U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.:	50-317/91-80 and 50-318/91-80 Readiness Assessment Team Inspection
License Nos.:	DPR-53 and DPR-69
Licensee:	Baltimore Gas and Electric Company Post Office Box 1475 Baltimore, Maryland 21203
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, Maryland
Inspection Conducted:	February 4 through 8, 1991
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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

A Readiness Assessment Team Inspection (RATI) was conducted to assess the adequacy of the management systems used for oversight and control of activities in the areas of Operations, Maintenance and Surveillance, and Safety Assessment and Quality Verification and to evaluate the actual implementation and effectiveness of these control systems such that the team could, with reasonable assurance, determine the ability of the facility to support concurrent, safe operation of Units 1 and 2. The team was divided into three groups of two inspectors per group to cover the three areas selected for review and evaluation. The groups were led by experienced inspectors with backgrounds in the selected areas of inspection.

In the area of Operations the team found management controls to be acceptable. Of particular note was the low threshold level established for initiation of Problem Reports and the subsequent action taken to address identified plant problems. In general the program weaknesses observed in the Operations area by the team could be identified as minor program informalities where desired control activities were not specifically detailed within the controlling procedure. Some weakness was noted in the area of Temporary Modifications (TMs). Specifically the governing Calvert Cliffs Instruction (CCI) did not address certain programmatic issues, such as training on TMs and controls for Safety Tagging of systems that contained TMs. The team noted that although the desired controls were not specifically stated, there were no examples of lack of control identified. The Plant Manager was informed of these concerns and has initiated action to address them.

In the area of Maintenance and Surveillance the team found that there were mechanisms in place, including a sufficient level of checks and balances, to reasonably ensure that significant outstanding maintenance and surveillance activities are being appropriately prioritized. These mechanisms provide confidence that the Technical Specification requirements will be fully satisfied for Unit 2 startup. The Team noted that a complete audit of all outstanding deficiency tags was conducted in late 1990 and provides confidence that the facility is cognizant of the current status and tracking of open deficiencies. A complete audit of all Technical Specification (TS) surveillance requirements was also conducted during the Fall of 1990. This audit was conducted to provide assurance that all TS required surveillances are addressed in surveillance test procedures.

In the area of Safety Assessment and Quality Verification (SA/QV), the Team's overall assessment of current policies, procedures and programs implemented for the assessment of safe operations and the verification of quality, is satisfactory performance. The team observed that equipment failures, programmatic concerns, non-conforming conditions and procedural deficiencies are being identified and addressed. Furthermore, the threshold for identifying these types of problems was low. In addition, the initial screening process of problem reports was

observed to be both timely and thorough. The team did identify some informal problem identification and resolution processes, principally: the tracking, trending and resolution of Quality Verification (QV) and Quality Engineering Unit (QEU) findings; the lack of a formal requirement for cross unit consideration of procedure changes; and, a non-proceduralized method to control safety tagging of TS related equipment. The Plant Manager was informed of the teams findings and has implemented corrective action to address identified problems.

The team's overall assessment is that the in-place management and control systems will provide reasonable assurance that safety issues will be addressed and resolved prior to Unit 2 readiness for restart. The team also determined that there was adequate assurance that sufficient controls were in place to allow safe simultaneous operation of Units 1 and 2.

2.0 SUMMARY OF OBSERVATIONS

Strengths

1. A 100% verification of deficiency tags in the plant was conducted in October 1990. This process uncovered many findings which has resulted in an accurate record of outstanding work and issuance of Maintenance Orders. Coupled with the priority controls established for Maintenance Orders; and, with maintenance management review of lower priority work to assure proper prioritization prior to startup, this process has improved management's control of outstanding work to support startup (Paragraph 5.1).

2. A 100% verification of TS surveillance requirements was completed, in the fall 1990 as part of the Technical Adequacy Review Program, to assure that all Surveillance Requirements are contained in a Surveillance Test Procedure. This has provided assurance that the STP scheduling process will effectively ensure that TS surveillance of equipment is completed within the required schedule and for TS mode changes. It is recognized that the STP review process is still ongoing as outlined in the PIP. This process may still uncover inadequate procedures; however, overall the Technical Adequacy Review Program is a strength (Paragraph 5.2).

3. Control room level of knowledge with respect to surveillance activities is a strength. This was observed in the conduct of STPs, especially the modified STP 0-4-2 (Paragraph 5.2).

4. Detailed control room pre-evolution briefings were observed (Paragraph 4.6).

5. There was a low threshold for initiating Problem Reports (Paragraphs 4.3 and 6.3A).

6. Timeliness and thoroughness of the PR Review Group initial screening of PRs was excellent (Paragraph 6.3A).

Informal Practices and Areas with Opportunity for Improvement

1. A formal method to address the impact of a procedure change on other procedures within the applicable unit or on applicable procedures for the other unit is not included in the procedure change process (Paragraph 6.3D).

2. Two areas for improvement within the temporary modification process were identified:

   a. No formal means exists to ensure that Temporary Modifications are considered during system or component tagouts (Paragraph 4.1).

   b. No formal requirement is included in the governing CCI to ensure System Engineer awareness of all applicable Temporary Modifications (Paragraph 4.1).

3. No proceduralized method exists to prevent unnecessary out-of-service time of TS related equipment due to tagging (Paragraph 4.2).

3.0 INTRODUCTION

3.1 Background

In December 1988, Calvert Cliffs (the licensee) was placed on the NRC's list of plants warranting close monitoring, because of regulatory concerns about declining performance. The NRC requested the licensee to submit an integrated plan to address identified performance problems. In March 1989, in response to an NRC Senior Management Meeting initiative, a special team inspection (STI) was conducted to determine the reasons for the licensee's performance decline. The team identified a management philosophy which appeared to emphasize production over safety, weak procedural adherence, ineffective corrective action programs, inadequate procedures, and a lack of written QA instructions as contributory factors. In April 1989, the licensee submitted its Performance Improvement Plan (PIP) outlining corrective actions to address the weaknesses identified by the STI.

