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Constellation
Nuclear

Calvert Cliffs
Nuclear Power Plant

A Member of the
Constellation Energy Group

May 15, 2002

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
60-Day Response to NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity"

REFERENCE: (a) NRC Bulletin 2002-01: Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity, dated March 18, 2002

The purpose of this letter is to forward Calvert Cliffs Nuclear Power Plant, Inc.'s (CCNPP's) 60-day response to Nuclear Regulatory Commission (NRC) Bulletin 2002-01 (Reference a). The Bulletin was issued to require pressurized-water reactor addressees to submit:

(1) information related to the integrity of the reactor coolant pressure boundary including the reactor pressure vessel head and the extent to which inspections have been undertaken to satisfy applicable regulatory requirements, and

(2) the basis for concluding that plants satisfy applicable regulatory requirements related to the structural integrity of the reactor coolant pressure boundary and future inspections will ensure continued compliance with applicable regulatory requirements, and

(3) a written response to the NRC in accordance with the provisions of Title 10, Section 50.54(f), of the *Code of Federal Regulations* (10 CFR 50.54(f)) if they are unable to provide the information or they can not meet the requested completion dates.

Attachment (1) to this letter provides the information required within 60 days of the date of Bulletin 2002-01.

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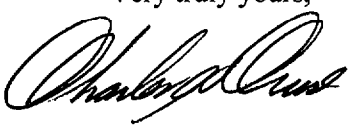
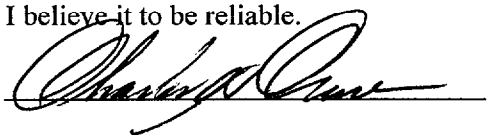
Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, Charles H. Cruse, being duly sworn, state that I am Vice President - Nuclear Energy, Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP), and that I am duly authorized to execute and file this response on behalf of CCNPP. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other CCNPP employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.



Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 15th day of May, 2002.

WITNESS my Hand and Notarial Seal: Denise Snuka
Notary Public

My Commission Expires: 02/01/06
Date

CHC/GT/bjd

Attachment: (1) 60-Day Response to NRC Bulletin 2002-01

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
D. M. Skay, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

60-DAY RESPONSE TO NRC BULLETIN 2002-01

Calvert Cliffs Nuclear Power Plant, Inc.
May 15, 2002

Requested Information

Within 60 days of the date of this bulletin, all PWR addressees are required to submit to the NRC the following information related to the remainder of the reactor coolant pressure boundary:

A. the basis for concluding that your boric acid inspection program is providing reasonable assurance of compliance with the applicable regulatory requirements discussed in Generic Letter 88-05 and this bulletin. If a documented basis does not exist, provide your plans, if any, for a review of your programs.

CCNPP Response

The reactor coolant pressure boundary (RCPB) at Calvert Cliffs Nuclear Power Plant (CCNPP) is inspected for boric acid corrosion in accordance with Generic Letter 88-05. The inspections are controlled by plant procedure MN-3-301, "Boric Acid Corrosion Inspection (BACI) Program." The program's objective is to provide systematic requirements to ensure that boric acid corrosion does not degrade the RCPB. This degradation could be caused by Class 1 system leakage or by leakage from other systems containing borated water adjacent to Class 1 ferritic steel components. It is recognized that leakage smaller than the allowable Technical Specification limit has the potential to cause degradation.

The CCNPP Boric Acid Corrosion Inspection Program procedure contains:

