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Senior Vice President

July 11, 2002
NL-02-099
IPN-02-060

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555-0001

SUBJECT: Indian Point 2 and 3 Nuclear Power Plants
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64
"Supplement to 15-Day Response for NRC Bulletin 2002-01"

References:
1. Entergy letter to NRC, NL-02-050 / IPN-02-023; "Submittal of 15-day Response to NRC Bulletin 2002-01," dated April 2, 2002.
2. NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," dated March 18, 2002.

Dear Sir:

This letter supplements the 15-day response (Reference 1) to NRC Bulletin 2002-01 (Reference 2) provided by Entergy Nuclear Operations, Inc (ENO) for the Indian Point Energy Center (IPEC). The information provided herein is in response to a conference call between ENO and NRC staff on May 10, 2002. Information regarding Indian Point Units 2 and 3 is provided in Attachments I and II, respectively.

Also, during a site visit on May 30, 2002, NRC staff reviewed additional data pertaining to Indian Point Unit 3. The supplemental information discussed during that site visit is included in Attachment II.

ENO has been monitoring industry experience regarding this issue to determine the best course of action for long-term resolution at IPEC. Inspection plans for the next refueling outages (Fall 2002 for Unit 2 and Spring 2003 for Unit 3) will be provided as required by Bulletin 2001-01.

A095

No new commitments are being made in this letter. If you have any questions, please contact Mr. John McCann (914) 734-5074, Licensing Manager.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

Executed on 7-11-02
(Date)

Mr. John Herron
Senior Vice President
Indian Point Energy Center
Entergy Nuclear Operations, Inc

cc:

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ATTACHMENT I TO NL-02-099 / IPN-02-060

SUPPLEMENT TO 15-DAY RESPONSE TO

NRC BULLETIN 2002-01

FOR INDIAN POINT UNIT 2

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

The following questions were discussed during a conference call between ENO and NRC staff on May 10, 2002.

Question 1:

Your 15 day response to Bulletin 2002-01 indicates that sections of insulation adjacent to leaking canopy seal welds were removed in 1986, 1987, and 1988, and a bare-metal inspection of the reactor vessel head was performed. Provide a sketch of the location of the leaks and the locations where the insulation was subsequently removed for each occurrence. Discuss the size (area) of the insulation that was affected by the leaks and the size (area) of the base metal that was exposed. Discuss whether or not any boric acid deposits and/or residue were identified on the bare metal of the head and/or whether any boric acid/water penetrated the insulation.

Answer 1:

Removal of insulation and inspection of the bare metal was performed as described below. Locations are shown on Figure I.

- 1986: Approximately 6 inch diameter section removed between nozzles 70 and 81.
  Approximately 15 inch x 15 inch section removed adjacent to nozzle 75.
- 1987: Same location as 1986, between nozzles 70 and 81.
- 1988: Approximately 4 inch x 4 inch section removed adjacent to nozzle 97.

In all above cases, no boron accumulation on the vessel head or degradation of base metal was observed, and the head coating (high-temperature aluminum silicate) appeared to be intact. During the 1986 / 1987 inspection and repair efforts, samples of insulation were tested to determine the degree to which the leaking, borated water had penetrated the head insulation. The results of these tests showed that, although the insulation provided some protection against the leaking water contacting the head base metal, some boron was found through the thickness of the insulation, indicating that the insulation is not water tight. However, no visible signs of boron were found on the vessel head.

Question 2:

Your response to item 1.C of the Bulletin indicates that there were three instances of conoseal leakage and three instances of canopy seal weld leakage for Indian Point Unit 2. It appears that the 1986, 1988, and 1997 leaks were corrected during the outage in which they were found. There was no mention of repair of the leak identified in 1996. Clarify whether or not all leaks were repaired during the outage in which they were identified. Discuss the amount of boric acid that was found on the insulation following these leakage events.

Answer 2:

Conoseal 91 experienced a small leak in Feb. 1996 during a plant heatup. The Conoseal was retorqued to reduce the leakage and a catch basin was installed to prevent leakage from reaching the head. After one cycle of operation with minor leakage, a permanent repair was implemented during the 1997 outage.

Leaks which were identified during outages were repaired prior to plant startup. Leaks which were identified during operation, were repaired during the subsequent maintenance or refueling outage.