In March, 1989, Unit 2 was shut down for refueling. In May, 1989, leaks were discovered in the Unit 2 pressurizer heater sleeve welds. Unit 1 was shut down in May, 1989, to inspect for similar pressurizer heater sleeve weld leaks. On May 23, 1989, the licensee committed to not restart either unit until the pressurizer leak problem was understood and resolved, and better controls over work activities and procedural compliance had been established. On May 25, 1989, Confirmatory Action Letter (CAL) 89-08 was issued to confirm these commitments. In November, 1989, a Readiness Assessment Team Inspection (RATI) found Calvert Cliffs generally improved, although several significant deficiencies were identified. NRC concerns about failure to implement low temperature overpressure protection (LTOP) commitments resulted in the issuance of Supplement 1 to CAL 89-08 on February 1, 1990. An inspection in March 1990 determined that the licensee's corrective actions and plans concerning LTOP and commitment implementation were adequate. On March 16, 1990, the licensee submitted a request to NRC Region I for release from the CAL and its supplement. On March 21, 1990, the licensee presented its assessment of their readiness to restart Unit 1 and the closeout of issues raised by the STI and the CAL to the NRC. On April 10, 1990, Supplement 2 to CAL 89-08 was issued to document NRC's agreement with the restart of Unit 1. NRC agreement with the restart of Unit 2 would await completion of NRC's evaluation of the physical readiness of that unit, and its assessment of the licensee's ability to adequately control the operation of both units simultaneously. All repairs of the Unit 2 pressurizer heater sleeves have been completed with NRC review of that activity complete as of June, 1990. On January 7, 1991, the licensee presented its assessment of their readiness to restart Unit 2. During the week of February 4 through 8, 1991 a RATI was conducted to assess the effectiveness of the in-place management and management control systems at the Calvert Cliffs site. The results of that inspection are detailed in this report.

3.2 Purpose and Scope of Inspection

This RATI is part of the NRC staff process for determining restart readiness of Calvert Cliffs Unit 2. Its specific purpose was to determine whether in-place management and management control systems were effective in the control and oversight of plant activities and would provide reasonable assurance that safety issues would be addressed prior to Unit 2 restart and support simultaneous operation of Unit 1 and 2.

The team was designed to look broadly at the level of performance in those areas of concerns previously identified. The team was not tasked to look deeply and in detail at individual issues. Detailed review is coordinated by the resident staff during routine and region based inspections.

3.3 Methodology

In order to effectively address the areas of interest, the team was organized into three inspection groups with each group having two inspectors. Each one of the three groups was assigned one of the following functional areas:

- Operations
- Maintenance and Surveillance
- Safety Assessment and Quality Verification

The inspection consisted of interviews with plant staff and operations personnel, observation of plant activities in the selected areas, and examinations of selected procedures, records, and documents. Particular emphasis was placed on management and management systems for oversight and control of activities in the selected inspection areas. All team members conducted independent plant tours to assess material condition and progress towards restart readiness.

An important feature of the team was the extensive interaction among the team members to arrive at a collective and supportable assessment of the level of performance and of areas of strength and weakness. The team focused on Unit 2 activities, however, management and programmatic controls are essentially identical for both units.

4.0 OPERATIONS

Purpose:

The purpose of the operations review was to assess the effectiveness of in-place management control systems in selected areas of plant operations; verify that sufficient management oversight and control of those activities exists; and, to provide reasonable assurance that a safe restart of Unit 2 and safe two unit operation can be performed.

Scope:

The inspectors reviewed selected station procedures, observed activities in the areas of plant modifications, out of service equipment, locked valves, component tagging, and pre-evolution briefings.

4.1 Modifications

Findings:

The inspection included a review of licensee procedures governing permanent and temporary plant modifications with emphasis on operations interfaces, operator training on modifications, and the availability of information provided to plant staff regarding plant modifications. A review of selected modification packages was also conducted.

Review of the Calvert Cliffs Instruction (CCI 126, Rev. J) governing permanent modifications, or Facility Change Requests (FCRs), did not reveal any procedural inadequacies. Impact on the plant and Technical Specifications of the FCR was considered during the review and implementation process. Post modification testing was also addressed. The inspector's review of one complete FCR and portions of one other FCR showed that affected documentation (prints and procedures) were appropriately revised to reflect changes.

During the review of CCI-117, Revision I, which controls temporary modifications (TMs), the inspectors noted that some procedural weaknesses existed. It was possible that the System Engineer (SE) could be bypassed during the TM process because of the CCI wording. The procedure did not require the SE to be informed of TMs if he was not the TM initiator. Also, the CCI did not clearly specify responsibility for implementing or conducting procedure changes and/or training on installed TMs. For example, for a TM on the Emergency Diesel Generator Starting Air System that was implemented during this inspection, procedure changes and training were not performed to coincide with the TM installation. Training was subsequently conducted during shift turnover briefings, which were observed by and determined to be acceptable by the inspectors. Post modification testing was also addressed and performed although less formally for TMs than for FCRs. The inspector discussed the above problems with licensee representatives. The licensee, replied that they were in the process of revising CCI-117 to ensure that the SEs would not be bypassed and to address training and procedure revisions associated with TMs.

Licensed operators are informed of modifications through various means, such as log entries, night orders, shift briefings, or formalized classroom instruction. However, there was no formalized process to ensure that TMs were considered during subsequent plant evolutions or system safety tagging. This was a contributor in an event on October 2, 1990, when minor inadvertent Auxiliary Feedwater leakage was experienced during system maintenance because the system tagout was conducted without tagging group knowledge that internals of a check valve had been removed via a TM. The licensee is aware of this weakness and has initiated long term corrective action including consideration of inclusion of TMs in control room drawings. In the interim, the tagging group, which is made up of experienced operators, is conducting a thorough and complete review of control room TM records to support system or component tagging.

The inspector reviewed the number, status, and age of TMs. The licensee has been reducing the number of its oldest outstanding TMs for both units. In July 1990, there were 105 TMs with several older than 60 months. As of the end of January 1991, there were 77 TMs with the oldest being 42 months. While this number is still high, the licensee stated that they will review through startup review board activities and performance of OP-6 (Startup Check-Off List) that any remaining Temporary Modification will not adversely affect safe plant operation.

