



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

June 23, 2010

CAL No. 3-10-001

Mr. Barry Allen  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Davis-Besse Nuclear Power Station  
5501 North State Route 2, Mail Stop A-DB-3080  
Oak Harbor, OH 43449-9760

**SUBJECT: CONFIRMATORY ACTION LETTER - DAVIS-BESSE NUCLEAR  
POWER STATION**

Dear Mr. Allen:

This letter confirms commitments by FirstEnergy Nuclear Operating Company (FENOC) regarding the identification of control rod drive mechanism (CRDM) nozzle cracks in and reactor pressure boundary leakage from the reactor pressure vessel (RPV) head at the Davis-Besse Nuclear Power Station. These commitments were agreed upon in telephone conversations between James Lash and me on June 18, 2010, and included a commitment to shutdown the unit no later than October 1, 2011, and replace the RPV head with one manufactured using materials resistant to pressurized water stress corrosion cracking (PWSCC).

During the most recent refueling outage at Davis-Besse, which began on February 28, 2010, FENOC discovered the effects of PWSCC, including boric acid deposits indicative of pressure boundary leakage, at the CRDM nozzles on the RPV head. The discovery, which was the result of visual and ultrasonic examinations required by 10 CFR 50.55(a), prompted additional examinations using a combination of dye penetrant and eddy current testing. As a result of the examinations, FENOC repaired 24 of the 69 nozzles, and conducted additional examinations to demonstrate that the repaired nozzles and the RPV head could be safely returned to service.

Following the initial identification of flaw indications on March 12, 2010, the U.S. Nuclear Regulatory Commission (NRC) dispatched a specialist inspector, and on March 17, 2010, chartered a Special Inspection Team (SIT) to assess the adequacy of FENOC's identification, analyses, and resolution of the CRDM nozzle cracks and leakage to ensure acceptable repairs were made prior to placing the RPV head back in service. The SIT has extensively observed in-process examination and repair activities and independently evaluated FENOC's analysis of the direct cause of the cracks and leakage, PWSCC, and its impact on continued operations.

The NRC also conducted a public meeting with you and members of your organization on June 3, 2010, to collect information regarding the results of your RPV head examinations, the extent of your completed repairs, and your rationale regarding acceptability of the head for continued service. The summary of that meeting, including the slides used for NRC and FENOC's respective presentations, can be found at the NRC's Agencywide Documents Access and Management System (ADAMS) Accession Numbers ML101610792 and ML101540031.

The NRC continued to question whether the number of nozzles affected, coupled with the relatively short period of time the current RPV head has been in service, was consistent with identified industry experience. Given the observed phenomena, the NRC staff was concerned that some uncertainty remained with respect to crack initiation and rate of growth for the current Davis-Besse RPV head and whether there would be a low probability of leakage once the repaired head was placed back in service, specifically during the later portion of the planned operating cycle length.

Subsequently, FENOC documented commitments in a June 11, 2010, letter (ML101650688) to the NRC, intended to provide additional assurance that the plant would continue to operate safely following the return of the current RPV head to service. Following discussions between FENOC and the NRC regarding the details of these commitments, particularly the proposed analytical evaluations and their impact on the length of the operating cycle, you committed to the actions described in the enclosure to this (our) letter in lieu of those proposed in your June 11, 2010, letter. Of note, is your commitment to voluntarily shut down Davis-Besse no later than October 1, 2011, to replace the RPV head. We acknowledge that you have provided the documentation, requested in Confirmatory Action Letter Item 1 to the SIT, and we await your written confirmation that this commitment item has been completed.

Pursuant to Section 182 of the Atomic Energy Act, 42 U.S.C. 2232, you are required to: 1) notify me immediately if your understanding differs from that set forth above; 2) notify me if for any reason you cannot complete the actions and commitments contained in the enclosure to this letter within the specified schedule and advise me in writing of your modified schedule in advance of the change; and 3) notify me in writing when you have completed the actions and commitments addressed in this Confirmatory Action Letter.