The canopy seal leaks discussed in the 15 day response, resulted in a thin layer of boron over some sections of the insulation while conoseal leaks resulted primarily in boron accumulation at the seal joint location outside of the cooling shroud.

Question 3:

During an extended maintenance outage in 1998, you performed a modification to the part length control rod drive mechanism (CRDM) housing. Discuss the reason for the modification (i.e. was the modification necessary due to evidence of boric acid leakage).

Answer 3:

The part length CRDM modification was performed in response to the Prairie Island leak issue. The two primary reasons for the modification were:

(1) questionable inspection techniques available at the time to inspect the complex geometry where the cracking could occur, and
(2) the fact that Indian Point 2 had some of the same heats of material which had experienced cracking at Prairie Island.

An additional benefit of this modification was that field samples were provided to the Westinghouse Owners Group (WOG) to assist in developing an industry position on this issue. No leakage was occurring at Indian Point 2. All eight of the part length CRDMs were removed and provided to the WOG for evaluation. The weld cracks identified at Prairie Island were not evident in the CRDMs removed from Indian Point 2.

Question 4:

Discuss whether or not there are any gaps, cracks, or other similar disturbances in the insulation (i.e., discuss the integrity of the outer surface of the insulation). Also discuss if there are any gaps between the insulation and the nozzle. If gaps are present, discuss any inspections that have been performed.

Answer 4:

Overall, the insulation is in good condition based on the information reviewed to date, although there are some areas where cracks and other small gaps exist. A review of video inspections performed during past outages also indicate that some nozzles have small gaps between the nozzle material and the insulation. Although some of these gaps would be expected to close up during operating (i.e. hot) conditions, some remaining gaps can not be discounted. Inspection of these areas did not reveal any signs of leakage originating from under the insulation although some leakage from the canopy seals above, may have run down some nozzles and into some of these gaps.

Question 5:

Your 15 day response to Bulletin 2002-01 states that examination of "essentially 100% of the CRDM penetrations" would be conducted during the next outage. In a previous submittal (supplemental response to Bulletin 2001-01) you defined "essentially 100%" to mean "essentially 360 degrees around 100 percent of the vessel head penetrations". Discuss any limitations that may prevent examination of a full 360 degrees of 100 percent of the penetrations.

Answer 5:

There are no known limitations which will prevent 100% inspection of the CRDM nozzles. ENO is continuing to monitor inspection activities at other plants to support preparation of inspection plans for the Fall 2002 refueling outage. Additional information about the planned inspection will be provided to the NRC no later than 90 days prior to the start of the outage.

Question 6:

Has ENO reviewed the insulation removal / replacement experience at Point Beach with respect to inspection plans for the Indian Point 2 refueling outage in October 2002.

Answer 6:

ENO did monitor the insulation removal / replacement experience at Point Beach because the insulation material and design is similar to both units at Indian Point. ENO is currently evaluating the available inspection options to provide for an effective and efficient inspection during the Fall 2002 refueling outage. Details of the inspection plan will be provided to the NRC no later than 90-days prior to the start of the outage.

Question 7:

Discuss any evaluation or actions taken in response to Information Notice 2002-13

Answer 7:

The following actions have been taken to address the information provided in Information Notice 2002-13:

- The containment fan cooler units were inspected and there was no evidence of boron deposits.
- Health Physics technicians replace the roll-type filter paper in the containment air particulate monitor approximately every 3 weeks. They have been briefed about the operating experience reported in the Information Notice. No evidence of boron or rust deposits has been found on the used filter paper.
- A general walk down of containment determined that there no visible signs of area boron deposits.
- Unidentified Reactor Coolant System leakage is monitored and trended daily.

