

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

REPORT/DOCKET NO. 50-317/93-34
LICENSE NO. DPR-53
LICENSEE: Baltimore Gas and Electric Company
FACILITY NAME: Calvert Cliffs Nuclear Power Plant, Unit 1
INSPECTION AT: Lusby, Maryland
INSPECTION DATES: January 24-28, 1994 and
March 7-11, 1994

INSPECTOR:

P. Patnaik

Prakash Patnaik, Reactor Engineer
Materials Section, EB, DRS

3.31-94

date

APPROVED BY:

Michael C. Modes

Michael C. Modes, Chief
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4/4/94

date

Areas Inspected: Review of inservice inspection (ISI) program, scope of ISI work, eddy current examination program for steam generator tubes and closeout of certain outstanding violations and an unresolved item.

Results: The inservice inspection program, during the outage of Calvert Cliffs Unit 1, was found to be in compliance with the applicable ASME Section XI Code and the regulatory requirements. The eddy current examination of steam generator tubes exceeded the requirements of the technical specifications. The evaluation of eddy current examination data was believed to be conservative. The licensee exercised adequate control over inservice inspection activities during the outage of Calvert Cliffs Unit 1. The violations 93-02-02 and 93-14-1 and the unresolved item 93-08-2 were closed out.

DETAILS

1.0 INSERVICE INSPECTION (ISI) (73753)

1.1 Scope

The conduct of inservice inspection using ultrasonic, magnetic particle and liquid penetrant examination methods helps to ensure the integrity of the pressure boundary. During this inspection, reviews of the ten-year ISI plan, the scope of work for the outage, a sampling of inservice inspection data, and observation of work activities were performed to ascertain if the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, and the technical specifications were met. Also during this inspection, licensee's drawing change control, the steam generator tube examination program and data, the corrective action to several outstanding violations and the root cause evaluation and corrective action to indications on the leak detection piping of the reactor vessel head closure seal were reviewed.

1.2 Findings

Baltimore Gas and Electric (BG&E) Company, the licensee for Calvert Cliffs Nuclear Power Plants, conducted an inservice inspection of Unit 1 during the 1994 outage, in accordance with the ASME Code Section XI, 1983 Edition, including the summer 1983 addendum. This unit is in the second inspection period of the second ten-year inspection interval. This outage is the only outage of the unit during the period. At the end of the first period of the inspection interval, BG&E completed the examination of 26 percent of Class 1 and Class 2 welds and by the end of the second inspection period, the remaining welds will be completed for the period. The inspector reviewed the scope of ISI work for the February 1994 outage of Unit 1 and determined that the welds selected for examination were in accordance with the long-term plan for the second inspection interval. The inspector further verified that the examination methods for the welds met the requirements of the 1983 ASME Code, Section XI, including the Summer 1983 Addendum. The ten-year ISI plan included the relief requests, the applicable code cases and their justification for use. The inspector reviewed the information pertaining to each of the relief requests and the code case and was in concurrence with licensee's justification. The ten-year plan and the outage plan identified applicable calibration block for ultrasonic examination of the component. The inspector verified, on a sampling basis, that the block was appropriate for examination of the component. A tour of the calibration block storage area indicated that the storage of blocks was satisfactory and the condition of blocks appeared to be good with no visible corrosion.

The site inservice inspection group exercised adequate control over the contractor's nondestructive examination (NDE) activities, including witnessing calibration of ultrasonic equipment and examination of welds. The ISI group also performed engineering reviews and evaluation of data as required by the licensee's procedure, "Acceptance of Section XI Examination Results, MEA&IP 5.09," for the resolution of nondestructive examination findings and the disposition of components following inservice inspection.

The Quality Audit Unit of the Nuclear Quality Assurance Department periodically performs surveillances of the ISI functions of contractors and inhouse organizations. The inspector reviewed Surveillance Reports 5-93-16, 5-93-37 and the Quality Assurance Audit Report 92-05 from the previous outage. The licensee's schedule of quality assurance audits planned during 1994 was reviewed. The inspector determined that quality assurance coverage of the inservice inspection activities was adequate

The inspector observed nondestructive examination of the following welds.

