U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-317/90-11

Docket No. 50-317

License No. DPR-53

Licensee: Baltimore Gas and Electric Company
Charles Center
P. O. Box 1475
Baltimore, Maryland 21203

Facility Name: Calvert Cliffs Nuclear Power Plant - Unit 1

Inspection At: Lusby, Maryland

Inspection Dates: May 29 - June 1, 1990

Inspector: R. W. Winters 8/13/90
R. W. Winters, Reactor Engineer, Materials and Processes Section, EB, DRS — date

Approved by: D. Terao 8/13/90
D. Terao, Acting Chief, Materials & Processes Section, Engineering Branch, DRS, RI — date

Inspection Summary: Routine unannounced inspection from May 29 - June 1, 1990 (Report No. 50-317/90-11)

Areas Inspected: The inservice inspection program, including the second 10 year plan, steam generator eddy current testing, and the erosion/corrosion control program were reviewed.

Results: No violations or deviations were identified.

DETAILS

1.0 Persons Contacted

Baltimore Gas and Electric Company

* S. Buxbaum, Supervisor, NDE Unit
  P. Crinigan, General Supervisor, Chemistry
  L. Decker, Nuclear Materials Engineering
* K. Hoffman, Supervisor, Nuclear Materials and Engineering
* L. Larraguite, Senior Engineer - Compliance Unit
  R. Pond, Manager, NDE and Materials Unit
  A. Reed, Principal Materials Examiner
* J. Volkoff, Engineer, Compliance Unit
* J. Wood, Senior Engineer, Quality Audits

Zetec Corporation

D. Calender, Principle Analyst, Level III

NDE Technologies Corporation

T. Beirs, Lead Analyst, Level III

United States Nuclear Regulatory Commission

* L. Nicholson, Senior Resident Inspector

* Denotes those attending the exit meeting.

The inspector also contacted other administrative and technical personnel during the inspection.

2.0 Scope

The scope of this inspection included a review and observation of activities in the following areas:

-- steam generator eddy current examination

-- the second 10 year inservice inspection (ISI) program

-- the erosion/corrosion control program

-- the NDE examiner certification program

3.0 Steam Generator Eddy Current Examination Results

The inservice inspection of the steam generator tubes is conducted in accordance with the unit's Technical Specifications. This steam generator inspection is not part of the ASME, Boiler and Pressure Vessel, Section XI, ISI program for the balance of plant equipment and components. In accordance with the Technical Specifications, the minimum number of tubes required for the inspection was 6% of the active tubes in one steam generator or 3% in each of the two steam generators. Prior to the inspection, SG No. 11 had 8421 active tubes and SG No. 12 had 8452 active tubes.

The licensee, however, elected to perform a 100% full length bobbin coil inspection of all active tubes in both steam generators. In addition motorized rotating pancake coil (MRPC) inspections were performed in the roll transition area as shown in Table 1.

TABLE 1

MOTORIZED ROTATING PANCAKE COIL INSPECTIONS

	SG No. 11	SG No. 12
Cold Side Random Sample	256	256
Cold Side Around Stays	66	55
Hot Side Random Sample	256	256
Hot Side with 2 inch Deep Sludge	1189	1333
Tubes Adjacent to Plugged Tubes	210	210

The extensive testing using the MRPC was a licensee initiative to assure that the Calvert Cliffs steam generators did not have cracking at the top of the tubesheet as had been experienced at other nuclear plants.

At the time of this inspection, the eddy current examination had not been completed, but five tubes in steam generator No. 11 had been found with defects greater than 40% through wall (defective tubes). No defective tubes had been identified in steam generator No. 12.

The licensee qualified a new design for the bobbin probe for this inspection. This probe provided significantly longer life (i.e., 500 - 2000 inspections vs 100 - 300 inspections) with an accompanying reduction in exposure caused by changing the units in a high radiation field.