Conclusions:

The inspectors concluded through the above review of TMs and associated logs and records that the licensee is making progress towards reducing the number of outstanding TMs and is tracking the status of FCRs as they affect startup. Details pertaining to the inclusion of system engineers in the TM process and dissemination of temporary modification information were weak and are being addressed in a proposed revision to the governing CCI. Overall, the licensee's modification process was determined to be satisfactory.

4.2 Out of Service Equipment

Findings:

The team reviewed the licensee's policies and procedures which were used to minimize the amount of time that safety related equipment was out of service for maintenance and testing. The review included discussion and review of the recent implementation of the Quarterly System Schedule (QSS) (during the last quarter of 1990) on Unit 1. It also included discussions with personnel in the Safety Tagging Group regarding Technical Specification equipment tagouts, review of control room logs, Calvert Cliffs Instruction 112, Revision L, Safety Tagging, and the equipment out of service list in the control room.

The licensee utilized a Quarterly System Schedule (QSS) to plan routine work on safety related systems. Common attributes, such as power supplies, were considered in developing twelve groups of systems that were able to be worked concurrently. Routine work accomplished during the quarter was performed during the week assigned by the QSS. Corrective maintenance was scheduled independent of the QSS, based on priority. The intent of the QSS was to minimize safety related equipment out of service time by grouping maintenance activities on related equipment and systems into a single outage period. Implementation of the QSS on Unit 1 during the last quarter of 1990 appeared to have been successful.

The control room operators track out of service Technical Specification equipment in control room logs and have an equipment out of service list generated daily by the Safety Tagging Group. Shift turnover briefings also highlight Technical Specification equipment which is out of service.

The Safety Tagging Group utilized a process which was effective at identifying Technical Specification related equipment that had been removed from service without timely work initiation. The Safety Taggers separated Technical Specification related tagouts and verified that authorization to begin work had been requested within a few hours of the equipment being removed from service. If work had not begun, the job supervisor was contacted. The team noted that although this was an effective process, it was not formalized by inclusion in plant procedures. Prior to the end of the inspection, the licensee had initiated an action item to revise appropriate plant procedures.

Conclusions:

The combination of the Quarterly System Schedule, review by the equipment tagging group, and tracking by the control room operators appeared to be successful in preventing excessive non-productive out of service time of safety related equipment, although some portions of the licensee's processes to minimize out of service time were informal.

4.3 Evaluation of Operational Events

Findings:

A sampling of recent onsite event evaluations and corrective actions were reviewed to determine the effectiveness of the licensee's system of evaluation of operational events that occur onsite and throughout the industry for applicability to Calvert Cliffs 1 and 2. The program for the evaluation of industry event information and a sampling of these evaluations was also reviewed. The sample included NRC Information Notices, Combustion Engineering Info-bulletins and other industry shared information.

Onsite event evaluations were initiated by use of the Problem Report (PR) process. PRs were implemented at a low threshold level and were generally comprehensive and thorough. Operations Department management was sensitive to minimizing near events or events of minimal significance as they were considered precursors to events of greater significance. Further discussion of the PR process is included in Section 6.3.A of this report.

Assessment of industry events was conducted by the Plant Operating Event Assessment Committee (POEAC). The POEAC acted to screen issues and direct them to appropriate places within the organization. The sample of assessments reviewed by the Team indicated that the process provided a satisfactory initial screening process.

Conclusions:

Issues identified by the plant staff via Problem Reports were of a low threshold. Operations Department management was sensitive to identifying and implementing corrective action for precursor type events to prevent significant event occurrences. Assessment of industry events by POEAC for applicability to Calvert Cliffs was satisfactory.

4.4 Locked Valve Program

Findings:

The inspectors reviewed CCI 309, Revision C, Locked Valves and observed the performance of a portion of a system lineup verification of the diesel generator fuel oil system.

Based on a review of CCI-309, the inspector noted that the licensee specified the types of valves, based on operational impact, which were to be locked, color coded tags associated with the locked valves (to indicate desired locked position), and the kind of locking mechanisms to be used for various valves. The CCI also required audits to be performed to verify designated valve position and to document any position deviations that were found, including exceptions due to plant status.

The inspector, with the assistance of an operator, walked down the valve lineup of the fuel oil system for the 21 diesel generator. All valves were in their correct positions with required valves locked and properly tagged.

Conclusions:

Based upon the review of the CCI and the valve lineup check, the licensee's locked valve program was determined to be satisfactory.

4.5 Control of Component Tagging

Findings:

The inspectors reviewed Calvert Cliffs Instructions, Operating Instructions and a sampling of safety tagging orders which were verified from reference documents and through observation of the removal of the equipment from service. The inspection focused on the effect of tagging Unit 1 and 2 interfacing systems, support systems for Technical Specification equipment and methods to prevent wrong unit or wrong train tagging errors. The methods utilized to minimize safety related equipment out of service time were also reviewed as documented in section 4.2 of this report.

The facility has a minimum number of systems that are common to both units. The emergency diesel generators, control room ventilation and post accident sampling systems are examples of those that are common. Control of evaluating the effect of removing equipment common to both units or support systems from service relies primarily upon operator knowledge. However, there were some examples of common or interfacing systems identified in operating procedures which addressed the removal of specific equipment from service. Licensee Event Report (LER) 90-028 was a voluntary LER submitted on November 30, 1990, which detailed an issue in which both trains of Control Room Emergency Ventilation System (CREVS) were found to be inoperable. Corrective actions included reemphasis of Standing Instruction 80-12, "Operability Verification of Redundant Components," and the development of a more conservative policy concerning the implementation of Technical Specification 3.0.5. Corrective actions for this event were considered appropriate and timely. This event is addressed in combined NRC Inspection Report 50-317/90-25 and 50-318/90-25. The team concluded that the combination of conservative direction concerning use of TS 3.0.5, operating procedure guidance and operator knowledge of common and support system interfaces with safety related systems provided reasonable assurance that significant unidentified safety related equipment unavailability would be prevented.