<u>Weld No.</u>	<u>System</u>	<u>Examination</u>	<u>Result</u>
6" DC-1-1009 Weld #1	Safety Injection	PT & UT	No recordable indication
4" DC-2-1006 Weld #3	Safety Injection	PT & UT	No recordable indication
#12 Pressurizer Surge Line Weld #12	Reactor Coolant	PT & UT	No recordable indication
#12 Pressurizer Surge Line Weld #13	Reactor Coolant	PT & UT	No recordable indication
10" GC-1-1018 Weld #9	Containment Spray	PT	No recordable indication
8" GC-2-1005 Weld #3	Containment Spray	PT	No recordable indication

The examinations were performed in accordance with the applicable procedure. The certifications of personnel performing the examinations were readily available and a review indicated that they were in compliance with (1980) SNT-TC-1A requirements.

2.0 EDDY CURRENT EXAMINATION OF STEAM GENERATOR TUBES

The licensee performed eddy current examination of all tubes in 11 and 12 steam generators from hot leg to cold leg using a bobbin coil. The licensee also performed one hundred percent MRPC (motorized rotating pancake coil) examination of the roll transition area of the hot leg tube sheet regions of both steam generators. Any questionable indication found by using a bobbin coil was also reexamined by using an MRPC probe. The licensee also examined one hundred locations in the vicinity of the ninth support plate for large dents, using an MRPC probe.

As a result of the above examinations, a total of 32 tubes in #11 steam generator and 30 tubes in #12 steam generator were plugged. Included in the plugged tubes were three circumferential cracks at the hot leg tube sheet region of #11 steam generator detected by the MRPC examination.

The following is the summary of tubes plugged.

<u>Steam Generator</u>	<u>Location of Indication</u>	<u>Examination</u>	<u>Number of Tubes Plugged</u>
11	Hot leg tube sheet region	MRPC	7
	Steam blanket region	Bobbin and MRPC	20
	Hot leg tube sheet region	Bobbin	2
	Vertical middle support	Bobbin	2
	Second horizontal support	Bobbin	1
Total			32
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12	Hot leg tube sheet	MRPC	11
	Steam blanket region	Bobbin and MRPC	9
	Hot leg tube sheet	Bobbin	8
	Sixth horizontal support	Bobbin	1
	First horizontal support	Bobbin	1
Total			30

All indications found during eddy current examination are believed to be originating from the outside surface of the tubes.

The inspector witnessed the tube plugging operation which was in progress at the time of inspection. The plugging was performed in accordance with licensee's approved procedures.

The inspector questioned the structural integrity and the leak-tightness of the plugged steam generator tubes. The licensee provided documents concerning qualification testing of the mechanical tube plugs for their steam generator tubes. The inspector believed that the information contained in the qualification document provided adequate assurance of the structural integrity and the leak-tightness of the plugged tubes to withstand design loading.

3.0 CONCLUSION

The inservice inspection program, during the outage of Calvert Cliffs Unit 1, was found to be in compliance with the ASME Section XI Code and regulatory requirements. The eddy current examination of steam generator tubes exceeded the requirements of the technical specifications. The evaluation of eddy current examination data was believed to be conservative. The licensee exercised adequate control over inservice inspection activities during the outage of Calvert Cliffs Unit 1.

4.0 DRAWING CHANGE CONTROL

The licensee's procedure CCI-707, Revision 0, provides the process for initiation, implementation and control of drawing changes. A review of the procedure indicated that controls are in place to ensure expedient processing of critical drawings (drawings important to plant operations including Process and Instrumentation Diagrams (P&IDs)). All critical drawing revisions are required to be issued to the field within a predefined time period. All non-critical drawings are also issued to the field in accordance with procedurally controlled time requirements. The licensee's procedure requires that the critical drawings be updated within 14 days of field installation of a modification. During this 14 day period, controls are in place to ensure that Operations Department has all drawing change information available when utilizing the critical drawings.

The status of drawing changes are tracked by a unique tracking mechanism to ensure compliance with the processing time requirement of the procedure. The inspector verified there was no backlog of critical drawing changes lagging behind modifications during the year 1993 and the process of drawing change control, as detailed in the Procedure CCI-701, Revision 0, is effective at Calvert Cliffs.

5.0 REACTOR VESSEL HEAD CLOSURE SEAL LEAK DETECTION PIPING

During an inservice inspection of Unit 2, following a recent plant trip, boric acid crystallization on the outside of the 3/4 inch leak detection system piping provided a positive indication of a reactor vessel head inner o-ring seal leak. After removal of the boric acid crystals, two through-wall pin-holes were found in the 3/4 inch stainless steel leak detection system piping. A liquid penetrant examination of the affected piping indicated both axial and circumferential pipe crack radiating from pinholes. During the recent refueling outage of Unit 1, the licensee performed a liquid penetrant examination of the leak detection system piping for Unit 1. The examination revealed both axial and circumferential indications. The

affected piping segments of this system, in both units, were replaced with new piping. On a preliminary examination, the root cause of cracking in this piping is believed to be due to stress corrosion. Additional metallographic examination will be performed later to confirm this root cause. The licensee plans to do some design modification of this piping in future.

