Calvert Cliffs Nuclear Power Plant
Constellation Generation Group, LLC

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

Constellation Energy

August 24, 2006

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317; License No. DPR 53
Licensee Event Report 2006-002, Revision 01
Control Element Assembly Determined to be Untrippable

The attached supplemental report is being sent to you as required by 10 CFR 50.73. Should you have questions regarding this report, please contact Mr. L. S. Larragoite at (410) 495-4922.

Very truly yours,

Joseph E. Pollock
Plant General Manager

JEP/CAN/bjd

Attachment: As stated

cc: P. D. Milano, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR

JE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory 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 and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 an 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Calvert Cliffs Nuclear Power Plant, Unit 1	05000 317	1 OF 004

4. TITLE
Control Element Assembly Determined to be Untrippable

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
04	08	2006	2006	- 002 -	01	08	24	2006	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE
2

10. POWER LEVEL
0

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☒ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Craig A. Neyman, Engineering Analyst	410-495-3507

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	JD	ROD	0033	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On April 8, 2006 at 1835, Unit 1 was in Mode 2 undergoing low power physics testing following refueling. While inserting Regulating Group 2 Control Element Assemblies (CEAs), CEA 21 stopped inserting at approximately 134 inches. Comparison of CEA position indications revealed that CEA 21 did not move inwardly with the rest of Regulating Group 2 CEAs. Operators entered Abnormal Operating Procedure (AOP)-1B, CEA Malfunction, due to CEA 21 misalignment. Troubleshooting activities were initiated to determine the cause of CEA 21 failure to insert. As a result of troubleshooting, CEA 21 was declared untrippable. Technical Specification Limiting Condition for Operation 3.1.4.F was entered. Operators commenced a unit shutdown at 2342, placing the unit in Mode 3 at 2345. Operators manually tripped the reactor on April 9, 2006 at 0001. Control Element Assembly 21 remained withdrawn. At 0430, troubleshooting was commenced to determine the cause of binding. At 0459, CEA 21 was inserted to the Lower Computer Stop. The most likely cause of CEA 21 failure to insert was debris in or on top of a fuel assembly guide tube. The debris was released from the guide tube area during troubleshooting. Corrective actions include training enhancements, spent fuel pool clean-up, increased CEA testing and inspection of the affected CEA and fuel assembly during the next refueling outage.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
CALVERT CLIFFS, UNIT 1	05000 317	2006	- 002 -	01	02 OF 004

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

I. DESCRIPTION OF EVENT

On April 8, 2006, a condition was discovered that resulted in a plant shutdown required by Technical Specifications. At 1835 on April 8, 2006, while inserting the Regulating Group 2 Control Element Assemblies (CEAs) during the performance of low power physics testing, CEA 21, which is part of Regulating Group 2, stopped inserting at approximately 134 inches as indicated by the CEA Position Display System. At the same time, a Secondary CEA Position +/- 4" Deviation Alarm was received in the Control Room. At the time of discovery, Unit 1 had completed a refueling outage and was in Mode 2 at 5.0 E-2 percent power. Control Element Assembly 21 experienced binding soon after commencing the insertion process from a fully withdrawn condition, however no binding was experienced during subsequent withdrawal activity. The CEA was declared untrippable by the Shift Manager. In accordance with plant procedures and Technical Specification 3.1.4.F the reactor was shutdown, and boration commenced until Mode 3 shutdown margin was achieved on April 8, 2006 at 2345. Control Element Assembly 21 movement stopped at 126.7 inches as indicated by CEA Position Display System during insertion of the Regulating Group CEAs. Control Element Assembly 21 remained at 126.7 inches when the Reactor Trip Circuit Breakers were manually opened for reactor shutdown. During troubleshooting, CEA 21 was fully inserted.

II. CAUSE OF EVENT

The most likely cause of the binding experienced on CEA 21 was the presence of debris in or on top of a fuel assembly guide tube. Based on the size of the debris required to cause CEA binding, the debris could not be transferred upward from the bottom of the core and into the guide tube. The debris most likely fell down into the CEA guide tube during a period of low Reactor Coolant System (RCS) flow or was introduced into the fuel assembly guide tube prior to insertion into the core while in the spent fuel pool. The basis for this assumption is determined by the clearances that exist in the CEA guide tubes. The debris size required to create interference is at least 0.055 inches and most likely larger. The probability that a particle of this size could be transported through the RCS, enter the bottom of the core barrel, go through the fuel assembly lower-end fitting and debris protection fuel grid, and be entrained into the small diameter openings in the CEA guide tubes, which has very low RCS flow rates, is extremely low. Successful completion of CEA testing provided assurance that the debris suspected of creating the CEA binding has been released from the guide tube area and that no other CEAs have similar occurrences of debris impacts.