The review of the tagging process indicated that sufficient controls were in place and provide requirements for qualification of job supervisors, safety taggers and senior safety taggers. It also establishes independent reviews of safety tagging orders. Management support of thorough safety tagging reviews regardless of delays in maintenance activities, when necessary, was also observed.

Three methods were observed for preventing wrong unit or wrong train tagging errors. They were unit color coding, equipment labelling, and a "self verification" policy described in CCI 300, Revision L. The unit color coding was noted to be minimally implemented and improvements to component labeling were ongoing. The team concluded that the third method could be challenged by the incomplete implementation of the first two methods. The incomplete labeling of components/equipment was a possible contributing factor in the tagging error that occurred on February 4, 1991, which disabled both the 21 and 22 instrument air compressors. The team asked the licensee to provide a copy of the root cause analysis of this event when it was completed. The licensee provided a copy to NRC RI on February 28, 1991. The licensee's root cause analysis concluded that labeling was a contributing factor along with fatigue and insufficient degree of attention by the operator.

Conclusions:

The team concluded that the combination of conservative direction concerning use of TS 3.0.5, operating procedure guidance and operator knowledge of common and support system interfaces with safety related systems provided reasonable assurance that significant unidentified safety related equipment unavailability would be prevented. Strong management support to ensure appropriate tagging reviews regardless of delays in maintenance activities was also noted. Licensee initiatives such as improved equipment labeling and unit color coding should reduce the heavy reliance on "self verification" to minimize wrong unit or wrong train safety tagging errors.

4.6 Pre-Evolution Briefings

Findings:

The inspectors attended and observed several shift turnovers and pre-evolution briefings to evaluate their effectiveness.

The licensee used night orders, CCI's that addressed general activities (e.g., Tagging, Engineering Test, etc.), and steps included within specific activity or test procedures to specify when briefings were to be held. Shift turnovers were evaluated for content and conduct. The designated SRO briefed the crew on Unit status, equipment status, pertinent system lineups, evolutions planned or in progress, TMs installed, and lessons learned from recent operational errors. Individuals were given the opportunity to provide input or ask questions.

During pre-evolution briefings, procedures were talked-through, responsibilities were delineated, and methods of field communications were specified. The good quality of the pre-evolution briefings was demonstrated by the identification of an error in Surveillance Test Procedure (STP) 04. The error was corrected and the test was performed satisfactorily.

Conclusions:

Based on procedural guidance pertaining to pre-evolution briefings and the observation of shift turnovers and pre-evolution briefings observed during the conduct of this inspection, the team determined the licensee's performance in this area was strong.

4.7 Summary

Overall the team concluded that operations management placed emphasis on the identification of minor events to bring about corrective action to prevent events of more significance. This emphasis was reflected by the low threshold of issues documented in Problem Reports. The combination of the Quarterly System Schedule, review of TS related tagging orders by the safety tagging group and tracking by the control room operators appeared to be successful in preventing excessive non-productive safety related TS equipment out of service time. Planned improvements to the Temporary Modification process include enhanced involvement of the System Engineers and the increased availability of information concerning operations evolutions and safety tagging. Shift turnovers and pre-evolution briefings observed during this inspection, were strong. Partially implemented initiatives such as improved equipment labeling and unit color coding placed heavy reliance on the self verification policy to minimize wrong unit or wrong train safety tagging errors.

5.0 MAINTENANCE AND SURVEILLANCE

Purpose:

Surveillance programs were reviewed to evaluate the effectiveness of in-place management control systems that were developed to ensure that the Technical Specification Surveillance Requirements of equipment are met within the required time limitations and as necessary to support changes in operational modes. Also, that in-place maintenance program management systems effectively ensure that equipment requiring maintenance is identified, and associated work is appropriately prioritized so that necessary equipment is available to support unit start up.

Scope:

To assess the maintenance and surveillance program the inspectors observed a sampling of ongoing activities, interviewed responsible station and staff personnel, reviewed completed activity records, and evaluated management control systems and processes.

5.1 Maintenance Assessment:

Findings:

The inspectors conducted a maintenance assessment to ensure that the licensee had sufficient controls for conduct of maintenance, and in establishing the correct priority for activities on the maintenance backlog.

The inspectors observed a sample of activities in the field and reviewed the maintenance program implementation to ensure that important to safety equipment maintenance is assigned an appropriate priority so that TS Limiting Conditions for Operation are not exceeded and that an appropriate level of authority and responsibility has been assigned for program control. The inspectors also verified that controls are in place to identify and control activities that interface between Units 1 and 2 and that the plant operators are cognizant of and have proper control over plant maintenance activities.

The inspector observed portions of the following maintenance activities:

MO No. 201034157A	Feedwater pump seal replacement
MO No. 201032125A and No. 201032126A	Temporary Modification to the diesel generator air starting system
MO No. 201030023A	Temporary installation of a high speed recorder to support functional testing of the No. 12 diesel generator
MO No. 209024687A	Temporary Modification on the fuel transfer tube
MO No. 201518604A	Temporary Modification on the compressed air system
MO No. 201036276A	Corrective maintenance to investigate and repair the No. 21 containment spray pump

For the observed activities, it was determined that the licensee was properly implementing the maintenance program. Prompt initiation of Maintenance Orders (MO) and of root cause analysis was noted. One example of this process was observed by the inspector when a containment spray pump failed during post-maintenance testing following its refurbishment. Prompt initiation of root cause analysis and determination of the pump failure was important to enable the licensee to assess the potential for common mode failure of other similarly maintained rotating equipment. At the end of the inspection the licensee was establishing an investigation and repair plan. The inspector reviewed the plan and discussed its development with the system engineer. The licensee's plan appeared comprehensive.

Overall, sufficient planning was evident, as indicated by proper use of procedures and instructions by personnel conducting the maintenance. The maintenance personnel were knowledgeable in their area of expertise, as well as in the overall MO process. Management oversight and review of important to safety activities were apparent. However, it was noted that the maintenance process was cumbersome and it was difficult to follow the associated paperwork through the post maintenance test and management review process. The inspection did not identify any equipment improperly returned to service as a result of the observed inefficiencies.

