

UNITED STATES OF AMERICA  
 NUCLEAR REGULATORY COMMISSION  
 OFFICE OF NUCLEAR REACTOR REGULATION

Eric J. Leeds, Director

In the Matter of ) ) FIRSTENERGY NUCLEAR OPERATING ) COMPANY ) ) ) (Davis-Besse Nuclear Power Station, Unit 1) )	Docket No. 50-346  License No. NPF-3
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DIRECTOR'S DECISION UNDER 10 CFR 2.206

I. INTRODUCTION

By letter to R. William Borchardt, Executive Director for Operations at the U.S. Nuclear Regulatory Commission (NRC), regarding the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS), dated April 5, 2010, David Lochbaum (the Petitioner) of the Union of Concerned Scientists (UCS) filed a Petition pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 2.206, "Requests for Action under This Subpart."

In a letter dated July 13, 2010, the NRC informed the Petitioner that it had denied his request for the issuance of a Show Cause Order, or comparable enforcement action, to the licensee for the DBNPS that would prevent the reactor from restarting and that the issues in the Petition were being referred to the Office of Nuclear Reactor Regulation for appropriate action.

Action Requested

The Petitioner requested that the NRC issue a Show Cause Order, or comparable enforcement action, to the licensee for the DBNPS in the state of Ohio, preventing the reactor from restarting until such time that the NRC determines that applicable adequate protection

standards have been met and reasonable assurance exists that these standards will continue to be met after operation is resumed.

#### Petitioner's Bases for the Requested Action

The Petitioner states that the NRC's regulations and the operating license that the NRC issued for DBNPS define adequate protection standards, which include zero reactor coolant pressure boundary leakage during operation, with the requirement to shut down the reactor within 6 hours if such leakage exists. The Petitioner states that the licensee for DBNPS has repeatedly violated Federal regulations and the explicit conditions of its operating license by operating the reactor longer than 6 hours with pressure boundary leakage. In doing so, the Petitioner states that the public was exposed to elevated and undue risk.

The Petitioner compares a Show Cause Order previously issued to the licensee of the Surry Nuclear Plant requiring both reactors to be shut down and remain shut down until a potential safety problem was remedied. In the Surry case, the Petitioner states that non-conservative mistakes in computer studies prevented a determination that the adequate protection standard was met, and the NRC did not allow the reactors to operate until this shortcoming was rectified. The Petitioner states that in the DBNPS case, ample evidence clearly demonstrates that the adequate protection standard was not met on multiple occasions and that it is imperative for the NRC to act now to protect the public from an actual hazard as the NRC acted in the Surry case to protect the public from a potential one.

## II. DISCUSSION

On March 12, 2010, during ultrasonic testing of reactor pressure vessel head control rod drive mechanism (CRDM) nozzles (while the reactor was in a cold shutdown mode), the licensee identified certain nozzles that did not meet acceptance criteria. Additionally, the

licensee identified boric acid deposits on the reactor pressure vessel head that were indicative of reactor coolant system (RCS) leakage.

The circumstances associated with this cracking were evaluated against the criteria in Management Directive 8.3, "NRC Incident Investigation Program," and Inspection Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors." The NRC made the determination that a Special Inspection would be conducted on March 16, 2010, to evaluate the facts and circumstances surrounding the March 12, 2010, identification of cracks in the reactor vessel head control rod drive penetration nozzles and J-groove welds.

The Special Inspection Team reviewed selected procedures and records, observed activities, and interviewed personnel with a focus on the areas described in the Special Inspection Charter. The NRC confirmed that the nondestructive examinations of the nozzles and J-groove welds met NRC requirements and were successful in identifying cracks at an early stage, such that plant safety was not challenged. The NRC concluded that the licensee for DBNPS had established a strong basis for the direct cause of this cracking, which was primary water stress-corrosion cracking (PWSCC). The NRC confirmed that appropriate nozzles were repaired in accordance with NRC requirements and concluded that the repaired vessel head was suitable to return to service. Further, based on crack growth analyses and the shortened operating period for the reactor vessel closure head (RVCH) (confirmed in Confirmatory Action Letter (CAL) 3-10-001, issued on June 23, 2010), the NRC concluded that margins existed such that the likelihood of PWSCC-induced nozzle leakage would remain low for the remaining planned RVCH operating service period. The CAL included a commitment by the licensee to shut down the unit no later than October 1, 2011, to replace the reactor pressure vessel head with one manufactured using materials resistant to PWSCC. The inspection report, which was

issued October 22, 2010, documents the inspection results that were discussed with the licensee at the exit meeting held on September 9, 2010, which was open to the public.

