

February 15, 2005

Mr. Christopher M. Crane, President
and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2 - REQUEST FOR RELIEF I2R-46 FROM
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND
PRESSURE VESSEL CODE (CODE) SECTION XI REQUIREMENTS FOR
CLASS 1 AND 2 BOLTING EXAMINATION METHODS
(TAC NOS. MC3842 AND MC3843)

By letter dated July 22, 2004 (ML04205321), as supplemented by letter dated September 23, 2004 (ML042670411), Exelon Generation Company, LLC (Exelon) requested relief from the requirements of the 1989 Edition of the ASME Code, Section XI to use ASME Code Case –652 at Byron Station (Byron), Units 1 and 2 as an alternative on the basis that the proposed alternative provides an acceptable level of quality and safety. Application of Code Case –652, “Alternative Requirements to Categories B-G-1, B-G-2, and C-D Bolting Examination Methods and Selection Criteria,” will permit Exelon to reduce the radiological dose incurred during an outage at Byron.

The U.S. Nuclear Regulatory Commission staff reviewed Exelon’s request for relief and concludes that use of Code Case –652 at Byron as an alternative to the inspections specified in the Byron code of record provides an acceptable level and quality and safety. Therefore, the licensee’s proposed alternative to use Code Case –652 is authorized pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR) for the second 10-year Inservice Inspection interval or until Code Case –652 is approved for use in Regulatory Guide (RG) 1.147 and incorporated by reference in 10 CFR 50.55a(b). At that time, if Exelon intends to continue to implement Code Case –652 the licensee must follow all provisions in the subject code case with the conditions as specified in RG 1.147, and limitations as specified in 10 CFR 50.55a(b)(4), (b)(5), and (b)(6), if any.

Sincerely,

/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-454 and STN 50-455

Enclosure: Safety Evaluation

cc w/encl: See next page

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The U.S. Nuclear Regulatory Commission staff reviewed Exelon's request for relief and concludes that use of Code Case -652 at Byron as an alternative to the inspections specified in the Byron code of record provides an acceptable level and quality and safety. Therefore, the licensee's proposed alternative to use Code Case -652 is authorized pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR) for the second 10-year Inservice Inspection interval or until Code Case -652 is approved for use in Regulatory Guide (RG) 1.147 and incorporated by reference in 10 CFR 50.55a(b). At that time, if Exelon intends to continue to implement Code Case -652 the licensee must follow all provisions in the subject code case with the conditions as specified in RG 1.147, and limitations as specified in 10 CFR 50.55a(b)(4), (b)(5), and (b)(6), if any.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO REQUEST FOR RELIEF NO. I2R-46

SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

BYRON STATION, UNITS 1 AND 2

DOCKET NUMBERS STN 50-454 AND STN 50-455

1.0 INTRODUCTION

By letter dated July 22, 2004 (ML04205321), Exelon Generation Company, LLC (Exelon, the licensee) submitted for approval inservice inspection (ISI) relief request I2R-46 for its second 10-year ISI interval. The licensee's request was for the U.S. Nuclear Regulatory Commission (NRC) to authorize the use of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Case –652, Alternative Requirements to Categories B-G-1, B-G-2, and C-D Bolting Examination Methods and Selection Criteria.” Code Case –652 would be used in lieu of the ASME Code, Section XI, 1989 Edition requirements for class 1 and 2 bolting examination methods. By letter dated September 23, 2004 (ML042670411), the licensee provided clarifying information pertaining to its risk informed ISI program.

2.0 REGULATORY EVALUATION

The ISI of ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda as required by Section 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC if: (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection [ISI] of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable Code of record for the

ENCLOSURE

second 10-year ISI for Byron Station, Units 1 and 2, is the 1989 Edition of the ASME Boiler and Pressure Vessel Code, Section XI. The second 10-year ISI interval for Byron Station, Unit 1 began on June 30, 1996, and ends on June 30, 2005. For Byron Station, Unit 2 the second 10-Year interval began on August 16, 1998, and ends on August 16, 2007.

The licensee shortened the second 10-year for Byron Station, Units 1 and 2 interval as required by IWA-2430(d)(1), because the licensee extended the first 10-Year ISI Interval.