The licensee completed a 100 percent verification of all deficiency tags in the plant in October 1990. As a result of this effort the maintenance organization was able to identify a number of errors in the deficiency reporting system. In some cases, the actual maintenance was completed but the deficiency tag was not removed from the component. In other cases, the tags appropriately identified deficient conditions, but a maintenance request was not generated. Both of these types of discrepancies have been corrected. This has resulted in an accurate record of outstanding work to be completed in the plant.

Control and tracking processes in use for maintenance activities were also reviewed. It was determined that the licensee had an appropriate system for establishing the priority of maintenance activities and controlling backlogged work. This prioritization system should ensure that all important to safety equipment will be available when required in support of unit restart. In addition, the maintenance manager must review all low priority backlogged work (which is not necessary to be completed) to determine if it has been properly classified. This review will then be presented to the Start Up Review Board so that a determination can be made to proceed with startup.

During observation of control room activities, it was found that the shift supervisor and/or the unit SRO were properly notified of planned maintenance activities and exercised proper control by review and approval of Maintenance Orders. This ensured that the activity could be safely conducted and ensured that the operators were aware of the plant current conditions. Shift briefings and relief turnovers were observed in which the ongoing maintenance activities were adequately discussed. In addition to this routine approval process, prior to unit restart, senior maintenance management is required to sign the Operation's Start Up Checkoff List (OP-6). Through this, each senior maintenance supervisor is required to review all outstanding work and inform the operations staff that all work was completed to support restart.

Conclusions:

These reviews, together with the prioritization system and the recent field verification of deficiency tags, should ensure that backlogged maintenance activities should not adversely affect unit start up.

5.2 Surveillance Assessment

Findings:

The inspectors performed an assessment of the surveillance program to ensure that Technical Specification (TS) Surveillance Requirements were completed within the required interval and to support operational mode changes.

In addition to direct observation of activities in the field, the inspectors reviewed surveillance program attributes that control and schedule surveillance tests to assure TS requirements are met and that address the handling of out-of-specification conditions to ensure proper operation of equipment. The inspectors also verified that unit interface controls were established, if necessary.

The inspectors observed or reviewed portions of the following surveillance test procedures (STPs):

STP 0-8A-2 Monthly test of the No. 12 diesel generator and No. 21 4KV bus sequencer conducted February 7, 1991.

STP 0-8C-0 Semi-annual test of No. 12 diesel generator conducted November 30, 1990.

STP 0-4-2 Modified integrated engineered safety features test conducted February 5, 1991.

STP 0-73K-2 No. 21 containment spray pump performance test conducted February 5, 1991.

With respect to the observed activities, the procedures were adequate and were adhered to and the staff performing the STPs demonstrated a good level of knowledge. It was evident that the newer STPs that were written using the procedures writer's guide developed under the PUP, were of a much higher quality and more clearly describe the feature being tested. The shift supervisor and control room SRO demonstrated good control over the surveillance testing activities, as well as other ongoing work that affected systems necessary for operation or that could have interfered with the testing.

The "modified" STP 0-4-2 was a major test activity requiring observation by and coordination of approximately 10 to 12 staff personnel assigned throughout the plant. The pretest briefing for this activity was very good. As an example, during the original briefing the procedure was determined to be technically inadequate by the operators prior to attempting the test. The procedure was subsequently corrected and the test was conducted satisfactorily.

With respect to the post maintenance test of the No. 21 containment spray pump, which was being observed by the inspector, the operators took appropriate action to quickly secure the pump when the field operator identified the seal and apparent bearing failure.

The licensee's surveillance control program was also reviewed. It was determined that controls are established to ensure that TS Surveillance Requirements are scheduled to ensure that the required test interval is met. Various department managers responsible for conducting the surveillance tests, are required to verify completion by signature on Operation's Start Up Check List, OP-6, prior to operational mode change. In addition, controls were in place to revise the STPs as a result of TS changes. Three recent TS changes were reviewed and were reflected in the STPs.

The Surveillance Test Coordinator maintains a master schedule of surveillance activities. This schedule is provided to the various departments on a two week look ahead schedule so that the STPs could be appropriately assigned for completion. This schedule is dependent upon the accuracy of the Technical Specification Cross Reference List of Surveillance Requirements. This list is a cross reference between the TS Surveillance Requirements and the implementing STPs.

Recent licensee audit findings were reviewed by the inspector. The findings indicate that there is a continuing need to complete the Surveillance Test Program upgrade. As part of the PIP, the licensee initiated a change to the Surveillance Test Program management to provide more central control. This effort has been completed. However, the licensee is still in the process of completing the procedure(s) upgrade for the Surveillance Test Program. This upgrade is a result of the PUP and is called the Technical Adequacy Review Program (TARP). The TARP is being implemented in three phases. The first phase, which included a 100% verification that there is a Surveillance Test Procedure (STP) to implement a given TS Surveillance Requirement, is complete. The second phase is designed to ensure that the implementing procedure is technically correct. The final phase will be a review of the TS Surveillance Requirements to ensure that the TS surveillance requirements adequately determine equipment operability.

Phase one of the TARP has been completed and there is confidence that the Technical Specification Cross Reference List is accurate and that the TS Surveillance Requirements are being appropriately completed. However, during 1990, there were eight Licensee Event Reports (LERs) written involving surveillance activities. These LERs were a result of surveillance test procedures that were not technically correct. The licensee is aware of this issue and is actively taking corrective action through phase two of the TARP which is scheduled to be completed in mid-1991. The inspector reviewed a sample of test procedures to determine if they adequately implement the Surveillance Requirements. No discrepancies were identified. The inspector had no further questions regarding the licensee's surveillance test program.

Conclusions:

The team concluded, with respect to the observed activities, that in general the procedures were adequate and were being adhered to. The staff performing the STPs demonstrated a good level of knowledge. The newer STPs that were written using the procedures writer's guide developed under the PUP, were of a much higher quality and more clearly describe the feature being tested. The shift supervisor and control room SRO demonstrated good control over the surveillance testing activities, as well as other ongoing work that affected systems necessary for operation or could have interfered with the testing. Controls are established to ensure TS Surveillance Requirements are scheduled at the required test interval and completed in a timely manner. Further, controls are established to ensure that Surveillance activities are completed as necessary to support unit startup.

