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Point Beach Nuclear Plant
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NRC 2002-0091

BU 2002-02

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Dockets 50-266 and 50-301
Point Beach Nuclear Plant, Units 1 and 2
NRC Bulletin 2002-02: Reactor Pressure Vessel Head And Vessel Head Penetration Nozzle
Inspection Programs – Response to Request for Additional Information

By submittal dated September 12, 2002, Nuclear Management Company, LLC (NMC) provided the 30-day response for Point Beach Nuclear Plant (PBNP), Units 1 and 2, to Bulletin (BL) 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs".

During a conference call between NMC representatives and NRC staff on September 25, 2002, NRC staff requested additional information regarding new aspects of the issue associated with this Bulletin. The attachment to this letter provides the NMC response to the staff's questions.

This letter contains no new commitments.

for 
A. J. Cayia
Site Vice-President

CAT/kmd
Attachment

cc Regional Administrator, USNRC, Region III
NRC Resident Inspector – PBNP

Project Manager, PBNP, USNRC, NRR

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**NRC 2002-0091
ATTACHMENT**

**NUCLEAR MANAGEMENT COMPANY, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2
DOCKETS 50-266 AND 50-301**

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
30-DAY RESPONSE TO NRC BULLETIN 2002-02**

The following information is provided in response to the Nuclear Regulatory Commission staff's request for additional information (RAI) on the Nuclear Management Company, LLC (NMC) September 12, 2002 response to NRC Bulletin 2002-02. NRC staff requested information regarding new aspects of the issue associated with this Bulletin during a telephone conference on September 25, 2002.

The NRC staff's questions are restated below, with the NMC response following.

NRC Question

During the course of North Anna 2 reactor pressure vessel (RPV) head inspection in response to Bulletin 2002-02, the licensee identified indications on the weld of 63 of 65 penetrations. The licensee considers these indications to be unacceptable and has plans to repair them. In light of the North Anna 2 observations and your stated inspection plans, please tell us how your inspection plan provides assurance that the indications seen at North Anna are unlikely to exist or be of concern at your facility.

Response

The PBNP Unit 1 inspection involved a bare head visual examination, ultrasonic examination (UT) of the control rod drive mechanism (CRDM) tubing and vent penetration, and an UT leak path examination. The final results of these activities will be provided in NMC's followup response to NRC Bulletin 2002-02, following completion of examinations. The inspections and results are summarized below. NMC believes the results of these activities provide assurance that the indications seen at North Anna 2 are unlikely to exist or be of concern at PBNP Unit 1.

A bare metal visual examination was completed on each of the reactor vessel head penetrations. No evidence of leakage was observed. No limitations were encountered.

UT examination was completed on 100% of the examination region for forty-five (45) of forty-nine (49) CRDM penetrations and the vent tube penetration. Partial UT examination coverage was obtained on the remaining four (4) CRDM penetrations. These UT examinations did not reveal evidence of cracking or leakage.

Dye penetrant examination of the j-groove weld for CRDM penetration number 1, conducted in order to help disposition an anomalous UT indication, confirmed that the examination region is free of cracking. A followup UT examination, using a more sensitive probe, confirmed the lack of cracking.

These inspections confirm that the CRDM tubing is free of axial and circumferential cracking within the examination region. The bare metal head visual examination confirms that wastage has not occurred.

NMC has reviewed information relative to the North Anna 2 and PBNP Unit 1 reactor vessel heads. This information is tabulated below.

Comparison of PBNP Unit 1 and North Anna 2 Information	
<u>North Anna 2 Reactor Vessel Head</u>	<u>PBNP 1 Reactor Vessel Head</u>
Fabricator of Vessel Head - Rotterdam	Fabricator of Vessel Head - B&W
Higher EDY 19.8	Lower EDY 14.5
BA on Head	No BA on Head
Many tubes with cracking	No tubes observed with cracking
PT or EC indication on almost all welds	No PT indication on penetration #1
No previous UT leakage path examination	No evidence of leakage from UT leak path

The information provided in the above table illustrates that there is a significant difference between the conditions of the North Anna 2 and PBNP Unit 1 reactor vessels heads. The difference between the North Anna 2 and PBNP Unit 1 reactor vessel head effective degradation years (EDY) values is 5.3 EDY, which corresponds to approximately 7.5 effective full power years (EFPY) of operation of PBNP Unit 1. Notwithstanding these differences, NMC understands that reactor vessel head CRDM alloy 600 tubing and j-groove welds are subject to the potential of primary water stress corrosion cracking (PWSCC) and has taken appropriate actions to manage this issue. Our responsibility for managing PWSCC is further illustrated by our decision to conduct supplemental ultrasonic examinations of the CRDM nozzle base material during the next scheduled refueling outage for PBNP Unit 2, currently scheduled for September 2003.

Based on the above information, the indications observed at North Anna 2 are unlikely to exist at PBNP Unit 1. We believe that we are taking appropriate action to manage any potential degradation of the reactor vessel head, CRDM tubing, and j-groove weld. These activities will ensure safe operation of PBNP Unit 1 as discussed below.

As identified in MRP-75, "Supplemental Visual Inspections to Ensure RPV Closure Head Structural Integrity," September 2002, weld metal cracking by itself does not result in an immediate safety concern. Cracking that is contained entirely within the weld metal, even if 360° around the nozzle, will not lead to nozzle ejection. The portion of the weld that is attached to the outside surface of the nozzle will not be able to pass through the tight annular fit. Additionally, the outward distortion in the penetration from weld shrinkage would further prevent the nozzle from passing through the tight annular fit. Through-weld cracking to the annulus has the same consequence as a leaking nozzle, in that it can result in a leak and wastage of the vessel steel and/or the initiation of a circumferential crack in the nozzle material. Therefore a weld metal examination is not needed to address the safety issues associated with PWSCC of reactor vessel head penetrations and welds if a bare metal head visual examination and UT of the nozzle material are being performed. The benefits of each inspection type are discussed below.

Performing UT of the reactor vessel head CRDM nozzle material will address all safety concerns associated with ejection of a reactor vessel head CRDM penetration by detecting circumferential cracking. As identified in MRP-75, a circumferential crack in a nozzle above the weld, takes several years to grow to a point of being an ejection concern even in the highest temperature plant with greater than 18 EDY. Therefore, by performing UT of the reactor vessel head CRDM penetration nozzle material, the safety issue associated with OD circumferential cracking initiating above the weld, whether initiated by through-wall weld or nozzle cracking, will be addressed.

By performing a bare metal head visual inspection, any leakage that could cause wastage will be identified. In the event that a through wall leak in the weld or tube does not result in visible leakage on top of the head, then no consequential wastage can occur.

The safety concern associated with reactor vessel head CRDM ejection and head wastage is addressed by performing both bare metal visual and UT of the reactor vessel head and CRDM nozzle material, respectively. Therefore, no new recommendations or changes are required to the PBNP Unit 1 inspection plan to address the North Anna concerns.