Based on observations, evaluations, and conclusions from our ongoing special inspection, our evaluation of your bases for determining that the current RPV head is acceptable for return to service, and the commitments described in the enclosure to this letter, we have determined that the RPV head is acceptable for continued operations through October 1, 2011. Specifically:

1. Your examinations were sufficient to identify appropriate nozzles for repair. The final repairs met regulatory requirements and provided for appropriate structural integrity and a reasonable assurance of low probability of leakage. In particular, our SIT has directly observed a substantive portion of the examination and repair activities and evaluated the results, and your staff adequately addressed pertinent safety issues raised by the SIT inspectors. The NRC also had a national laboratory conduct independent reviews of selected examination results to verify the licensee's conclusions.

2. Based on an independent and conservative NRC evaluation of crack growth rate, we have concluded that there exists reasonable assurance for a low probability of leakage through at least October 1, 2011, when you have committed to shut down the unit to replace the RPV head. This commitment sufficiently addresses our concern regarding uncertainties in crack initiation and rate of growth that impacted the later portion of the planned operating cycle length. Furthermore, enhancements to your reactor coolant system leakage monitoring program, which is the subject of Item 3 in the enclosure, provide additional confidence that significant reactor coolant leakage that could challenge the structural integrity of the RPV head will not occur. Also, our resident inspectors will continue their routine monitoring of the results of your reactor coolant system leakage monitoring program. This monitoring provides the NRC with early indications should any significant increases be identified through your leakage monitoring program.
3. There exists reasonable assurance that cracks that may develop during this time will not lead to CRDM nozzle ejection. In order for nozzle ejection to occur, cracks would have to form and propagate circumferentially (around the cylindrical nozzle) to a significant extent. The examination results from the current outage indicate that only two nozzles had developed circumferentially oriented cracks, with a relatively small extent. These cracks would not have challenged the head's structural integrity. The cracks in the remaining identified nozzles were characterized as axial (along the length of the nozzle) in nature, which can cause leakage, but will not directly challenge the structural integrity of the RPV head.

Issuance of this Confirmatory Action Letter does not preclude issuance of an Order formalizing the above commitments or requiring other actions on the part of the licensee, nor does it preclude the NRC from taking enforcement action for violations of NRC requirements that may have prompted the issuance of this letter. Failure to meet the commitments in a Confirmatory Action Letter may result in an order if the licensee's performance, as demonstrated by the failure to meet Confirmatory Action Letter commitments, does not provide reasonable assurance that the NRC can rely on the licensee to meet the NRC's requirements and protect public health and safety or the common defense and security.

As of the date of the issuance of this letter, NRC inspections remain in progress through the efforts of the SIT. The SIT continues to independently assess FENOC's evaluation of the root and contributing causes of the cracks and leakage and associated corrective actions. At the completion of the special inspection, the NRC will conduct a public exit meeting in the vicinity of Davis-Besse to present the inspection results. In addition, the NRC will continue to monitor and inspect any future actions relative to Davis-Besse's RPV head replacement project.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide

B. Allen

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a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

*/RA/*

Mark A. Satorius  
Regional Administrator

Docket No. 50-346  
License No. NPF-3

Enclosure:  
As stated

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### **Confirmatory Action Letter Commitments**

1. Provide to the NRC, in writing, the results of the Reinspection Years (RIY) calculation for Operating Cycle 17 performed in accordance with American Society of Mechanical Engineers (ASME) Code Case N-729-1 based on calculated RPV Head temperatures. Due prior to plant restart (Mode 2).
2. Upon completion of destructive examination of the CRDM Nozzle ring samples removed from nozzles #4 and #10, quarantine one untested minimum full-length 90 degree sample, and turn over ownership to the NRC. Quarantine the sample immediately until arrangements can be made to transport the sample to an independent laboratory selected by the NRC.
3. Beginning with reactor startup (Mode 2) and until RPV head replacement, upon reaching Action Level 3 of EN-DP-01171, "Engineering Implementation of the RCS Integrated Leakage Program," the plant shall be shutdown in 30 days if RPV Head leakage cannot be ruled out. During subsequent shutdown as part of the containment inspection for RCS leakage, if RPV Head leakage cannot be ruled out a bare metal visual examination of the RPV head will be performed per applicable ASME Code Case and 10 CFR 50.55a(g)(6)(ii)(D).
4. The licensee has voluntarily elected to shut down the unit no later than October 1, 2011, and replace the RPV head.

Enclosure

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redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

*/RA/*

Mark A. Satorius  
Regional Administrator

Docket No. 50-346  
License No. NPF-3

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Letter to B. Allen from M. Satorius dated June 23, 2010

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POWER STATION

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