1. Requirements for visual examinations for leakage following every reactor shutdown which is 30 days since the last examination or any reactor shutdown due to Reactor Coolant System (RCS) leakage. This examination is to be performed as soon as possible after attaining Mode 3, Hot Standby conditions, and access to Containment is authorized. This examination is performed to identify any boric acid leakage or residue in the areas of the Containment where RCPB components are found.
2. During each refueling outage or forced outage where Mode 5 (cold shutdown)/Mode 6 (refueling) conditions are attained the BACI Program requires more specific components be examined. These items are believed to be the principal areas where RCS leakage could begin or be located. These areas include reactor vessel (RV) lower head, RV Closure Head Penetrations, Incore Instrumentation (ICI) Flange Studs, Reactor Coolant Pump Suction Elbows, Reactor Coolant Pump Studs/Seals/Controlled Bleedoff lines, Pressurizer Penetrations (120 Heater Sleeves and 7 Instrument Nozzles), Pressurizer Manway Studs, Steam Generator Manway Studs, valves and mechanical joints in the Chemical and Volume Control System, Safety Injection, Containment Spray, Pressurizer Safety/Relief and RCS systems in the containment, and RCS and Pressurizer Surge Line piping.
3. The BACI Program requires personnel performing the examinations be certified VT-2, Level II or III Nondestructive Examiners. These personnel are qualified and certified in accordance with CCNPP's American Society of Mechanical Engineers Section XI and American Society for Non-Destructive Testing CP-189 programs.
4. The non-destructive examination procedures require the examiner to the extent possible, to locate the source of the leakage, quantify the leak rate, and establish the leakage path of the coolant, and any reactor coolant pressure boundary contacted.
5. The BACI Program requires evidence of boric acid leakage to be documented via an Issue Report to ensure its inclusion in the site corrective action program. If boric acid leakage is identified, the boric acid residue must be removed and the underlying steel must be evaluated for wastage. If corrosion is noted, the component is required to be evaluated for suitability for continued service. The corrective action program also requires corrective actions to prevent recurrence.

The BACI Program has been effective at identifying leakage that could cause degradation of the RCS due to boric acid corrosion. The program has identified leakage from alloy 600 penetrations on the Unit 1 pressurizer in 1998 and from a seal weld leak from the top of the reactor vessel monitoring system on the Unit 2 reactor vessel head in 1993. In each case the leakage was identified before any measurable boric acid corrosion could occur, repairs were implemented, and the integrity of the RCS pressure boundary was restored. The BACI Program has also been responsible for identifying many small leaks and initiating corrective actions on valve packing and other mechanical connections on both Units 1 and 2 to insure leakage is minimized.

The CCNPP BACI Program is a living program that is periodically updated to incorporate both CCNPP lessons learned and industry events. As discussed in Reference 1, a formal root cause evaluation was performed in 1994 to address the potential lessons to be learned following leakage events from the Unit 1 and 2 ICI flanges. Corrective actions were identified during this evaluation which resulted in a more robust CCNPP BACI Program.

The CCNPP BACI Program was evaluated during the License Renewal process and it was determined that the BACI Program would adequately manage the aging effects of various components susceptible to the boric acid corrosion degradation mechanism in accordance with the current licensing basis. Recent CCNPP assessments of the BACI Program have found the program to be effective and meeting the requirements of Generic Letter 88-05.

In summary, the CCNPP BACI Program requires action to discover boric acid leakage and if leakage is found, requires removal of accumulated boric acid, assessment for corrosion of the underlying steel and repair of any leak that may exist.

Calvert Cliffs Nuclear Power Plant has other programs that are intended to help ensure the integrity of the RCPB is maintained. Two specific procedures are described below.

The CCNPP Alloy 600 Program Plan systematically determines actions necessary to eliminate nuclear safety risks and minimize economic risks associated with the potential for primary water stress corrosion cracking (PWSCC) of all Alloy 600 nozzles and pressure boundary components in the RCS. For each group of Alloy 600 components in the RCS, detailed analysis were performed. These analyses addressed susceptibility to PWSCC, safety significance, possible inspection techniques, potential repair/replacement techniques, potential mitigation techniques, regulatory issues, feasible options, economic analysis, and recommendations. The program plan makes short and long-term recommendations as necessary to address potential nuclear safety and economic issues. An Issue Report is generated for any potential nuclear safety issues identified to enter them in the corrective action program.

The objective of Calvert Cliffs Nuclear Power Plant procedure MN-3-201, "Radioactive Systems Integrity Program" is to ensure systems that contain radioactive materials are inspected, monitored, and maintained to reduce the possibility of loss of system integrity, and minimize contamination. This procedure identifies the existing site procedures and activities that, when integrated, constitute the Radioactive Systems Integrity Program. Procedure MN-3-201 specifies responsibilities for trending parameters, which could be indicative of possible RCPB leakage. Procedure MN-3-201 requires monitoring reactor coolant leakage, containment sump discharge frequencies, containment humidity, containment atmosphere activity and iodine levels, containment surface contamination and containment air cooler performance.

