

June 25, 2004

NRC 2004-0065
10 CFR 50.73

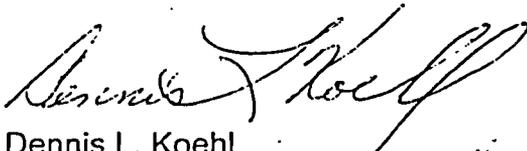
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Unit 1
Docket 50-266
License No. DPR-24

Licensee Event Report 266/2004-001-00
Reactor Pressure Vessel Upper Head Penetration 26 Flaw Indications

Enclosed is Licensee Event Report (LER) 266/2004-001-00 for the Point Beach Nuclear Plant Unit 1. This LER discusses the identification and resolution of flaw indications in penetration nozzle 26 of the Point Beach Nuclear Plant Unit 1 reactor pressure vessel head. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(A).

This submittal contains no new regulatory commitments and no revisions to existing commitments.



Dennis L. Koehl
Site Vice-President, Point Beach Nuclear Plant
Nuclear Management Company, LLC

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to: bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)
REACTOR VESSEL UPPER HEAD CRDM PENETRATION 26 FLAW INDICATIONS

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|----------------|-----|------|----------------|-------------------|--------|-----------------|-----|------|-------------------------------|---------------|
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 05 | 06 | 2004 | 2004 | - 001 | - 00 | 06 | 25 | 2004 | | 05000 |
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| OPERATING MODE (9) | 6 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR :: (Check all that apply) (11) | | | | | | | | |
| POWER LEVEL (10) | 000 | 20.2201(b) | | 20.2203(a)(3)(ii) | | 50.73(a)(2)(ii)(B) | | 50.73(a)(2)(ix)(A) | | |
| | | 20.2201(d) | | 20.2203(a)(4) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | | |
| | | 20.2203(a)(1) | | 50.36(c)(1)(i)(A) | | 50.73(a)(2)(iv)(A) | | 73.71(a)(4) | | |
| | | 20.2203(a)(2)(i) | | 50.36(c)(1)(ii)(A) | | 50.73(a)(2)(v)(A) | | 73.71(a)(5) | | |
| | | 20.2203(a)(2)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(v)(B) | | OTHER | | |
| | | 20.2203(a)(2)(iii) | | 50.46(a)(3)(ii) | | 50.73(a)(2)(v)(C) | | Specify in Abstract below or in | | |
| | | 20.2203(a)(2)(iv) | | 50.73(a)(2)(i)(A) | | 50.73(a)(2)(v)(D) | | NRC Form 366A | | |
| | | 20.2203(a)(2)(v) | | 50.73(a)(2)(i)(B) | | 50.73(a)(2)(vii) | | | | |
| | | 20.2203(a)(2)(vi) | | 50.73(a)(2)(i)(C) | | 50.73(a)(2)(viii)(A) | | | | |
| | | 20.2203(a)(3)(i) | X | 50.73(a)(2)(ii)(A) | | 50.73(a)(2)(viii)(B) | | | | |

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| LICENSEE CONTACT FOR THIS LER (12) | |
| NAME | TELEPHONE NUMBER (Include Area Code) |
| Charles Wm. Krause, Senior Regulatory Compliance Engineer | (920) 755-6809 |

| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | |
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| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | EXPECTED SUBMISSION DATE (15) | | MONTH | DAY | YEAR |
| YES (If yes, complete EXPECTED SUBMISSION DATE). | X | NO | | | | | | |

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

During the performance of non-destructive examinations (NDE) of the Point Beach Nuclear Plant (PBNP) Unit 1 reactor pressure vessel head as required by the First Revised NRC Order (EA-03-009), possible flaw indications were observed using ultrasonic testing (UT) techniques in the "J" groove weld area for CRDM head penetration 26. To further characterize these indications, multiple dye penetrant (PT) examinations of the penetration 26 J groove weld area were performed, including PT testing following minor excavation of the weld surface. The results of these examinations confirmed the existence of flaws in the "J" groove weld. On May 6, 2004, based upon preliminary analyses, NMC determined that these indications would probably not be found acceptable under ASME Code standards. Therefore, this condition was reported under 10 CFR 50.72(b)(3)(ii)(A) as a significant degradation of a principal safety barrier. Research on the observed UT indications concluded that the indications were likely the result of weld repairs during fabrication and were not related to primary water stress corrosion cracking. A weld repair of the penetration 26 CRDM nozzle was completed on May 22, 2004, in accordance with an approved plant modification. The safety significance of this condition was minimal. PBNP Unit 1 was returned to service following the U1R28 refueling outage on June 8, 2004.

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Event Description:

During the performance of non-destructive examinations (NDE) of the Point Beach Nuclear Plant (PBNP) Unit 1 reactor vessel (RV) [EIS System Code: AB Component Code: RPV] head, possible flaw indications were initially observed by ultrasonic examination (UT) of the "J" groove weld area of control rod drive mechanism (CRDM) [EIS System Code: JD Component Code: RCT] penetration 26. At the time of discovery, PBNP Unit 1 was in Mode 6 and in a refueling outage (U1R28). The NDE of the Unit 1 RV head was being conducted as required by NRC Order EA-03-009 "Issuance of First Revised Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors", dated February 20, 2004. In response to these UT indications, liquid penetrant test (PT) examinations of the "J" groove material were conducted to confirm whether primary water stress corrosion cracking (PWSCC) was occurring in penetration 26. The PT exams revealed surface indications that required further evaluation. The results of those exams indicated that flaws existed in the weld material that did not meet the accepted flaw evaluation guidance. Based on this information and preliminary analysis, NMC determined on May 6, 2004, that these indications would likely not be found acceptable under ASME Code standards. Accordingly, the NRC was notified (EN# 40728) that this condition could represent degradation of a principal safety barrier and; therefore, was reportable pursuant to 10 CFR 50.72(b)(3)(ii)(A).

Event Analysis:

NMC was conforming to NRC Order EA-03-009 in the management of PWSCC at PBNP by performing essentially a 100% UT inspection of the reactor vessel heads to verify that PWSCC has not occurred. NMC is also in the process of procuring new RV heads for replacement in both of the PBNP units. The Unit 1 reactor vessel pressure head replacement is scheduled during the fall of 2005; and the Unit 2 reactor pressure vessel head is scheduled to be replaced during the spring of 2005.

The inspection of the PBNP Unit 1 RV head was performed utilizing one of the two methods specified in Order EA-03-009 for the examination of the Alloy 600 CRDM tubing and "J" groove welds. The examination included UT of the tubing, UT of the counterbore region for corrosion products, and above-head visual examinations. As mentioned previously, the UT that was performed for CRDM Penetration 26 disclosed an indication in the "J" groove weld area that extended into the CRDM tube base material on the downhill side of the penetration. The indication was initially determined to be a crack by the UT analyst.

A comparison of UT data from the U1R28 examination and the results of the previous PBNP Unit 1 RV head inspection during the U1R27 refueling outage in the fall of 2002 was performed. The comparison determined that the indication (reflector) was visible but not recordable during the U1R27 RV head inspection. At that time; however, scanning was only performed using an axial

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blade probe. The U1R28 inspection scan used circumferential blade probes. A detailed evaluation of the indications determined that the indication did not possess the characteristics indicative of PWSCC and that there was no change in the nature and size of the UT indications between U1R27 and U1R28 when re-scanning using the same type probe. The absence of changes in the nature and size of the indications is expected, and consistent, with fabrication-type indications.

To further characterize this flaw indication, PT examinations of the "J" groove material in penetration 26 were completed. The PT examinations disclosed that surface indications were present that required further evaluation. Four separate PT examinations were performed; two of which involved removal of weld metal in an attempt to clear the indications. The results of these examinations revealed that the initial PT indications were faint. The surface condition of the "J" groove weld was relatively smooth at the time of the initial PT as a result of the original fabrication grinding process. Therefore mechanical surface conditioning of the examination area was not performed prior to the conduct of the initial examination. A second PT was performed following minor mechanical cleaning and showed a slight increase in coloration. A third PT was performed after grinding approximately 1/16" and produced results consistent with that from the second PT. A fourth PT was performed following additional grinding and produced results similar to the previous PTs. The location of surface cracking was adjacent to the large UT signature. The orientation of the majority of the short cracks was transverse to the weld beads with a few running parallel with the weld beads.

Safety Significance

An evaluation was conducted to determine the extent of the condition. This evaluation concluded that the tubing, counterbore region, and other areas on the RV head were free of defects, wastage and boric acid deposition and; therefore, the structural integrity and leak integrity of the RV head was assured. This conclusion was arrived at based upon the following considerations:

- A review of ultrasonic signatures obtained during the U1R27 and U1R28 under-head inspections.
- Review of available fabrication records to ascertain if other penetrations may have been repaired during original fabrication.
- Inspection of the Alloy 600 CRDM tubing, counterbore region and RV head in accordance with NRC Order EA-03-009.
- The leakage integrity of the reactor coolant system boundary was verified by visual examination of the top of the reactor pressure vessel head. There were no evidence of defects, wastage or boric acid crystal deposition on the top of the RV head. Leakage

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integrity was further verified by the absence of axial and circumferential flaws in the Alloy 600 tubing, as well as the absence of corrosion products in the counterbore region adjacent to the Alloy 600 tubing above the "J" groove weld.

Based on these considerations and the completed repair of the penetration 26 indication, NMC concludes that the safety significance of the condition identified in this report was minimal. NMC further concludes that the welfare and safety of the public and plant staff were not impacted by this condition. This event did not involve any loss of safety function and; therefore, did not constitute a safety system functional failure.

On June 4, 2004, the NRC approved a relaxation of the First Revised Order EA-03-009, regarding RV head inspections, dated February 20, 2004, for the upcoming Unit 1 operating cycle. This relaxation allowed the removal of a Mode 2 restraint on Unit 1 and authorized full power operation of PBNP Unit 1 for one operating cycle. Unit 1 entered Mode 1 on June 7, 2004.

Cause:

Research on the flaw detected by UT disclosed that the indication was likely fabrication related, and not a result of PWSCC. This conclusion was based upon a review of the fabrication records for the reactor pressure vessel (RPV), which was manufactured by Babcock & Wilcox (B&W) under contract to Westinghouse Electric Corporation, the nuclear steam supply system (NSSS) vendor. Official fabrication records for the Unit 1 RPV do not fully document repairs performed on penetration 26; however, records from 1969 indicate the likelihood that a repair was performed on that penetration, as documented in a September 1969 report entitled, "Field Repair of Unit 1 Reactor Vessel Closure Head." The RPV was fabricated in accordance with ASME Boiler & Pressure Vessel (B&PV) Code Section III.

Corrective Action:

A weld repair of the penetration 26 "J" groove indications was completed. The repair was performed in accordance with approved plant procedures and work documents. Verbal relief from ASME Section III and XI Code requirements to perform the repairs was granted by the NRC on May 26, 2004. Final acceptance of the weld repair was completed with the performance of the reactor coolant system leakage test conducted when Unit 1 was returned to service following the U1R28 outage.

Previous Similar Events:

A review of recent LERs (past three years) identified no other events involving flaw indications in the reactor coolant system pressure boundary for PBNP Unit 1.