



Byron Generating Station

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Unit 2
Renewed Facility Operating License No. NPF-66
NRC Docket No. STN 50-455

SUBJECT: Byron Station Unit 2 90-Day Inservice Inspection Report for Interval 3, Period 3,
(B2R19)

The subject 90-Day Inservice Inspection Report for the Byron Station Unit 2, Refueling Outage Nineteen (B2R19) is being submitted pursuant to the requirements of Article IWA-6000, "Records and Reports" of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code 2001 Edition through the 2003 Addenda.

This letter provides a copy of Form OAR-1, "Owner's Activity Report" for inservice inspection activities performed during the previous fuel cycle. This report meets the requirements of the ASME Code Case N-532-4, "Repair/Replacement Activity Documentation Requirements and Inservice Summary Report Preparation and Submission." The report covers the inservice inspections conducted prior to and during the Unit 2 Spring 2016 refueling outage.

If there are any questions regarding this matter, please contact Mr. Douglas Spitzer, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "Mark E. Kanavos", written over a horizontal line.

Mark E. Kanavos
Site Vice President
Byron Generating Station

MEK/RGM/LZ/sg

Attachment

1.0 INTRODUCTION

Inservice inspections of American Society of Mechanical Engineers (ASME) Class 1, 2, 3, CC, and MC components were conducted at Byron Station Unit 2 from October 24, 2014 through May 17, 2016. The majority of these activities occurred during the nineteenth refueling outage (B2R19) from April 18 through May 17, 2016.

The activities were performed in compliance with the rules and regulations of ASME Section XI (applicable edition and addenda), pursuant to the requirements of 10 CFR 50.55a.

See Section 4.0 for a listing of referenced documents.

This summary report meets the requirements of ASME Code IWA-6000, as modified by the adoption of ASME Code Case N-532-4, for the inspection of Class 1, 2, 3, CC, and MC components. The Nondestructive Examination (NDE) Inservice Inspection (ISI) Program for these components was developed in accordance with the requirements and intent of Section XI Subsections IWA, IWB, IWC, IWD, IWE, IWF and IWL, 2001 Edition, through the 2003 Addenda.

In addition to the ASME Section XI requirements of examination, certain Nuclear Regulatory Commission (NRC) augmented ISI inspections and industry initiatives (NEI-03-08) were required. The Byron Station Unit 2 augmented ISI examination requirements include:

- a) Class 1 pressure boundary for leakage at nominal operating pressure, in accordance with NRC Generic Letter 88-05;
- b) Class 1 Alloy 600 weld examinations in accordance with N-722 and N-729-1;
- c) Class 2 and 3 pressure boundary for leakage at nominal operating pressure, in accordance with NUREG 0737.
- d) Class 1 examinations of *non-isolable Reactor Coolant System branch lines for Thermal Fatigue* in accordance with MRP-146;

1.1 Identification of Examination Requirements

The ISI Program Plan contains examination program tables consistent with the tables found in Subsections IWB, IWC, IWD, IWE, IWF, and IWL-2500 of Section XI of the ASME Code. The examination tables include the corresponding code category, item number, and component/weld selection in conformance with examination. Augmented examinations as specified by NRC and industry initiatives are also included in these tables. ASME Class 1, 2, 3, CC and MC components, or parts of components, that are not included in the examination tables and are exempt from examination, as specified in Section XI Paragraphs IWB, IWC, IWD, IWE, IWL-1220, and Tables IWB, IWC, IWD, IWE, and IWL-2500-1.

For Class 1, 2, and certain non-class piping components, the requirements of Risk Informed Inservice Inspection (RI-ISI) are followed using EPRI TR112657 and Table 1 of ASME Code Case N-578-1. The implementation of the risk-informed program as described in the Byron Station Relief Request I3R-02.

Class 1 or 2 piping welds exempted by IWB and IWC-1220 are not included in the RI-ISI program. Previous selection and examination exemptions identified in Tables IWB and IWC-2500-1 for the piping Examination Categories B-F, B-J, C-F-1, and C-F-2, are not

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incorporated into the RI-ISI program. With the adoption of RI-ISI, piping welds classified as Risk Category 6 or 7 are not subject to examination.

1.2 Significant Activities during the B2R19 Cycle

Reactor Vessel Head Examinations

The reactor vessel head surface and the head penetrations were visually examined for evidence of leakage per the requirements specified in N-729-1 for Item B4.10 components.

Ultrasonic examination of the RPV Head penetrations was performed as specified in N-729-1 for Item B4.20 components. The examination results of the reactor head penetrations were acceptable.

Steam Generator Alloy 600 Component Replacement

The steam generator bowl drains manufactured with Alloy 600 materials were replaced with PWSCC-resistant Alloy 690 material. This replacement of the Alloy 600 components will allow the removal of the steam generator bottom channel head drains from the requirements of ASME Code Case N-722-1 Item B15.120.

2.0 **OWNER'S ACTIVITY REPORT SHEETS**

The ASME Form OAR-1, Owners Activity Report (OAR-1) and Form NIS-2A, Repair/Replacements Certification Record (NIS-2A) were filed during the cycle. See the attached section for the B2R19 OAR-1.

3.0 **CONTAINMENT ISI PROGRAM**

The following provisions of 10CFR50.55a were reviewed for conditions that require reporting in the B2R19 ISI Summary Report.

Section XI condition: Concrete containment examinations.

No conditions were found that warranted inclusion in this report as specified by (b)(2)(viii)(E).

Section XI condition: Metal containment examinations.

No conditions were found that warranted inclusion in this report as specified by (b)(2)(ix)(A)(2).

4.0 **REFERENCED DOCUMENTS**

4.1 Code of Federal Regulations, Title 10 Energy

Part 50, *Domestic Licensing of Production and Utilization Facilities*

50.55a, *Codes and Standards*

4.2 American Society of Mechanical Engineers Boiler and Pressure Vessel Code

Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, 2001 Edition, through 2003 Addenda

- Subsection IWA: General Requirements
- Subsection IWB: Requirements for Class 1 Components
- Subsection IWC: Requirements for Class 2 Components

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- Subsection IWD: Requirements for Class 3 Components
- Subsection IWE: Requirements for Class MC/Class CC Metallic Liners Components
- Subsection IWF: Requirements for Class 1, 2, 3, and MC Component Supports
- Subsection IWL: Requirements for Class CC Concrete Components
 - a) IWA-6000: *Records and Reports*
 - b) IWx-1220, *Components Exempt from Examination*
 - c) IWx-2500, *Examination Categories*

Code Case N-532-4: *Repair/Replacement Activity Documentation Requirements and Inservice Summary Report Preparation and Submission*

- Form OAR-1, Owners Activity Report.
- Form NIS-2A, Repair/Replacements Certification Record.

Code Case N-578-1: *Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B.*

Code Case N-722-1: *Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials.*

Code Case N-729-1: *Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds.*

4.3 Miscellaneous NRC Documents

Generic Letter 88-05, *Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.*

NUREG 0737, *Clarification of TMI Action Plan Requirements.*

4.4 Electric Power Research Institute

Topical Report TR112657 Revision B-A, *Revised Risk-Informed Inservice Inspection Procedure*, December 1999.

Materials Reliability Program: *Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines* (MRP-146, Revision 1), June 2011

4.5 Nuclear Energy Institute

NEI 03-08, *Guideline for the Management of Materials Issues.*

4.6 Byron Station Documents

Relief Request I3R-02: *Alternate Risk-Informed Selection and Examination Criteria for Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds.*

Relief Request I3R-14: *Alternative Requirements for the Repair of a Reactor Vessel Head Penetration In Accordance with 10 CFR 50.55a(a)(3)(i)*

Relief Request I3R-20: *Request for Relief Alternative Requirements for the Repair of Reactor Vessel Head Penetrations In Accordance with 10 CFR 50.55a(a)(3)(i)*

ATTACHMENT 1

FORM OAR-1 OWNER'S ACTIVITY REPORT

Report Number B2R19

Plant Byron Generating Station, 4450 North German Church Road, Byron, Illinois 61010

Unit No. 2 Commercial Service Date August 21, 1987 Refueling Outage Number B2R19
(if applicable)

Current Inspection Interval Third Inspection Interval (ISI), Second Inspection Interval (Containment ISI)
(1st, 2nd, 3rd, 4th, other)

Current Inspection Period Third Inspection Period (ISI and Containment ISI)
(1st, 2nd, 3rd)

Edition and Addenda of Section XI applicable to the Inspection Plans ASME Section XI 2001 Edition through 2003 Addenda

Date / Revision of Inspection Plans June 10, 2012 / Revision 7

Edition and Addenda of Section XI applicable to repair/replacement activities, if different than the inspection plans Same as above

Code Cases used: N-460, N-513-3, N-532-4, N-552, N-566-2, N-578-1, N-586-1, N-597-2, N-639, N-652-1, N-661, N-665, N-685, N-686-1, N-700, N-706, N-722-1, N-729-1, N-731, N-739, N-747, N-751, N-753

CERTIFICATE OF CONFORMANCE

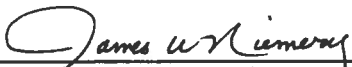
I certify that (a) the statements made in this report are correct; (b) the examinations and tests, meet the Inspection Plan as required by the ASME Code, Section XI; and (c) the repair/replacement activities and evaluations supporting the completion of B2R19 conform to the requirements of Section XI (refueling outage number)

Signed  Robert McBride, ISI Program Owner Date 7/26/16
(Owner or Owner's designee, Title)

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Hartford Steam Boiler Inspection Province of Illinois and employed by and Insurance Company of CT. of Hartford, Connecticut have inspected the items described in this Owner's Activity Report, and state that to the best of my knowledge and belief, the Owner has performed all activities represented by this report in accordance with the requirements of Section XI