As discussed in the description of MN-3-201 above, there are numerous other CCNPP procedures and activities which play a role in ensuring the integrity of the RCPB.

Calvert Cliffs Nuclear Power Plant has implemented numerous modifications aimed at enhancement of the leak tight integrity of the RCPB since the issuance of Generic Letter 88-05. These modifications include installation of hermetically sealed valves on RCS instrument lines, installation of Alloy 690 replacement nozzles, nickel plating of the Unit 1 pressurizer heater sleeves inner diameter, preventative installation of mechanical nozzle seal assemblies on a number of Unit 1 and 2 pressurizer instrumentation nozzles and implementation of a valve packing replacement program using Chesterton Packing.

Calvert Cliffs is in compliance with the applicable regulatory requirements described in the Applicable Regulatory Requirements Section of the NRC Bulletin 2002-01 and will continue to remain in compliance through the remainder of the term of our renewed operating licenses. Calvert Cliffs is in compliance with General Design Criteria (GDC) 14 in that the RCPB has an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture. The phenomena that have been recently observed regarding reactor vessel head leakage are thought to be caused by PWSCC of the Alloy 82/182/600 penetrations, or by boric acid corrosion of low alloy steel due to leakage of coolant through a PWSCC crack in Alloy 82/182/600 penetrations. The former has been shown to not represent a near-term risk of violating GDC 14 for moderate susceptibility plants such as Calvert Cliffs. General Design Criteria 30, which specifies the RCPB be designed, fabricated, erected, and tested to the highest quality standards practical is assured by our BACI Program's demonstrated capability to locate leaks and enter them in the corrective action program for corrective and preventative measures. General Design Criteria 31, which specifies that the probability of rapidly propagating fracture of the RCPB be minimized, is similarly satisfied. Finally, GDC 32, which specifies that components which are part of the RCPB have the capability of being periodically inspected to assess their structural and leaktight integrity, is satisfied because Calvert Cliffs has the capability to inspect for boric acid corrosion of the RCPB by performing visual examination.

Calvert Cliffs is in compliance with 10 CFR 50.55a because we do not have existing pressure boundary leaks or degradation. Furthermore, we have an effective BACI Program for identification and repair of leaks, and removal of boric acid residue and assessment of the underlying steel for continued service.

Calvert Cliffs is in compliance with Criterion V (Instructions, Procedures, and Drawings) of Appendix B to 10 CFR Part 50 in that we have procedures, instructions, and drawings that control our inspections. We document inspection results in accordance with this criterion.

Calvert Cliffs is in compliance with Criterion IX (Control of Special Processes) of Appendix B to 10 CFR Part 50 in that special processes, including nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

Calvert Cliffs is in compliance with Criterion XVI (Corrective Action) of Appendix B to 10 CFR Part 50 in that we are performing proactive inspections of the RCPB to discover evidence on RCPB deterioration due to either PWSCC or boric acid corrosion. Furthermore, as discussed above and in Reference 1, we have improved our BACI Program through previous compliance with Criterion XVI following degradation of low alloy steel bolting in 1993 and 1994.

Calvert Cliffs remains in compliance with plant Technical Specifications in that we are not operating, nor do we plan to operate, with RCPB leakage.

Calvert Cliffs has implemented a program in accordance with Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," that is very effective

in identifying and addressing the corrosive effects of RCPB leakage. This program enables us to remain in compliance with GDC 14, 30, and 31.

We will remain in compliance with these regulatory requirements because our BACI Program would promptly identify any leakage, should it occur, and would cause the leak to be repaired, the boric acid to be removed, and the underlying steel to be evaluated for evidence of boric acid corrosion.

Reference

1. Letter from C. H. Cruse (CCNPP) to Document Control Desk, (NRC), dated April 2, 2002, 15-Day Response to NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity"