U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NO. 50-317/86-99; 50-318/86-99

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT

ASSESSMENT PERIOD: May 1, 1986 - August 31, 1987

TABLE OF CONTENTS

I. INTRODUCTION

A. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect the available observations and data on a periodic basis and to evaluate licensee performance based upon this information. The SALP program is supplemental to normal regulatory processes used to ensure compliance to NRC rules and regulations. The SALP program is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee's management to promote quality and safety of plant operation.

The NRC SALP Board, composed of the staff members listed below, met on October 16, 1987 to review the collection of performance observations and data and to assess licensee performance in accordance with guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance". A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety performance at the Calvert Cliffs Nuclear Power Plant for the period May 1, 1986 through August 31, 1987. It is noted that the summary findings and totals reflect a 16 month assessment period.

The SALP Board was comprised of the following:

Chairman

W. F. Kane, Director, Division of Reactor Projects (DRP)

Members

T. T. Martin, Director, Division of Radiation Safety and Safeguards (DRSS) (Part-Time)
W. V. Johnston, Acting Director, Division of Reactor Safety (DRS) (Part-Time)
R. A. Capra, Acting Director, Project Directorate I-1, NRR
S. J. Collins, Deputy Director, DRP (Part-Time)
R. R. Bellamy, Chief, Emergency Preparedness and Radiological Protection Branch, DRSS (Part-Time)
J. P. Durr, Acting Deputy Director, DRS (Part-Time)
J. H. Joyner, Chief, Nuclear Materials Safety and Safeguards Branch, DRSS (Part-Time)
L. E. Tripp, Chief, Reactor Projects Section (RPS) No. 3A, DRP
T. Foley, Senior Resident Inspector, Calvert Cliffs Nuclear Power Plant
S. A. McNeill, Project Manager, Project Directorate I-1, NRR

Other Attendees (non-voting)

D. C. Trimble, Resident Inspector, Calvert Cliffs NPP
D. F. Limroth, Project Engineer, RPS 3A, DRP (Part-Time)
A. B. Sidpara, Reactor Engineer, RPS 3A, DRP (Part-Time)
C. A. Carpenter, Reactor Engineer, RPS 3C, DRP (Part-Time)

II. CRITERIA

Licensee performance is assessed in selected functional areas. Functional areas normally represent areas significant to nuclear safety and the environment.

One or more of the following evaluation criteria were used to assess each area.

1. Management involvement and control in assuring quality.

2. Approach to resolution of technical issues from a safety standpoint.

3. Responsiveness to NRC initiatives.

4. Enforcement history.

5. Operation events (including response to, analysis of, and corrective actions for).

6. Staffing (including management).

7. Training and qualification effectiveness .

However, the SALP Board is not limited to these criteria and others may have been used where appropriate.

Based upon the SALP Board assessment each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and concerned with nuclear safety; licensee resources are adequate and reasonably effective so that satisfactory performance with respect to operational safety is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear strained or not effectively used such that minimally satisfactory performance with respect to operational safety is being achieved.

The SALP Board may determine to include an appraisal of the performance trend of a functional area. Normally, this performance trend is only used where both a definite trend of performance is discernible to the Board and the Board believes that continuation of the trend may result in a change of performance level. Improving (declining) trend is defined as:

Licensee performance was determined to be improving (declining) near the close of the assessment period.

III. SUMMARY OF RESULTS

A. Overall Summary

Our assessment of your performance during this assessment indicates that three broad problem areas were evident; (1) management control of interfaces between departments (i.e., dissemination of engineering requirements to the field, integration of systems engineers into the plant staff, and functioning together as a team), (2) insufficient resources in the maintenance and engineering departments hampering their ability to support operations (slow resolution of recurrent equipment problems), and (3) ineffective use of available tools to recognize emerging plant problems (i.e. QA audits, lack of independence of oversight committees).

There were additional weaknesses in surveillance testing, communication of results to appropriate levels of management, and adequate followup/resolution of indicators of potential equipment operability problems. As a result, optimal equipment operability/reliability was not always achieved. Furthermore, post-maintenance and surveillance testing appeared to be oriented toward demonstrating Technical Specification compliance rather than assuring equipment reliability. Existing systems have achieved limited success in prioritizing maintenance activities and resolving long standing deficiencies. The failure to demonstrate timely decision making and protective action recommendations in the emergency planning area indicated reduced attention to this function. Housekeeping was observed to deteriorate during outages, particularly in individual contaminated areas. In addition to being hindered by interface, coordination, communication, and resource problems, engineering appeared to be overloaded with better direction and guidance needed regarding prioritization.

Notwithstanding the weaknesses discussed above, notable areas of strength were observed. These include (1) the Trip Reduction Task Force and a Trip Evaluation Review Group that were instrumental in helping prevent trips from recurrent causes and provided root cause diagnosis of the cause(s) of feed pump trips, (2) performance of licensed operators, (3) the in-plant radiation protection program which continued to achieve good control of exposures and a strong ALARA effort, (4) the 10-year In-Service Inspection program which was well managed and displayed good initiative in implementing state-of-the-art techniques that often exceeded regulatory requirements, (5) a loss of off-site power event which was handled well, (6) well

coordinated and managed refueling and outage activities, (7) consolidation and movement of engineering functions to the site, (8) the technical ability, credibility and effectiveness of the QA department by recent initiatives to add more technically oriented staff and to use outside consultants to assess performance in complex areas, and (9) well trained and highly motivated plant employees and first line supervisors.

In summary, although significant areas of strength were noted, overall performance slipped during this period. Recognition and resolution of deficiencies, including timeliness and comprehensiveness of root cause analyses, continued to be a problem although some progress was noted toward the end of the period. Improved interfaces between the Engineering, Operations and Maintenance Departments to assure that they work together effectively as a team is considered to be the primary area for improvement.

B. Background

1. Licensee Activities

Unit 1

Unit 1 was at full reactor power (825 MWe) at the beginning of the assessment period. From May 16 to May 19, 1986 the unit was at reduced power (790 MWe) for installation of a new type of traveling screen. On June 20, power was reduced to 1% to permit a containment entry to add oil to No. 12A reactor coolant pump upper oil reservoir. The unit was returned to 100% power operation on June 22, 1986.

On July 10, a large influx of jellyfish, crabs, and marine life caused shear pins on the travelling screen motors to shear thus necessitating a power reduction. This was followed by several days where the bay oxygen concentration was below normal causing increased marine life to accumulate at the intake structure. On July 20, reactor coolant pump 12B tripped off, due to grounds within a capacitor, also causing a plant trip. The unit was returned to service the following day.

On August 3, the licensee reduced power to perform a temperature coefficient surveillance. During much of the month of August, licensee personnel spent considerable time in preparation for the upcoming ten year In-Service Inspection (ISI) and refueling outage scheduled for October 25, 1986. On October 10 an operator mispositioned a condenser off-gas discharge valve causing a loss of condenser vacuum and a turbine trip, resulting in a reactor trip. During the restart from this trip, the unit tripped again on October 11 from 15% power due to axial flux offset. The plant was returned to power operations on October 11, 1986 and continued routine operation.

On October 24, the unit was shut down to commence the 10-year In-Service Inspection and refueling outage.

The licensee had requested and was granted an emergency Technical Specification change to allow refueling to be conducted without an operable diesel generator specifically assigned to that unit. The unit continued the outage keeping close to schedule. Work activities proceeded in a systematic, harmonious, and steady manner. However, final repair of the No. 12 diesel generator (DG), repairs to the main generator collector and retaining ring and failure of the #11B reactor coolant pump shaft seal all contributed to delays (a few days each) in outage recovery activities.

On December 31, the unit was refueled and ready for startup activities while awaiting resolution of the hydrogen seal and main generator bearing problems.

Unit 1 was returned to power operation on January 12, 1987. A manual trip occurred on January 27 following a loss of instrument air pressure due to an operator error in returning the instrument air system to a normal valve alignment at the conclusion of a system performance test. Two condensate booster pumps were damaged during the event, which delayed unit start up until January 31. On February 1, Unit 1 was manually tripped following a turbine run back due to low stator cooling liquid pressure. The manual trip was in anticipation of an automatic trip on high reactor coolant system pressure. The unit was returned to power on February 2. On February 7, the unit was removed from the grid to repair an oil leak on a turbine intercept valve.

On March 10, the reactor coolant quench tank rupture disk ruptured due to a leaky pressurizer safety valve. The unit was subsequently shut down, the safety valves replaced and the pressurizer vent valves repaired. The unit was returned to power operations on March 15. During the week of March 23, NRC regional specialists reviewed environmental qualification (EQ) outstanding items and observed apparent inadequacies in the program. Routine operations continued until April 1, when the licensee identified additional EQ deficiencies and the unit was shut down to correct discrepancies.

On April 14, 1987, containment spray was inadvertently initiated due to operator error in performing a valve lineup.

On April 23, 1987, the licensee informed the NRC that certain replacement items (principally threaded fasteners) not fully meeting AMSE code requirements had been used in Class 1, 2, and 3 systems on both units. While the non-conforming parts appeared to have been manufactured from the correct material, they did not meet code requirements with respect to marking, certification and, in some cases, non-destructive examination. Resolution of this issue coupled with the EQ problems forced Unit 1 to extend the shutdown.

On May 27, Unit 1 entered Mode 1 after completing surveillance, Mechanical Commercial Quality and EQ post maintenance testing. The unit paralleled to the grid, escalated in power on May 28 and remained at 100% power throughout the remainder of the period.

Unit 2

Unit 2 began the assessment period at full reactor power (825 MWe). The unit was manually tripped on May 21, 1986 because of a loss of steam generator feed pumps (SGFP). The cause of the loss of the SGFPs was not determined. On May 23, 1986 the unit was paralleled to the grid.

On May 27, 1986, the unit was automatically tripped due to loss of SGFPs. On May 28, 1986, the unit was paralleled to the grid and remained at 60% power (520 MWe) to test the SGFP instrumentation. Testing of the SGFP instrumentation remained in progress from May 28, 1986 until June 7.

On July 25, a decision was made to shut down due to a concern regarding increasing vibration trends on reactor coolant pump (RCP) #21B. Before shut down commenced, a RCP #21A seal pressure transmitter flex hose end fitting separated causing a reactor coolant leak. An Unusual Event was declared as required by the site Emergency Plan due to any forced shut down required by Technical Specifications. The plant remained shut down while industry experts evaluated vibration traces from RCP #21B until August 1 when the unit was restarted.

On September 5, the unit tripped due to a failed surge capacitor on No. 21A Reactor Coolant Pump. The unit was returned to operation on September 7. Full power operation continued until September 12 when operators manually tripped the plant due to a loss of No. 21 SGFP and an impending low steam generator water level. The unit was returned to service on September 14; however, power level was maintained at 60% (capacity of a single feed pump) while the Trip Evaluation and Review Group (TERG) directed troubleshooting efforts on 21 SGFP control system. On September 18, the unit underwent a controlled shutdown anticipating the inability to meet a Technical Specification Limiting Condition for Operation Action Statement due to an inoperable emergency diesel generator. With NRC concurrence, the unit was returned to 60% power until September 20 when repairs were completed. Full power operations were resumed. During September considerable time was devoted to resolving problems associated with No. 12 emergency diesel generator jacket water cooling pressure oscillations, apparently caused by carbon monoxide (CO) leaking into the cooling system. These efforts extended from September 10 through October 7.

Unit 2 operated at full power until February 28, when the unit tripped on low steam generator water level due to a level control system failure. The unit had been in operation for 169 consecutive days.

On March 13, the unit shut down to commence its 10 year In-Service Inspection and Refueling Outage.

On July 3, the unit was paralleled to the grid and tripped on low steam pressure due to an incorrect rheostat setting in the turbine control circuit initial valve position limiter. The unit returned to power operations later that day but was limited to reduced power operation due to turbine bearing vibration. It was brought to zero power and a balance shot was performed on July 8; then returned to power on July 9, 1987.

2. Inspection Activities

Two NRC resident inspectors were assigned during the inspection period. The total NRC inspection effort for the period was 4018 hours (3013.5 annualized) with a distribution in the appraisal functional areas as shown in Table 2 (Inspection Hour Summary). Table 1 lists every NRC inspection conducted at Calvert Cliffs during this period.

During the period, NRC team inspections were conducted of the following areas:

a. Actions taken relative to Generic Letter 83-28 in the area of Equipment Classification, Vendor Interface, Post Maintenance Testing, Surveillance and QA/QC overview (Inspection Report 317/86-10, 318/86-10.

b. Emergency Preparedness Partial Scale Exercise and subsequent remedial drill (Inspection Report 317/86-14).

c. Follow up of licensee actions relative to deficiencies previously identified regarding Post Accident Sampling capabilities (Inspection Report 317/87-03).

d. Follow up inspection of Environmental Qualification deficiencies, Post Maintenance Testing, use of Commercial Grade Fasteners (Inspection Report 317/87-13 and 318/87-14).

Inspection Activities are summarized in Tables 1 and 2. Enforcement activities are summarized in Table 3.

This report also discusses "Training and Qualification Effectiveness" and "Assurance of Quality" as separate functional areas. Although these topics, in themselves, are assessed in the other functional areas through their use as criteria, the two areas provide a synopsis. For example, quality assurance effectiveness has been assessed on a day-to-day basis by resident inspectors and as an integral aspect of specialist inspection. Although quality work is the responsibility of every employee, one of the management tools to measure this effectiveness is reliance on quality assurance inspections and audits. Other major factors that influence quality, such as involvement of first-line supervision, safety committees, and work attitudes, are discussed in each area.

The topic of fire protection is not discussed as a separate functional area because of insufficient inspection activity. The available observations on fire protection and housekeeping are included in the various relevant functional areas.

C. Facility Performance Analysis Summary

Functional Area	Category Last Period 10/1/84-4/30/86	Category This Period 05/1/86-08/31/87	Trend
1. Plant Operations	2	2	Improving
2. Chemistry and Radiological Controls	1	1	
3. Maintenance	2	2	
4. Surveillance	1	2	
5. Emergency Preparedness	1	2	
6. Security and Safeguards	1	1	
7. Refueling, Outage Management	2	1	Declining
8. Engineering Support	N/A	3	Improving
9. Licensing Activities	1	2	
10. Assurance of Quality	2	2	
11. Training and Qualification Effectiveness	2	2	Improving

D. Unplanned Shutdowns, Plant Trips, and Forced Outages

UNIT 1

Date & Power Level	Description	Cause	Functional Area
07/20/86 - 100%	Loss of flow and automatic reactor trip; reactor coolant pump surge capacitor failure	Long-standing repetitive design deficiency	Engr.
10/10/86 - 100%	Automatic turbine/reactor trip; loss of condenser vacuum due to auxiliary operator mispositioning an off gas discharge valve	Personnel error	Ops.
10/11/86 - 15%	Automatic reactor trip; axial flux offset during start up	Inadequate procedure and training	Ops.
01/27/87 - 100%	Manual reactor trip due to imminent steam generator low level caused by loss of instrument air due to the same auxiliary operator as above mispositioning valves during a restoration from a performance test	Personnel error	Ops.
02/01/87 - 70%	Manual reactor trip in anticipation of high RCS pressure following a turbine run back caused by low stator cooling liquid pressure	Inadequate procedure	Ops.
02/07/87	Unit was removed from the grid to repair an oil leak on the turbine intercept valves		
03/10/87 - 100%	Controlled shutdown due to a blown RCS quench tank rupture disc caused by leaky code safety valves and insufficient spare parts	Component failure	Ops.

Date & Power Level	Description	Cause	Functional Area
04/01/87 - 100%	Controlled shutdown to correct environmental qualification program deficiencies	Implementation of inadequate program	Engr.
07/14/87 - 20%	Automatic reactor trip due to high steam generator water level resulting from a transient on the 16A feedwater heater combined with operator over boration	Personnel error/ training	Ops.
07/23/87 - 100%	Total loss of offsite power initiated by a ground fault (tree near relay at offsite transmission line) and overly sensitive protection relay at Calvert Cliffs	Other	N/A

UNIT 2

Date & Power Level	Description	Cause	Functional Area
05/21/86 - 100%	Manual trip due to loss of a steam generator feed pump	Grounds in FW control circuit	Maint.
05/27/86 - 100%	Automatic trip due to loss of a steam generator feed pump	Grounds in FW control circuit	Maint.
07/25/86 - 100%	Controlled shutdown to repair RCP seal flex hose transmitter line	Random component failure	Engr.
09/05/86 - 100%	Reactor coolant pump surge capacitor failure	Design	Engr.
09/12/86 - 100%	Manual reactor trip due to loss of a feed pump and impending low steam generator water level	Grounds in FW control circuit	Maint.
09/18/86	Unit underwent a controlled shutdown anticipating the inability to meet a TS LCO		Maint.
02/28/87 - 100%	Automatic reactor trip on low steam generator level resulting from the failure of control system component i.e., downcomer lead/lag unit	Random component failure	
07/03/87 - 15%	Automatic reactor trip on low steam pressure due to improper setting of the turbine control circuitry	Inadequate vendor guidance	Maint.
07/08/87 - 60%	Controlled shutdown to perform a turbine balance shot	Normal maintenance	Maint.

Date & Power Level	Description	Cause	Functional Area
07/17/87 - 80%	Controlled shutdown to repair vent and drain valves leaking greater than T/S limit and correct turbine vibration	Random component failure	
07/23/87 - 100%	Total loss of offsite power (see Unit 1, same trip)	Other	N/A

IV. PERFORMANCE ANALYSIS

A. Plant Operations (40.9%)

1. Analysis

The previous SALP determined the Operations area to be Category 2. It concluded that management needed to be more aggressive in pursuing recognition of safety issues and perform more thorough and comprehensive root cause analysis of the issues.

During the beginning of this period, inadequate pursuit of safety issues continued to be a problem as demonstrated by the three successive reactor trips caused by multiple grounds in the feedwater control system on May 21, May 27, and August 12, 1986. The utility responded to the concerns identified in the previous SALP by instituting a "Trip Evaluation Review Group" (TERG) and a "Trip Reduction Task Force". The feed pump trips were subsequently diagnosed by the TERG. Throughout the period the TERG improved the root cause analysis of operational problems.

Previously, slow to recognize potential safety issues, the licensee aggressively pursued RCP subharmonic vibration problems, unknown elsewhere in the industry, and an Emergency Diesel generator gassing problem.

In addition to pursing root cause analysis of reactor trips (see Engineering section of this report), the licensee recognized the relatively high number of reactor trips (14) during the last period and instituted a Trip Reduction Task Force. Recommendations of the task force appear to be well founded and comprehensive, however, many which have a high potential for reducing reactor trips were slow to be implemented because of engineering delays and/or resource constraints, i.e, instrument air upgrades and replacing RCP surge capacitors. Those recommendations requiring minimal time and resources have been implemented. Much of the initial task force momentum now appears to have weakened. A significant portion of the 14 reactor trips which occurred during this period would have been averted had all the recommendations been implemented at the start of this period (i.e., loss of instrument air, axial flux offset, steam generator feed pump trips and two RCP surge capacitor trips).

During the sixteen month period, five personnel errors occurred within the Operations area (see Table 4). No consistent trends or management inadequacies were evident. Operations Department shift personnel have undergone "team training" sessions on the simulator and in the classroom to improve the communications, coordination and help better use synergism in the recognition of plant transients. Two procedural inadequacies resulted in reactor trips (see Table 4). These were isolated instances and not indicative of a general problem.

The large number of licensed operators (75 active licenses; 41 SRO's, 34 RO's) allows the Operations Department to utilize experienced licensed individuals to rotate through a "Procedures Development" group and a "Tagging Authority" group. Procedures Development has been tasked with the improving procedures in general. Specific upgrades of each procedure which has the potential for causing plant trips and improving the Emergency Operating Procedures (EOPs) were in progress. Several other significant initiatives have been implemented to develop improved procedures.

In spite of the noted personnel and procedural errors, operators have responded extremely well to plant events and transients. On several occasions, operators prevented unnecessary plant transients due to equipment failures (instrument air malfunctions) by their attentiveness and quick response, i.e., July 1, 1987, during a loss of No. 13 vital AC Instrument Bus causing a loss of four reactor trip breakers and one channel of ESF. Only by close adherence to procedure and maintaining composure did operators determine the plant had not tripped. During the total loss of offsite power event, operators and the Operations staff performed professionally, conservatively, and demonstrated the culmination of knowledge by consolidating emergency preparedness training, emergency operation procedure training, knowledge of plant conditions and excellent use of operating instructions in responding to a single event. Operators performed in a normal fashion; calm, deliberate, and per procedures.

Notwithstanding the licensee responsiveness to the last SALP, improvements in the effectiveness of the Plant Operations Safety Review Committees manner of doing business may be warranted. The "organization" might be more effective if (1) the preponderance of the attending members were were not directly responsible to the chairman; (2) the chairman was less aggressive and influential; (3) recommendations were made independently to the plant manager; and (4) further use of subcommittees was evaluated. Further, a recent Quality Assurance Audit also noted this lack of independence and potential for a slight bias towards plant operation.

Routine tours of the facility and discussions with workers have indicated a very favorable attitude towards plant management and the company. Management was frequently involved in onsite activities, managers and the Vice President were usually in attendance at outage meetings and most managers were routinely seen touring the plant on housekeeping inspections. Periodically, during outages, all work was stopped in order to stress the importance of housekeeping. Generally, housekeeping was good, however, housekeeping areas within the contaminated, controlled areas were sometimes poorly maintained. Tools, hoses and debris were found in some areas with boric acid crystals and valve leakage.

The licensee continued to display a strong commitment toward licensed operator training, evidenced by a high success rate in NRC Reactor Operator (RO) and Senior Reactor Operator (SRO) examinations. Written and operating examinations were administered to four SROs, all of whom passed, and six ROs, one who failed the simulator portion of the examination and two who failed the written and operating section. Subsequently, two ROs were re-examined and found satisfactory. During this period, the simulator was first used for examinations and performed well.

The training program appears to be strong overall with some minor weaknesses. For example, the requalification training program adequately covered the potential axial shape index problems during start up at the end of cycle with a large xenon transient in progress, but operators had not practiced such a start up on the simulator.

The Shift Engineer Program was also strong. Degreed engineers obtain SRO licenses and are integrated into operational shifts. The prospective shift engineers must qualify on all plant operator watch stations prior to the license class and serve as control room supervisors and plant watch supervisors as well as STAs.

The 75 licensed operators provide a considerable depth of talent to allow for training, vacations, sickness, promotions, and spare people on shift without unnecessary overtime. The operations staff is a solid stable work force with little turnover. A new Assistant General Supervisor of Operations position has also been allotted and filled. Shift turnovers were thorough, one-on-one walk throughs of the control panels with review of administrative logs. Shift Supervisors and Control Room Operators routinely demonstrated a very conservative approach to safety. They are technically knowledgeable, professional, well trained and provide an added level of assurance in safe operation. They typically have good morale, attitudes, and an excellent rapport with the facility staff.

The operations group worked harmoniously with maintenance, HP, and others throughout this period in the area of coordinating maintenance and operations activities (see outage activities for engineering interface). They helped set maintenance priorities, optimized scheduling, tagged equipment out of service at the proper time, and ensured post maintenance testing was accomplished. They improved their guidance on what specific post operational tests were required for various types of maintenance.

The licensee placed strong emphasis on planning. Improvement in prior planning, setting priorities, and assignment of responsibilities was evidenced in the establishment of pre-shift briefings to the oncoming watch section of non-licensed operators. A recently established morning operations meeting between department general supervisors, principal and system engineers and planners now sets the day's priorities, discusses delays, coordinates activities, and assigns responsibilities. A revised "Plan of the Day" now includes maintenance, surveillance, and other expected facility activities rather than a simple status of each reactor.

The licensee's approach to the resolution of technical issues from a safety standpoint generally exhibited conservatism and was technically sound and thorough. Reactor coolant pump shaft and cover cracks, LPSI header relief valve weld cracks, and RCP suction deflector ring failure demonstrated technically sound resolutions. However, occasionally during the period, NRC intervention was necessary to cause management to be aware of deficiencies associated with surveillance testing or events relating to the operability of safety-related equipment. Occasionally, safety related equipment was initiated and failed to operate. If attempted a second time and it operated and passed a Technical Specification surveillance test, the original failure was not always recorded or identified to management. Once aware, appropriate reviews and action was taken (see Surveillance section referencing additional details).

In summary, in spite of several visible events which drew attention to the facility (EDG gassing, RCP shaft cracking, containment spray down), numerous program improvements were made. Many were made in response to the last SALP, others in response to the licensee's recognition of weaknesses. The Plant Operations Safety Review Committee has a potential to be biased towards operations since the structure places the Chairman in a position to lose objectivity. Post-maintenance operational testing requires improvements. A formal mechanism appeared to be lacking which ensures that all failures are brought to the appropriate level of management attention in a timely fashion. Performance of operating department personnel, especially licensed operators, was excellent.

2. Conclusion

Rating: 2

Trend: Improving

3. Board Recommendation

Licensee: None

NRC: None

B. Chemistry and Radiological Controls (11.6%)

1. Analysis

The Radiological Controls Program was rated Category 1 last assessment period. Significant concerns with management control over the PASS system were noted which led to escalated enforcement and issuance of a civil penalty although the root cause(s) of this problem primarily reflected on performance in other functional areas.

During this period, there were seven inspections by regional specialists in the chemistry and radiation control areas and routine coverage by the resident inspectors. The in-plant radiation protection program was effectively implemented during both operational and outage conditions.

The radiation protection organization, particularly in the ALARA area, was well-defined and adequately staffed, with well-qualified individuals. An appropriate number of trained and qualified contractor technicians were used to support the outage. The use of contractors to supplement radiation protection staff was well controlled. The licensee continued to implement an effective radiation worker training program. Both the radiation protection ALARA and operations groups were aggressive in assisting in the development of this program. Procedures in the radiation protection area were well-defined and well-implemented. A need for the proceduralization of certain non-routine activities, such as the use of steam generator TLD phantoms or operation of non- routine survey instruments was identified as an area for improvement.

The licensee's external exposure controls program continued to be effective and contributed to overall program strength. Information concerning radiological survey data and conditions was readily available to workers signing into the work area. Daily exposure tracking was well-controlled; reports of accruing exposure for each worker were reported to responsible supervisors twice daily during outage conditions. The licensee effectively utilized their Special Work Permit (SWP) system to establish radiological controls.

Two unrelated deficiencies occurred during this period in the area of High Radiation Area controls. During one incident identified by the licensee, two individuals "jimmied" the locked door to a High Radiation Area and entered rather than waiting for the HP technician to arrive with the key. Subsequent investigation, prompted by an allegation, identified that a set of

master keys to the station's locked High Radiation Areas was uncontrolled. No examples of unauthorized use were identified indicating a significant breakdown of controls in this area had not occurred. Licensee corrective actions were timely and comprehensive.

An effective internal exposure controls program was in place. The licensee aggressively utilized containments and portable ventilation as methods of controlling airborne activity. Posting of airborne areas and tracking of MPC hours were performed at action levels more conservative than those required by regulations. Recurring problems were noted with the auxiliary building drain system, which repeatedly backs up and causes contamination of previously clean floor areas. This creates a situation that radiation protection personnel are forced to live with and indicates that plant management needs to be more aggressive in resolving the root causes of this problem. Similarly, as discussed in the Operations functional area, more attention needs to be focused on cleanup of individual contaminated areas.

The ALARA program continued to exhibit strong performance. ALARA pre-outage involvement and planning was substantial; numerous exposure/savings mechanisms (mock-up training, automated equipment, closed circuit TV, temporary shielding) were utilized during the outage. Actual exposure for 1986 for the two units was 347 person-rem vs. a projected goal of 390 person-rem. The 1987 goal was only 405 man rem, although considerable high rad work was necessary. Experience through the end of the SALP period indicated that this goal was achievable. This experience indicates an aggressive goal setting program was in place and was used to improve ALARA performance.

The solid radwaste program was effective. An aggressive program for volume reduction resulted in disposal of volumes approximately one half of those at comparable PWRs. The organizational responsibilities for processing, preparation and shipping solid radwaste materials were clearly defined in procedures, well understood by the responsible groups, and functioned smoothly during the assessment period.

The presence of failed fuel pins presented a technical challenge to the solid radwaste program which was recognized, adequately analyzed and handled. Properly constituted corrective actions were taken to prevent regulatory problems; 10 CFR 61 scaling factors were modified to reflect the new conditions. A high degree of quality control involvement in solid radwaste activities was effective in ensuring the waste classification, form, and packaging requirements were being met.

The radioactive effluents control program exhibited positive controls over radioactive releases and radwaste system operation with well stated procedures to promote proper performance. When the plant vent wide range gas monitor (WRGM) original calibration data was deemed insufficient, the licensee declared the monitor inoperable, submitted an LER, and notified the NRC. Management controls resulted in timely restoration; alternative sampling techniques were used in the interim.

Routine surveillances of the radiation monitoring and air cleaning systems were found to meet frequency requirements in all cases. In the previous assessment period the licensee had failed to take carbon samples at the required frequency. This suggests an increased level of management involvement.

Routine radiochemical analysis of reactor coolant parameters was satisfactory. In one instance identified by the licensee, a surveillance was missed, due to an inadequate shift turnover. Management response and mitigation efforts were timely. This event was a singular occurrence and did not suggest a programmatic breakdown of management controls.

During the assessment period, licensee management took aggressive action to correct the inoperability of the PASS system identified in the previous assessment. The original PASS system was taken out of service and the NSSS sample sink was modified to meet NRC requirements. The resolution of the PASS deficiencies by modifying the NSSS sample sink demonstrated a clear understanding of issues by the licensee as well as a technically sound approach. Furthermore, twelve items were reviewed during a special NRC follow up inspection and eleven, including all the violations, were closed, indicating timely and thorough resolution of issues.

The licensee's program for the Radiological Environmental Monitoring Program was found to be generally adequate. Sampling frequencies, type of measurements, analytical sensitivities, and reporting schedules generally complied with Technical Specification requirements. A measurement quality control program was implemented including participation in the EPA Cross Check Program. Measurement results of the collected TLDs between the NRC and the licensee were generally in agreement.

In summary, the in-plant radiation protection program continued to be effectively implemented during this assessment period. In particular, good controls were in place and exercised, exposures were tracked well and maintained low, the ALARA program was strong, and radioactive effluents and radwaste were minimized with appropriate monitoring.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

C. Maintenance (13.9%)

1. Analysis

The previous SALP rated the maintenance area as Category 2. Material condition weaknesses required continued effort in several areas, but increased management attention and resources were being devoted to these areas. Additional I&C engineering support was needed because of weaknesses in the staffing, direct line supervision, vendor support, and spare parts areas. The licensee was to evaluate the impact of secondary system maintenance problems on reactor trips and determine if poor maintenance and/or design weaknesses were contributing to balance of plant related trips.

During this period, regional specialists conducted six inspections of this area. Resident inspectors also routinely reviewed this area.

During this period, the I&C area significantly improved; a new general supervisor aggressively pursued issues, assigned responsibilities, and held personnel accountable. Systems were implemented which trended and provided status of control room deficiency tags. Some progress was made in reducing the number of control room MRs. Problems identified last period regarding the operability of main steam isolation valves were resolved by the replacement of those valves; a major modification performed very well. As noted in the Operations area, operators, engineers, and maintenance personnel attended factory acceptance testing and worked with the vendor to develop operational test, operating and maintenance procedures. Grounds on the Feed Water Control System are also under control. Several enhancements took place (separation of power supplies and replacement of numerous parts with state of the art controls). A task force to improve the feed systems reliability generated several recommendations not yet fully implemented. The licensee installed two new and improved travelling screens at either end of the intake structure, where most jelly fish accumulate.

Both communications and coordination between maintenance, operations, and engineering showed improvements. General supervisors visited other nuclear plants to obtain alternatives in order to improve the recognized weaknesses in the MR system. A "Perfect Planning" effort was effective in planning outage activities (see the Outage activities section for details).

Training of both electrical and mechanical personnel improved. All maintenance training programs are now INPO accredited. All maintenance personnel receive two weeks of general training.

Although improved, the volume of out of service instruments affecting the control room operators performance was excessive, about 15 per unit. Additionally, several instruments that do not have MRs attached were inappropriate for operator use in that the normal operating parameters were at the top or bottom 5% of the scale. For example, 100% steam flow is recorded at the very top. Similar problems exist with the surge line temperature and pressurizer water temperature indicators. These examples of maintenance and design/engineering inadequacies had the potential to adversely affect operator performance.

Other indications of inadequate maintenance impacting operations was the safety injection tank in-leakage problem. Operators must keep No. 21 charging pump in pull to lock in order to prevent dilution of the safety injection tanks (SIT) because of back leakage through several valves inner-connecting the systems. Maintenance and testing efforts to date were ineffective. Similarly, the Instrument Air System air dryers/regeneration units repeatedly failed to transfer and caused a loss of instrument air. This problem has been tolerated for several years causing either plant scrams or near misses. Only after NRC inspector prompting did the licensee effectuate some improvements to alleviate the problem.

Service water pumps and auxiliary feed water pump packings continued to be a problem. Maintenance spent considerable time reworking these packings without significant success. Engineering efforts were in progress to improve these, however, this problem has persisted several years. Other equipment seemingly out of service for extended periods were: the plant air compressors, intake air coolers, and screen wash pumps. Resolution was slow.

Programs and efforts to address such problems have not worked very well for the following reasons:

(1) The Integrated Management System (IMS) has been implemented which provides a systematic method for prioritizing plant betterment and projects by development of benefit to cost ratios. The IMS system appeared to hinder improvements in several areas by excessively cancelling or delaying many enhancements recommended by veteran supervisors, because the benefit to cost ratio requirements were not met. Supervisors appear to have insufficient involvement in the setting of priorities. This caused several long standing deficiencies.

(2) During the last three years the Integrated Corrective Action Program (ICAP) was under development to assist in tracking component failures and identifying rework. Management has not tracked component failures or repetitive maintenance during this time because ICAP was imminent. Trending or evaluations of repetitive failures do not occur by other than supervisor recollection.

(3) Currently, no consolidation program exists which, during the life of a component, reverifies vendor technical manual design requirements or FSAR requirements. Nor is component performance ascertained during post maintenance testing (PMT). Most often PMT only assures that the component operates.

The above problems and numerous others identified by MRs were situations which hinders plant operations. They existed throughout the period and reflected the need for additional staffing and resources.

The licensee focused on preventive maintenance (PM). PMs existed for both safety related and non-safety related components. PMs had high priority. Procedures were generally good and a feedback mechanism existed through engineering back to the maintenance procedure group. However, PM frequency was based on arbitrary judgment or coincided with Technical Specification required surveillance frequencies. Often, routine PMs were performed on components seldom operated since the previous PM, i.e., ESF components, yet many outstanding corrective maintenance items were not corrected in a timely manner. PM results were not trended or thoroughly evaluated which could provide a better basis for frequency of performance. A better use of maintenance history or component failure trends would also provide an excellent tool for managing the limited maintenance resources.

Another area recognized by the licensee as being deficient was poor work practices apparently due to a lack of pride in ownership. At times tools and work-related debris were found scattered about after completion of maintenance. Cleanliness and housekeeping were at times also below standards. Maintenance management attempted to increase craft "job satisfaction" by minimizing reassignment of people from jobs in progress to a "more urgent job". This previous practice caused a lack of ownership of jobs and personal pride in performance. Operations

personnel would lose confidence in maintenance personnel's ability to stay with or adequately complete a job. Recognizing maintenance problems, operations personnel were sometimes reluctant to submit MRs believing they would not be adequately addressed. By allowing the same people to start and finish a job, more pride and ownership is expected to occur and workers will receive either positive or negative recognition for "their" job.

Progress has been made despite the above problems. Grounds on the feed system, gassing problems on Emergency Diesel Generators, replacing two reactor coolant pump rotating assemblies, back to back ten year In Service Inspection and refueling outages followed by Environmental Qualification and Commercial Quality issues placed severe stress on the entire plant staff. Notwithstanding, since the licensee implemented its response to the last SALP, there has been only one maintenance-related plant trip compared to eight last period. The procedure to calibrate the Turbine Generator Electro-Hydraulic Controller was deficient in prescribing a new micrometer setpoint for a newly purchased turbine simulator control device resulting in a reactor trip. Meetings are now held daily to coordinate maintenance, engineering, and operations. Prioritizing MRs, troubleshooting, determining root causes, scheduling and tracking work activities during operation has greatly improved towards the end of this period, due to the coordination by this morning meeting.

Nuclear maintenance tracks maintenance-related reactor trips, control room instrumentation out of service, valves repacked, Mode 1 corrective maintenance working backlogs and Mode 1 corrective maintenance orders older than three months. Maintenance orders are further divided and trended by numbers due to numerous causes for delay. This trending/tracking system worked well.

A recently established oil analysis and vibration trending program was somewhat successful in predicting component failures. Previously, problems had occurred with adding the wrong type of oil to components.

The licensee recognized most of the above problems as well as others. They established programs or placed these items on the Key Items List with assigned responsibilities and priorities. The programs are showing improvement. As an example, the 2000 valves repacked last year resulted in a reduction in dissolved oxygen by a factor of 5 in Unit 2 condensate. An "Investigative Planner" has been established to troubleshoot and correct minor deficiencies within 24 hours of the MR origination. This resulted in a 35% reduction in the MRs greater than 24 hours old.

In summary, maintenance faced a great work load and still demonstrated slow improvements as compared to last period. Management programs effectiveness appeared constrained by limited manpower and resources and engineering support. Use of the IMS to prioritize resource use appeared to be ineffective in resolving long standing deficiencies. Lack of effective use of trending, maintenance history and component failures reduces resource efficiency. Some poor work practices continued to exist due to lack of attention to detail and insufficient supervision. Post maintenance testing requires improvement.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: Review adequacy of programs for prioritization.