3.0 TECHNICAL EVALUATION

Component Identification:

Code Classes:	1 and 2
Reference:	Table IWB-2500-1 and Table IWC-2500-1
Examination Categories:	B-G-1, B-G-2, and C-D
Item Numbers:	All item numbers applicable to these examination categories
Component Numbers:	All Unit 1 and Unit 2 components applicable to these categories (See Table 2 for Complete Listing ¹)
Drawing Numbers:	All Unit 1 and Unit 2 drawings with components applicable to these categories (See Table 2 for Complete Listing)

Code Requirements:

The 1989 Edition of ASME Code, Section XI, Table IWB-2500-1, Examination Categories B-G-1 "Pressure Retaining Bolting, Greater Than 2 Inches in Diameter," and B-G-2, "Pressure Retaining Bolting, 2 Inches and Less in Diameter," and Table IWC-2500-1 Examination Category C-D, "Pressure Retaining Bolting, Greater Than 2 Inches in Diameter," contain requirements for the selection, scheduling, and examination of component bolting. Specific requirements are identified for each item number within these categories.

Licensee's Basis for Relief Request (As Stated):

As an alternative to the ASME Code, 1989 Edition, Section XI requirements, EGC [Exelon Nuclear Generation Company, LLC] requests NRC approval to use ASME Code Case –652, "Alternative Requirements to Categories B-G-1, B-G-2, and C-D Bolting Examination Methods and Selection Criteria, [Division 1]." Use of Code Case N–652 will supplement the 1989 Edition, Section XI requirements in the areas of examination methods, selection criteria, and scheduling of examinations.

The 1989 Edition is not specific in the subject of selection and scheduling requirements for all of the components in these categories. Use of the code case will clarify these requirements.

1. Table 2 is a list of components included as a attachment in Request for Relief I2R-46 and is not included in this safety evaluation.

Use of Code Case –652 will reduce the radiological dose during an outage by:

- a. limiting examinations to a single component in a group that are similar in design, type, and function;
- b. eliminating highly restrictive examinations on in-place components (the bolting components may be examined after removal); and
- c. eliminating redundant examinations of components that are repeatedly disassembled during the interval (this would include flange surfaces).

Use of Code Case N–652 will reduce the time and examination costs during an outage by:

- a. eliminating multiple examinations on Class 1 closure head studs and
- b. allowing the use of surface methods on bolting that have complex shapes which are not readily examined using field volumetric methods.

In addition, portions of the ASME Code, 1989 Edition, requirements for examination of Class 1 bolting are duplicated by examinations performed for other programs such as the examination of the bolted connection of components containing borated fluids and the pressure test programs.

The highlighted items in Table 2 [of the licensee’s July 22, 2004, submittal] of this request identify fifty-nine component numbers at Byron Station that would benefit from the alternative examination rules of ASME Code Case –652. Given that these component numbers are typically composed of multiple examination points (for example, the reactor vessel close stud component number consists of 58 studs that each require examination), the radiation dose savings during an outage can be significant. However, quantification of the radiation dose savings is difficult since the components cover a variety of plant locations all subject to varying radiation dose fields. The radiation dose impact also depends on the degree of required examination support (e.g., [erection of] scaffolding, insulation removal) and the duration of the examination (i.e., volumetric, surface, or visual).

Licensee’s Proposed Alternative Examination (As Stated):

In accordance with to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety. Examinations of Class 1 and 2 bolting will substitute the requirements of the current 1989 Section XI programs with the alternatives presented in ASME Code Case –652. The changes using this code case are divided into three areas as follows.

A. Examination Methods of Components in Examination Categories B-G-1 and C-D

Use of visual methods of closure head nuts:

The ASME Code, 1989 Edition, of Section XI Table IWB-2500-1 does not list the examination requirements figure numbers or the acceptance standards for Item B6.10.

It states in a footnote that these requirements are "In course of preparation." Code Case –627 was published by the ASME allowing the substitution of surface examination methods with visual methods. This code case was approved for use by the NRC in Regulatory Guide 1.147, Revision 13 [Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1]. However, Code Case –627 does not specify the examination areas or acceptance standards. This missing information regarding the examination areas and acceptance standards for the closure head nuts is supplied in Code Case –652.

Elimination of the distinction of in-place and removed closure head studs:

Closure head studs require a volumetric examination whether the studs are removed or remain in-place. Item Numbers B6.20 (in-place) and B6.30 (removed) were combined into a single item B6.20 in Code Case –652 surface examination is optional for removed studs. The surface method may replace the volumetric method for removed studs per Note (2²). The option of surface or volumetric examinations for closure head studs is incorporated in later editions of the ASME Code and these later editions have been endorsed in 10 CFR 50.55a.