A self-revealed violation of Technical Specification (TS) 3.4.13, "RCS Operational Leakage," was identified. This violation was associated with pressure boundary leakage through cracked CRDM penetration nozzles during the prior operating cycle. As discussed in greater detail below, because the licensee appropriately implemented its quality control program, and because this violation resulted from equipment failure that was not avoidable by reasonable licensee quality assurance measures, the NRC elected to exercise enforcement discretion and not issue a violation.

The NRC reviewed the root cause analysis of the event and RCS leakage data from previous operating cycles and concluded that the equipment failure (cracked CRDM nozzles) could not have been avoided or detected by the licensee's quality assurance program or other related control measures. The direct cause of this event was PWSCC of the CRDM nozzles and J-groove welds, and the licensee identified and repaired a total of 24 CRDM nozzles with PWSCC in the nozzle or J-groove welds. The NRC evaluated the safety significance of this cracking and concluded that the cracking was identified early enough that plant safety was not challenged. Because the PWSCC identified in the CRDM nozzles was well below the crack sizes required for nozzle ejection or sizes that would challenge structural integrity, and there was no discernible head wastage, the NRC concluded that this issue was of very low safety significance.

TS 3.4.13 requires that RCS operational leakage be limited to "no pressure boundary leakage" when in Modes 1 through 4 (power operation, startup, hot standby, and hot shutdown, respectively). Contrary to this requirement, during Operating Cycle No. 16, which ended

February 28, 2010, the licensee operated the DBNPS in Mode 1 with pressure boundary leakage from cracked CRDM nozzles Nos. 4 and 67.

Because the licensee met all associated NRC regulations with regard to CRDM nozzle inspections and the violation resulted from equipment failure that was not avoidable by reasonable licensee quality assurance programs or other related control measures, the NRC elected to apply Section VII.B.6, "Violations Involving Special Circumstances," of the Enforcement Policy (November 28, 2008), and exercise enforcement discretion to not issue a violation. In addition, the licensee did not miss any available indicators of leakage such that it could have identified the leakage earlier.

#### Comments on the Proposed Director's Decision

This section documents the NRC staff's response to the Petitioner's comments on the proposed Director's Decision. The NRC issued the proposed Director's Decision on November 10, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103020411). The NRC received comments from the Petitioner on November 23, 2010 (ADAMS Accession No. ML103340455). The licensee did not provide any comments to the NRC on the proposed Director's Decision. The NRC staff has amended the proposed Director's Decision to acknowledge the Petitioner's comments; however, the NRC staff has determined that the comments provided by the Petitioner did not provide any relevant additional information and support for the Petition that had not already been considered. Thus, the comments did not change the conclusion of the proposed Director's Decision, and the final Director's Decision denies the Petitioner's request for enforcement action. A summary of the Petitioner's comments and the NRC staff's response to them is presented below.

#### Summary of Comments

In summary, the Petitioner states the following:

