ENCLOSURE 1

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE FINAL REPORT

REPORT 50-334/88-99
REPORT 50-412/88-99

DUQUESNE LIGHT COMPANY

BEAVER VALLEY POWER STATION, UNITS 1 AND 2

ASSESSMENT PERIOD: JUNE 1, 1988 - AUGUST 31, 1989

BOARD MEETING DATE: OCTOBER 17, 1989

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SUPPORTING DATA AND SUMMARIES

I. INTRODUCTION

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. SALP is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee management to promote quality and safety of plant operation.

An NRC SALP Board, composed of the staff members listed below, met on October 17, 1989, to review the collection of performance observations and data to assess the licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance". A summary of the guidance and evaluation criteria is provided in Section B in the Supporting Data of this report.

This report is the NRC's assessment of the licensee's safety performance at the Beaver Valley Power Station for the period of June 1, 1988, to August 31, 1989.

The SALP Board was composed of:

W. Kane, Director, Division of Reactor Projects (DRP) and SALP Board Chairman
M. Hodges, Director, Division of Reactor Safety (DRS)
M. Knapp, Director, Division of Radiation Safety and Safeguards (DRSS)
J. Stolz, Director, Project Directorate I-4, Office of Nuclear Reactor Regulation (NRR)
E. Wenzinger, Chief, Projects Branch No. 3, (DRP)
C. Cowgill, Chief, Reactor Projects Section 3A, (DRP)
P. Tam, Licensing Project Manager, (NRR)
J. Beall, Senior Resident Inspector

II. SUMMARY OF RESULTS

A. Overview

During the assessment period both units operated for the majority of time at power. Unit 1 shutdown for approximately nine weeks to repair reactor coolant system and steam generator leaks and Unit 2 under went its first refueling outage. In September 1989, Unit 1 began a core life extension program designed to move the scheduled refueling outage in order to establish a separation from the Unit 2 scheduled refueling outage. A high number of trips and transients were experienced by both units throughout the period as a result of various personnel errors and component failures.

In operation, the organization performed well and management involvement and operator response to plant transients were identified strengths. The performance of the balance of plant equipment was improved based on the reduced number of secondary components failures resulting in power reductions or trips. However, the incidence and impact of personnel errors by operators increased.

The radiological controls, chemistry, and effluent control programs were well defined and effectively implemented. The routine radiation protection organization was reorganized which strengthened the ALARA group and established an industrial safety and health group. The licensee was generally responsive to NRC concerns, however, the previously identified concern of a need to improve contamination control, and supervisory oversight of significant radiological work activities was not resolved.

The maintenance program was well controlled, with improvements in post maintenance testing and trending. The surveillance program implementation resulted in high number of unnecessary challenges to safety systems due to personnel errors. Housekeeping and overtime control during outages were areas identified as needing improvements.

The emergency preparedness program was effectively implemented. The response of key decision makers during exercises of the emergency plan and the close working relationship between the licensee and local communities were strengths. Good initiatives were clearly demonstrated and a substantial effort was made to ensure all programmatic areas were well maintained.

The security program was effective and performance oriented with management attention clearly evident in all aspects of program implementation. The efforts expended to maintain an effective program were commendable and demonstrated a commitment to the establishment a high quality security program.

The engineering and technical support programs incorporated management initiatives which improved plant safety and performance. The engineering and technical support response to NRC initiatives was timely and thorough in most cases. The response to plant events and technical issues continued to improve.

The licensee demonstrated a positive attitude towards compliance with NRC safety initiatives and often went beyond mere compliance to achieve a higher level of safety and quality. The programmatic root cause analysis program and proactive licensing staff were examples of the licensee's positive attitudes.

Significant improvements were made in the area of licensed operator training. All management positions in the training department were filled and Emergency Operating Procedures identified deficiencies were corrected. Nonoperator training activities were effective throughout the period.

The challenge for the licensee is to reduce the number of unplanned trips and transients by reducing the number of personnel errors. Also, the licensee needs to strengthen management oversight and self-assessment capabilities in the area of radiological controls.