Use of surface methods as an alternative to volumetric examinations:

For bolting of components other than reactor vessels, (B6.60, B6.90, B6.120, B6.150, B6.180, B6.210, and all of Class 2 Category C-D) a surface examination may also be substituted for the volumetric method per B-G-1 Note (2²) and C-D Note (2³) [of Code Case –652]. This change makes the examination requirements consistent for all bolting components greater than 2 inches in diameter. The option to use surface methods in lieu of volumetric methods also facilitates examination of studs and bolts with complex shapes that are not easily examined using field volumetric techniques.

B. Selection Criteria for Various Components

Heat exchangers, pumps, and valves:

Code Case –652, Category B-G-1 Notes (4² and 5²) and Category B-G-2 Note (2⁴) clarify the selection requirements for these components to reflect the selection requirements of the associated vessels (B-B), pumps (B-L-2), and valves (B! M! 2). This modifies the criteria specified in the 1989 Edition of the ASME Code, Category B-

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2. Note 2, Note 3, Note 4, Note 5, and Note 6 are from Table 1 Examination Category B-G-1 Alternative Rules for Pressure Retaining Bolting Greater than 2 in In Diameter of Code Case N–652. Table 1 of Code Case N–652 is not contained in this safety evaluation.
 3. Note 2 is from Table 3 Examination Category C-D Alternative Rules for Pressure Retaining Bolting Greater than 2 in In Diameter of Code Case N–652. Table 3 of Code Case N–652 is not contained in this safety evaluation.
 4. Note 2 and Note 3 are from Table 2 of Code Case N–652, Examination B-G-2 Pressure Retaining Bolting 2 in and Less in Diameter . Table 2 of Code Case N–652 is not contained in this safety evaluation.

G-1, Note (3²) that stated the examinations are limited to those components selected under the other categories. These other categories divided the components into groups based on size, design, and function. Code Case –652 now includes the corresponding conditions in the selection of the bolting for these components. This criterion is unchanged in Category C-D.

Piping flange components:

Code Case –652, Category B-G-1 Note (6²) and Category B-G-2 Note (3⁴) added the selection requirements that these components may be divided into groups based on size, design, and function and that the examination may be limited to one component within the group. This establishes a grouping criteria similar to the one used for heat exchangers, pumps, and valves. In addition, the 1989 Edition of the ASME Code required that the examinations are limited to those components selected for examination under the piping Category B-J for Class 1 and Category C-F for Class 2. The 1989 Edition of the ASME Code definition of component as it applies to Categories B-J and C-F is unclear. Byron Station has conservatively applied this condition to select all piping flanges within the Class 1 piping boundary. Byron Station has also adopted risk-informed inservice inspection using Code Case –578-1⁵ [Risk-Informed Requirements for Class 1, 2, or 3 Piping Method B Section XI, Division 1]. Use of Code Case –578-1 eliminates examination categories B-J and C-F. Code Case –652 establishes a selection criterion without using these category references.

C. Scheduling Changes with Code Case –652

Deferral of examination for B-G-1 Components:

The 1989 Edition of the ASME Code has Note (5⁶) allowing deferral to the end of the interval if no leakage of borated water is detected. This note applied to all items in the category. Code Case –652 replaced this note by allowing a deferral for all components. Subsequently, the allowance of this deferral results in a conclusion that examination of B-G-1 components need only be performed once in the inspection interval.

B-G-1 Visual Examinations of Heat Exchanger, Pumps, and Valves:

Code Case –652 clarifies that for components that are disassembled the examination need only be performed once in the interval. Some components such as steam generator manway bolting may be disassembled more than once in an inspection

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5. In accordance with the licensee's letter dated September 23, 2004, the Byron Station, Unit 1 and Unit 2 risk-informed inservice inspection (RI-ISI) program was developed in accordance with NRC approved Electric Power Research Institute Topical Report TR-1 12657, Revision B-A, "Revised Risk-informed Inservice Inspection Evaluation Procedure," using the Nuclear Energy Institute template methodology. The Byron Station RI-ISI program was subsequently approved for use in NRC Safety Evaluation dated February 5, 2002.
 6. Note 5 is from Table IWB-2500-1, Examination Category B-G-1 Pressure Retaining Bolting Greater than 2 in In Diameter of the 1989 Edition of the ASME Code. Table IWB-2500-1 of the 1989 Edition is not contained in this safety evaluation.

interval and the clarification by Code Case –652 will eliminate redundant examinations of these components.