Question 8:

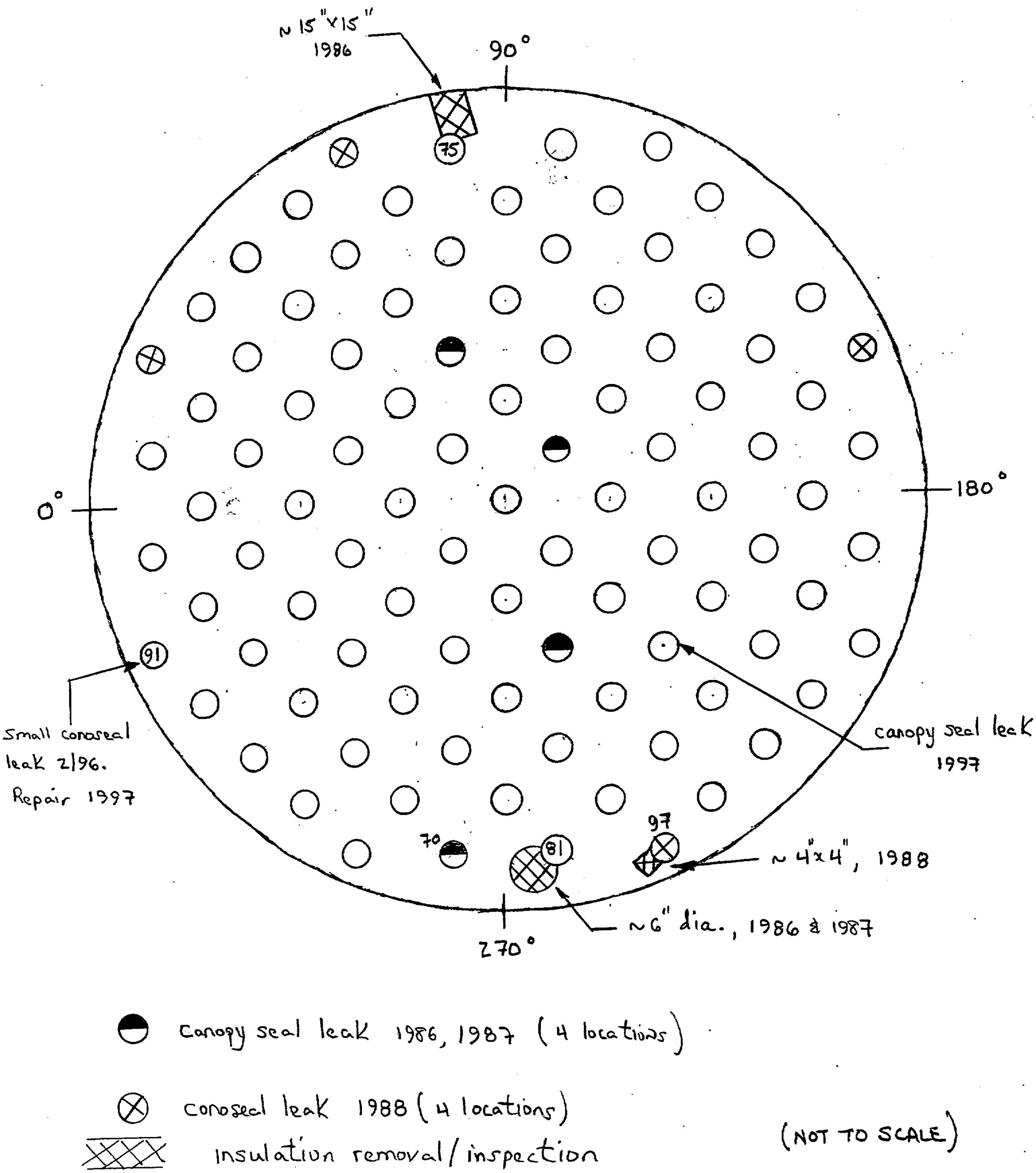
Provide additional explanation of the inspection conducted during the outage in 2000 pertaining to a licensee Condition Report.

Answer 8:

The inservice leak test performed in accordance with the requirements of ASME Section XI is performed using test procedure PT-R75 as the end of each refueling outage. In preparing for the response to Bulletin 2002-01, the completed procedure from the 2000 Refueling Outage was reviewed. Although PT-R75 has a step for the VT-2 inspector to verify that there is no leakage in the vessel head or in it's attachments / penetrations, it is not documented whether the actual inspection included direct examination of the portion of the head that is located inside the CRDM cooling shroud. The inspector was interviewed, but he was not able to remember the details of the inspection. Therefore, ENO concludes that the portions of the head inside the cooling shroud may not have been visually inspected during the 2000 inservice leak test. As a result of this experience, the test procedure has been revised to specify that the CRDM cooling shroud inspection ports must be opened to perform a direct visual inspection of that portion of the head.

