

**NRC Report
February 2010**

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 (B&PV 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.

In February 2010, the NRC staff expects to publish a proposed rule for public comment that would incorporate by reference the following ASME codes and code case into 10 CFR 50.55a:

- 2005 Addenda through 2008 Addenda of Section III, Division 1, and Section XI, Division 1, of the B&PV Code
- 2005 Addenda and 2006 Addenda of the *Code for Operation and Maintenance of Nuclear Power Plants*
- Code Case N-770, "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, Section XI, Division 1"

The proposed rule would also do the following:

- clarify which portions of Section III are approved for use by applicants and licensees
- identify which portions of Section III are NRC requirements, and which portions of Section III are not required to be implemented ~~covered~~ by 10 CFR 50.55a
- substitute the word "condition(s)" for the words "limitation(s)" "modification(s)" and "provision(s)" throughout 50.55a for consistency
- clarify the time frame for licensees to submit requests for relief based on impracticality for IST and ISI
- allow the use of 1994 Edition of NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications," when using the 2006 Addenda of Section III of the ASME B&PV Code and later editions and addenda
- remove conditions throughout 50.55a that are no longer necessary and renumbering paragraphs as appropriate

Finally, the NRC will also request comments on what the scope of the ASME B&PV Code edition and addenda rulemaking should be; how often the NRC should incorporate Code editions and addenda into 10 CFR 50.55a; and in what ways the NRC should communicate the scope, schedule for publishing the rulemakings in the Federal Register, and status of the 10 CFR 50.55a rulemakings to external users.

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 reviewed and approved by the program offices. The draft final amendment to 10 CFR 50.55a to incorporate the guides by reference has been developed and is currently being reviewed by the program offices. The final amendment and regulatory guides are scheduled to be published in March 2010.

The NRC staff has completed its review of Supplements 1 - 9 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

On December 1, 2009, Westinghouse submitted a revised Pressurized Water Reactor Owners Group (PWROG) plan to the NRC for implementation of WCAP- 16168-NP-A, Revision 2, "Risk-Informed Extension of the Reactor Vessel In-Service Inspection Interval" Agencywide Documents Accession and Management System [ADAMS] No. ML093370133). The implementation plan was revised as a result of three recent changes in inspection requirements: 1) MRP-139 and ASME Section XI Code Case N-770 - Inspection and Mitigation of Alloy 82/182 Reactor Vessel Nozzle Welds, 2) MRP-227 - Inspection and Evaluation Guidelines for PWR Reactor Vessel Internals, and 3) 10 CFR 50.61a- Alternate Pressurized Thermal Shock Rule.

The NRC amended its regulations by issuing 10 CFR 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," in the Federal Register dated January 4, 2010 (75 FR 00015). The amended regulations provide alternate fracture toughness requirements for protection against pressurized thermal shock (PTS) events

for pressurized water reactor (PWR) pressure vessels. The final rule provides alternate PTS requirements based on updated analysis methods.

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

In 2006 ASME started the development of a Code Case for inspection of Alloy 82/182 butt welds. Code Case N-770 has been completed, and the NRC has incorporated it with conditions in the soon to be published proposed amendment to 10 CFR 50.55a. The NRC staff previously provided comments on the Code Case related to these proposed conditions to the cognizant ASME committees.

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

The staff is in the process of preparing a Regulatory Issue Summary (RIS) on the regulatory requirements for application of weld overlays and other mitigation techniques in piping systems approved for leak-before-break. Prior to issuing the RIS, the staff will hold a public meeting to obtain stakeholder input. The staff expects this meeting to take place sometime this winter.

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 January 15, 2010, 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 6 and 7
- 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.

** Suspended at request of applicant.

Advanced Reactors Program

NRC has established an advanced reactors program in the Office of New Reactors. Currently there are no applications under review, but several applications are expected to be submitted in the next three years including:

- High Temperature Gas-Cooled Reactors:
 - Pebble Bed Modular Reactor (PBMR) – Design Certification Application expected FY 2013
 - Next Generation Nuclear Plant (DOE) – Design Certification application expected FY 2013
- Small and Medium-size LWRs:
 - mPower (B&W)– Design Certification application expected Q1 CY 2010
 - IRIS (Westinghouse) – Design Certification application expected Q3 2012

NRO Quality and Vendor Branch 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.