To ensure that the CEA is not currently bound in the CEA guide tube, testing in accordance with Technical Specification SR 3.1.4.4 is performed more frequently than required. This Surveillance test verifies CEA freedom of movement and trippability on a quarterly basis. For the first two weeks following startup from the refueling outage, this test was performed weekly. Testing then transitioned to monthly testing for two months. The testing will then resume its normal quarterly frequency. No binding or loss of freedom of movement has been observed in any of the tests conducted to date.

To ensure that the fuel assembly was not damaged by the binding of the CEA within the CEA guide tube, an inspection of the affected fuel assembly will occur during the next Unit 1 refueling outage.

III. ANALYSIS OF EVENT

The subject event is reportable per 10 CFR 50.73(a)(2)(i)A, "The completion of any nuclear plant shutdown required by the plant's Technical Specifications." Technical Specification Limiting Condition for Operation 3.1.4 requires CEAs to be Operable when in Modes 1 and 2. The plant was in Mode 2 at the time of the

event. With CEA 21 binding in the CEA guide tube, it was determined to be untrippable. Technical Specification Condition 3.1.4.F addresses actions for an untrippable CEA and requires that a plant shutdown to Mode 3 be completed within 6 hours. Operators then commenced a unit shutdown and placed the unit in Mode 3 by inserting Regulating Group CEAs. Operators then manually tripped the reactor and CEA 21 remained withdrawn to 126.7 inches.

Since a manual reactor scram was initiated and was not part of a pre-planned sequence during testing or reactor operation, this event is also reportable per 10 CFR 50.73(a)(2)(iv)A, "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section."

The Operability (e.g., trippability) of the shutdown and regulating CEAs is an initial assumption in all safety analyses that assume CEA insertion upon a reactor trip. The safety analyses include a required assumption that the highest worth CEA remains fully stuck out of the core. Required CEA testing following a refueling outage is done to determine the trippability and freedom of movement of CEAs. If CEA testing determines that a CEA is not likely to insert following a scram, the cause of the CEA binding is determined and resolved to ensure that the initial safety analysis assumptions are met. If this condition had been discovered at other power levels, the resulting actions would have been the same (i.e. to shut down the reactor to Mode 3 in accordance with Technical Specification 3.1.4.F). The Completion Time allotted to perform the shutdown action ensures that the plant is brought into a condition in alignment with its accident analysis assumptions in a time commensurate with the safety significance of the issue. If the plant were not shut down as required by Technical Specification 3.1.4.F, the safety analysis would have to assume that a specific CEA and an additional CEA would not insert. Such a scenario (i.e., two stuck CEAs) is not covered by the existing safety analysis.

There were no actual safety consequences as a result of this condition which was present during the time period from 1835 on April 8, 2006 through insertion of CEA 21 at 0459 on April 9, 2006. Following the completion of CEA testing, Unit 1 meets the applicable acceptance criteria that assure CEA operability.

IV. CORRECTIVE ACTIONS

A. Subsequent testing was performed on CEA 21. The testing was successful and an evaluation of the potential causes for the original test failure concluded that a recurrence of the failure is unlikely during this operating cycle. The debris creating the CEA binding has been released from the guide tube area and no other CEAs have similar occurrences of debris impacts.

B. An increased frequency of online CEA performance testing, as outlined in Surveillance Test Procedure O-029-1, was performed as a compensatory action. Testing frequency was weekly for the first two weeks after start-up, then transitioned to monthly testing for two months and then resumed normal quarterly surveillance.

C. An inspection will be performed of CEA 21 and the associated fuel assembly during the next refueling outage for cause of CEA 21 binding.

D. Improvements will be made to the site Foreign Material Exclusion (FME) training program to include: creating a separate training module for FME, create a Dynamic Learning Activity, and create and track FME worker and monitor qualification items.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
CALVERT CLIFFS, UNIT 1	05000 317	2006	- 002 -	01	04 OF 004

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

E. Spent fuel pool inspection, cleaning and removal of waste items is in progress. A long-term spent fuel pool clean-up plan is being implemented to perform inspection and cleaning of empty spent fuel storage racks that may contain debris.

V. ADDITIONAL INFORMATION

A. Component Identification

Component	IEEE 803 EIIS Function	IEEE 805 System ID
Rod	ROD	JD

B. Previous Occurrences

No previous similar events have occurred within the past three years.