Although inspection of the head inside the shroud would have provided additional verification that the head was free of leaks, ASME Section XI (IWA-5241 and 5242) allows inspection of the areas surrounding a component to be inspected if the component is inaccessible to direct visual inspection during the pressure test. Absence of leakage in the area adjacent to the head provides evidence that the vessel head was free of active leaks during the inservice leak test performed at the end of the 2000 refueling outage.

FIGURE I
UNIT 2 REACTOR VESSEL HEAD
LEAK LOCATIONS AND INSULATION REMOVAL



ATTACHMENT II TO NL-02-099 / IPN-02-060

SUPPLEMENT TO 15-DAY RESPONSE TO

NRC BULLETIN 2002-01

FOR INDIAN POINT UNIT 3

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

The following questions were discussed during a conference call between ENO and NRC staff on May 10, 2002.

Question 1:

Your 15 day response to Bulletin 2002-01 indicated that insulation around 14 CRDMs was removed, and inspections were performed due to a canopy seal leak that was identified in 1990. Discuss whether or not any boric acid deposits and/or residue were identified on the bare metal of the head and/or whether any boric acid/water penetrated the insulation. Clarify whether or not this area is still accessible, and if accessible, discuss the inspections that have been performed.

Answer 1:

A plan view of the Unit 3 reactor vessel head is provided in Figure II to show the relative locations of areas described in answers to several of the NRC questions.

Leakage from the canopy seal on CRDM 28 was detected during startup from a scheduled outage in March 1990. A clamp assembly was installed (Work Request 21446) to repair the leak and the wetted insulation over an area approximately 3 feet by 5 feet was removed (Work Request 21284). In addition, a clamp assembly was installed on CRDM 26 (Work Request 21447) because boric acid residue was found on the canopy seal area, although no active leakage was detected. Prior to installing new insulation, the reactor vessel head was cleaned and inspected in the area of removed insulation. No corrosion was noted in the work package documentation.

The insulation replaced consisted of calcium silicate block with a top layer of asbestos free finishing cement and reinforcing fabric (approx. ½" thick) to form a continuous, durable, drip-resistant surface.

Another inspection of this area (top of insulation) was performed during a subsequent refueling outage (RO 11) in April 2001. The visual assessment report (see response to question 4) concluded that there is no evidence of leakage or corrosion products at the areas reviewed, that could be attributed to a penetration / vessel joint failure or leakage from above the insulation.

Question 2:

During RFO 10 in 1999, stains were observed on the head outside of the CRDM shroud around vessel studs 5 through 18. As a result of these findings, the top of the insulation was inspected and streaks were observed on the CRDMs. No evidence of any new leakage or degradation of the insulation was found. Based on these findings, you postulated that the residue found near the vessel studs was due to humidity and entrainment in the ventilation system. According to your 15 day Bulletin response, the only leak in Indian Point Unit 3 at that time occurred in 1990. Discuss how/why staining would be observed 9 years after the original leak. Clarify whether or not the affected insulation was removed. In addition, discuss whether or not there are other instances of boric acid leakage onto the head.

Answer 2:

The Refueling crew inspected the exposed surface of the Reactor Vessel head outside the CRDM shroud assembly per 3PT-R114 during vessel disassembly. At the beginning of R10, the inspection noted boron deposits/streaks around vessel studs #5 through #18, which was documented in the test procedure and in the IP3 corrective action program (Deviation Event Report 99-01968).

The corrective action implemented was a video inspection under the vessel CRDM shroud using a camera mounted to an extended pole in lieu of the normal general visual inspection. This inspection was videotaped for more comprehensive evaluation and to allow comparison with future inspections. Although evidence of the historical leaks remained (for example, boron streaking on the CRDMs that was determined to be coming from above the RPV head and insulation), no indication of any new leakage or degradation of insulation was found. It was postulated that the residue found on the exposed surface of the vessel head flange was due to humidity and entrainment of historical residue in the head ventilation system, which condensed outside the CRDM shroud during plant cool down. The deposits on the exposed surface were cleaned and no degradation was noted.

The evaluation noted that RCS leakage over the previous cycle (up to the R10 shutdown) was very low and there were no unexplained trends in the containment area radiation monitoring system.

