

L-PI-03-084

September 19, 2003

10 CFR 50.54(f)  
BL 2003-02

U S Nuclear Regulatory Commission  
ATTN: Document Control Desk  
11555 Rockville Pike  
Rockville, Maryland 20852

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
DOCKETS 50-282 AND 50-306  
LICENSE NOS. DPR-42 AND DPR-60

**NUCLEAR REGULATORY COMMISSION BULLETIN 2003-02: LEAKAGE FROM  
REACTOR PRESSURE VESSEL LOWER HEAD PENETRATIONS AND REACTOR  
COOLANT PRESSURE BOUNDARY INTEGRITY – 30-DAY RESPONSE**

On August 21, 2003, the Nuclear Regulatory Commission (NRC) transmitted Bulletin (BL) 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity." The NRC required that specific information be provided within 30 days of the date of the BL for those facilities that will enter refueling outages before December 31, 2003. In accordance with this requirement, Nuclear Management Company, LLC (NMC) is providing the 30-day response for the Prairie Island Nuclear Generating Plant.

This letter contains two new commitments and no revisions to existing commitments. The new commitments are:

1. NMC will attempt, during the current Unit 2 refueling outage, a 100% bare-metal visual exam of the lower reactor pressure vessel (RPV) dome up to and including each bottom-mounted instrumentation (BMI) penetration to RPV junction. It is possible that unforeseen circumstances will prevent a complete 100% bare-metal visual exam, but NMC will modify, as necessary, the inspection process or the insulation (based on the lessons learned during this inspection) to ensure the ability to perform 100% bare-metal examinations in subsequent outages.
2. NMC will perform a 100% bare-metal visual exam of the lower RPV dome up to and including each bottom-mounted instrumentation (BMI) penetration to RPV

junction. This examination will be completed on each unit during refueling outages subsequent to the current Unit 2 refueling outage.

I declare under penalty of perjury that the foregoing is true and accurate. Executed on September 19, 2003.



Joseph M. Solymossy  
Site Vice President, Prairie Island Nuclear Generating Plant

cc: Regional Administrator, USNRC, Region III  
Project Manager, Prairie Island Nuclear Generating Plant, USNRC, NRR  
NRC Resident Inspector – Prairie Island Nuclear Generating Plant

Attachment

**ATTACHMENT**

**NUCLEAR MANAGEMENT COMPANY, LLC  
PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
DOCKETS 50-282, 50-306**

**September 19, 2003**

**NRC BULLETIN 2003-02:  
LEAKAGE FROM REACTOR PRESSURE VESSEL LOWER HEAD PENETRATIONS  
AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY  
30-DAY RESPONSE**

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**BULLETIN 2003-02: LEAKAGE FROM REACTOR PRESSURE VESSEL LOWER HEAD  
PENETRATIONS AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY  
30-DAY RESPONSE**

***Requested Information***

- (1) *All subject PWR addressees are requested to provide the following information. The responses for facilities that will enter refueling outages before December 31, 2003, should be provided within 30 days of the date of this bulletin. All other responses should be provided within 90 days of the date of this bulletin.*

**Response**

Nuclear Management Company, LLC (NMC) is providing a 30-day response in accordance with Nuclear Regulatory Commission (NRC) Bulletin (BL) 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity," for the Prairie Island Nuclear Generating Plant.

***Requested Information***

- (a) *A description of the RPV lower head penetration inspection program that has been implemented at your plant. The description should include when the inspections were performed, the extent of the inspections with respect to the areas and penetrations inspected, inspection methods used, the process used to resolve the source of findings of any boric acid deposits, the quality of the documentation of the inspections (e.g., written report, video record, photographs), and the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of the RPV lower head penetrations.*

**Response**

The current Prairie Island Nuclear Generating Plant (PINGP) program of reactor pressure vessel (RPV) lower head examination consists of system pressure testing performed each refuel outage in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) code, Section XI, 1989 Edition, Table IWB-2500-1. The examination is a visual examination for evidence of leakage by a VT-2 qualified inspector with the system at normal operating pressure and with the insulation in place as allowed per IWA-5242. A 4-hour holding time at the test temperature and pressure is required prior to beginning the inspection. The examination is performed by procedure and is documented on a system pressure test report in accordance with our ASME Section XI program. The system pressure tests have not identified any bottom-mounted instrument (BMI) leakage to date. Indications of leakage would be dispositioned per subarticle IWB-3142 of the code. Any active leak would require repair, replacement or evaluation in accordance with subarticle IWA-5250 of the code.

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In addition to Section XI pressure testing, the reactor vessel engineer performed an augmented inspection of the lower dome of reactor vessel insulation on Unit 1 during refueling outage 1R22 (November 2002). This inspection was performed in response to refueling cavity leakage that occurred during that outage. The inspection found that the lower dome insulation was free of any indications of boric acid.