In-place examinations of B-G-2 components:

Code Case –652 eliminates visual examinations of in-place, under tension, bolting components. These examinations are highly limited in access to all of the required surfaces for the visual examination. These assembled components are also VT-2 examined once per outage for the insulated borated bolted connections where applicable per IWA-5242(a) and all are examined for the VT-2 examination performed at nominal pressure and temperature. If leakage occurs at a bolted connection, the bolting shall be removed for visual examination under both category B-G-2 and IWA-5250(a)(2).

Code Case –652 does not specify use of specific ASME Code editions or addenda [Normally its standard practice that a code case its self does not state the specific use of ASME Code editions or addenda, but is listed in the *Applicable Index for Section XI Cases*]. Code Case –652 is applicable for the 1977 Edition of the ASME Code through the 1998 Edition with the 2000 Addenda. The ASME Code, Section XI is endorsed through the 2000 Addenda as documented in 10 CFR 50.55a(b)(2). With respects to personnel and equipment certifications, details of examination techniques, and applicable examination figures and acceptance standards, EGC will use the applicable portions of the 1989 Edition of the ASME Code.

The proposed alternative will provide an acceptable level of quality and safety given that:

- A. The alternative approach was produced within the ASME organization.
- B. Alternative examination methods are as capable of detecting service-induced flaws as the original methods.
- C. Alternative selection and scheduling criteria clarify the original examination categories and are supplemented by additional activities from other portions of Section XI.

EGC proposes to substitute the requirements of the ASME Code, 1989 Edition, of Section XI for examination categories B-G-1, B-G-2, and C-D with the alternative requirements presented in ASME Code Case –652.

Staff Evaluation

A. Examination Methods of Components

Use of visual methods of reactor vessel closure head nuts (Examination Category B-G-1, Item No. B6.10):

The ASME Code requires that the closure head nuts be inspected by a surface examination and Code Case –652 changes the examination method to a VT-1 visual examination. A VT-1 visual examination requires that the closure head nuts be examined for cracks, corrosion, erosion, or physical damage of the component based on the acceptance standard IWB-3517. The ASME Code, Section XI required surface examination does not have an acceptance standard as noted in Table IWB-2500-1, Examination Category B-G-1, Item B6.10. A footnote in the ASME Code, Table IWB-2500-1, Examination Category B-G-1 indicates that the acceptance standard is in the course of preparation. The attributes of a VT-1 visual examination are similar to that of a surface examination. Industry experience shows that degradation such as corrosion and cracking will likely initiate from the root of the thread or face surface of a nut. For such degradation, the use of a VT-1 visual inspection techniques is essentially as effective as surface techniques. A qualified VT-1 visual exam meeting the acceptance standards of IWB-3517 as specified in Code Case –652 will provide the sensitivity of flaw detection in the nuts as required by the Code using surface examination methods. Therefore, the code case requirements provide reasonable assurance of quality and safety.

Elimination of the in-place and removed reactor vessel closure head studs volumetric examinations (ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 Items Numbers B6.20 (in-place) and B6.30 (removed)):

The Code requires that reactor closure head studs be volumetrically examine whether the studs are removed or remain in-place. ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1, Item Numbers B6.20 (in-place) and B6.30 (removed) were combined into a single item B6.20 in Code Case –652 and a surface examination is optional for removed studs. Per Code Case –652, Table 1, Note 2 the surface method may be substituted for the volumetric method when the studs are removed which meets the requirements contained in ASME Code, Section XI, IWB-3515 *Standards for Examination Category B-G-1, Pressure Retaining Bolting Greater than 2 inches in Diameter*. Subparagraph IWB-3515.1 *Allowable flaws for Surface Examinations of Studs and Bolts* states that the allowable surface flaws in vessel closure studs and pressure retaining bolting shall not exceed ¼ inch in length for nonaxial flaws and 1 inch for axial flaws. Industry experience shows that degradation such as corrosion and cracking will likely initiate from the OD surface of a bolt or stud. For such degradation, the use of surface inspection techniques is essentially as effective as volumetric techniques. A qualified surface exam meeting the acceptance standards of IWB-3515 as specified in Code Case –652 will provide the sensitivity of flaw detection in studs and bolts as required by the Code using volumetric methods. OD initiated degradation when detectable by volumetric methods, such as UT, would also be detectable by a surface examination, such as dye penetrant testing (PT). Therefore, these examinations would detect any cracks, if any in the reactor vessel closure head studs providing reasonable assurance of quality and safety.