It is noted that there was no repeat of the streaks of boron deposits found on shutdown in Refueling Outage 10 when IP3 shutdown for refueling outage 11 and disassembled the reactor. The boron streaking on stud hole number 5 through 18 did not reoccur.

During a forced outage at the end of 1992, while performing surveillance test 3PT-R114 possible boric acid residue was reported around one of the vessel head penetrations (#35),at a canopy seal weld. A pressure test and examination at 1700 psig and 340 degrees F was performed and no leakage was noted.

During a forced shutdown in September, 1990 boric acid residue was noted on a clamp assembly for conoseal #4 on penetration #77. Work request 23986 was issued to fix this mechanical clamp assembly and the assembly was replaced. As a preventive measure, mechanical clamps were also installed on the canopy seal weld joints for all 5 CET penetrations (74, 75, 76, 77, and 78) and the 10 spare penetrations (2, 3, 4, 5, 15, 17, 19, 21, 27, and 29).

Question 3:

During RFO 11 in 2001, boron deposits were observed around a leaking conoseal. This leak resulted in staining of the reactor vessel head which was similar to the staining observed during RFO 10. Discuss the possibility that the boric acid reached the reactor vessel head, and the possibility that the staining observed during RFO 10 and 11 was a result of corrosion of the base metal of the head.

Answer 3:

The inspections noted born residue at the location of stud hole #38, which is a different location than refueling outage 10 as noted above.

Inspections were performed and boron deposits were noted at a gasketed joint (conoseal) on the #4 thermocouple penetration (also designated as head penetration #77). This was documented in IP3's corrective action program. This leakage was initially noted on-line (during a leak inspection walk down inside the containment by plant personnel. During RO11, the IP3 ISI engineer, Corporate Metallurgist and system engineer evaluated the areas that showed evidence of boron residue. No degradation of the Reactor vessel was noted. The conoseal was disassembled and repaired during this refueling outage. The conoseal gaskets are normally replaced each refueling as part of the reactor disassembly / reassembly process.

Using a remote camera, a general area inspection of the RPV head (top of insulation and CRDMs) and approximately 60% of the nozzles (at the insulation interface) were inspected by a VT-2 equivalent examination from above the vessel head insulation. The RO11 inspection was compared with an inspection videotaped during the previous refuel outage, RO10. There were no apparent changes in the condition of the vessel head under the cooling shroud with the exception of the #4 thermocouple penetration leakage discovered prior to the RO11 outage. Boron had precipitated from this leak and collected on the alloy steel canopy clamp. Also, there is evidence that some traces did traverse down the tube and were entrained in the CRDM ventilation depositing on the exposed vessel head outside the cooling shroud. The inspection revealed minor streaks of boron residue on the head surface at the location of stud hole 38. The streaks were cleaned prior to return to service with no degradation noted. It was surmised that the boron deposits accumulated from the #4 thermocouple penetration leak as this was not noted in Refueling outage 10 and this was the only known leak entering refueling outage 11.

In summary, there was no evidence of leakage from penetration/vessel head joints at inspected locations. There was no evidence of any Reactor Vessel base metal degradation. An engineering evaluation was performed in Refueling outage 11 of all boric acid residues to ensure that there was no affect on RPV head integrity.

Question 4:

Your response to Bulletin 2002-01 states that an engineering evaluation was performed during RFO 11 to ensure the integrity of the reactor vessel head, and the staff requests that you provide this evaluation. In addition, address whether or not boric acid deposits were left on the reactor vessel head. Given the assumption that humidity is present, address whether or not any boric acid deposits would be wetted during operation such that active corrosion could be occurring.

Answer 4:

The requested evaluation (PEP-RAP-2001-0148) is provided at the end of this Attachment. No boric acid deposits were left on the Reactor Vessel base material to the best of our knowledge. Some boric acid residue was left on top of the insulation system. This is not expected to cause any corrosion due to the protective insulation system, which was described in our previous response and the protective coating on the bare metal head.

Question 5:

Discuss whether or not there are any gaps, cracks, or other similar disturbances in the insulation (i.e., discuss the integrity of the outer surface of the insulation). Also discuss if there are any gaps between the insulation and the nozzle. If gaps are present, discuss any inspections that have been performed.