NRC: None

D. Surveillance (8.2%)

1. Analysis

The previous SALP determined performance in this area to be Category 1. Conservatism was noted in licensee policies for entering and interpreting Technical Specification action statements. It was concluded that the program was effectively managed utilizing good procedures which were rarely violated. It was noted that a significant problem existed with erosion of steam piping and that a more aggressive corrective action program was needed.

The resident inspectors examined surveillance activities as part of the routine inspection program. Three inspections by region based personnel examined activities associated with two plant ten year In Service Inspections (ISI). Surveillance activities related to specific areas of inspection were reviewed during several additional inspections conducted by NRR and region based personnel.

The surveillance/ISI program continued to be effectively managed with only one minor instance of a missed surveillance (radiochemical analyses) as discussed in Section IV.B. Methods for scheduling tests improved. In addition to the normal surveillance testing/ISI workload, additional effort was required to successfully complete two ten year in service inspections. Increased effort and resources were dedicated to the secondary piping corrosion/erosion inspection and replacement program. There were no instances of low pressure steam line ruptures, as had occurred previously, during this period.

As noted in previous SALP reports, workers performing tests and inspections were knowledgeable of the systems and testing requirements, and QC involvement was evident.

Licensee policies and procedures did not adequately address intermittent equipment failures or significant degradations when the equipment, without undergoing corrective maintenance, was retested and functioned properly. Those procedures permitted such equipment to be declared operable without first requiring either root cause determination and correction or, in cases where the root cause cannot be immediately identified, thorough evaluation of operability and need for compensatory actions. They also were weak in requiring documentation of these failures and degradations. This allowed a problem with intermittent

tripping of the steam driven auxiliary feedwater pumps to persist for an extended period without being recognized by plant management and demonstrated that the surveillance program was not being used as effectively as possible in identifying equipment performance and reliability problems. Such experiences indicate that equipment operability has been adversely affected by inadequate recognition and communications of surveillance problems as well as a lack of thoroughness in troubleshooting and root cause analysis. POSRC review and plant management actions on operability issues appear to have been more keyed towards Technical Specification compliance than on reliability and safety.

The following deficiencies were noted during the period. They appeared to be unrelated in nature and not indicative of any significant programmatic weaknesses. Problems were noted by the NRC and the licensee's QA group with improper segregation and storage of out-of-calibration measuring/test equipment. Three inadequacies of a more significant nature were found by the licensee and NRC in surveillance test procedures. One resulted in long term inoperability of the wide range noble gas monitors, the second in inadequate testing of a dynamic response circuit in the Reactor Protective System, and the third in a failure to periodically verify closure of certain containment penetrations prior to movement of irradiated fuel.

As discussed in the Engineering Support functional area, the licensee has become more proactive in identifying deficiencies. Examples in the surveillance area of this overall trend included: system engineer discovery of two of the surveillance test procedure deficiencies noted above, the conduct of a steam generator tube inspection program that exceeded regulatory requirements, and continued conduct of an aggressive secondary piping inspection and replacement program. Another example of particular note was licensee adaptation, as an industry first, of current state of the art ultrasonic examination technology to the field (UDRPS system) and successful use of this system during two ten year In Service Inspections. The use of this system enabled the licensee to conduct inspections which, in many cases, exceeded regulatory requirements.

The In-Service Inspection (ISI) group and the metallurgical engineering group which supports ISI activities have historically been staffed by very technically competent individuals. This strength continued throughout this assessment period. In

addition to ISI activities, both groups provided valuable support to the plant in assessing emerging problems such as reactor coolant pump shaft and cover cracking indications. One area for improvement the licensee was requested to consider, and which may assist an already very capable ISI staff in achieving superior performance, would be the addition of an independent Level III Examiner to review all ISI data.

In summary, the surveillance/ISI program was well managed. Workers performing tests and inspections were knowledgeable of the systems and testing requirements. The ISI program was carried out and supported by particularly well qualified personnel and went beyond regulatory requirements. However, licensee policies and procedures do not adequately address intermittent equipment failures or degradation. Also, the surveillance program was not being used as effectively as possible to identify equipment performance and reliability problems.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: Assess overall controls (policies, procedures, reporting requirements, decision making, trending, and assignments of responsibility) for identifying and resolving intermittent equipment failure problems. An NRC/Licensee meeting should be scheduled to discuss the results of this assessment.

NRC: None

E. Emergency Preparedness (7.7%)

1. Analysis

Licensee performance in this area was rated as Category 1 during the previous assessment period based upon good exercise performance and the licensee's own initiatives in emergency preparedness.

During the current assessment period, there were three region-based inspections of emergency preparedness activities which included a routine safety inspection, observation of the annual exercise, and observation of a follow up remedial drill. Observations regarding implementation of the site emergency plan during an approaching hurricane in August 1986 and during the loss of offsite power event in July 1987 are included. Emergency planning was also one of the key areas examined during the Operational Safety Review Team (OSART) review.

The licensee adequately addressed deficiencies in previous exercise performance through appropriate program changes and retraining. Concerns remained in the areas of emergency notifications and issuance of protective action recommendations (PAR) for sheltering, evacuations, and authorization of potassium iodine (KI) to personnel. During the partial participation exercise held on September 9, 1986, NRC observed several significant weaknesses in the licensee's performance. A recurring deficiency occurred relating to an inadequate decision making process for PARs. The recommendations made to offsite authorities were untimely and did not exhibit conservatism primarily due to problems in overall direction and control of the accident and dose assessment staffs. Dose assessors were observed to have difficulty in obtaining proper information for input into the dose assessment model. Additional inaccuracies were observed in determination of source terms, release pathways, and calculation of integrated offsite dose. The lack of efficiency in information flow between the radiological assessment staff together with a complacent attitude displayed by key response personnel were the contributing factors in inadequate and untimely recommendations for protective measures. Scenario difficulties and inconsistencies may have contributed to this delay.

A Confirmatory Action Letter (CAL) was issued following the exercise which outlined the major deficiencies. The CAL requested that the licensee take corrective measures by conducting a review of the ineffective portions of the Emergency Plan and Implementing Procedures and provide specialized training in weak areas. On October 16, 1986, a remedial drill was held to determine licensee responsiveness to initiatives in the areas of protective action recommendations, dose assessment, and information flow during emergencies. Licensee performance in the deficient areas was acceptable during the remedial drill. Accident assessment, notifications, communications, and protective action recommendations were timely, but concerns remained about the effectiveness of the dose assessment program. The licensee subsequently implemented changes to radiological assessment procedures and staff direction and control assignments for evaluation and communication of dose projections. The licensee emphasized the dose assessment area after the remedial drill through specialized training and drills; improvements were shown in subsequent drills.

The licensee had ample full-time onsite and corporate staff assigned. Assistance was also provided by the Training Department staff to integrate corrections of deficiencies in exercise performance or programmatic areas into emergency response training. Emergency Response Facilities (ERF) were dedicated for emergency preparedness and were adequately maintained. The overall capability of Emergency Operations Facility is excellent. However, improvements could be made in the size and space availability of the Technical Support Center.

During an approaching hurricane in August 1986, the licensee declared an Unusual Event. Timely, conservative measures were taken for hurricane preparation. In July 1987, the plant experienced a significant loss of offsite power event resulting in the tripping (shut down) of both units, operation in natural circulation core cooling conditions for an extended period (approximately 5 hours), and declaration of an "Alert" condition in accordance with the site emergency plan. During the event, operations and plant staff personnel responded correctly and properly implemented emergency operation procedures and the emergency plan. Communications to the NRC were notably excellent. This event demonstrated the effectiveness of the emergency plan as well as operations and emergency plan training programs.

The licensee has established a close working relationship with off site officials and support groups. Evidence of a strong commitment to train and inform these groups as well as members of the general public regarding site activities is evident.

In summary, the level of staffing and training to administer basic emergency preparedness program functions appears adequate, however, performance of response personnel during the annual exercise was marginal. The poor performance appeared to be due to a complacent attitude and inadequate management attention rather than a programmatic problem. The licensee immediately recognized the weakness and performance has improved considerably since the annual exercise. This improved performance was demonstrated during the recent loss of all offsite power event.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

F. Security and Safeguards (2.2%)

1. Analysis

During the previous SALP period, the licensee's performance in this area was Category 1. No major regulatory issues were identified.

There was one physical security and one material control and accounting inspection conducted by region-based inspectors during this assessment period. A management meeting, at the request of the licensee, was held to discuss the circumstances of a repetitive violation.

Both plant and corporate security management continue to be aggressively involved in the security program at Calvert Cliffs and in nuclear power plant security, in general. This was demonstrated by the licensee's continuing attention to program improvements, e.g., providing a firearms range on owner controlled property adjacent to the site to facilitate the maintenance of firearm skills by members of the security force between requalification periods, the installation of two new explosive detectors to facilitate searches at the main entry point to the protected area, and training program initiatives that are discussed later in this assessment. Additionally, the licensee was actively following up on the concerns identified during the Regulatory Effectiveness Review that was conducted in October 1985 by the NRC. Even those findings that were not NRC requirements were actively pursued by the licensee in an effort to enhance and upgrade the security systems and were included with the licensee's previously planned security program upgrades that began in 1982. Security management also continued to actively interact with other utilities regarding security matters, by membership in the Region I Nuclear Security Association and other groups engaged in nuclear plant security matters.

Security supervisors were well trained and continued to provide effective supervision over security force members who performed their assigned duties in a competent and professional manner. Security force members were very knowledgeable and actively encouraged to participate in program implementation and enhancements by making recommendations, particularly during critiques after drills and exercises. The licensee also ensured that feedback was provided on all routine security duties. These initiatives were very effective in sustaining the high level of morale exhibited by members of the security force.

The licensee developed and implemented a specialized security training course for members of the site quality assurance staff to enable them to conduct a more effective audit of the personnel and security equipment performance. In addition, the licensee continued to maintain effective interface and liaison with local law enforcement and emergency services agencies through periodic meetings and on site drills and familiarization tours. Both of these provided valuable feedback to the training program during this assessment period and were further evidence of the licensee's interest in implementing an effective security program.

During this assessment period, a repetitive violation occurred involving the control of vehicles while inside the protected area. The licensee requested a management meeting to discuss the previous and additional proposed corrective actions. The licensee's corrective actions were extensive and adequate to prevent recurrence. No similar problems were identified during the remainder of the assessment period. The violation identified in the material control and accounting area involved the licensee's failure to maintain adequate records to demonstrate that physical inventories of special nuclear materials were conducted in accordance with NRC regulations. The licensee took immediate and appropriate action to correct an omission in the accounting procedure to prevent recurrence. Neither of the violations were indicative of a programmatic problem. The prompt and effective corrective action undertaken was evidence of the licensee's interest in implementing high quality security and effective safeguard programs.

Five security event reports were submitted in accordance with the requirements of 10 CFR 73.71. Three reports were required as a result of a recurrent hardware problem with the security computer early in the assessment period. That problem was pursued by the vendor and no recurrence has been experienced. A fourth report, involving the computer, resulted from an error made by a maintenance technician. The fifth report resulted when a fake bomb-like object was found in a building inside the plant protected area. The five events were properly responded to by the security force and appropriate compensatory measures were implemented in each case. The licensee's Security Contingency Plan (SCP), as interpreted by NRC, committed to reporting of events, such as the three computer related hardware events, to the NRC, but two such previous events had not been reported when they occurred. However, NRC regulations do not require reports of such events. The licensee corrected some ambiguous language in the SCP that caused the confusion in the reporting commitments. Each report was clear and concise and provided an adequate explanation of the event to enable NRC analysis. This demonstrated proper management oversight and review of events and reports submitted to NRC.

During the assessment period, the licensee submitted three revisions to the security plan and a revision to the SCP under the provisions of 10 CFR 50.54(p). Some minor modifications were necessary to several changes but only two changes required additional information. Plan changes were of high quality and demonstrated management's continuing oversight of the program to ensure it was consistent with NRC performance objectives. Personnel involved in maintaining plans current and consistent with NRC objectives were very knowledgeable of NRC requirements.

During the assessment period enhancements of the personnel screening program were made by implementation of the Nuclear Employee Data System.

In summary, the licensee continued to maintain an effective physical security and safeguards program. Efforts to improve and upgrade the operation and reliability of system and equipment and the performance of personnel were continuing.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

G. Refueling, Outage Management (6.7%)

1. Analysis

The previous SALP included Engineering Support within this area and rated this area as Category 2. Routine activities were well planned and coordinated. Strong management influence in decision making was evident. Good communications and orchestration of activities were demonstrated resulting in meeting of schedules and minimizing man rem exposure. Two areas, post accident sampling, and environmental qualification of equipment lacked sufficient management attention and required NRC involvement to identify deficiencies.

There were two ten year In Service Inspections and refuelings conducted during this evaluation period. Outage activities monitored included: pre-outage planning meetings, responsible engineer presentations on Facility Change Requests (FCRs) and major modifications, morning coordination/status meetings, steam generator eddy current testing, reactor vessel level instrumentation modifications, refuelings, in service inspection of the reactor vessel, replacement of reactor coolant pump rotating assembly, replacement of main steam isolation valves, numerous other refueling activities, i.e., leak rate testing, nozzle dams work, hydrostatic tests, and human factors improvements made in the control room.

Refuelings typically were characterized by good communications, excellent planning, good control over contractor personnel, and a strong management involvement.

Engineering's onsite presence demonstrated a notable strength by providing responsible engineers to brief general supervisors and principal engineers at pre-outage meetings on all the scheduling, support coordination, responsibilities, potential problem areas, and details of the more complex evolutions planned to occur during the outage. This process called "Perfect Planning" brought together all facets of job planning including ALARA engineering, mock up training, procedures and spare part status, and ensured all involved personnel were aware of their assigned responsibilities. This planning technique was used primarily for critical path high impact items and jobs that have never been performed before, jobs with significant potential man rem exposure, or with interfaces between many groups. This technique improved the efficiency and reduced exposure for MSIV replacement, core exit thermocouple modifications and RCP rotating

assembly replacement. The outage coordination meetings held daily tracked critical paths for primary work, secondary work, refueling and other major job efforts, ensuring delays for any reason were minimized and necessary support was provided. These meetings facilitated strict adherence to the schedule of activities. Good communications existed between departments and contractors. Site management were regularly in attendance. The morning meeting and specific technical meetings thereafter were succinct and effective.

The outage management section, a division of the Operations Department, utilized senior reactor operators as operations/maintenance coordinators to facilitate the availability of equipment, to ensure operations was aware of ongoing maintenance and to expedite the isolation of equipment though the tagging authority. Another good initiative was the use of shift and area coordinators/facilitators who facilitated material, coordinated and assigned priority to jobs within an area when conflicts arose, i.e., containment coordinator.

Outage meetings were periodically supplemented with "pep talks" from the Vice President stressing quality work, safety first and doing the job right the first time. Management conveyed clearly that plant operation was second to safety and quality work.

Beyond a normal refueling, the two refueling outages involved the following: two In Service Inspections of reactor vessel components; a problem with #12 Emergency Diesel Generator gassing; main generator collector ring cracks; failure of #11B reactor coolant pump seal after replacing all of the other RCP seals; replacement of two reactor coolant pump rotating assemblies; replacement of about 2,000 feet of secondary steam piping and repacking about 2,000 valves with a constant load Chesterton packings; replacement of the MSIVs on each unit; and installation of a new plant computer. These were accomplished with a site person rem exposure of less than the tight goals despite additional required work and no individual receiving more than 2 rem thereby exhibiting good planning and control. During these events, numerous technical problems faced the licensee. Each in time was resolved in a technically sound and thorough manner.

Despite the problems experienced beyond a normal refueling, both the refueling and ISI portions were successfully completed. The added complications, generator collector ring cracking, environmental qualification and mechanical commercial quality issues extended each outage, however these did not appear to influence the licensee's well coordinated persistent pace. Personnel attitudes and morale remained high despite the setbacks.

Some problems, however, appeared to be persistent. Upon returning to power operations, an excessive number of maintenance requests remained outstanding. Some of this was attributable to the marginal post maintenance test program and the limited resources in maintenance. However, another contributing factor was the licensee's tolerance to live with out of service or deficient equipment upon return to power operation (see also maintenance functional area).

Another area of concern was the amount of debris in the reactor coolant system. During the current fuel cycle, coolant activity on Unit 2 has been relatively high, 5 micro curies per cubic centimeter gross activity and 0.3 micro curies per cubic centimeter dose equivalent Iodine 131. This appears to be caused by debris within the RCS causing fuel pin failures. The failure mechanism appears to be debris-related fretting, indicating that material control practices during outages while systems were open were weak. Clean area controls during refueling were strictly adhered too around the reactor vessel. However, the controls was not so strict around other areas where the primary system was open. The licensee first clearly recognized this problem after examining the fuel during this outage. As an initial corrective action step the licensee stressed cleanliness controls in the Calvert Cliffs News Letter to heighten employees sensitivity to the issue. Further procedural controls are planned for future outages. Similarly, overall housekeeping significantly declined during the outages, particularly in some contaminated areas as discussed in previous functional areas.

In summary, outages and refuelings were well managed. Operations personnel and other outage coordinators/facilitators were effective in achieving good coordination of activities including unexpected problems encountered late in the refueling outages. In particular, planned maintenance, in-service inspections, modifications and major outage tasks were effectively scheduled, coordinated and managed. Despite the good overall management of outages, problems were noted near the end of the period as housekeeping in contaminated areas deteriorated and the plants were returned to service with an excessive number of maintenance requests outstanding and equipment out-of-service.

2. Conclusion

Rating: Category 1

Trend: Declining

3. Board Recommendation

Licensee: Set goals for minimizing out of service equipment before returning to power operations.

NRC: None

H. Engineering Support (6.8%)

1. Analysis

Although this area was not rated separately in the previous SALP, problems were identified with (1) a lack of management attention in the establishment of a viable Equipment Qualification (EQ) program and (2) inadequate orchestration of multidisciplined tasks in that responsibility and authority were not vested in individuals in such a manner to ensure effective task completion. This area was covered as a part of several individual and team inspections during this assessment period. Further evidence of the above concerns was seen during this assessment period. Specifically, they were the root causes of significant deficiencies identified in the EQ program. Those deficiencies primarily involved the use of unqualified taped electrical splices. The second problem continued to exist in that the roles and responsibilities of systems engineers (individuals who are key coordinators in assuring proper maintenance, performance, and design improvement of plant systems) were found to be poorly addressed in plant procedures and appeared to be too broad, thus reducing the effectiveness of this function.

Related to the above problems, communications, both formal and informal, between engineering and other plant groups were weak. For example, important mechanisms for communicating engineering requirements to the field were unclear. Similarly, the engineering personnel were not made aware of the fact that the setpoints for certain Reactor Protection System (RPS) constants were not being adjusted to values recommended by the NSSS vendor following core reloads. The licensee has experienced difficulty in getting engineers out of their office area and into the plant and communicating with operational and maintenance personnel to more fully realize the benefits of the relocation of all engineering functions to the site.

The EQ issue pointed out a failure of engineering department and plant management to give credence to and heed the advance warnings of both the QA group and the NRC of program weaknesses. It also pointed out a need for management to more frequently utilize third party expertise to provide assessments of the adequacy of more specialized or technically complex programs.

During this period, the licensee pursued an emergency diesel generator gassing problem which was originally thought to be only slightly excessive. As the licensee pursued the problem, it became worse and more complicated during repair attempts requiring several changes to the Technical Specifications. The licensee was candid and responsive to NRC concerns which facilitated an acceptable and timely resolution, however, communication with NRC on the issues exhibited a lack of coordination between engineering and operations.

During the assessment period, a great deal of licensee management and NRC attention was focused on the engineering department. Licensee managers now recognize that the engineering function was operating under resource constraints that, at least in part, prevented (1) the timely close out of Facility Change Requests for which physical work has been completed (approximately 400 changes outstanding near the end of the SALP period), (2) better root cause analysis of plant maintenance problems, (3) timely engineering of facility modifications, and (4) needed improvements in engineering tools (e.g., improved means for determining and maintaining design basis information). Resource constraints additionally slowed the development of a performance based training program for the engineers. The fact that the general experience level of the systems engineers was low added emphasis to the need for such a training program. Additionally, the engineering department had internal and/or external commitments to complete final corrective actions for the EQ and MCQ issues, complete upgrades in the Q-list, and to develop master calibration data sheets in support of I&C maintenance activities. While performance in the engineering support area was hindered by work overload, it also suffered from inefficient control and use of existing resources due to insufficient prioritization and poor coordination.

Immediately prior to and during the assessment period, all engineering support functions for the plant, with the exception of the metallurgical engineering group, were moved to the site and consolidated under one Nuclear Engineering Services Department. At the same time, the systems engineer function was implemented. The consolidation, coupled with two 10 year ISI and refueling outages and several plant problems as discussed previously placed considerable stress on the engineering organization. In spite of this and extending beyond response to crisis situations, there were notable accomplishments which benefitted the plant and which indicate strong potential for the engineering group, with proper development, to further contribute to the overall improvement of plant operation and maintenance.

(1) The Engineering Department directed the efforts of the "Trip Evaluation Review Group (TERG)". As noted in the operations section, this group successfully identified problems in the feedwater control system. Two reactor trips were caused by failures of reactor coolant pump (RCP) capacitors. Engineering performed testing to determine if the capacitors could be replaced with an alternative. Currently, a modification is in progress to replace the capacitors with inductors. There have been no repetitive reactor trips due to the same cause or unidentified root cause since TERG establishment except for the RCP capacitor failures.

(2) The organization has become more proactive in identifying deficiencies. For example, engineering personnel identified the MCQ fastener and the RPS set point problems, and they discovered a significant error in vendor guidance for calibration of the wide range noble gas monitors. This was partially due to systems engineers being available to provide focused attention on assigned systems.

(3) The engineering group provided two useful tools for predictive maintenance through development of the oil analysis program and enhancements in the equipment vibration monitoring and analysis program.

(4) The engineering department's ISI group and the metallurgical laboratory group took state of the art ultrasonic examination technology and, as an industry first, adopted it to the field (UDRPS system). This system was then very successfully used during two 10 year ISI inspections. Also, for the first time, a zero channel head entry device (SM-10) was used on a CE designed plant for steam generator tube eddy current inspection which resulted in an estimated 10 man rem exposure reduction per unit. The ISI group and the metallurgical laboratory group have historically been staffed by very technically competent individuals. These individuals also provided valuable support to the plant in analyzing reactor coolant pump shaft and cover cracking problems.

(5) The licensee's secondary piping inspection/replacement program continued to receive high priority.

(6) Upon the initiative of the QA group, immediately following the SALP period the licensee performed a proactive, in-house inspection similar to the NRC Safety System Functional Inspection (SSFI) to examine engineering configuration controls. A contractor familiar with SSFI techniques assisted them in this effort.

(7) 500 safety-related loop drawings were developed to better support Electrical & Controls maintenance activities.

(8) Although progress was slow, some of the long-standing technical problems have been resolved or appear to be on the path to resolution. Examples include: replacement of high maintenance requirement main steam line isolation valves with components of superior design, improved packing performance for the charging pumps, improved reactor coolant pump seal rebuild capability, intake structure traveling screen/screen wash system improvements, and updating of Unit 2 main feedwater controls.

In summary, the consolidation and movement of all engineering functions to the site and the implementation of the systems engineer concept were positive steps toward improving engineering support of the plant. Problems still existed with: (1) full integration of the Nuclear Engineering Services Department into the plant staff which includes improved communications as well as systems engineer training and involvement with operations/maintenance personnel to improve engineer credibility and effectiveness; (2) assessment and, where needed, redefinition of the roles/responsibilities of systems engineers; (3) for multidiscipline tasks, lack of clear assignment of responsibility; (4) providing the necessary resources to complete corrective actions for past problems (e.g., EQ, MCQ, FCR backlog) and to providing better maintenance support and to resolve long standing technical problems; and (5) ensuring appropriate management attention is given to identified deficiencies (e.g., QA findings and recommendations). Several corrective actions have been initiated (e.g., team training for managers, daily operations/maintenance/engineering meetings). Accomplishment of such a large agenda of improvement efforts will require dedicated and skillful management attention. During the latter part of the assessment period, areas of improvement were noted. These included system engineer identification of problems, self-identification and correction of MCQ problems, the SSFI initiative to evaluate engineering configuration controls and improved engineering support for the licensing functional areas.

2. Conclusion

Rating: Category 3

Trend: Improving

3. Board Recommendation

Licensee: Perform independent assessment of the engineering organization which identifies engineering functions and includes a review of the overall system for establishing priorities, assigning responsibilities, and obtaining resources.

NRC: None

I. Licensing Activities (1.9%)

1. Analysis

This licensee was rated Category 1 in this functional area for the previous SALP evaluation period. Management involvement and control of licensing activities, as well as licensee responsiveness to NRC initiatives were viewed as strengths because the licensee assisted in resolving several NRC initiatives and its submittals were of high quality with noted improvement in the no significant hazards analysis provided in support of Technical Specification (TS) amendment requests. Weakness was noted only in the communications between the operations and licensing staffs concerning the reliability of equipment controlled by TS.

During the current SALP evaluation period, a number of significant occurrences had a decided impact upon the evaluation of the licensee in this functional area. These occurrences included (1) the degradation of the #12 emergency diesel generator (EDG) which necessitated one exigent and two emergency TS amendment requests, (2) the licensee's shift to a 24-month operating cycle which necessitated submittal and review of a wide range of TS amendment requests, and (3) the licensee's discovery of environmental qualification deficiencies and of the improper use of uncertified material replacement parts. Licensing activities are summarized in Table 5.

In responding to these occurrences and to other issues and events over the course of the SALP rating period, the licensee demonstrated generally good management overview with respect to licensing activities. The senior engineering management actively participated in these actions by prioritizing these actions with the concurrence of the Manager of Nuclear Operations. Assignment of priority was based upon the impact on current or future planned plant operations and upon the licensee's evaluation of the safety significance of the item.

Generally, the licensee responded to the NRC in a timely manner, particularly, with regard to requests for additional information made to obtain technical support for licensee requested activities. Licensee responses to NRC initiated issues were normally thorough and of high technical quality. Response was not as prompt to NRC issues of generic concern. Due to a staffing shortage, the licensing activities prioritization scheme adversely impacted the timeliness of NRC requested and required licensing activities which the licensee often viewed as a lower priority. As a result, senior management diverted manpower

resources away from these NRC initiated activities to those deemed to be more in the interest of the utility. The licensee requested extensions for responding to several NRC generic letters and deferred action on SPDS operability, Dedicated Control Room Design Review and the annual FSAR update.

Senior management attention towards NRC licensing requirements during this rating period was found to be inconsistent with regards to ensuring licensee compliance with the various reporting requirements. Several required reports were filed late and some annually required reports (e.g., challenges to and failures of the pressurizer PORV's and code safety valves) had not been filed for several years. No licensee unit was tasked with the responsibility for or the authority to ensure that these reports were submitted as required.

The licensee possesses significant technical capabilities in most of the engineering and scientific disciplines necessary to resolve issues of concern to the NRC and the licensee. However, in several instances these capabilities were not reflected in the quality of the submittals. Most of the licensee's evaluations of the significant hazards considerations were accurate though brief, thus routinely requiring additional information to justify the request. The licensee has characterized every amendment request submitted during the rating period as not presenting any possible significant hazards considerations. In three instances, however, the NRC determined that these characterizations of the amendment requests were not justifiable based upon technical facts.

Several instances of poor senior management review and/or inadequate engineering analysis occurred during this rating period. These instances included: (1) a requested TS main steam isolation valve closure time limit, tested under no steam flow conditions, that would have placed the plant outside the analyzed bounds of the steam line break design basis event; (2) a change to the NRC approved peak reactor coolant system (RCS) pressure limit for the feed line break (FLB) event from 110% design RCS pressure to 120% design RCS pressure in the FLB event's safety analysis. This was made to justify a proposed increase in the moderator temperature coefficient limit. This change in peak pressure was not indicated in the licensee's TS amendment request. This peak pressure change was not reviewed by the licensee's safety review committees; (3) the justification for continued Unit 1 operation with an existing flaw in the main steam line was technically deficient; and (4) numerous technical inconsistencies and regulatory inadequacies existed in the licensee's submittals of the exigent and the first of two emergency TS amendment requests for the #12 EDG.

Over the last six months, marked improvement has been observed with respect to senior management involvement in and the quality of the technical responses to non-routine licensing activities, particularly the environmental qualification and replacement parts certification deficiencies arising at Calvert Cliffs.

Licensing issues were carried out by three different groups in the Technical Services Engineering section of Nuclear Engineering Services. Primary NRC/licensee interface was with the Fuel Cycle Management unit, and the Licensing and Operational Safety unit. The third group that carried out licensing activities was the Analytical Support unit. NRC interface with this unit was minimal.

The Licensing unit was capably staffed though there was a staff turnover of approximately 45% during this rating period. Though the level of experience appreciably declined, this unit's work product continually and significantly improved due to the persistence and dedication of the unit's staff and to the quality of training provided. NRC communications with the Licensing unit were marked with good relations, a high degree of cooperation and a free exchange of information. This unit actively sought to improve communications.

The Fuel Cycle Management unit had an experienced staff with significant expertise in the technical issues of fuels management. Staff turnover was low. The quality of this unit's work product remained adequate during this period with no significant decline or improvement noted. However, many tasks assigned to this unit remained incomplete over periods of several years. For example, the Fuel Cycle Management Facility Change Request (FCR) process is used to initiate TS changes, core reloads and other related changes; and modifications, tests and experiments as permitted under 10 CFR 50.59. No FCRs have been completed by this unit since April 1983 although 24 such actions, including 5 core reloads and 10 TS amendments (9 of which were approved by the NRC) were initiated since this date. The licensee attributed this failure to insufficient manpower. The licensee also attributed this unit's failure to maintain its training records to this manpower shortage. Communications with this unit were adequate though they were hesitant to inform the NRC of problems with licensing actions in a timely manner.

In summary, the licensee's greatest strengths were the significant technical capabilities that its staff possesses and the management's recently demonstrated determination to improve the quality of their licensing actions, as particularly demonstrated through the improvements in performance level made by the Licensing and Operational Safety unit. Still, improvement is needed in (1) in the quality and level of management overview, (2) the

quality and comprehensiveness of the hazards analyses provided by the various engineering units to support licensing's development of justifications for TS amendment requests, and (3) the staffing level required to permit response to NRC initiatives in a more timely fashion and to permit the staff to perform all tasks that are required, particularly for Fuel Cycle Management.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

J. Assurance of Quality (0.0%)

1. Analysis

The primary purpose of this functional area is to assess the effectiveness of the licensee's program for identifying and correcting problems. It includes management control, verification and oversight activities which affect or assure the quality of plant activities, structures, systems, and components. It also assesses the attitude and performance of plant staff personnel.

Various aspects of this area were routinely examined as part of the resident inspector and region-based specialist inspection programs. A specific QA program review was performed as part of one team inspection.

The previous SALP noted that although an extensive quality program existed throughout the organization, its effectiveness in incorporating quality into such important plant activities as identification of root causes of plant trips and installation of the Post Accident Sampling System was not clearly visible. QA audits were often quite superficial and were not identifying real problems and root causes. A Category 2 rating was assigned.

In response to these concerns, immediately before and during this assessment period, several improvements were made. More technically-oriented personnel with a wide variety of plant and engineering experience were added to the QA unit. The former General Supervisor, Operations was assigned to manage the QA unit and has helped to refocus attention more on technical and performance aspects of areas reviewed rather than just on QA programs. The findings and recommendations included in several audit reports during the period were candid and demonstrated that deeper levels of insight were being gained into subject areas. The "Trip Evaluation Review Group" concept was implemented, and that group was effectively utilized in identifying root causes of plant trips. Increased emphasis was placed on interdepartmental coordination and planning for major modifications.

During the previous SALP period the licensee consolidated all departments with nuclear responsibilities under one vice president and moved all of these departments to the plant site. One objective of the move was to improve communications and interfaces between departments. The consolidation has had

beneficial effects this period as evidenced by increased involvement of engineering in resolving daily plant problems. The Operations department began to better prioritize and communicate its needs for support to both the maintenance and engineering departments. Many examples were noted where interdepartmental interfaces were effective such as in the conduct of outage activities and in response to emergent equipment problems such as reactor coolant pump shaft cracking. However, the discovery of major deficiencies in the Equipment Qualification (EQ) program and, later, the discovery by the licensee of problems with use of mechanical commercial quality (MCQ) fasteners demonstrated that some of the interdepartmental interface problems that had existed prior to the reorganization were still present and were significant. For example, documents providing engineering guidance to craft personnel were inadequate. Engineering personnel were not aware of improper as-built or as-maintained conditions in the field. Additionally, it was noted that the licensee was experiencing problems in fully integrating engineering personnel into the plant staff and in defining their responsibilities.

Senior management involvement and oversight was weak throughout the establishment of EQ program. Although clear warnings of problems were provided (before and following the reorganization) by both the NRC and the licensee's QA group, sufficient management attention was not paid to them.

The fact that the licensee has often demonstrated their capability to work as a team in successfully resolving plant problems once those problems are fully recognized by senior plant management suggests that the more significant weakness of management may lie in their tools and abilities for perceiving problems. For example, management did not recognize the need for third party expertise to provide an independent assessment of the EQ program. In the area of safety review committees, the Off Site Safety Review Committee (OSSRC) was principally made up of on site managers. With such strong day to day involvement in plant activities, members are less likely to be able to provide independent views on plant activities and may be slow to recognize emerging plant problems. The high proportion of operations department membership on and control of the Plant Operations and Safety Review Committee (POSRC) has the potential for unduly biasing that committee toward operation and may thereby lessen its effectiveness in identifying safety concerns. In the area of plant operation, the licensee lacks a policy to uniformly ensure aggressive pursuit of the root cause of intermittent failures of plant equipment. Very little trending of equipment performance is done to identify impending failures.

The licensee has taken several new initiatives which address some of these problems. The QA unit recently began using outside consultants in specialty areas. For example, immediately following the SALP period, a consultant was used to perform an inspection similar in nature to the NRC's Safety System Functional Inspections (SSFI). Additionally, QA personnel were being used to investigate plant events and make corrective action recommendations to the POSRC. In combination, these efforts appear to improve the credibility of the QA unit with line organizations as well as adding effectiveness to QA functions. The upgrades in QA helped the licensee to become more proactive in identifying their problems. Evidence was also seen of other plant groups becoming increasingly proactive. For example, problems with the use of commercial quality fasteners in code class systems and insertion of improper values for certain constants in the Reactor Protection System were identified. New programs were developed to provide early indication of impending equipment failures (oil analysis and vibration programs). There was strong management support for using state of the art equipment in performing ISI inspections which exceeded code requirements and increased resources were expended on identification and precautionary replacement of secondary piping subject to erosion/corrosion problems. Of significant note, the licensee volunteered for and participated in the first International Atomic Energy Agency (IAEA) Operational Safety Review Team (OSART) Inspection conducted in the United States.

In general, plant employees are well trained, highly motivated and well supervised at the first line level. However staffing constraints appear to hamper the ability of the maintenance and engineering departments to support operations in areas such as final close out of Facility Change Requests (FCRs), timely update of engineering construction standards, timely engineering of needed facility modifications, and correction of control room deficiencies.

In several areas such as outage management and control, radiation protection and security, effective programs and initiatives have been implemented thereby assuring quality in these areas as discussed earlier in this report. For example, the licensee's radiation protection and ALARA programs continued throughout the period to be effective in reducing overall personnel exposures. The quality of personnel screening was enhanced through implementation of the Nuclear Employee Data System which is a cooperative effort by several utilities to exchange security and health physics information on employees and contractor personnel.

In summary, weaknesses were noted in senior management control of interfaces between departments and ability to get departments to function together more effectively as a team. Although significant improvements have been made in the QA group, management was not effectively utilizing the information they provided. Potential weaknesses were seen in the ability of licensee senior management to perceive plant problems and determine root causes and in the safety committees' abilities to provide independent views on plant activities to management. Resource constraints are hampering the ability of the maintenance and engineering departments to support the operations group. Several initiatives were taken by the licensee during the period to help the organization become more proactive in identifying plant problems. These included participation in the first OSART inspection conducted in the United States. Plant personnel are highly motivated and, in general, well qualified and well supervised at the first line level.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendation

Licensee:

(1) Review composition of POSRC and OSSRC to determine if they are sufficiently independent from plant operations to provide objective assessment and root cause analysis.

(2) Senior corporate management attention is needed to assure proper functioning of the operations-maintenance-engineering on-site interface.

NRC: Perform an integrated performance appraisal inspection concentrating on the functioning of departmental interfaces.

K. Training and Qualification Effectiveness (0.0%)

1. Analysis

The previous SALP recognized that the licensee had expended significant resources in upgrading training facilities and programs. It pointed out that significant improvements were made in a previously weak maintenance training program, however the effectiveness of those improvements was not yet apparent. Appropriate management attention was being devoted to training. A Category 2 rating was assigned.

Although attributes of this topic are discussed in other SALP functional areas, the topic is segregated here because of its importance, and to provide a synopsis of the training and qualification programs. Training effectiveness was assessed primarily by observations of performance of licensee personnel and reviews of non-licensed staff training and training associated with the post accident sampling system, solid radwaste handling, and health physics activities. An NRC team inspection, in part, assessed engineering staff training. NRC licensing examinations were administered twice during the assessment period.

During this assessment period, the licensee continued to dedicate significant attention and resources to training. In May 1987, the final five training programs requiring INPO accreditation were accredited. With all 10 of their training programs accredited, the licensee is now a member of the National Academy for Nuclear Training.

Beyond accreditation the licensee is continuing to upgrade training programs. For instance, the 1986 operator requalification examinations more accurately assessed operator capabilities to perform job functions by greater usage of questions dealing with real-life situations. In cooperation with the University of Maryland, the licensee is developing an educational program, offered on site, which will lead to a Bachelor's degree in Nuclear Science. Some courses in the program have already been provided to interested employees. Based upon an analysis of systems engineer job functions (i.e., performance-based analysis), training needs were assessed, and a systems engineer training program was developed. Implementation of this program began immediately following the SALP period. During outages, maintenance and technical staff training instructors joined plant maintenance crews, thereby contributing their expertise and example to craft activities as well as enhancing their credibility with field personnel and updating their knowledge of current plant problems.

The license training program for operators was effective in preparing candidates for examination (further detail is provided in the plant operations analysis section). The training program for shift engineers was excellent in that it included senior operator training/examination as well as shift technical advisor training. Additionally, those individuals received further on-the-job training by virtue of being fully utilized on shift as control room supervisors.

In July 1987, the plant experienced a significant loss of off-site power event resulting in the tripping (shut down) of both units, operation in natural circulation core cooling conditions for an extended period (approximately 5 hours), and declaration of an "Alert" condition in accordance with the site emergency plan. During the event, operations and plant staff personnel responded correctly and properly implemented emergency operating procedures and the emergency plan. Communications to the NRC were excellent. This event demonstrated the effectiveness of the operator and emergency plan training programs.

Effective training was also evident in two very specific areas, post accident sampling and steam generator nozzle dam installation/removal (which resulted in low man-rem exposures).

The general experience level of system engineers was low. As noted above a training program for these individuals was only in the initial stages of implementation. Although NRC inspections have not specifically identified plant problems attributable to engineer training deficiencies, inspectors did note that operators and technicians generally lack confidence in the level of knowledge of the system engineers. Therefore, the engineers were not typically viewed as a useful source of expertise in solving technical problems.

Training weaknesses contributed to two major problems in the maintenance area. Maintenance planning, QC and craft personnel were not sufficiently aware of engineering requirements for replacement mechanical fasteners. As a result, commercial quality fasteners were improperly installed in ASME Code Class I, II, and III systems. Similarly, Electrical and Controls personnel lacked sufficient guidance and training to properly install electrical splices for equipment included in the electrical equipment qualification (EQ) program.

Three reportable events, although not principally caused by training deficiencies, did indicate weaknesses in (1) non-licensed operator understanding of the safety significance and administrative controls associated with refueling water tank level switches, (2) non-licensed operator understanding of the operating principle of the condenser air removal system which caused a unit trip, and (3) licensed operator ability to fully anticipate and control axial flux distribution during plant start up near end of core life.

In summary, the licensee continued to provide the necessary resources and management attention to training. Emphasis is needed in training craft and QC personnel on engineering requirements. Because craft training programs have only been recently finalized and accredited, their effectiveness could not be fully assessed. Adequate training was not provided for engineering personnel and was a significant weakness.

2. Conclusion

Rating: Category 2

Trend: Improving

3. Board Recommendation

Licensee: None

NRC: None

V. SUPPORTING DATA AND SUMMARY

A. Investigations and Allegations Review

Two allegations were received in April 1986 regarding personnel "jimmying" a high radiation door and that additional keys to high radiation areas were maintained by several people within the plant and were generally uncontrolled. These were substantiated. A violation was issued and licensee response was prompt and effective.

B. Escalated Enforcement Actions

1. Civil Penalties

None.

2. Orders

None.

3. Confirmatory Action Letters

October 1, 1986 Confirmatory Action Letter issued concerning deficiencies identified in Emergency Preparedness exercise. A remedial drill was held with acceptable results.

C. Licensee Conferences Held During The Assessment Period

April 28, 1987 - Enforcement Conference at Region I to discuss details of the isolation of the refueling water tank level switches resulting in the loss of the automatic feature of the RAS.

May 6, 1987 - Enforcement Conference at Region I to discuss underlying causes of violations noted in the Environmental Qualification Program.

July 13, 1987 - Senior NRC management met with senior BG&E management at Bethesda, Md. to discuss indicators of declining performance.

D. Review of Licensee Event Reports Submitted by the Licensee

The overall quality of Licensee Event Reports (LERs) is good. Over the assessment period there was a significant improvement noted in the discussions of safety consequences. Improvements were also noted in discussions of corrective actions and operator actions. Areas which would benefit from added attention include descriptions of personnel/procedure errors, component failures and safety system responses.

Two LERs (317/86-04 and 318/86-06) concerned failed reactor coolant pump surge capacitors. Those failures led to reactor trips. A modification to remove the capacitors and use inductors for surge suppression is nearing the end of the engineering design phase.

Two LERs (318/87-03 and 318/87-04) reported repeat cracking on a branch line for a relief valve for the Low Pressure Safety Injection System.

Three LERs (318/86-04, 318/86-07, and 318/87-02) involved grounds and component failures in Unit 2 feed water control systems. Corrective actions taken in this area may have largely resolved the problems as evidenced by no recurrences for a major portion of the SALP period.

Two LERs (317/87-07 and 317/87-09) describe problems with improper electrical splices on components in the Equipment Qualification program and use of improper fasteners in code class systems. Both problems largely resulted from inadequate engineering guidance to field personnel.

Four LERs (317/87-03, 317/87-05, 317/87-08, and 317/87-11) involved personnel errors and three LERs (317/86-07, 317/87-04, and 318/87-05) involved procedure errors.

TABLE 1

INSPECTION REPORT ACTIVITIES

REPORT NUMBERS INSPECTION DATES		TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
86-09 05/01/86	86-09 06/30/86	RESIDENT	247	ROUTINE RESIDENT INSPECTION
86-10 06/16/86	86-10 06/20/86	SPECIALIST	24	GENERIC LETTER 83-28 EQUIPMENT CLASSIFICATION, VENDOR INTERFACE, POST MAINTENANCE TESTING, PLANT SURVEILLANCE AND QA/QC OVERVIEW
86-11 07/01/86	86-11 08/31/86	RESIDENT	261	ROUTINE RESIDENT INSPECTION
86-12 08/11/86	86-12 08/15/86	SPECIALIST	40	WRITTEN AND OPERATING EXAMINATIONS ADMINISTERED TO SIX REACTOR OPERATOR AND FOUR SENIOR REACTOR OPERATOR CANDIDATES
86-13 07/21/86	86-13 07/25/86	SPECIALIST	40	EMERGENCY PREPAREDNESS EXERCISE
86-14 09/08/86	86-14 10/17/86	SPECIALIST	260	EMERGENCY PREPAREDNESS EXERCISE AND REMEDIAL DRILL
86-15 08/18/86	86-15 08/22/86	SPECIALIST	24	SURVEILLANCE AND CALIBRATION TESTING PROGRAM AND CONTROL OF MEASURING AND TEST EQUIPMENT
86-16 09/01/86	86-16 10/17/86	RESIDENT	206	ROUTINE RESIDENT INSPECTION
86-17 09/15/86	86-17 09/19/86	SPECIALIST	74	IMPLEMENTATION OF RADIATION PROTECTION PROGRAM AND OUTAGE PREPARATIONS INCLUDING ALARA EXPOSURE AND RADIOACTIVE MATERIAL CONTROL
86-18 10/18/86	86-18 11/30/86	RESIDENT	209	ROUTINE RESIDENT INSPECTION

Table 1

REPORT NUMBERS INSPECTION DATES		TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
86-19 12/01/86	86-19 01/12/87	RESIDENT	289	ROUTINE RESIDENT INSPECTION
86-20 11/03/86	86-20 11/07/86	SPECIALIST	94	PLANT OPERATIONS AND SURVEILLANCE PROGRAMS FOR CONTAINMENT INTEGRITY, ISOLATION VALVES AND AIR LOCKS, HYDROGEN CONTROL AND OTHER SYSTEMS
86-21	86-21			CANCELLED
86-22	86-22	MEETING	NA	LICENSEE REQUESTED MEETING
86-23 11/17/86	11/21/86	SPECIALIST	24	REVIEW OF THE ISI PROGRAM, OBSERVATIONS OF ULTRASONIC AND EDDY CURRENT EXAMINATIONS AND REVIEW OF NDE PROCEDURES
86-24 11/17/86	86-23 11/21/86	SPECIALIST	30	MAINTENANCE PROCEDURES, ELECTRICAL, MECHANICAL AND INSTRUMENTATION MAINTENANCE AND MODIFICATION TASKS AND QA/QC CONTROL INTERFACES
86-25 12/01/86	12/05/86	SPECIALIST	32	RADIOLOGICAL SAFETY INSPECTION - IMPLEMENTATION OF RADIOLOGICAL CONTROLS DURING UNIT 1 OUTAGE
87-01 01/12/87	87-01 02/28/87	RESIDENT	196	ROUTINE RESIDENT INSPECTION
87-02 02/17/87	87-02 02/20/87	SPECIALIST	32	FOLLOWUP ON SECURITY PROGRAM EVENT REPORTS AND A PREVIOUSLY IDENTIFIED VIOLATION, MANAGEMENT EFFECTIVENESS AND INDEPENDENT INSPECTION
87-03 02/24/87	87-03 02/27/87	SPECIALIST	84	PASS SAMPLING OF REACTOR COOLANT & CONTAINMENT ATMOSPHERE, NOBLE GAS EFFLUENT MONITORS, EFFLUENT MONITORING, IN PLANT RADIO-IODINE MEASURES
87-04 02/23/87	87-04 02/27/87	SPECIALIST	32	NON-LICENSED STAFF TRAINING

Table 1

REPORT NUMBERS INSPECTION DATES		TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
87-05 04/20/87	87-05 04/24/87	SPECIALIST	40	WRITTEN AND OPERATING RETAKE EXAMINATION ADMINISTERED TO ONE REACTOR OPERATOR AND RETAKE OPERATING EXAMINATION TO ONE OTHER RO CANDIDATE
87-06 03/01/87	87-06 04/13/87	RESIDENT	202	ROUTINE RESIDENT INSPECTION
03/23/87	87-07 03/27/87	SPECIALIST	40	UNANNOUNCED OCCUPATIONAL RADIATION PROTECTION INSPECTION AT UNIT 2 DURING UNIT OUTAGE
87-07 03/23/87	87-08 03/27/87	SPECIALIST	40	UNANNOUNCED INSPECTION OF LICENSEE ACTIVITY IN RESPONSE TO INFORMATION NOTICE 86-03 AND INFORMATION NOTICE 86-53
87-08 03/01/87	87-09 04/03/87	SPECIALIST	40	UNANNOUNCED INSPECTION OF THE LIQUID AND GASEOUS RADIOACTIVE EFFLUENTS CONTROL PROGRAM REPORT
87-09 03/26/87	03/30/87	RESIDENT	24	SPECIAL INSPECTION TO ASCERTAIN CIRCUMSTANCES INVOLVING ISOLATION OF ALL RECIRCULATION ACTUATION SYSTEM LEVEL SWITCHES - LER 317/87-05
04/06/87	87-10 04/10/87	SPECIALIST	40	INSPECTION OF IN SERVICE INSPECTION PROGRAM AND STEAM GENERATOR INTEGRITY
87-10 04/14/87	87-11 05/18/87	RESIDENT	187	ROUTINE RESIDENT INSPECTION INCLUDING DEFICIENCIES IN EQ PROGRAM, REPETITIVE BRANCH LINE CRACKING AND CQ REPLACEMENT PARTS
87-11 04/28/87	87-12 05/01/87	SPECIALIST	40	INSPECTION OF NUCLEAR MATERIAL CONTROL AND ACCOUNTING
87-12 04/27/87	87-13 05/01/87	SPECIALIST	40	MECHANICAL, ELECTRICAL, AND I&C MAINTENANCE INCLUDING PROCEDURES, MODIFICATIONS, EQUIPMENT HISTORIES, TRANSFORMER REVIEWS & QA INTERFACE

Table 1

T1-4

REPORT NUMBERS INSPECTION DATES		TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
87-13 05/11/87	87-14 05/15/87	SPECIALIST	308	SPECIAL INSPECTION REVIEWING EQ DEFICIENCIES, COMMERCIAL QUALITY MECHANICAL FASTENERS, PM TESTING, ENGINEERING REQUIREMENTS AND QA
05/11/87	87-15 05/15/87	SPECIALIST	40	INSPECTION OF IN SERVICE INSPECTION REVIEW OF ISI DATA AND QA COVERAGE, REPAIR ACTIVITIES ON 2-RV-439, EROSION/ CORROSION EXAMINATIONS
87-14 05/19/87	87-16 06/30/87	RESIDENT	312	ROUTINE RESIDENT INSPECTION
87-15 07/13/87	87-17 07/17/87	SPECIALIST	39	SOLID RADIOACTIVE WASTE PROCESSING, PREPARATION, PACKAGING AND SHIPPING PROGRAM
87-17 07/01/87	87-19 07/31/87	RESIDENT	276	ROUTINE RESIDENT INSPECTION
87-16 07/13/87	87-18 07/17/87	SPECIALIST	32	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
87-18 07/13/87	87-20 07/13/87	SPECIALIST	8	SENIOR MANAGEMENT MEETING HELD AT NRC HEADQUARTERS
87-20 08/17/87	87-22 08/21/87	SPECIALIST	32	INTERNATIONAL ATOMIC ENERGY AGENCY VISITATION
87-22 08/01/87	87-24 08/31/87	RESIDENT	80	ROUTINE RESIDENT INSPECTION
87-19	87-21	SPECIALIST		CANCELLED
87-21	87-23	SPECIALIST		CANCELLED

