

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-317/89-07
50-318/89-07

Docket Nos. 50-317
50-318

License Nos. DPR-53
DPR-69

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

Facility Name: Calvert Cliffs Nuclear Power Plant Units 1 and 2

Inspection At: Lusby, Maryland

Inspection Conducted: April 24-28, 1989

Inspectors:	<u>A. Finkel</u>	<u>7-3-89</u>
	A. Finkel, Senior Reactor Engineer	date
	<u>W. Oliveira</u>	<u>7-3-89</u>
	W. Oliveira, Reactor Engineer	date
	<u>T. Rebelowski/482</u>	<u>7-3-89</u>
	T. Rebelowski, Senior Reactor Engineer	date
Approved by:	<u>N. Blumberg</u>	<u>7/5/89</u>
	N. Blumberg, Chief, Operational Programs Section, Operations Branch, DRS	date

Inspection Summary: Inspection on April 24-28, 1989 (Inspection Report Nos. 50-317/89-07 and 50-318/89-07)

Areas Inspected: Routine unannounced inspection of the licensee's maintenance program including industry initiatives, resource allocation, performance measurement, documentation control, role of quality control, mechanical maintenance activities, control of contracted maintenance, deficiency identification and control system, maintenance trending, support interfaces, maintenance facilities, and training. The licensee's procurement, receipt and use of A-36 steel from various material suppliers were also evaluated.

Results: The inspection team identified weaknesses in the licensee's maintenance program implementation as follows:

- (1) The maintenance order (MO) system does not provide for control of MO's that extend from outage to outage. Reference paragraph 2.2.
- (2) The documentation control system is not assuring that technical manuals are maintained with the latest revised documentation. Reference paragraph 2.7.
- (3) The training mockup areas do not represent the existing structures of the plant configuration nor does the equipment represent the plant configuration. Reference paragraph 2.8.
- (4) There is a lack of policies and procedures to perform Root Cause Analysis (RCA) and to analyze Nuclear Plant Reliability Data System (NPRDS) information. Reference paragraph 2.9.
- (5) Material receiving inspection test equipment and required training for personnel are inadequate. Reference paragraph 3.0.
- (6) No system established to validate placards posted in the plant for operators' use. Unresolved item 50-317/89-07-01, 50-318/89-07-01. Reference paragraph 4.0

No violations or deviations were identified.

Details

1.0 Persons Contacted

Baltimore Gas and Electric Company

*M. Bowman, General Supervisor, Planning and Support
R. Denton, Manager of Quality Assurance and Services Department
*R. Heibel, General Supervisor, Quality Assurance
*J. Lippold, General Supervisor, Technical Services
*J. Jerold, Supervisor, Maintenance
*K. Neitman, General Supervisor, Nuclear Training
J. Osborne, Licensing Engineer
L. Russell, Manager, Calvert Cliffs Nuclear Power Plant
J. Thorp, Operations Engineer
*A. Thornton, General Supervisor, Plant and Project Engineering
*L. Wenger, Senior Engineer, Performance Engineering
*L. Weckbaugh, General Supervisor, Electrical and Controls
*W. Whitaker, General Supervisor, Mechanical Maintenance
G. Wolf, Supervisor, Operations/Modifications Coordinator

United States Nuclear Regulatory Commission

H. Eichenholz, Senior Resident Inspector
V. Pritchett, Resident Inspector

The Inspectors also held discussions with other licensee personnel during the course of this inspection.

*Denotes those present at the exit meeting on April 28, 1989.

2.0 Maintenance Inspection (62700 and 62702)

2.1 Scope

The scope of this inspection included an evaluation of selected functional activities of the licensee's maintenance program to determine if the plant is maintained in a safe and reliable condition. To achieve this goal, elements within the maintenance functional areas were selected for review and implementation effectiveness. This was accomplished by reviewing procedures and records, and inspecting components under test and repair. The documentation on selected components evaluated during this inspection are listed on Attachment A of this report.