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

- Sargent and Lundy, Chicago, IL, September 2009 – issued
- Sumitomo Metals, Japan, September 2009 – issued
- Curtiss-Wright EMD, Cheswick, PA, October 2009 – issued
- Namco Controls, SC, October 2009 – issued
- Energy Steel & Supply, La Peer, MI, October 2009 – issued
- Dubose National Energy Services, Clinton, NC, December 2009 – (Part 21 only) 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>

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, Japan and France. The SDOs from Japan, France, Canada and the U.S. met at the NRC offices on November 18-19, 2009 to present the final results to the MDEP/CSWG. The next step is complete a peer review of the results and to start the Code-comparisons for Class 1 piping, pumps and valves. In addition, Canada plans to complete its Code-comparison effort for Class 1 vessels in the next year. Russia has also recently agreed to perform a comparison of its pressure-boundary code for Class 1 vessels with the ASME Code, Section III requirements. In the meantime, Bryan Erler, ASME Vice-President of Nuclear Codes and Standards issued a letter to the MDEP/CSWG chairman on December 18, 2009, commenting on MDEP/CSWG's future plans and proposed path forward. The next MDEP/CSWG meeting is planned to be held in Paris, France at NEA's headquarters tentatively on April 14-16, 2010.

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:

- 59 units approved (Beaver Valley on November 5 and Susquehanna on November 24)
- 13 applications (19 units) under review
 - 2 (2 units) awaiting final approval (Pilgrim and Vermont Yankee)
 - 2 (4 units) completed ACRS full committee (Indian Point 2 & 3, Prairie Island 1 & 2)
 - 0 (0 units) completed ACRS subcommittee
 - 7 (10 units) awaiting ACRS subcommittee (Cooper 5/10, Duane Arnold 6/10, Crystal River 6/10, Kewaunee 7/10, Palo Verde 9/10, Hope Creek 11/10 and Salem 12/10)
 - 2 (3 units) applications received (Diablo Canyon 1 & 2 and Columbia)
- 6 applications with scheduled application dates through 2011
 - 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

Four plants have entered the operating period beyond 40 years:

- Oyster Creek – April 9
- Nine Mile Point Unit 1 – August 22
- Ginna – September 19
- Dresden – December 22

Upcoming plants in 2010 are H.B. Robinson, Monticello, and Point Beach Unit 1.

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 COMPLETE – draft portions of documents were made available on the 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
 - Information Notice 2009-26, “Degradation of Neutron-Absorbing Materials in the Spent Fuel Pool,” issued on October 28.
 - Draft Interim Staff Guidance (ISG) for Boral and other neutron absorber materials was issued for public comment on December 1 (LR-ISG-2009-01, “Staff Guidance Regarding Plant-Specific Aging Management Review and Aging Management Program for Neutron-Absorbing Material In Spent Fuel Pools”). Final ISG will be issued soon.
- Buried Piping
 - Recent operating experience, including tritium releases. NRC has initiated on-going interactions with NEI, EPRI, INPO and NACE.
- Socket Welds
 - Consideration of the need for non-visual examinations to ensure integrity of these welds.
 - Industry reviewing/evaluating operating experience
- 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 of one to assure conservative fatigue calculations.
- Containment Liner
 - Corrosion identified at several plants.
 - An item was introduced on the agenda of Section XI, Subsection IWL to assess the need to identify early detection methods for containment liner plate degradation/corrosion. Discussion of this issue is continuing in working group meetings.
 - NRC has initiated an activity to review operating experience and assess likelihood of corrosion occurrence.
- Concrete Containment
 - Delamination at tendon thickness location identified at one plant. Conditions not identified at a similar plant.
- 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. On December 2, 2009, the NRC staff responded to the Chairman’s memorandum dated September 3, 2009, ADAMS No. ML092460648, tasking the staff to describe the activities currently underway or planned addressing the issue of leaks from buried piping. The response

is SECY-09-0174, "Staff Progress in Evaluation of Buried Piping at Nuclear Reactor Facilities," and can be found at <http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2009/>.

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.