- (1) "...the NRC failed to address key elements of our petition and acted to deprive UCS of our legal rights...." The Petitioner states that the proposed Director's Decision failed to mention the third commitment from the CAL. The Petitioner states, "The CAL's third commitment was either a *de facto* technical specification change or a *de facto* NRC order, but without the attendant legal protections these processes guarantee. In our opinion, the CAL's third commitment illegally circumvented established legal processes and, in so doing, deprived us [UCS] of our legal rights." The Petitioner challenges the legal authority of the NRC in replacing TS Limiting Condition for Operation 3.4.13 with the provision of the CAL's third commitment.
- (2) The CAL's third commitment is defective because it is triggered only when Action Level 3 in a non-public licensee procedure is reached and because it allows continued reactor operation for up to 30 days beyond attainment of Action Level 3.
- (3) "Existing technical specification 3.4.13 requires Davis-Besse to be shut down within 6 hours after the onset of pressure boundary leakage." The Petitioner states, "...the public had every right to expect that the NRC would enforce this safety requirement."
- (4) The acceptance criterion for General Design Criterion (GDC) 30, "Quality of Reactor Coolant Pressure Boundary," in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states that "Means shall be provided for detecting, and to the extent practical, identifying the location of the source of reactor coolant leakage." Further, satisfaction of GDC 30 is based on meeting the guidelines of Regulatory Guide (RG) 1.45, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage." The Petitioner emphasizes that RG 1.45 states, "Plants should monitor critical components of the RCPB [Reactor Coolant Pressure Boundary] for leakage....In currently operating

reactors, the critical RCPB components include, but may not be limited to, the reactor vessel head, control rod penetration nozzles....” The Petitioner states, “[t]he NRC staff position expressed in the proposed Director’s Decision contradicts previously established and not abandoned staff positions.”

#### NRC Response to Comments

The NRC response to the Petitioner’s first three summarized comments follows.

The third commitment of the CAL states the following:

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 for the RPV head will be performed per applicable ASME Code Case and 10 CFR 50.55a(g)(6)(ii)(D).

The purpose of the RCS operational leakage limiting condition for operation is to limit system operation in the presence of leakage either from normal operational wear or mechanical deterioration to amounts that do not compromise safety. The commitments in the CAL do not replace or relax any TS requirements, and the licensee for DBNPS is required to comply with the TS. A CAL is an administrative action that is used by the NRC to confirm a licensee’s agreement to take certain actions in order to ensure public health and safety. In this instance, it was properly applied and does not replace any requirements, but rather confirms additional commitments to which the NRC expects the licensee to adhere.

In addition to the TS regarding unidentified leakage and the third commitment in the CAL, the NRC's baseline inspection program includes a daily review by the NRC resident inspectors of licensee-reported data concerning unidentified leakage. As part of that review, if unidentified leakage has a statistically significant increase, either as a step change in a single day or as a slow rise over a period of time, then the NRC resident inspectors will evaluate the licensee's actions to determine the cause and source of the increase and will notify senior NRC management of the change.

In the case of DBNPS, a statistically significant increase in unidentified leakage can be as small as a few hundredths of a gallon per minute. The NRC resident inspectors' daily review of leakage data ensures that each licensee has an adequate process for monitoring leakage and identifying unexplained significant increases in leakage and takes appropriate steps before the leakage becomes significant. For any case in which a licensee determines that unidentified leakage is from pressure boundary leakage, the licensee must take the actions required by its TS. For DBNPS, if the licensee is unable to rule out pressure boundary leakage as part of its unidentified leakage monitoring program, the licensee must take the additional steps described in the CAL's third commitment.

The NRC can address noncompliance with a commitment in a CAL through various means, such as an order or demand for information. Issuance of a CAL does not preclude issuance of an order formalizing commitments or requiring other actions on the part of the licensee.

The NRC views nuclear regulation as the public's business and, as such, believes it should be transacted as openly and candidly as possible to maintain and enhance the public's confidence. Ensuring appropriate openness explicitly recognizes that the public must be informed about, and have a reasonable opportunity to participate meaningfully in, the NRC's

regulatory processes. The NRC considers public involvement in, and information about, its activities to be a cornerstone of strong, fair regulation of the nuclear industry. The NRC recognizes the public's interest in the proper regulation of nuclear activities and provides opportunities for citizens to be heard. Information on public involvement can be found at <http://www.nrc.gov/public-involve.html>. The NRC affords the public opportunities to comment on proposed rules and policies, licensing actions, and draft technical documents, and information on these opportunities can be found at <http://www.nrc.gov/public-involve/doc-comment.html>. Information on public involvement in enforcement-related activities can be found at <http://www.nrc.gov/public-involve/doc-comment.html>.