Use of surface methods as an alternative to volumetric examinations for ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 (Items B6.60, B6.90, B6.120, B6.150, B6.180, B6.210, and all Items of Table IWC-2500-1, Category C-D):

For bolting of components other than reactor vessels, (B6.60, B6.90, B6.120, B6.150, B6.180, B6.210, and all Items of Table IWC-2500-1, Category C-D) a surface examination may also be substituted for the volumetric method per Code Case –652, Table 1, Examination Category B-G-1, Note 2, and Table 3, Category C-D, Note 2. This change makes the examination requirements consistent for all bolting components greater than 2 inches in diameter. The option to use surface methods in lieu of volumetric methods also facilitates examination of studs and bolts with complex shapes that are not easily examined using field volumetric techniques. Industry experience shows that degradation such as corrosion and cracking will likely initiate from the OD surface of a bolt or stud. For such degradation, the use of surface inspection techniques is essentially as effective as volumetric techniques. A qualified surface exam meeting the acceptance standards of IWB-3515 as specified in Code Case –652 will provide the sensitivity of flaw detection in studs and bolts as required by the Code using volumetric methods. OD initiated degradation when detectable by volumetric methods, such as UT, would also be detectable by a surface examination, such as PT, thereby providing reasonable assurance of quality and safety.

In-place examinations of B-G-2 components:

Code Case –652 eliminates visual examinations of in-place, under tension, bolting components. These examinations are highly limited in access to all of the required surfaces for the visual examination. These assembled components are also VT-2 examined once per outage for the insulated borated bolted connections where applicable per IWA-5242(a) and all are examined for the VT-2 examination performed at nominal pressure and temperature. If leakage occurs at a bolted connection, the bolting shall be removed for visual examination under both Category B-G-2 and IWA-5250(a)(2), thereby providing reasonable assurance of quality and safety.

B. Selection Criteria for Various Components

Heat exchangers, pumps, and valves (Code Case N–652 Examination Category B-G-1, Table 1, Items B6.120, B.160, B180, B.210, Examination Category B-G-2, Table 2, Items B7.40, B7.60, and B7.70 and Examination Category C-D, Table 3 all Items):

Code Case –652, Table 1, Category B-G-1, Notes 4 and 5 and Table 2, Category B-G-2, Note 2 clarify the selection requirements for these components to reflect the selection requirements of the associated vessels (B-B), pumps (B-L-2), and valves (B-G-2). This modifies the criteria specified in the 1989 Edition of the ASME Code, Table IWB-2500-1, Category B-G-1, Note 3 that stated the examinations are limited to those components selected under the other categories. These Categories require the components to be selected for examination only when the connection is disassembled or when the bolting is removed. However, there is no technical basis to associate volumetric examination to component disassembly.

As an alternative specified in Code Case –652, Category B-G-1, Note 4, volumetric examinations and for Category B-G-2, Note 2, surface examination may be conducted on one heat exchanger, one pump, or one valve among a group of heat exchangers, pumps, or valves that are similar in design, type, and function. In addition, when the

component to be examined contains a group of bolted connections of similar design and size, such as flanged connections, examination may be conducted on one bolted connection among the group. This criterion is unchanged in Category C-D.

Since under the code case volumetric and surface examinations of the bolts and studs will be performed under a sample program, bolts and studs are grouped under similar conditions, such as design, type, and function. Therefore, if degradation in a bolt were to occur, it would likely also take place in other bolts under similar conditions, and the sampling examination would detect the degradation. The staff finds that the requirements as specified in the code case should effectively detect degradation in a manner that allows for timely corrective action.

The staff also determined that even though bolting inspection will be performed under a sample program (one connection of like connections), the change made by Code Case –652 is more restrictive in that it will require examination of Category B-G-1 and B-G-2 bolting regardless of whether the connection is disassembled. Therefore Code Case –652 requirements provide reasonable assurance of quality and safety.

Piping flange components Examination Categories B-G-1, B-G-2, and C-D

For Class 1 bolted piping flange components that are greater than 2 inches in diameter Note 6 in Code Case –652, Table 1, Category B-G-1 was added to clarify the requirements for examination of the flange bolting in piping systems. It requires examination of one bolted connection among a group of bolted connections that are similar in design, type, function, and service.

For Class 1 bolted piping flange components that are less than 2 inches in diameter Note 3 was added in Code Case –652, Table 2, Category B-G-2 to clarify the requirements for examination of flange bolting in piping systems. It requires examination of one bolted connection among a group of bolted connections that are similar in design, type, function, and service.