5.3 Summary

There are mechanisms in place, including a sufficient level of checks and balances, to assure that significant outstanding maintenance and surveillance activities are being appropriately prioritized. Further, there is confidence that these controls should ensure that the Technical Specifications will be satisfied for unit startup.

6.0 SAFETY ASSESSMENT/QUALITY VERIFICATION

Purpose:

The inspectors conducted a review of selected station oversight functions, quality verification activities and problem identification/resolution processes to assess the effectiveness of these programs and processes in identifying problems and assuring adequate corrective actions to support a safe restart of Unit 2 and continued safe operation of Unit 1.

Scope:

To assess this area the inspectors observed ongoing processes, interviewed responsible station personnel, and reviewed the tangible results of selected safety assessment programs and processes.

6.1 Oversight Functions

A. Startup Review Board (SURB)

Findings:

The SURB is a temporary body made up of senior Nuclear Energy Division managers tasked with reviewing and assessing the restart of both units. The SURB makes recommendations regarding station operations directly to the Plant General Manager (PGM). The inspectors reviewed the Unit 2 Startup Plan, dated January 30, 1991, which was prepared and approved by the SURB, the minutes from several past SURB meetings (December 4, 1990 through January 14, 1991) and the SURB Self-Assessment Report, dated October 29, 1990 of the September 1990 Unit 1 restart. The inspectors noted that the lessons learned from the Unit 1 restart self-assessment had been incorporated into the Unit 2 Startup Plan. In addition, the inspectors observed that the meeting minutes reflected a thorough examination of each specific lesson learned and that appropriate recommendations were made to the PGM. The SURB process will be continued through the startup of Unit 2 and will again be the focal point for the restart self-assessment.

Conclusions:

The inspectors concluded that the SURB's Unit 2 Restart Plan provided an adequate vehicle for the assessment of major milestones in the Unit 2 startup process and that the Unit 1 self-assessment lessons learned had been appropriately incorporated into this plan.

B. Plant Operations and Safety Review Committee (POSRC)

Findings:

POSRC is the on-site committee responsible for the review of all matters related to nuclear safety and for advising the PGM, on the same, as specified in the Plant Technical Specifications. The inspectors attended two routine POSRC meetings (No. 91-027 and 91-028) and observed the various presentations made by station personnel and the subsequent POSRC member discussions. Following the meetings, the inspectors held a debrief with the POSRC Chairman to clarify understandings of the discussions held and to provide inspector observations to the Chairman.

Conclusions:

The inspectors concluded that, in general, the interdisciplinary reviews and detailed discussions observed at the POSRC meetings were well focused and thoroughly addressed the safety issues. The POSRC members did not hesitate to defer their approval if additional information was needed. In addition, the inspector observed at the conclusion of one meeting a critique of the individual presenters. These critiques were conducted to provide feedback to the presenter and thereby improve the subsequent presentations and consequently make the POSRC meetings more efficient. The inspector did note one presentation and subsequent POSRC approval of a component cooling water system change (FCR/FEC No. 90-11) which was conducted with neither the Operations Department voting POSRC member nor the Senior Reactor Operator license holder member present. Consideration was given to their absence by the POSRC, however, it concluded that there was sufficient operations experience present within the assembled quorum to provide an adequate review and approval to the change. The inspector found their deliberation and approval process acceptable.

C. Independent Safety Evaluation Unit (ISEU)

Findings:

The inspector reviewed ISEU activities with respect to assessments made of Unit 1 restart and planned activities for the Unit 2 startup. The inspector determined that assessment plans were still being formalized for the Unit 2 startup and some of the targeted areas for review include: corrective actions for Unit 1 restart problems; SURB process effectiveness; use of overtime; safety issues resolution; training; and Operating Procedure (OP)-6 sign-off verifications. These planned activities appeared to be performance oriented and not duplicative of other oversight group activities.

The inspector determined that the ISEU review of Unit 1 restart activities was captured in their evaluation, which consisted of an assessment of ten operational events which occurred between August and October 1990. The inspector found the evaluation to be concise and well-written. The events appeared to be thoroughly examined and the findings and recommendations well founded. However, because of the sensitivity of some of the evaluation findings the evaluation was published with limited distribution and did not receive POSRC safety review. The inspector acknowledged the necessity to protect the confidentiality of individuals when dealing with sensitive issues. However, the potential broader implications of these matters and the specific programmatic concerns raised in the evaluation appeared to warrant an interdisciplinary review by both the POSRC and the Off-Site Safety Review Committee (OSSRC).

Conclusions:

The inspector determined that the evaluation had received senior BG&E management review and had been presented to the SURB. Prior to the conclusion of the team inspection, the General Plant Manager informed the inspector that a closed session of the POSRC would review the evaluation and that the OSSRC would also make their assessment of the evaluation. The inspector found these actions satisfactory.

D. Operations Management Overview

Findings:

The inspector discussed planned oversight activities for the Unit 2 startup with the Superintendent of Nuclear Operations (SNO). The inspector determined that the planned oversight functions would be much the same as the Unit 1 restart. That effort primarily consisted of placing Assistant Operations General Supervisors (AOGS) on shift to provide 24-hour coverage and direct operations management overview of all startup related activities. The inspector reviewed the Unit 1 Startup AOGS Logbook entries and concluded that on-shift events, problems and concerns and system status were clearly documented in the logs and that performance assessments and lessons learned were written in the logbook, as well.

In addition, the inspector determined that the operations department was developing a scheduled internal audit program. This program is intended to provide a mechanism for periodic internal audits of various operations functions. This program was planned to be implemented in the near term.

The inspector reviewed Operating Procedure (OP)-6, Startup Checklist and discussed its content with operations management. Procedural revisions were made to OP-6 to reflect some of the lessons learned from the Unit 1 restart. Of particular note was the assignment of the various department representatives to specific unit readiness sign-offs for their area(s) of responsibility. This practice lends itself to better definition of duties and responsibilities as well as greater individual accountability.