These inspections as well as the requirements of the Prairie Island Boric Acid Corrosion Control (BACC) Program and Section XI Program examinations (described in the Prairie Island responses to NRC BL 2002-01) ensure compliance with applicable regulatory requirements related to the integrity of the RPV & lower head penetrations.

***Requested Information***

***(b) A description of the RPV lower head penetration inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the extent of the inspections which will be conducted with respect to the areas and penetrations to be inspected, inspection methods to be used, qualification standards for the inspection methods, the process used to resolve the source of findings of boric acid deposits or corrosion, the inspection documentation to be generated, and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of the RPV lower head penetrations.***

**Response**

**Insulation Description**

The Prairie Island Units 1 & 2 RPV's are installed with mirror-type insulation at the lower RPV dome. This insulation generally conforms to the contour of the lower RPV dome but has a gap of about one to three inches between the RPV surface and the insulation. Each BMI penetration has a slight gap between the insulation and the BMI tube material. This annular gap varies in size (approximately one half inch) and is normally covered by metal flashing.

**Inspection Plans**

A Prairie Island Unit 2 refueling outage is currently underway. A bare-metal visual (BMV) examination of the lower RPV dome up to and including each BMI to RPV junction is being performed during this outage. If limitations exist during performance of this examination, lessons learned will be incorporated and changes will be made to ensure that a 100% BMV exam will be performed during the subsequent refueling outages.

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Any evidence of boric acid will be evaluated to determine the source, extent of leakage and possible extent of cracking. Detection of cracking may require characterization by non-destructive methods as applicable and comparison to the acceptance criteria specified in ASME Section XI. Any indication of cracking will be evaluated in accordance with the methodology of ASME Section XI.

Personnel performing visual examinations will be VT-2 qualified. The acceptance criterion will be zero leakage from the lower reactor head and penetration nozzles. Examination methods may include fixed, pole-mounted, or robotic video, still photography, or direct visual examination. Written and photographic evidence will be used to document each examination. Although the examiner will be VT-2 qualified, this will not be an ASME Section XI VT-2 examination subject to the pressure and temperature requirements, hold times, and other requirements specific to the performance of a code-required system pressure test.

The long-term examination plans for subsequent refueling outages will include BMV examinations of the BMI to RPV junction during each refueling outage. This will continue until industry experience, changes to the ASME code, or a change in regulatory requirements justify a change to the inspection frequency or method.

These examinations as well as those of the requirements of the BACC Program and Section XI Program examinations (described in the Prairie Island responses to NRC BL 2002-01) ensure compliance with applicable regulatory requirements related to the integrity of the RPV lower head penetrations.

**Resolution of Possible Boric Acid Deposits**

As stated in BL 2003-02, evidence of past leakage from refueling operations may be present in the vicinity of the BMIs. NMC understands the importance of accurate analyses and inspections to differentiate between RCS leakage and refueling cavity leakage.

NMC will fully document the as-found condition of suspect deposits whether adhering to the RPV lower head or present on the insulation facing the RPV. All such deposits will be carefully evaluated to determine the most likely origin of the material based on visual, physical, and chemical evidence. Visual evidence will be evaluated with consideration of the guidance and examples given in industry reference materials for similar inspections of RPV upper heads supplemented by the recent observed conditions at the South Texas Project. When deemed appropriate, relevant physical evidence will be carefully collected to provide reliable, documented data for use in the evaluation process. Chemical and radio isotopic analysis techniques may be employed where appropriate to help discriminate between deposits with operational versus outage-related sources.

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***Requested Information***

- (c) If you are unable to perform a bare-metal visual inspection of each penetration during the next refueling outage because of the inability to perform the necessary planning, engineering, procurement of materials, and implementation, are you planning to perform bare-metal visual inspections during subsequent refueling outages? If so, provide a description of the actions that are planned to enable a bare-metal visual inspection of each penetration during subsequent refueling outages. Also, provide a description of any penetration inspections you plan to perform during the next refueling outage. The description should address the applicable items in paragraph (b).*

***Response***

As described above, the goal for the current Prairie Island Unit 2 refueling outage is to complete a 100% BMV examination of each BMI penetration. If some currently unforeseen circumstance prevents the ability to examine each penetration, NMC will apply lessons learned to ensure a BMV examination of each penetration is performed during the next refueling outage. Until the lessons learned from the first inspection are evaluated, NMC is unable to specify in detail and with certainty what actions will be taken to enable a 100% BMV examination of each penetration during the subsequent refueling outage. These actions may include modification of the reactor vessel insulation and the use of alternative examination techniques.

***Requested Information***

- (d) If you do not plan to perform either a bare-metal visual inspection or non-visual (e.g., volumetric or surface) examination of the RPV lower head penetrations at the next or subsequent refueling outages, provide the basis for concluding that the inspections performed will assure applicable regulatory requirements are and will continue to be met.*

***Response***

As described above, NMC plans to perform BMV examinations of the lower RPV head up to and including each BMI to RPV junction at the next and subsequent refueling outages at Prairie Island Units 1 and 2.