Answer 5:

There are some gaps in the insulation near the CRDM penetrations. Previous pictures were provided in the response to NRC Bulletin 2001-01. When gaps were present, the interface of the insulation to the CRDM penetration was inspected for boric acid leakage. Boron deposits were not observed in these areas.

Question 6:

Your 15 day response to Bulletin 2002-01 states that examination of "essentially 100% of the CRDM penetrations" would be conducted during the next outage. In a previous submittal (supplemental response to Bulletin 2001-01) you defined "essentially 100%" to mean "essentially 360 degrees around 100 percent of the vessel head penetrations". Discuss any limitations that may prevent examination of a full 360 degrees of 100 percent of the penetrations.

Answer 6:

There are no known limitations which will prevent 100% inspection of the CRDM nozzles. ENO is continuing to monitor inspection activities at other plants to support preparation of inspection plans for the Spring 2003 refueling outage for Unit 3. Additional information about the planned inspection will be provided to the NRC no later than 90 days prior to the start of the outage.

Question 7a:

Discuss whether there are any possible indicators of reactor vessel head degradation

Answer 7a:

Actions taken by ENO with respect to possible indicators of reactor vessel head degradation are based on the observations at Davis-Besse as reported in Information Notice 2002-013. Based on the data collected, there is no evidence of reactor vessel head degradation. Additional details were provided during a site visit by NRC staff as described later in this document.

Question 7b:

In the video record of the inspection, several large deposits of material were noted on the surface of the insulation. What is the licensee's evaluation of this material?

Answer 7b:

The initial response by ENO during the conference call of May 10, indicated that the material may be insulation cement residue from prior repair of insulation. After subsequent review of the videotape, ENO concludes that some of the material in question may be boric acid that fell from a leaking CRDM canopy seal weld.

The following additional information was discussed during a site visit by the NRC on May 30, 2002.

A. Review of video tape

During a visit to the IPEC site on May 30, 2002, NRC staff reviewed videotapes provided by ENO which documented the above-insulation inspections conducted during the last two refueling outages (1999 and 2001). Although the videotape shows some areas of deterioration of the existing insulation, ENO is confident that none of these areas are indicative of leakage from the reactor vessel head. A comparison of the tapes from the two different time periods shows that there is not a change in the condition. In general, past water spillage or leakage from sources above the insulation and past removal / replacement of insulation sections has contributed to the observed deterioration. The specific cause for each affected area may not be precisely known, but it is reasonable to conclude that leakage from the reactor vessel head is not the cause.

B. Review of data collected in response to Information Notice 2002-013

ENO monitors and trends RCS leakage to ensure that any changes in leakage are detected, the source identified, and appropriate corrective actions are taken. Over the last two operating cycles, there have not been any unexplained changes in RCS leakrate and the quantity of unidentified leakage is consistently maintained at less than 0.1 gpm.

IP3 has five fan cooler units (FCU) which are subject to routine preventive maintenance (PM) activities which include inspection and cleaning. The last PM was performed in October 1999 on FCU-31 and FCU-32. Test records show that no debris or boron deposits were observed. Periodic surveillance testing of the FCU HEPA filters is also performed to verify cleanliness and acceptable differential pressures. Review of past test results show no evidence of unexplained clogging or boron deposits. As an additional measure, a containment entry was made on May 24, 2002 to inspect FCU-33. There was no evidence of boron deposits on the finned heat exchanger, filter panels, or surrounding wall / floor surfaces. On May 28, another containment entry was made to collect a water sample from the FCU-33 drain tray for chemical analysis. A sample from the containment sump was also analyzed. The FCU results are consistent with the sump water and this information provides a baseline for comparison to other samples that will be taken during the current operating cycle.

The containment radiation monitors are routinely monitored for trends or changes in containment radioactivity levels. This data, in combination with the trended RCS leak rate data provides early indicators of potential changes in RCS pressure boundary components. The R11 monitor (particulate) uses a reel-to-reel filter assembly, which is replaced approximately every 3 weeks. Technicians responsible for filter replacement have been briefed about the operating experience reported in the Information Notice. As an additional measure, a recent used filter roll was retrieved and chemically analyzed for boron and iron. There was no measurable difference between a sample of used paper and a sample of unused paper on the same roll.

A general area inspection of containment was performed and contamination smear samples were taken. No unusual conditions were identified.

C. Plans for ongoing data collection during the current operating cycle

As a followup to the potential precursor indicators discussed in Information Notice 2002-13, ENO plans to continue the following monitoring / data collection activities for the remainder of this operating cycle:

- Monthly inspection of a fan cooler unit for any unusual deposits or fouling, so that all five FCUs are inspected in a five month period.
- Monthly chemistry analysis of a fan cooler unit weir or drain tray to monitor for unexpected concentrations of boron and / or rust.
- Monthly chemical analysis of the containment sump water to monitor for unexpected concentrations of boron.
- Monthly chemical analysis of the radiation monitor filter paper to monitor for deposits of boron and / or rust.
- Monthly general inspection of containment in accessible areas.
- Monthly random smears inside containment to monitor for changes in contamination levels.
- Quarterly robotic inspections of containment in areas inside of the crane wall.

These activities are in addition to the normal monitoring and inspections that are routinely performed.

D. Provisions for actions during a forced outage prior to the Spring 2003 RO

A two-phase approach has been established to implement additional actions in the event that a forced outage provides an opportunity for access to the reactor vessel head.

As a first step, in the event that the plant is shutdown to Mode 5 (cold shutdown), the CRDM shroud covers can be removed and the general condition of the reactor vessel head insulation can be reinspected and compared to prior inspection results. If questionable areas are identified, localized insulation removal will allow bare metal inspection. As a second step, if localized inspections indicate a need for more extensive work, ENO can expedite the complete insulation removal / replacement that is now planned to be performed during the next Refueling Outage.

Entergy

Inter-Office Correspondence

MAY 11 2001
PEP-RAP-2001-048

TO: Mike Tesoriero

FROM: A. Eng
W. H. Spataro
M. Dries

SUBJECT: CRDM/RPV VT-2 INSPECTION

The subject inspection was performed on Friday, May 4 and Thursday May 10, 2001. The inspection was performed and recorded in accordance with Procedure No. 3PT-R114, "RCS Boric Acid Leakage and Corrosion Inspection." Due to the position of the reactor vessel head so near the pool, approximately 40% of the penetrations could not be inspected on May 4th. The RPV head was rotated and the inspection was completed on May 10th. The inspection was videotaped.

The present inspections were compared with a similar inspection videotaped in RO10. There appear to be no changes in the condition of the vessel head under the cooling shroud with the obvious exception of the Conoseal #4 penetration tube and canopy leakage discovered prior to the outage (DER 01-00952.) Boron has precipitated from this leak and collected on the alloy steel canopy clamp. There is evidence that some traces did traverse down to the vessel head and then under the shroud to the exposed vessel surface. The results of the inspection show there are minor streaks of boron residue on this surface at the location of stud hole No. 38 .

The System Engineer, Consulting Metallurgist, WPO ISI Engineer and QC Level II VT-2 Inspector met on 5/11 to review all the tapes and complete 3PT-R114. Based on this review, the review team determined that there are no apparent issue of concerns. The white deposits observed on the woven insulation are insulation repair material. This was verified by comparison of the texture and shape of the deposits with known boric acid deposits as shown on the video inspections performed. Boric acid appears crystalline with shiny facets while the insulation appears amorphous and dull. Some of the penetrations inspected showed rust staining and boric acid deposits running down part of their length but all showed no signs of degradation.

The penetration/vessel head joints have insulation around them and were inspected for evidence that degradation or a leak had occurred at the joint. The evidence would be dark rust brown and/or boric acid white discoloration, with corrosion products and swelling and/or lifting of the insulation. The inspection showed that the insulation was only lightly discolored where there was evidence of rust staining found to have run down the associated penetration from above.