B. Facility Performance Analysis Summary

	Functional Area	Rating Last Period	Rating This Period	Trend
A.	Plant Operations	1	2	
B.	Radiological Controls	2	2	
C.	Maintenance/Surveillance*	2/2	2	
D.	Emergency Preparedness	1	1	
E.	Security	1	1	
F.	Engineering/Technical Support	2	2	
G.	Safety Assessment/ Quality Verification	2	2	
H.	Training Programs	3	2	**
I.	Preoperational and Startup Testing	1	***	

* Maintenance and Surveillance were rated separately in the previous period.

** Training Programs is not generally a separate functional area, but was rated separately in the previous period due to problems in that specific area. Improvements were noted in this period and it is not expected that this will be a separate functional area in the next SALP report.

*** This area not rated during this period. Preoperational and Startup Testing for Unit 2 was completed in the previous period.

III. PERFORMANCE ANALYSIS

A. Plant Operations (1975 hours, 50%)

1. Analysis

The previous assessment, evaluated as Category 1, was based on sound operational performance with few reactor trips and forced power reductions. Notable strengths were observed in management involvement, operator event response and problem solving. Special note was made of the absence of plant trips or significant operational events due to personnel error. A decrease in power reductions caused by BOP components was also observed from earlier SALP periods.

During the current period, management oversight and control of operations was generally good. Overall, operators exhibited good command and control and were knowledgeable and competent. However, the incidence and impact of personnel error by operations personnel increased from the previous period. Good performance and reliability were observed in Balance of Plant (BOP) equipment. The quality of operator performance in response to plant transients remained high.

The involvement of management in providing oversight and control of operations was evident on a daily basis during planning meetings, interdepartmental interface meetings, and management plant tours. Emphasis was consistently given to improving procedures and determining and addressing root causes of events. Operating procedures were generally good and operations personnel were instructed to initiate engineering review requests for repetitive component problems. Management support for the attainment of degrees by licensed operators has remained good.

Attention to personnel safety by all levels of management was high. Some unsafe personnel practices were identified in the performance of work in containment, but at the end of the period the site had completed over two and one-half million consecutive man hours without a lost time accident.

A decline in performance was observed in the area of errors by operations personnel during the period. Two reactor trips were experienced during the power operation due to licensed operator error reading the wrong procedure step, and not resetting a feedwater isolation (during a busy startup). Errors by operations personnel were also the cause of four other events during operations.

The four events during operating activities included a mistake during river water flow adjustment which led to the automatic start of the standby pump, and an automatic feedwater isolation after operators left steam dump control in manual vice automatic during turbine startup activities. The other two events involved AFW automatic starts during the same busy Unit 2 cooldown. During the previous assessment period, no reactor trips and three operational events were caused by operations personnel error. All of the errors involved tagging out or restoring equipment.

In the previous SALP periods, Unit 1 had a consistent decrease in significant forced power reductions caused by balance of plant (BOP) components from twelve to nine to four. There were three such forced reductions during the current period. The modifications completed late in the previous period appear to have eliminated the accelerated wear of the feedwater control valves which was the root cause of many Unit 1 forced power reductions. No such reductions were experienced during the period at Unit 1. Two Unit 1 trips were caused by BOP hardware failures: the spurious opening of a main feedwater valve motor breaker and the failure of an electro-pneumatic transducer in the feedwater control system.

Unit 2 experienced five significant, unrelated forced power reductions caused by BOP components. In all cases, the unit remained at reduced power and returned to full power after completion of repair activities. Unit 2 experienced one at-power trip related to BOP hardware failure. The trip followed a mechanical failure in the internals of a feedwater control valve.

The component-caused trip rate at Unit 1 was low, consistent with the previous period and the Unit 2 rate showed a decrease. The low incidence of BOP caused events and outages is indicative of good senior management attention to BOP equipment and the potential for impact on plant operations and safety.

The prompt and accurate operator response to plant transients noted as a strength in the previous assessment continued to be evident during this period. Control room professionalism and operator attitude were very good.

Both units have operated on a six shift rotation since January, 1988. The staffing levels of operators on each shift were adequate, but showed a steady decline during the period. This decline was caused by attrition and the absence of any classes of operators being awarded licenses. At the end of the period, there were no individuals in the training system being prepared to receive operator licenses, so the downward trend in shift staffing is expected to continue. The presence of extra licensed and non-licensed operators on shift was previously a strength and the reduction was a potential contributor to the increase in operator error, especially during busy periods.