By signing this certificate neither the Inspector nor his employer makes any warranty expressed or implied concerning the repair/replacement activities and evaluation described in this report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection

 Commissions NB 11622 AB/NC IL 01743K
(Inspector's Signature) National Board, State, Province, and Endorsements

Date 26 JULY 16

ATTACHMENT 1

**TABLE 1
ITEMS WITH FLAWS OR RELEVANT CONDITIONS THAT REQUIRED EVALUATION FOR CONTINUED SERVICE**

Examination Category	Examination Item Number	Item Description	Evaluation Description
C-H	C7.10	Chemical Volume Control Valve Bolting 2CV8401B	IR 02404642 BACC Evaluation BYR201414707
D-B	D2.10	Equip. Drain Waste Reprocessing Piping 2WER7AB-3" / 2WE82AB-2"	IR 02415038 Calculation 065903
C-H	C7.10	Reactor Coolant Flow Transmitter 2FT-0425	IR 02496992 BACC Evaluation BYR201515323
C-H	C7.10	Process Sampling Valve Packing 2PS9354A	IR 02516949 BACC Evaluation BYR201515463
C-H	C7.10	Chemical Volume Control Valve Packing 2CV190	IR 02517344 BACC Evaluation BYR201515467
C-H	C7.10	Safety Injection Valve Bolting 2SI8958B	IR 02534046 BACC Evaluation BYR201515606
D-B	D2.10	Fuel Cooling Pump Bolting 2FC01P	IR 02558105 BACC Evaluation BYR201515823
D-B	D2.10	Fuel Cooling Valve Bolting 2FC8758	IR 02558382 BACC Evaluation BYR201515824
C-H	C7.10	Chemical Volume Control Valve Bolting 2CV8481B	IR 02564813 BACC Evaluation BYR201516003
C-H	C7.10	Process Sampling Threaded Valve Bonnet 2PS9365A	IR 02657079 BACC Evaluation BYR201616603
B-G-2	B7.70	Reactor Coolant Valve Bolting 2RC8037A	IR 02657117 BACC Evaluation BYR201616611
B-G-2	B7.70	Reactor Coolant Valve Bolting 2RC8037C	IR 02657121 BACC Evaluation BYR201616612
C-H	C7.10	Safety Injection Valve Bolting 2SI8889A	IR 02657160 BACC Evaluation BYR201616610
B-G-1	B6.180	Reactor Coolant Pump Studs 2RC01PC	IR 02657183 BACC Evaluation BYR201616613
C-H	C7.10	Chemical Volume Control Valve Bolting 2CV8548A	IR 02659198 BACC Evaluation BYR201616651
D-B	D2.10	Fire Protection Piping 0FPJ8A-4"	IR 02661900 Calculation 033265
D-B	D2.10	Service Water Piping 2SX59AA-1.5"	IR 02661989 Calculation 030674
D-B	D2.10	Service Water Piping 2SX17AA-2" / 2SX17AC-2"	IR 02663826 Calculation 023156
D-B	D2.10	Service Water Piping 2SX16BA-2"	IR 02663826 Calculation 032662
B-G-2	B7.70	Chemical Volume Control Valve Bolting 2CV459	IR 02669900 BACC Evaluation BYR201616823

ATTACHMENT 1

**TABLE 2
ABSTRACT OF REPAIR/REPLACEMENT ACTIVITIES REQUIRED FOR CONTINUED SERVICE**

Code Class	Item	Description	Description of Work	Date Completed	Repair/Replacement Plan Number
3	2DG01KA-X1	2A Diesel Generator Jacket Water Upper Cooler	Replacement of upper cover. IR 02623330	02/13/16	WO 01754945-01
3	2DG01KA-X2	2A Diesel Generator Jacket Water Lower Cooler	Replacement of lower cover. IR 02623331	02/13/16	WO 01754945-05
3	2DG01KB-X1	2B Diesel Generator Jacket Water Upper Cooler	Repair localized pitting on the upper stationary head shell and stationary flange. IR 02630037	02/24/16	WO 01646187-03
2	2MS01211R	2D MS Line 2MS07AD-28" Stanchion Support	Localized buffing of indication on support. IR 02661963	04/30/16	WO 01781329-06
3	2VA01SA	2A SX Pump Room Cubicle Cooler	Repair localized pitting on the upper cooler tube sheet. IR 2406305	11/7/14	WO 01375451-01
3	2VA01SB	2B SX Pump Room Cubicle Cooler	Repair localized pitting on the upper cooler tube sheet. IR 02643059	03/21/16	WO 01799414-01 WO 01799414-05
3	2VA01SB	2B SX Pump Room Cubicle Cooler	Repair localized pitting on the lower cooler tube sheet and divider plate. IR 02643944	03/23/16	WO 01799414-02
3	2VA03SB	2B CS Pump Room Cubicle Cooler	Repair of upper and lower tubesheets. IR 01373138 IR 02614688	01/20/16	WO 01547113-01