2.2 Plant Maintenance Activities (37828, 37702 and 62702)

2.2.1 Scope

The inspectors reviewed and observed the maintenance activities for repairs, work control procedures, work planning, and supervision of the activities.

2.2.1.2 Findings

The inspectors verified that the work control system is initiated by the maintenance request (MR) document. The MR generates a Maintenance Order (MO) document which describes the action to be performed by maintenance personnel. The maintenance planning organization identifies and documents the work to be performed in accordance with the requirements of the MO. The inspectors verified on a sampling basis that the maintenance planning organization was performing their function as described in the following procedures:

- CCI 200.10 Maintenance System
- CCI 200.40 Work Execution

The maintenance management report lists the status of maintenance work requests on a weekly basis. A review of this report identified 350 maintenance orders (MO's) assigned to system engineering for evaluation. Of the 350 MO's, 200 were greater than one year old. The present system requires that the Plant Operation Safety Review Committee (POSRC) reviews all MO's greater than one year old, however, once the POSRC dispositions these MO's they are not required to perform another review until the reports indicate another year has passed since the last review. The lack of an additional review by POSRC of MO's that have exceeded a subsequent yearly time span(s) is considered a weakness in their management control system.

2.2.2 Contractor Work Control

2.2.2.1 Scope

The inspector observed selected maintenance activities performed by contractors, to determine the licensee's methods and procedures for controlling this function.

2.2.2.2 Findings

Selection of contractor personnel is based on previous experience, length in job classification and previous maintenance work order expertise. Approximately twenty contractor supervisory personnel are maintained on a year round basis. When an outage is started, these personnel direct the efforts of other assigned contractor personnel.

The inspectors observed and reviewed the following work in progress and verified that the plant maintenance staff and contractor personnel were performing the work as required by their procedures.

- MO 209-041-557A Repair of No. 21 circulator pump
- MO 208-041-425A Alignment of No. 21 LPSI pump ports
- PM No. 2-12-M-R-14 No. 21 SW Header preventive maintenance procedure for leak detection.
- PM No. 2-12-M-R-16 No. 21 SW Header preventive maintenance procedure for leak detection.

The above work was performed by the plant maintenance staff or a site contractor. The inspectors verified that both the plant maintenance personnel and the contractor personnel were knowledgeable of their task and, in the case of the contractor personnel, were knowledgeable of the site procedures and nonconformance (NCR) system. The inspectors also verified that the contractor welders were qualified for the work they were performing and that their training records were maintained in an updated status. The inspectors also verified that the contractor personnel performing electrical raychem splices were trained to the site requirements for this task.

The inspectors observed that the craft personnel working on Construction Work Permits (CWP's) were knowledgeable of their job tasks and the procedures associated with these tasks. The inspectors verified the above CWP's while observing contractor work on the Circulating Pump No. 21 and changes to the steam drain piping performed on the 25A Feedwater Heater. The inspectors noted that the licensee has strong control over their contractors and this is considered a licensee strength. No violations or deviations were identified.

2.3 Maintenance Procedures (37828)

2.3.1 Scope

The inspectors reviewed selected maintenance procedures to determine the adequacy of their approval and implementation process.

2.3.2 Findings

During the last quarter of 1988 a procedure update program was started. The procedure update program is based on INPO guidelines and is expected to be completed within the next two years. In addition to upgrading the maintenance procedures, the inspectors noted that departmental procedures were also being updated in accordance with the INPO procedure guidelines.

The inspectors review of the following procedures determined that they were written in accordance with the INPO procedure guidelines:

- RCS-21A, Reactor Coolant and Pump Seal Overhaul and Assembly
- GEN-15, Inspection and Maintenance of Limitorque Actuation, SMB-000
- RCS-20, Reactor Coolant Pump Oil Addition
- Pack-1, General Valve Packing Procedure
- SG-19, Installation and Removal of Steam Generator Primary Dams

Work packages released without the updated procedures will be rewritten prior to the next outage. Maintenance supervisors review the data and test results to assure that the work meets the requirements of the referenced documentation. No violations or deviations were identified.

2.4 Quality Control (62700 and 62705)

2.4.1 Scope

The inspectors reviewed the extent that quality control is integrated into the maintenance process by reviewing inspection criteria, hold points and quality systems for identifying, documenting and closing of nonconformance reports (NCR's). The documentation reviewed by the inspectors are listed in Attachment A of this report.

2.4.2 Findings

The inspectors witnessed the maintenance work performed on Maintenance Orders (MOs) 209-045-701A and 209-111-480A and verified that the work and inspection criteria were complied with. The inspectors also verified that the maintenance craft and quality control personnel were knowledgeable of their task assignments and complied with the maintenance order documentation requirements.

The following reports were reviewed:

- NCR 7664, EDG Blowers
- NCR 7665, SW Supply Valve to No. 11 EDG
- NCR 7667, Relief Valve DFO-4823
- NCR 7679, 4 Inch Pipe Downstream Valves 2-SRW-183 and 152
- NCR 7682, Intake Structure Items are not Seismically Mounted

QC personnel were performing maintenance inspections to approved acceptance criteria within the specific maintenance orders. Maintenance deficiencies are formally reported through the non-conformance reporting (NCR) system in compliance with Quality Assurance Procedure (QAP) 26. The NCR packages reviewed were completed per licensee's procedures; corrective and preventive actions tracked and verified; and status reported monthly to management. No violations or deviations were identified.

2.5 Observation of Licensee Adherence to Maintenance Orders in Field

2.5.1 Scope

The inspectors reviewed both in-process and completed documentation packages on selected Maintenance Requests (MRs) and Maintenance Orders (MOs) to determine if the deficiencies described in the MRs and MOs were identified, administratively controlled and closed.

2.5.2 Findings

The inspectors reviewed portions of the maintenance program as described in the following documents:

- CCI 200K Nuclear Maintenance System
- CCI 211H Preventive Maintenance Program
- QAP 26 Control of Conditions Adverse to Quality.

The inspectors witnessed the following maintenance work to verify that the work was performed as stated in the work package, that quality control hold points were inspected and that the craft personnel performing the task were trained and knowledgeable of their work assignments.

- MR A 07463 Packing leak found during the preventive maintenance of 2-CVC-504-MUV.
- MO 209-115-561F Remove and Replace Instrumentation for RCP 218.
- MO 209-111-480A, Adjust Auxiliary Switch Operator on Breaker 152-2114.

The inspector verified that the above work was performed and verified as required by their associated documentation requirements. The maintenance craft personnel were knowledgeable of tasks and quality control did perform their inspections as defined in the quality control inspection guidance attached to the work packages. No violations or deviations were identified.

2.6 Post Maintenance Testing (37702)

2.6.1 Scope

The inspectors reviewed the administrative procedures and selected maintenance test procedures to determine the level of post maintenance testing performed on equipment being returned to service after maintenance or surveillance work has been completed.

2.6.2 Findings

The inspectors determined that the Operations administrative procedures have minimally addressed post maintenance operations testing, to verify that system and components will function within their designed tolerances when placed back in service. The licensee has recognized this concern and a Post Work Test Manual (PWTM) has been prepared and is being reviewed for issue. The licensee plans to issue this document by June 1, 1989. The inspectors' review of the PWTM verified that the system/components to be placed back in service will receive post work testing (PWT) before being returned to operational service.

The planned use of the Post Work Test Manual by the planning organization and the control system for updating the manual appears to provide the missing direction that was required to address the post maintenance testing concern. No violations or deviations were identified.

2.7 Documentation Control System (62700)

2.7.1 Scope

The inspectors reviewed the documentation control system and the methods employed for maintaining site Technical Manuals and Vendor Catalogs.

2.7.2 Findings

2.7.2.1 Documentation Control of Technical Manuals

The licensee's present method of updating Technical Manuals (TM) is for the Technical Library of the Document Control Unit to send the latest approved revision of a TM to the assigned organization for updating their controlled documents. Upon receipt of the TM revision, a notification of receipt with the revision status is returned to the Technical Library for receipt verification. Control of the Technical Manuals (CCI-122E) requires that the Document Control Unit perform a yearly inventory of 10% of the

total number of Technical Manuals assigned to each control station. The yearly inventory review of the Control Room technical manuals performed by the Technical Library personnel identified that fourteen manuals were missing one revision, two manuals were missing two revisions, and two complete manuals were missing. The Technical Library report notified the responsible manager on March 15, March 24, and April 4, 1989 of the problem with their Technical Manuals before the manuals were replaced. Another example of a technical manual not in an updated configuration was the Nuclear Feedwater Pump manual. During an inspection of the maintenance Technical Manual Station documentation control area, the inspector identified that two revisions were not incorporated into the manual. An engineering review of the information described in these two unincorporated revisions indicated that no safety concern existed. The licensee is reviewing their procedure 122-E, Control of Technical Manuals, to determine what changes need to be made to prevent recurrence of the above concerns. No violations or deviations were identified.

2.8 Maintenance Facilities and Equipment (37828)

2.8.1 Scope

The inspectors evaluated the facility and equipment that was used to support maintenance personnel in performing their job related tasks.

2.8.2 Findings

An inspection of the maintenance mockup areas for training and the available training equipment in these areas was performed by the inspectors.

In the Instrument and Control (I&C) shop, numerous instrumentation mockups of pressure and control instruments were available for personnel to practice their previous formal training. Pressure regulators, solenoid valves and other instruments were available for internal examination and in mockups of installed in plant instrumentation. In addition examples of specified electrical splices such as the "Raychem Type" were on view.

The electrical shop had standard pre-assembled test boards, trip breakers and an inverter mockup. The lack of relays, timers, switches, motors, control centers indicated that minimum equipment was available for the electrical craft personnel to receive hands-on training.

The mechanical shop had two mockups, one was a portion of the reactor vessel head flange and a steam generator tube sheet mockup. Mockups of motor operated valves were mounted on portable stands, but were not available for training. The lack of both equipment and working space was identified by the inspectors and acknowledged by the licensee.

The lack of additional plant specific equipment and working space is considered a weakness of the overall maintenance hands-on proficiency element of the maintenance training program. No violations or deviations were identified.

2.9 Application of Industry Initiatives (62700)

2.9.1 Scope

The inspectors interviewed the nuclear engineering and plant performance engineering personnel to determine their responsibility in the use and application of industry initiatives. The inspectors also examined Site Performance Indicator reports, INPO Comparative Performance Indicator reports, NRC Systematic Assessment of Licensee Performance (SALP) reports, NRC Bulletins and Information Notices, and Owner's Group reports for their application and use.

2.9.2 Findings

NRC Bulletins and Information Notices, Owners Group reports and other documentation are tracked in a data system that routinely issues a management report. A tracking system defines overdue items with the organization responsible for due dates identified. The licensee has adopted INPO's program, "Nuclear Plant Reliability Data System" (NPRDS), for tracking maintenance and plant performance indicators, however, their method of using NPRDS data has not been specifically established in procedures or organization responsibilities. The inspectors did verify that procedures are in the developmental stages and that management has recognized the impact that maintenance activities have on overall plant operability.

Root Cause Analysis (RCA) is an engineering method used to identify the reason or the cause of a problem. Root Cause Analysis program development is similar in status to that of the NPRDS system. The licensee has not defined specific tasks or organizational responsibilities at this time. The Performance Engineering organization is in the process of developing guidance for a proposed RCA program. The allocation of resources to support the engineering tasks to prepare the NPRDS and the RCA programs has been identified as a potential problem by the licensee. During a review of the RCA task description, the inspector also identified the lack of manpower dedication in

this area. The responsible lead engineer assigned to prepare the RCA program documentation is also performing selected root cause analyses on system problems that have interfered with his schedule for completing the RCA documentation.