Conclusion:

The inspector concluded that the planned operations management 24-hour shift coverage was a [illegible] while endeavor based upon the documented Unit 1 reviews and that OP-6 was a [illegible]ehensive listing of all the prerequisites for the various mode changes.

E. Significant Issues Management System

Finding:

The inspector discussed and reviewed the Plant Manager's Significant Issues List (PMSIL) with him. The inspector determined that the PMSIL is a consolidation of a number of significant issues which impact Unit 2 restart but duplicates tracking systems such as the POSRC open items and mode restraining non-conformance reports.

The inspector reviewed specific items on the PMSIL and compared those with the other tracking systems being implemented. The inspector found good correlation between the lists and the proper prioritization of the specific items.

Conclusion:

The inspectors concluded that the PMSIL was an adequate management tool with respect to having one definitive list of important outage work items.

6.2 Quality Assurance and Verification Functions

A. Quality Assurance Surveillances

Findings:

The inspector reviewed the Quality Audits Unit (QAU) surveillance schedule being implemented to assess preparations for and activities planned for the Unit 2 startup. The schedule was developed by QAU in conjunction with SURB inputs from the Unit 1 restart self-assessment. In addition, the inspector reviewed QAUP-9, Activity Surveillance Program, and a sampling of recently completed QAU surveillances.

Conclusion:

The inspector found the completed QA surveillances and the list of those scheduled to be satisfactory.

B. Quality Verification and Quality Engineering Unit

Findings:

The inspector discussed the functions of the Quality Verification (QV) and Quality Engineering Unit (QEU) with the responsible QA managers. The inspector learned that no additional QV or QEU activities were planned for the Unit 2 startup. These groups' functions are relatively routine in nature. QEU reviews the Maintenance Orders (MOs) on a daily basis and ensures that they are satisfactorily written. QEU retains the option to generate a Quality Verification Inspection Instruction (QVII) to be performed in conjunction with the MO by a QV inspector.

Through discussions with the QA managers, the inspector determined that there currently exists no tracking or trending of either QVII results (rejectable or acceptable attributes) or QEU MO review results (satisfactory MOs or those requiring revision). The QA managers indicated that such information could be retrieved for QEU Maintenance Orders reviews, but nothing was immediately available for tracking QVII results. A revision to the QVII program was planned to be implemented in June 1991 and will incorporate a computer tracking and trending system. In the interim, the QA manager stated his interest in implementing a tracking system for both of these QA elements to provide a viable means of assessing and providing feedback on Maintenance Department performance and for ensuring optimum utilization of QA organization oversight resources. The inspector had no further questions regarding this issue.

Conclusion:

The inspector concluded that the QV and QEU activities are adequate in providing quality verification of station activities with identified areas of opportunity for improvement. The additional reviews agreed to by the QA manager and the implementation of the forthcoming tracking systems should contribute toward the increased effectiveness and oversight of these quality verification functions.

6.3 Problem Identification and Resolution

A. Problem Reports

Findings:

In early 1990, BG&E revised their program for identifying and resolving conditions which may be adverse to quality. Calvert Cliffs Instruction (CCI)-116, Revision H, Identification and Control of Non-Conforming Conditions, provides the guidelines for implementation of this program. The inspector reviewed the program, observed its use, witnessed the initial processing of Problem Reports (PRs) and reviewed a sampling of closed PRs and Non-Conformance Reports (NCRs).

The inspectors observed [illegible]lation of several PRs during the inspection and noted a broad spectrum of concerns be[illegible]entified by a variety of station organizations and individuals. The large number of PRs being generated and proce[illegible]sed and the obvious [illegible] threshold of reporting conditions potentially adverse to quality were considered a program strength. In addition, the inspectors witnessed the initial screening of recently generated PRs by the PR Review Group. The PR Review Group consists of QV, Operations and Plant (Systems) Engineering representatives with a Design Engineering representative typically in attendance. Their initial screening was considered timely and thorough, providing for a comprehensive cross-disciplinary review and possible referral for further engineering evaluation and/or potential reportability. The PR Review Group was also considered a noteworthy program strength.

The inspector did note that the duties and responsibilities of the PR Review Group were not explicitly defined in CCI-116, Revision H, and that the PR Review Group was established by General Plant Manager (GPM) memorandum dated July 27, 1990. The PR Review Group has been providing a valuable contribution to the PR review and resolution process; however, its duties and responsibilities should be formalized in the applicable CCI to ensure continued effectiveness of the program. This situation was discussed with station and Quality Verification management. It was reported to the inspectors that the PR Review Group is an interim measure. The function of this group will be taken over by an Issues Management Unit, whose activities will be more fully documented as stated in the Performance Improvement Plan (PIP).

Conclusion:

The inspector concluded that the implementation of problem identification and resolution, particularly as reflected in the functions of the PR Review Group, are a noteworthy strength. The inspector noted that the licensee plans to make this review group a permanent part of the problem identification process.

B. Maintenance Orders (MOs) Generation

Findings:

During the review of Quality Verification activities, discussed in section 5.2 above, the inspector learned that deficiencies in the MO generation and review process were identified by QEU and communicated to the Maintenance Department by memorandum (reference DJV to TJC memo, dated March 13, 1990). These deficiencies included vague instructions, insufficient detail in the MOs and use of uncontrolled documents. The inspector determined the problem highlighted by the deficiencies received proper management attention and resolution, however, the inspector noted that it was not tracked, resolved and subsequently closed-out by the existing formal QA or station problem identification and resolution process. The team did not see any similar problems in the maintenance orders that were reviewed during the inspection.

Conclusion:

The inspector concluded that appropriate, although informal, corrective action was taken in the above activity. The current Problem Reporting process, discussed in Paragraph 5.3A above, is a formal process and identifies problems at a low threshold level of significance.

C. Parts Cannibalization Controls

Findings:

The inspector reviewed the control of cannibalized parts from Unit 2 to support restart of Unit 1. The inspector determined that the concern for the adequacy of control over cannibalized parts was initially identified by BG&E as documented in Non-Conformance Report (NCR) 10430, dated August 8, 1990. The concern was characterized as a lack of programmatic controls. In response to the NCR, BG&E has drafted an Administrative Procedure (still under review) which is intended to improve the tracking of both safety and non-safety related cannibalized components.

Followup by the inspector identified that Maintenance Orders (MOs) for work activities at either unit provide appropriate, although somewhat cumbersome, controls of parts cannibalization. A part or component at either unit cannot be cannibalized without a MO authorizing the activity. That MO becomes the tracking vehicle. However, BG&E identified that the current MO procedural controls do not always address or highlight the cannibalization aspect of the work activity. Consequently, the individual maintenance disciplines' Assistant General Supervisors had established informal tracking systems to list these type of MOs. The inspector noted that a historical review was conducted by one shop to ensure that no completed MO used for cannibalization of parts had been overlooked. This provided further assurance that previous cannibalization was not a problem for the Unit 2 restart.

Conclusion:

The inspector concluded that parts cannibalization was being adequately, albeit informally, controlled and that efforts were ongoing to enhance the procedural controls.

D. Procedure Change Process

Findings:

The inspectors reviewed the existing procedure change process (both permanent and temporary changes) to assess the adequacy of the program. The inspectors reviewed the governing instruction, CCI-101, Revision N, Calvert Cliffs Implementing Procedure Development and Control, and found it to be satisfactory. Positive attributes of the instruction were the detailed procedure review checklist (Attachment 6) and change flowchart (Attachment 7). However, the inspector noted that the instruction does not explicitly address either the applicability of the procedure change to the opposite unit or the potential impact on other associated station procedures. The inspector did identify that some of the disciplines on site were using an informal checklist to accomplish this cross-reference to other procedures and the adjacent unit's procedures. The inspector did not identify any direct problems resulting from this lack of cross-referencing of procedure changes, but considered this observation to be an opportunity for improvement of the procedure change process. The inspector was also made aware of a SURB initiative that directed the station procedure groups to review all Unit 1 procedure changes for applicability to Unit 2.

Conclusion:

The control and assessment of procedural changes are part of a strong and well implemented station program. There is an opportunity for improvement, however, as evidenced by the reliance by station procedure generating groups on informal quality verification checklists to ensure adequate cross-referencing of procedure changes and to control effects on the other unit.

E. Systems Engineering

Findings:

Inspector followup of the parts cannibalization issue, Problem Report program and the procedural change process led the inspector to review the systems engineering department involvement in the overall process of problem identification and resolution. The inspector determined that the system engineer for any mechanical system has cognizance over both units' systems. In addition, Systems Engineering becomes initially involved in problem resolution as part of the PR Review Group, as discussed in Section 6.3.A.

Further discussions with a few of the system engineers identified that the specific duties and responsibilities of the system engineers were defined in a memorandum from CRM, dated August 14, 1989, titled, System Engineer Job Description. The inspector found the memorandum to be well written and generally comprehensive in defining the responsibilities of the system engineers and their various interfaces with other station disciplines. Various team members interacted with licensee system engineers during the inspection and in all cases the individuals were knowledgeable in their areas of expertise.

Conclusion:

The team concluded that adequate definition of the system engineer program existed and that the system engineers contacted had satisfactory knowledge in their areas of responsibility.

6.4 Summary

The inspectors overall assessment of this functional area is satisfactory. The inspectors witnessed and reviewed the processes used to identify, track and resolve equipment failures, programmatic concerns, non-conforming conditions and procedural deficiencies and concluded they were adequate. The Problem Reporting Process was particularly noteworthy, in that, the threshold for reporting problems by this program was low and the timeliness and thoroughness of the initial screening process were good. However, the inspectors found evidence of informal problem identification and resolution processes and identified some opportunities for improving existing processes.

7.0 MANAGEMENT MEETINGS

The Team Leader held meetings with the Plant General Manager (PGM) and representatives from the Compliance Engineering Group each day to discuss the preliminary findings or concerns of the inspection team. A final exit meeting was conducted February 8, 1991. At the exit meeting the Team Leader described the preliminary inspection results, including both the preliminary overall conclusions and the preliminary findings and observations including positive program attributes and identified weaknesses in each functional area. The Team Manager discussed how the Team findings would be used in NRC deliberations regarding facility restart readiness. The Baltimore Gas and Electric Vice President-Nuclear Energy Division and Station Management at the General Manager and Superintendent level attended the exit meeting (See Attachment A).

ATTACHMENT A

Personnel Attending February 8, 1991 Exit Meeting

Baltimore Gas and Electric Company

G. Creel, Vice President, Nuclear Energy Division
T. Camilleri, Superintendent, Maintenance
C. Cruse, Manager, Nuclear Engineering Department
S. Davis, Principle Engineer, Technical Support
R. Denton, Plant General Manager
G. Detter, Director, Nuclear Matters
D. Graf, Manager, Nuclear Outage and Projects
J. Hayden, Supervisor, Maintenance Programs
R. Heibel, Manager, Quality Assurance
P. Katz, Superintendent, Technical Support
L. Larragoite, Compliance Engineer
J. Lemons, Manager, Nuclear Support Services Department
M. Milbradt, Compliance Engineer
J. Rivera, Senior Operational Safety Analyst
R. Wenderlich, Superintendent, Nuclear Operations
J. Yoe, Training Support Supervisor

State of Maryland

R. McLean, Manager, Nuclear Evaluations

U. S. Nuclear Regulatory Commission

C. Hehl, Director, Division of Reactor Projects, Region I
L. Briggs, Senior Operations Engineer (Team Leader)
W. Cook, Senior Resident Inspector, Nine Mile Point, Units 1 & 2
C. Cowgill, Chief, Reactor Projects Section 1A (Team Manager)
R. Freudenberger, Resident Inspector, Maine Yankee
A. Howe, Resident Inspector, Calvert Cliffs
W. Maier, Operations Engineer
L. Nicholson, Senior Resident Inspector, Calvert Cliffs
P. Ray, Operations Engineer, NRR/DLPQ
D. Silk, Senior Operations Engineer
R. Summers, Project Engineer, Division of Reactor Projects