For Class 2 bolted piping flange components that are greater than 2 inches in diameter Note 2 in Code Case –652, Table 3 of Category C-D was editorially revised to clarify the language. No technical changes were made to this note.

The ASME Code required that the examinations are limited to those components selected for examination under the piping Category B-J for Class 1 and Category C-F for Class 2. Furthermore, the ASME Code definition of component as it applies to Categories B-J and C-F is unclear. Byron Station has conservatively applied this condition to select all piping flanges within the Class 1 piping boundary. Byron Station has also adopted a risk-informed inservice inspection which eliminates examination categories B-J and C-F. Code Case –652 establishes a selection criterion without using the risk-informed category references. Therefore, a broader scope of examination sampling is provided by Code Case –652 providing reasonable assurance of quality and safety.

C. Scheduling and Deferral Changes with Case Code –652

Deferral of examination for B-G-1 Components:

ASME Section XI, Table IWB-2500-1 Category B-G-1, Code Item Nos. B6.120 (Heat Exchangers), B6.150 (Piping), B6.180 (Pumps), and B6.210 (Valves) requires volumetric examination of bolts and studs in heat exchangers, piping, pumps, and valves regardless of whether the bolts or studs are examined in place or removed when selected for examination under Examination Categories B-B (Pressure Retaining Welds in Vessels other than Reactor Vessel), B-J (Pressure Retaining Welds in Piping), B-L-2 (Pump Casings), and B! M! 2 (Valve Casings). For Examination Categories B-B and B-J the scheduling is based on ASME Code, Section XI, Table IWB-2412-1 (Inspection Program B) in which a percentage of the components are inspected each period of the interval until 100% sample is achieved at the end of the 10-year interval. For B-L-2 and B! M! 2 examinations are required only when the pump or valve is disassembled.

The ASME Code, Note 5 of the ASME Code, Table IWB-2500-1, Examination Category B-G-1 allows deferral of the examination to the end of the interval if no leakage of borated water is detected. This note applies to all items in the category.

Deferral of the examination to the end of the interval is permissible in the code case and scheduling will follow Categories B-B, B-L-2, or B! M! 2 except that bolting will not be inspected each time a component is disassembled. This is discussed below. Therefore, there is no change in the deferral of examination requirements.

The ASME Code, Note 5 also states that it is permissible to defer the examinations provided no leakage of borated water is detected. However, the purpose of the code case is to examine the integrity of the bolt or stud not the joint for leakage. If leakage does occur at the bolted joint, the licensee will be required to take action according to the plant's technical specification requirements and/or plant procedures not by Code Case –652. The code case assures that a bolted connection will be selected under the code case selection criteria to be examined at least once during the 10-year ISI interval. Therefore, the code case requirements provide reasonable assurance of quality and safety.

Scheduling of B-G-1 visual examinations of heat exchanger, pumps, and valves:

Code Case –652 clarifies that for components that are disassembled the examination need only be performed once in the interval. For Examination Category B-G-1 Heat Exchanger, Pumps, Valves bolting, the examination requirements under Code Case –652 are more conservative than the ASME Code, Section XI requirements. The code case requires the licensee to examine at least one group of the component bolting every 10-year interval instead of when a component is disassembled as required by the ASME Code. In some cases it could be more than 10-years before a particular component is disassembled. A sample of bolted connections in vessels, pumps and valves is required to be examined regardless of whether the component is disassembled for maintenance or repair. This revision is more conservative than the code requirements and will provide leak tightness of the bolted connection.

In addition, Code Case –652 does require that the flange surface be examined when the connection is disassembled which includes 1 inch annular surface of flange surrounding each stud. Therefore, for the components that are required to be disassembled frequently, examination of the flange surface will provide some indication of the condition of the bolted joint and if further inspections are required. Therefore, frequent examination of the flange surfaces ensure leak tightness of the bolted connection and provide reasonable assurance of quality and safety.

4.0 CONCLUSIONS

The staff has reviewed the licensee's submittal and concludes that Code Case N-652 provides an acceptable level of quality and safety. Therefore, the licensee's proposed alternative to use Code Case N-652 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year ISI interval or until Code Case N-652 is approved for use in Regulatory Guide 1.147 and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue to implement Code Case N-652 the licensee must follow all provisions in the subject code case with the conditions as specified in RG 1.147, and limitations as specified in 10 CFR 50.55a(b)(4), (b)(5), and (b)(6), if any. All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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