On June 3, and September 9, 2010, the NRC held public meetings regarding the recent CRDM nozzle cracking issue, giving the public opportunity to comment and ask the NRC questions. Throughout the process of the NRC review of the Petitioner's 10 CFR 2.206 Petition, the NRC has given the Petitioner opportunities to address the NRC regarding the Petition.

The NRC response to the Petitioner's fourth summarized comment follows.

DBNPS is licensed for compliance with GDC 30. Appendix 3D to the updated final safety analysis report (UFSAR) describes compliance with all the GDC and, specifically, Section 3.D.1.26 describes compliance with GDC 30. Section 3.D.1.26 states the following:

Components which are part of the reactor coolant pressure boundary are designed, fabricated, erected, and tested to the highest quality standards practical. Means are provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

A public version of the UFSAR is available in the NRC Public Document Room (PDR).

Documents may be examined, and/or copied for a fee, at the NRC's PDR, located at

One White Flint North, Public File Area O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland, or you can contact the NRC PDR Reference staff by telephone at 1-800-397-4209 or 301-415-4737, or send an e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

The NRC guidance (NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition") dated May 2008, referenced in the Petition is applicable to new reactors. NRC staff positions in the proposed Director's Decision do not contradict any previous NRC guidance, including NUREG-0800.

### III. CONCLUSION

The Petitioner raised issues related to the DBNPS adequate protection standard regarding zero pressure boundary leakage and operation of the reactor at DBNPS. NRC Region III Inspection Report 05000346/2010-008(DRS) issued October 22, 2010 (ADAMS Accession No. ML102930380), focused on these concerns.

The NRC Special Inspection Team was chartered to assess the circumstances surrounding the identification of the flaws in the RVCH CRDM nozzle penetrations at DBNPS. The Special Inspection included the following items:

- (1) Establish the pertinent examination chronology/history of the replacement RVCH.
- (2) Compare current examination results with samples of the 2005 to 2008 examination records and preservice records to determine whether the conditions were preexisting.
- (3) Evaluate the adequacy of the licensee's plan for assessing the causes of flaws and the licensee's rationale regarding acceptability of the head for continued service.
- (4) Review current examination results and monitor in-progress examination and analysis activities to ensure that they are adequately conducted. Based on the review of the examination results, confirm that the licensee has identified appropriate nozzles for repair and the acceptability of the remaining nozzles for service.

- (5) Evaluate the adequacy of the repair activities and monitor implementation. Confirm that the repair implemented complies with NRC requirements.

The NRC has found the licensee response to the identified conditions to be reasonable and technically sound. The NRC has reviewed in detail the CRDM nozzle cracking, as well as the circumstances surrounding the causes of this cracking and previous opportunities for identification and intervention. The NRC's inspection determined that the public health and safety have not been, nor are likely to be, adversely affected. The inspection determined that the licensee conformed to the subject NRC regulatory requirements pertinent in this circumstance and applicable to assessing the cause and effect of the CRDM nozzle cracking conditions.

Based on the above, the Office of Nuclear Reactor Regulation has decided to deny the Petitioner's request for the issuance of a Show Cause Order or comparable enforcement-related action to the licensee of DBNPS. The Petitioner cites an example of the NRC issuing a Show Cause Order that required the Surry Power Station, Unit 2, to be shut down until a potential safety concern was remedied. The referenced Show Cause Order ordered the licensee for Surry to provide specific information to the NRC. In this case, a Show Cause Order is not needed since the NRC used a Special Inspection to obtain the same information that it might have requested in an Order. An inspection has an added advantage, in that the findings are in part based on the NRC's own observations. The NRC has completed a rigorous Special Inspection and determined that enforcement action was not appropriate for this matter. The NRC has reasonable assurance that adequate protection standards have been met and will continue to be met. The Petitioner's concern regarding the plant's not meeting the adequate protection of zero pressure boundary leakage has been adequately resolved such that no further action is required.

As provided in 10 CFR 2.206(c), a copy of this Director's Decision will be filed with the Secretary of the Commission for the Commission to review. As provided for by this regulation, this decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the decision within that time.

Dated at Rockville, Maryland, this 15 day of February 2011.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation