Division of Engineering, Component Integrity Branch, hosted a Category 2 public meeting on September 29, 2009, between the NRC staff and the Electric Power Research Institute (EPRI) to discuss preliminary results of the EPRI assessment of the probability of detection (POD) of flaws in dissimilar metal welds. A summary of the meeting can be accessed on ADAMS [ML092790044]. The purpose of the assessment is to produce POD curves in support of the re-evaluation of General Design Criterion 4, *Environmental and dynamic effects design basis*, of 10 CFR Part 50, Appendix A. The NRC staff initiated the re-evaluation of GDC 4 in order to investigate the requirement that there be an extremely low probability of rupture (xLPR) in reactor pressure boundary piping. It was determined that the re-evaluation was necessary to quantify the effects of primary water stress corrosion cracking (PWSCC) and other potentially active degradation mechanisms not considered in the original analyses.