TABLE 2

CALVERT CLIFFS 1&2
INSPECTION HOUR SUMMARY

AREA	HOURS	HOURS ANNUALIZED	PERCENT
OPERATIONS	1646	1234.5	40.9
RADCON/CHEMISTRY	465	348.7	11.6
MAINTENANCE	559	419.3	13.9
SURVEILLANCE	332	249.0	8.2
EMERGENCY PREP.	308	231.0	7.7
SEC/SAFEGUARDS	88	66.0	2.2
OUTAGES	271	203.3	6.7
ENGINEERING	275	206.2	6.8
LICENSING	74	55.5	1.9
ASSURANCE OF QUALITY	0	0.0	0.0
TRAINING/QUALIFICATION	0	0.0	0.0
TOTALS:	4018	3013.5	100.0

TABLE 3

CALVERT CLIFFS 1&2
ENFORCEMENT ACTIVITY

A. Violations versus Functional Area by Severity Level

AREA	No. of Violations in Each Severity Level						
	1	2	3	4	5	DEV	TOTAL
OPERATIONS				1			1
RADCON/CHEMISTRY				1			1
MAINTENANCE				1	1		2
SURVEILLANCE				2			2
EMERGENCY PREP.							0
SEC/SAFEGUARDS				2			2
OUTAGES							0
ENGINEERING SUPPORT							1*
LICENSING							0
ASSURANCE OF QUALITY							0
TRAINING & QUALIFICATION							0
FIRE PROTECTION-HK							0
TOTALS:				7	1		9*

*One or more violations pending in EQ

B. Summary of Violations

INSPECTION REPORTS INSPECTION DATES	REQUIREMENT VIOLATED	SEVERITY LEVEL	FUNCTIONAL AREA	DESCRIPTION
86-09 05/01/86 06/30/86	T.S. 6.12.1	4	RADCON	FAILURE TO MAINTAIN CONTROL OF LOCKED HIGH RADIATION AREA KEYS
86-10 06/16/86 06/20/86	T.S.6.8.1	4	MAINTENANCE	FAILURE TO FOLLOW PROCEDURES AFFECTING SAFETY-RELATED ACTIVITIES
86-15 08/18/86 08/22/86	10 CFR 50, APPX B	4	SURVEILLANCE	I&C TECHNICIANS USING TEST EQUIPMENT NOT WITHIN THE CALIBRATION DATE AND STORAGE POTENTIOMETERS OUT OF CALIBRATION
86-16 09/01/86 10/17/86	SECURITY PLAN	4	SEC/SAFEGRDS	FAILURE TO FOLLOW SECURITY PLAN PROCEDURES FOR VEHICLE KEY CONTROL
86-20 11/03/86 11/07/86	T.S. 6.8	4	SURVEILLANCE	FAILURE TO PROPERLY REVIEW COMPLETED SURVEILLANCES AND TAKE CORRECTIVE ACTION FOR OUT OF SPECIFICATION TEST RESULTS

Table 3

INSPECTION REPORTS INSPECTION DATES		REQUIREMENT VIOLATED	SEVERITY LEVEL	FUNCTIONAL AREA	DESCRIPTION
87-07 03/23/87	87-08 03/27/87	10 CFR 50.49	*	ENGINEERING	FAILURE TO ESTABLISH ADEQUACY OF THE MAINTENANCE PROCEDURES FOR MAINTAINING LIMITORQUE MOV'S FAILURE TO ESTABLISH QUALIFICATION OF ASCO VALVE LICENSEE FAILED TO ESTABLISH QUALIFICATION OF WRAP-AROUND TAPE SPLICES USED IN PIG-TAIL LEADS FOR SOLENOID VALVES
87-09 03/26/87	- 03/30/87	TS 3.3.2.1	4	OPERATIONS	FAILURE TO COMPLY WITH THE PRECAUTIONS OF A SURVEILLANCE TEST PROCEDURE ISOLATING RAS FUNCTION FOR ECCS & CSS
87-12 04/27/87	87-13 05/01/87	10 CFR 50	5	MAINTENANCE	FAILURE TO FOLLOW SAFETY TAGGING ADMINISTRATIVE CONTROLS DURING MAINTENANCE ACTIVITY
87-11 04/28/87	87-12 05/01/87	10 CFR 70.51(D)	4	SEC/SAFEGRDS	FAILURE TO MAINTAIN AND KEEP PHYSICAL INVENTORY RECORDS TO SUPPORT THAT INVENTORIES OF SNM WERE CONDUCTED BETWEEN 4/30/81 AND 3/30/85

*Pending - no violation issued yet.

TABLE 4

CALVERT CLIFFS 1&2
LICENSEE EVENT REPORTS

A. LER by Functional Area

FUNCTIONAL AREA	Number by Cause Codes A	B	C	D	E	X	TOTAL
OPERATIONS	5			3		2	10
RADCON/CHEMISTRY							-
MAINTENANCE	1	1		1	3		6
SURVEILLANCE		1					1
EMERGENCY PREP.							-
SEC/SAFEGUARDS							-
OUTAGES							-
ENGINEERING SUPPORT		8					8
LICENSING							-
ASSURANCE OF QUALITY							-
TRAINING AND QUALIFICATION							-
TOTALS:	6	10	0	4	3	2	25

B. LER Synopsis

CALVERT CLIFFS 1

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-03	04/30/86	A	BATTERY WATER LEVEL EXCEEDED HIGH LEVEL LIMIT
86-04	07/20/86	B	REACTOR TRIP CAUSED BY REACTOR COOLANT PUMP SURGE CAPACITOR
86-05	10/01/86	D	MAIN VENT WIDE RANGE NOBLE GAS EFFLUENT MONITOR INOPERABLE DUE TO DEFICIENT PROCEDURE
86-06	10/10/86	A	REACTOR TRIP DUE TO TURBINE TRIP FROM LOSS OF CONDENSER VACUUM
86-07	10/11/86	D	REACTOR TRIP CAUSED BY HIGH AXIAL SHAPE INDEX
87-01	12/10/86	D	VIOLATION OF TECHNICAL SPECIFICATION FOR OPERABLE SHUTDOWN COOLING LOOPS
87-02	12/03/86	B	MAIN STEAM PIPING FLAW
87-03	01/27/87	A	REACTOR TRIP AS A RESULT OF LOSS OF INSTRUMENT AIR
87-04	02/01/87	D	REACTOR TRIP AS A RESULT OF TURBINE RUN BACK
87-05	02/17/87	A	INADVERTENT ISOLATION OF ALL RECIRCULATION ACTUATION SYSTEM LEVEL SWITCHES
87-06	03/10/87	X	PRESSURIZER SAFETY VALVES 200 AND 201 SET POINTS OUT OF SPECIFICATIONS
87-07	04/01/87	B	ENVIRONMENTAL QUALIFICATION DISCREPANCIES REQUIRING SHUT DOWN
87-08	04/14/87	A	IMPROPER VALVE LINEUP RESULTING IN SPRAYING BORATED WATER IN CONTAINMENT BUILDING

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
87-09	04/23/87	B	USE OF FASTENERS (BOLTS, STUDS, THREADED ROD & NUTS) IN ASME CLASS 1, 2, & 3, SYSTEMS WITHOUT PROPER CERTIFICATION, SPECIAL NDE OR MARKING
87-10	05/22/87	B	PRESSURIZER SPRAY VALVE BONNET WELD DESIGN DEFICIENCY
87-11	07/14/87	A	LOSS OF FEED WATER HEATER AND OVERBORATION EVENT WITH REACTOR TRIP
87-12	07/23/87	X	FAULTY 500KV CIRCUIT BREAKER OPERATION LEADS TO LOSS OF NON-EMERGENCY AC POWER
CALVERT CLIFFS 2			
86-04	05/21/86	E	MANUAL AND AUTOMATIC TRIPS ON LOW STEAM GENERATOR WATER LEVEL
86-05	07/25/86	B	FLEX HOSE FITTING FAILURE ON 21A RCP REQUIRED UNIT SHUTDOWN AND UNUSUAL EVENT
86-06	09/05/86	B	REACTOR TRIP CAUSED BY REACTOR COOLANT PUMP SURGE CAPACITOR FAILURE
86-07	09/12/86	B	MANUAL REACTOR TRIP DUE TO PARTIAL LOSS OF FEED WATER FLOW TO STEAM GENERATORS
87-01			CANCELLED
87-02	02/28/87	E	FAILURE OF LEAD/LAG CIRCUIT IN FEED WATER REGULATING VALVE CONTROL SYSTEM LEADS TO LOW STEAM GENERATOR WATER LEVEL REACTOR TRIP
87-03	03/24/87	B	FAILURE OF INLET PIPING TO RELIEF VALVE (2-RV-439)
87-04	05/07/87	B	FAILURE OF INLET PIPING TO RELIEF VALVE (2-RV-439)
87-05	07/03/87	E	FOLLOWING THE CALIBRATION OF THE TURBINE GENERATOR CONTROLLER, EXCESS LOAD RESULTS IN A LOW STEAM GENERATOR PRESSURE REACTOR TRIP

C. Licensee Event Reports (LERs)

Tabular Listing

Type of Events	Unit 1	Unit 2
A. Personnel Error	6	0
B. Design/Man.Constr./Install	5	5
C. External Cause	0	0
D. Defective Procedure	4	0
E. Component Failure	0	3
X. Other	2	0
Total	17	8

Licensee Event Reports Reviewed:

Unit 1 LER 86-03 through 87-12; Unit 2 LER 86-04 through 87-05.

TABLE 5

SUMMARY OF LICENSING ACTIVITIES

A. NRR LICENSEE MEETINGS

September 19, 1986	Request for Emergency TS Amendment for #12 EDG
September 26, 1986	24-month Cycle Reload
October 3, 1986	CO in-leakage into #12 EDG Jacket Cooling Water System
December 10, 1986	Unit 1 Main Steam Line Flaw
January 7, 1987	Future Licensing Actions
May 5, 1987	Materials Qualification Deficiencies

B. NRR SITE VISITS

July 14, 1986	Site familiarization and training for new ORPM
July 18, 1986	SALP Meeting
August 1, 1986	Discuss licensing actions status
August 7, 1986	Investigate #12 EDG CO in leakage
October 2, 1986	Follow up information on #12 EDG
November 3-7, 1986	Containment Integrity Inspection
April 1, 1987	ATWS Modification Review
May 11-15, 1987	Restart Inspection (joint Region I/NRR team)
June 10, 1987	SG Tube ISI Amendment Request
August 10-28, 1987	OSART

C. COMMISSION BRIEFINGS

None.

D. SCHEDULAR EXTENSIONS GRANTED

September 30, 1986	Order for operable SPDS, Units 1 and 2

E. RELIEFS GRANTED

March 26, 1987	ASME Section XI Relief - Unit 1 Main Steam Line Flaw
May 11, 1987	ASME Section XI Relief - Units and 2 Class 1 and 2 Bolting and Control Rod Drive Housing
May 29, 1987	ASME Section XI Temporary Relief - Unit 2 Auxiliary Feed Water Hydrostatic Test

F. EXEMPTIONS GRANTED

None

G. LICENSEE AMENDMENTS ISSUED

Date	Unit 1	Unit 2	Title
June 17, 1986	118	100	Miscellaneous TS Changes
June 30, 1986	119	101	Miscellaneous TS Changes
August 6, 1986	120	102	Miscellaneous TS Changes
Sept. 8, 1986	121	103	Exigent DG LCO Change
Sept. 23, 1986	122	104	Emergency Change #12 DG
Oct. 6, 1986	123	105	DFOST Outage Time
Nov. 28, 1986	124	---	Emergency Change Refuel without an EDG
Dec. 19, 1986	125	106	RCP Flywheel Inspection/ Snubber Table Deletion
Feb. 25, 1987	126	---	MSIV Replace Closure
April 29, 1987	---	107	MSIV Replace Closure
June 30, 1987	---	108	Cycle 8 Reload Request

July 7, 1987	127	109	CEA Misalignment/ Purge Valve Isolation

H. ORDERS ISSUED

September 30, 1986	Modification of Order on Emergency Response Capability Schedules (Generic Letter 82-33) providing a schedular extension for SPDS Operability.