The licensee has made both management and organizational changes in the engineering and quality organizations which appear to have strengthened the site organization. A report of the site re-organization with manpower allocations is to be part of the licensee's "Performance Improvement Plan" due to be submitted to the NRC in July 1989. The "Performance Improvement Plan" is a program plan defining how the licensee plans to operate their plant in response to NRC concerns. The effectiveness of the site changes could not be evaluated at this time, however, the inspectors noted that the identification of the need for a root cause analysis program, better use of the NPRDS system, and the manpower to support these tasks are indicators that the licensee management is aware of their needs. The lack of these programs and the data generated from these systems to support engineering and maintenance analysis is a weakness of the licensee's present system. No violations or deviations were identified.

3.0 Nonconformance Reports Concerning Possible Use of Improper Steel In Safety Related Systems

Over a period of 18 months the licensee's QC section had issued three NCR's (No. 7266, November 3, 1987; No. 7744, February 27, 1989; and No. 7746, February 28, 1989) concerning the possible use of improper steel in safety related systems. The first of these NCRs concerned the lack of traceability of A-36 steel supplied by the Durrett-Sheppard Steel Company. Although incoming steel to that company was acceptable, traceability was lost after the steel entered company stock. Although there was no indication that steel purchased was unacceptable, the company was dropped as a supplier. Samples of A-36 steel already stocked by the licensee were chemically tested and found to be acceptable.

The inspector verified that A-36 Durrett-Sheppard steel stock which had been removed from the site warehouse for in-plant use had been verified as A-36 by the test laboratory. The inspectors review of the licensee's laboratory report indicated that the steel test samples were in conformance with the criteria of ferrous material values listed in tables 1 and 2 of the 1986 edition of SA-36/SA 36M (ASTM Section II 1986 Code). Acceptance of the laboratory report cleared the material hold tags and quality control released the material for site use.

In addition, the inspectors reviewed the receiving records of steel other than the A-36 material received from Durrett-Sheppard delivered to the site between November 1985 and March 1988. Thirty purchase

orders were issued during this time period. The inspectors reviewed the receiving records associated with these purchase orders and determined that the material documentation received by the licensee complied with the purchase order requirements and the material and data were traceable.

Because at least one sheet of defective steel got past the receipt inspection process before it was discovered, the inspector reviewed the receipt inspection process. Based on this inspection the inspector observed the following weaknesses.

- There were no written methods or attribute check lists for receipt inspectors to use in the inspection of incoming materials.
- Receipts inspectors have no measuring or test equipment to do sampling inspections of incoming material.
- There was a lack of training for receipt inspectors.
- Receipt inspectors rarely used the NCR system.
- There is only one person assigned to receipt inspection for safety related work.

Conclusion

The sampling testing of the A-36 steel from the licensee warehouse verified that the material did meet the requirements of the ASTM Section II 1986 code. Based on the licensee laboratory report on this material it appears that there is no safety concern with the use of the A-36 steel at this site. No violations or deviations were identified.

4.0 Plant Tours

The inspectors toured the Control Room, portions of the turbine building, the cable spreading rooms, the service water pump rooms, and the auxiliary feeder water pump rooms of Units 1 and 2. In the service water pump rooms, the inspector observed placards permanently mounted on four service water/salt water hand valve stations for service water heat exchanges 11, 12, 21 and 22. These placards show heat exchanger and valve alignments for portions of the service water systems. In addition, in the service water pump room, there were four placards (2 per room) for auxiliary feed water systems control valve stations. There did not appear to be any document control for these placards.

Further investigation revealed that these placards were not part of the licensee's operator aids program which only controls temporary placards. A licensee representative stated that the service water placards were installed because of a 10 CFR 50, Appendix R, Modification. The AFW

placards were installed for operator convenience. Other similar placards were identified to the inspector by the licensee. These included a trip circuit breaker diagram in each unit cable spreading room and valve alignment diagram to the AFW pumps posted adjacent to Condensate Storage Tanks Nos. 21, 12 and 11.

The inspector informed the licensee that since the above placards (eleven in all) were posted for use by the operators they were expected to be validated for accuracy and controlled like any other drawing or procedure. The licensee concurred with the inspector and stated that the placards would be validated, the validation documented, and a mechanism developed to ensure the placards are changed if there are any system changes. This item is unresolved pending licensee action and subsequent NRC review (50-317/89-07-01, 50-318/89-07-01).