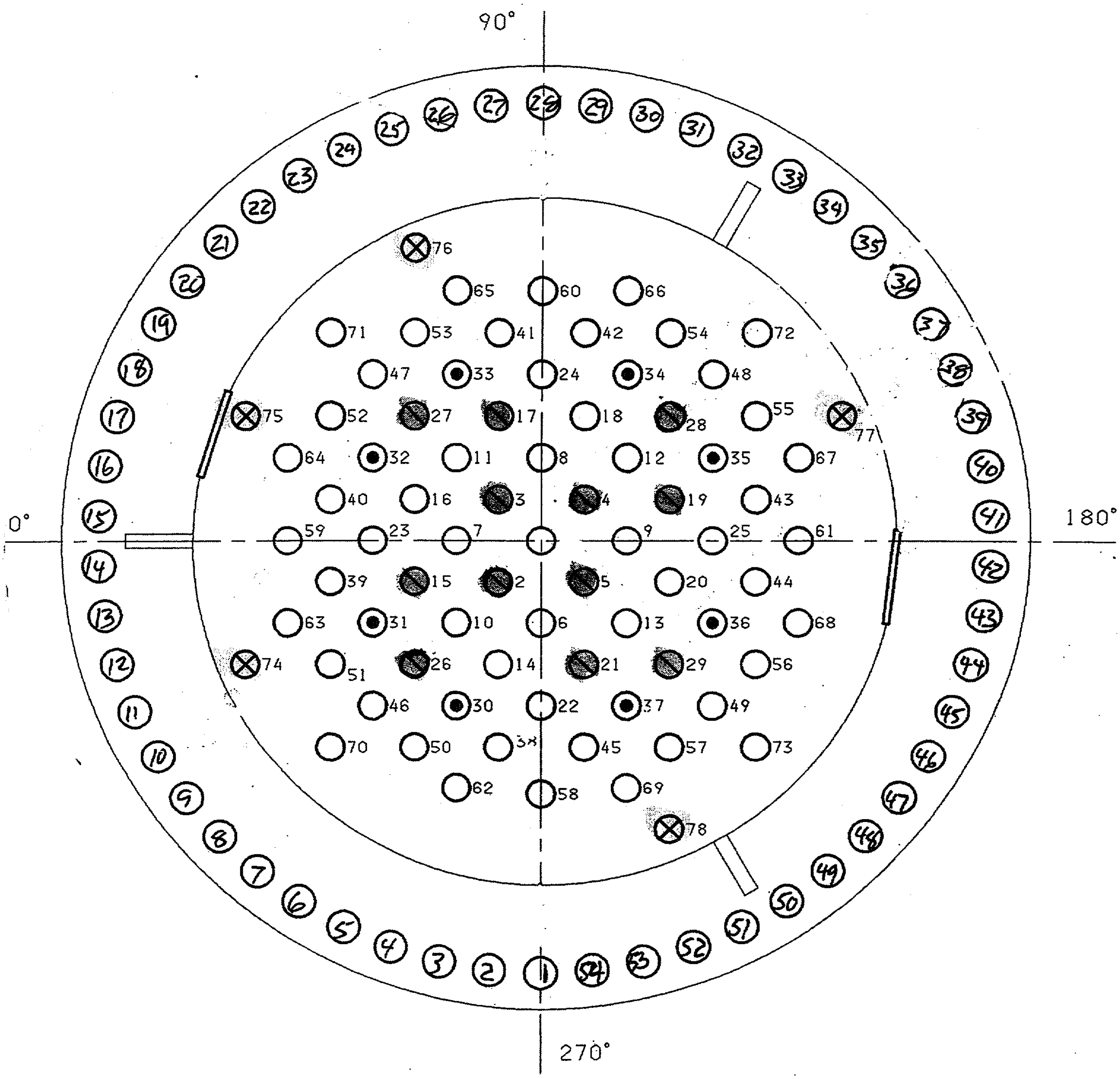
The penetrations with boric acid deposits showed no signs of corrosion because the boric acid had not progressed to or collected in the penetration/vessel head joints.

Leakage from the Conoseal #4 penetration did not collect in the penetration/vessel head joint because, as the boric acid flowed down the side of the clamp, it fell on the vessel head and rolled down the slope away from the joint.

In summary: the penetration/vessel head joints, including the joint associated with the Conoseal #4 penetration, showed no evidence of leakage or corrosion products that could be attributed to boric acid collection from above or from a penetration/vessel joint failure.

cc. Robert Penny, Pete Okas, Rick Petrone

FIGURE II
UNIT 3 REACTOR VESSEL HEAD
PENETRATIONS AND CLOUSURE STUD LOCATIONS



- CRDM NOZZLES** (53)
- PART LENGTH NOZZLES (8)
- CAPPED NOZZLES (12)
- THERMOCOUPLE NOZZLES (5)