6.0 CLOSED OUTSTANDING VIOLATIONS AND UNRESOLVED ITEMS (URI)

6.1 Closed URI 93-08-2 on Lack of Code Required Examination Coverage

The NRC Inspection Report 93-08 on Calvert Cliffs Unit 2, discusses the ultrasonic examination of safety injection system weld No. 6-SI-2202-10; a stainless steel valve-to-pipe weld, which was ultrasonically scanned from the pipe side using the shear mode with entry angles of 45° and 60°. It was believed, from the RAYTRACE data, that the licensee did not obtain greater than 90 percent volumetric coverage of the weld as required by Code Case N-460 accepted by NRC Regulatory Guide 1.147. The licensee contacted the Electric Power Research Institute (EPRI) NDE Center, who developed the computer software "RAYTRACE," and was informed that, from the pipe side, the examination coverage of the weld is greater than 90 percent based on EPRI's analysis of the RAYTRACE data. The licensee revised Procedure MEA&IP 5.09, "Acceptance of Section XI Examination Results," to enhance their involvement in vendor NDE activities at Calvert Cliffs. This procedural enhancement included a requirement to review all Section XI NDE results by their own ASNT Level III personnel. This was verified by the inspector during this inspection.

6.2 Closed Violation 93-14-1 on Magnetic Particle Examination Procedure Deficiency

The NRC Inspection Report 93-14 of Calvert Cliffs Units 1 and 2 discusses deficiencies in the magnetic particle examination procedures used for examination in accordance with ASME Code Section XI. The licensee revised the applicable magnetic particle examination procedures to comply with Article 7 of the ASME Code, Section V, and implemented the following additional corrective actions:

- Identified some items for repeat examination during the current inservice inspection interval.
- Other NDE procedures are scheduled for revision prior to their next use.
- Conducted self-assessments of the NDE program.
- A senior NDE representative has been assigned onsite to review NDE data.

The inspector verified the above corrective actions and closed violation 93-14-1.

6.3 Closed Violation 93-02-02 on Excess Overtime by Plant Personnel

The NRC Inspection Report 93-02 documented instances in which personnel involved in testing a new spent fuel pool crane exceeded, without prior written authorization, the overtime limits for plant staff members performing safety-related functions per Technical Specification 6.8.1.g. This written authorization is required by Calvert Cliffs Instruction CCI-159, which implements Generic Letter 82-12 and the NRC Policy Statement on working hours. The NRC Inspection Report 93-14 also documented NDE inspectors working overtime in excess of the Technical Specification 4.8.1.g limits, without proper authorization.

Based on the following corrective actions by the licensee, the inspector closed the above violation.

- The licensee counseled the personnel involved in overtime.
- The licensee provided instructions to personnel involved in similar projects on the applicability of procedures regarding the use of overtime. The specific problems resulting in this violation were reviewed with all project personnel, emphasizing the errors made.
- The overtime policy was added to the Calvert Cliffs supervisor training program.
- CCI-159 (use of overtime) was revised to clarify expectations regarding the use and approval of overtime.
- Conducted training on management's expectations and the procedure revisions.

7.0 ENTRANCE AND EXIT MEETINGS

Members of the licensee's management and engineering staff were informed of the scope and the purpose of the inspection at the entrance meeting which took place on January 24, 1994. The findings of the inspection were presented to and discussed with members of the licensee's management at the exit meeting conducted at the end of a second visit to the site on March 11, 1994. The licensee concurred with the findings of the inspection. A list of attendees of the exit meeting on March 11, 1994, is attached to this report as Attachment I.

ATTACHMENT I

Exit Meeting (March 11, 1994)

Baltimore Gas and Electric Company

G. L. Detter	Director, Nuclear Regulatory Matters
M. D. Milbradt	Compliance
K. M. Hoffman	NISU
S. R. Buxbaum	NDE - Nuclear Unit
P. G. Chabot	Superintendent, Technical Support
C. W. Smith	SSEU
B. C. Rudell	G.S. Project Management

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P. Patnaik	Reactor Engineer
F. Lyon	Resident Inspector