5.0 Exit Interview

Licensee management was informed of the scope and purpose of the inspection at the entrance interview on April 24, 1989. At the conclusion of the site inspection on April 28, 1989, an exit interview was conducted with the licensee's senior site representatives (denoted in section 1). The findings were identified and the status discussed with the licensee staff.

At no time during this inspection was written material provided to the licensee by the inspectors. The licensee did not indicate that any proprietary information was involved within the scope of this inspection.

Attachment A

Documentation used by the inspection team to review and evaluate the licensee's effort in the specified area.

Paragraph 2.2 Maintenance Packages

- MO 209-041-557A, No. 21 Circulating Water Reports
- PM No. 2-12-M-R-14, No. 21 SW Header
- PM No. 2-12-M-R-16, No. 21 SW Header

Paragraph 2.3 Maintenance Procedures

- RCS-21A, Reactor Coolant Pump Seal Overhaul and Assembly
- GEN-15, Inspection and Maintenance of Limitorque Actuation
SMB-000
- RCS-20, Reactor Coolant Pump Oil Addition
- SG-19, Installation and Removal of Steam Generator Primary Dams
- PACK-1, General Valve Packing Procedure

Paragraph 2.4 Quality Control

- QAP 26, Control of Conditions Adverse to Quality, Revision 40
- NCR 7664, EDG Blowers
- NCR 7665, SW Supply Valve to No. 11 EDG
- NCR 7677, Relief Valve DFO-4823
- NCR 7679, 4-Inch Pipe Downstream Valves 2-SRW-183 & 152
- NCR 7682, Intake Structure Item are not Seismically Mounted
- MO 209-045-701A, Replace Grease In No. 13 SWP Thrust Bearing
- MO 209-111-480A, Adjust Auxiliary Switch Operator on Breaker
152-2114

Paragraph 2.5 Deficiency Identification and Control System

- CCI 116F, Control of Deficiencies and Nonconformances Reports
- CCI 200K, Nuclear Maintenance System
- CCI 211H, Preventive Maintenance Program
- Quality Assurance Procedure (QAP) 26, Control of Conditions Adverse to Quality, Revision 40
- MR A 07463 and MO 209-116-629A, Packing Leak Inspection/Repack
- MO 209-045-701A, Replace Grease in No. 13 SWP Thrust Bearing
- MO-209-111-480A, Adjust Auxiliary Switch Operator on Breaker 152-2114

Paragraph 2.6 Post Maintenance Testing

- AP 85-4, Post Maintenance Operation Testing
- Post Work Test Manual

Paragraph 2.7 Documentation Control System For Maintenance

- Instruction 122-E, Control of Technical Manuals
- Controlled Technical Manual Inventory Results, March 29, 1989, November 18, 1988, November 11, 1988, November 4, 1988 and October 26, 1987.
- Technical Manual Past Due Report, April 25, 1989

Paragraph 2.9 Application of Industry Standard

- Calvert Cliffs Nuclear Power Plant Maintenance Inspection, January 31, 1989
- Instructions 118-L, Calvert Cliffs Reporting Requirements
- Instruction 143-F, Calvert Cliffs Administrative Control of License Amendments
- Instruction 154-B, Calvert Cliffs Response to NRC Correspondence
- Instruction 155, NRC-Reporting Requirements

Paragraph 3.0 Receiving Inspection

- Purchase Order 62697-GX Blanket Order to Durrett-Sheppard Steel Company
- Nonconformance Reports Nos. 7266, November 3, 1987; 7744, February 27, 1989; and 7746, February 23, 1989
- March 2, 1988, D. Wright Material Engineer to C. Fry, Procurement Coordinator. Attachment - A-36 Material Test Report Results of Warehouse Steel Stock
- August 3, 1988, K. Pickering letter to NCR file
- QAO-L-1987, Quality Surveillance Report, November 12, 1985