Data Analysis

The inspector observed the analysis of the eddy current data in process and interviewed the certified Level III analysts of the responsible organizations to determine the adequacy of the method. The data were independently analyzed by individuals certified to a minimum of Level II

in analyzing eddy current data. Following these analyses, resolution of differences was accomplished by a certified Level III analyst in eddy current examination. The inspector determined that no discrepancies had been found where one tube had been classified as degraded by one analyst and defective by the second analyst. If this had happened, the two Level III analysts would have resolved the difference. If no agreement was reached, the more conservative call would stand.

Conclusions

The licensee performed a thorough inspection of both the steam generators. In addition, an inspection for top of tubesheet cracking was performed to assure that the problems experienced with Combustion Engineering designed steam generators by other utilities were not present in the Calvert Cliffs units. The use of a new probe reduced the exposures due to probe changing in a high radiation field.

4.0 Inservice Inspection

Calvert Cliffs Units 1 and 2 are in the first period of the second 10 year inspection interval. The ISI program is based on the ASME Code, Section XI, 1983 Edition, Summer 1983 Addenda. The first 10 year interval was adjusted with the approval of the NRC so that the ISI program for each unit would be coincident.

The inspector discussed the ISI program with the responsible engineer, reviewed the schedule, and determined that the required inspections for this part of the period were on schedule.

The inspector reviewed the licensee's actions taken in response to violation 90-01-02 concerning NDE certifications and program for the licensee's staff. No action had been taken to close this violation at the time of this inspection.

Conclusions

The inservice inspection program is on schedule for the current interval and period. Some problems remain in the certification of nondestructive examination personnel in the NDE group in that the licensee has not provided an adequate basis for satisfying the experience requirements for individuals certified in visual examination.

5.0 Erosion Corrosion Control Program

The licensee initiated an informal erosion/corrosion (E/C) program in 1979 to identify carbon steel systems where flow assisted corrosion existed, to quantify the extent of E/C, and to establish a decision making process for inspection or replacing components. The present formal program was established in 1984.

The program is administered by the licensee's ISI group in accordance with procedure M&EA IP 5.05, Revision 0, Secondary System Piping Erosion/Corrosion Inspection Program. Appendix A of M&EA IP 5.05 defines 23 systems that are included in the program. The program includes criteria for selecting systems and components for evaluation and a method for establishing priorities for component inspections. The inspection point selection is based on an engineering evaluation of the following parameters:

-- fluid flow

-- piping/component geometry

-- piping/component material

-- operating conditions

-- temperature

-- history

-- consequence of failure

The results of inspections are classified in accordance with the program as follows:

- Unsatisfactory - It is recommended to the Systems Engineering group that the piping/component be repaired or replaced or a detailed engineering evaluation be made to accept the piping/component. Perform additional examinations at four adjacent (two upstream and two downstream) and similar points in other trains of the system.

- Red Alert - Perform additional examinations at four adjacent (two upstream and two downstream components) and similar points in other trains. These components are inspected during the next refueling outage and if time permits during any unscheduled outage.

- Yellow Alert - Perform additional examinations of immediately adjacent components and similar points in other trains of the system. Inspect during the next refueling outage, but may be deferred no later than two outages from when it was classified yellow alert.

- Satisfactory - Consider removing the inspection point from the E/C program or schedule the next inspection for ten years later.

During the present outage, approximately 208 components had been inspected without considering expansions due to the classification system. As a result of this effort, approximately 25 components were found unsatisfactory and were replaced. Another approximately 25 components were placed in the Red Alert status and are scheduled for inspection at the next outage.

Conclusions

The licensee has developed a good erosion/corrosion control program. The formal trending system has been in operation for approximately six years and has been proven effective in predicting areas of degraded components for replacement.

6.0 Management Meetings

Licensee management was informed of the scope and purpose of the inspection at the entrance interview on May 29, 1990. The findings of the inspection were discussed with licensee representatives during the course of the inspection and presented to licensee management at the June 1, 1990 exit interview (see paragraph 1 for attendees).

No written material was provided to the licensee by the inspector. The licensee did not indicate that proprietary information was involved within the scope of this inspection.