Particularly notable at Unit 1 were the responses to the scram and safety injection (SI) caused by de-energization of the auxiliary scram panel. At Unit 2, good operator actions allowed a controlled power reduction and turbine unloading in response to main vacuum degradation without requiring a reactor trip. Also notable at Unit 2 was the stoppage by operations personnel of an RCS leak in containment, thus preventing the need to complete a forced shutdown. Licensee management was closely involved in the troubleshooting and corrective action planning. This was evident in the identification and resolution of the design flaws which caused the SI after de-energizing the backup scram system at Unit 1 and the mechanism involved in an expansion joint failure on a Unit 2 component cooling water pump. Licensee event report (LER) root cause analysis was generally good with weaknesses identified by the NRC in only 2 of the 45 LER's reviewed.

In summary, an increase was noted in the incidence and impact of personnel errors by operations personnel. Good performance in BOP hardware was evident with relatively low impact on operations. Trips due to component failures remained at a low level at Unit 1 and decreased at Unit 2. Notable strengths were observed in management involvement, operator event response and problem solving. The NRC observed a declining staffing level of licensed operators with no replacement classes in progress.

2. Conclusion

Category - 2

BOARD RECOMMENDATION

Licensee: None

NRC: None

B. Radiological Controls and Chemistry (9%, 338 hours)

1. Analysis

The Units 1 and 2 Radiological Controls and Chemistry Programs were rated Category 2 for the last assessment period. The NRC found that overall licensee efforts to transit from single to dual unit operations were well managed. These efforts included increases in staffing of the radiological controls organization to support dual unit operations and comprehensive training of personnel on the differences between the two units. However, weaknesses were identified in the ALARA program and in supervisory and management oversight of significant radiological tasks, and the self-identification and corrective action system.

Radiation Protection

A generally well defined occupational radiation protection program was implemented during this assessment period. Management was involved in

setting and monitoring performance goals for this functional area. Radiation protection program performance indicators were routinely provided to management for review.

The enforcement history in this area has been good with only one licensee identified violation noted. This violation involved inadequate radiological controls for steam generator work. The licensee took extensive corrective actions for the problem.

The licensee reorganized the routine radiation protection organization during this assessment period. The reorganization was a good licensee initiative that strengthened the ALARA group and established an industrial safety and health group. The overall radiation protection organization for routine operations was well defined and adequately staffed.

NRC observations during this assessment period found that the augmented radiation protection organization (i.e., licensee plus contractor personnel), established to support the Unit 2 outage, was not well defined. Problems such as poor coordination and control of steam generator work, identified during review of Unit 2 outage activities, and discussed later in this assessment, were attributed in part to the lack of a well defined outage radiation protection organization and associated responsibilities.

A well defined and adequate initial training and qualification program was implemented for contractor and permanent radiation protection personnel and radiation workers. The training and qualification resulted in personnel having a good understanding of work, and performing their tasks with few personnel errors. An adequate continuing training program was also implemented. Overall, management attention to training was evident.

Inter- and intra-departmental communications (e.g., between operations and radiation safety personnel) were considered good. A communication problem between the radiation protection and security organizations identified during the last assessment period was corrected during the present period and ample staffing was available to support the Unit 2 outage.

Quality assurance (QA) audits of program implementation examined all appropriate areas. However, the audits were compliance oriented in nature. This weakness had also been observed during the previous assessment period. Outside technical specialists were rarely used to examine functional program areas. QA personnel experience in the area of radiation safety was minimal. Consequently, evaluation of radiation safety program adequacy and performance relative to industry standards and performance continued to be limited. The licensee has not been responsive to this concern.

Review of the routine radiation protection self assessment program during this period continued to indicate the need for improvement. Corrective actions continue to be incident or observation specific, rather than generic.

A number of weaknesses were observed in various areas during this assessment period. These included use of drinking fountains in the radiological controlled area (RCA), placement of frisking stations outside the RCA, improper passing of documents across RCA boundaries, identification of candy wrappers in the RCA (indicating ingestion of food in the RCA), improper use of radioactivity sample counting equipment, and weak procedures for hot particle exposure controls. Licensee QA and self-assessment programs were not effectively used to improve the radiation protection program.

Reviews of the external and internal exposure controls program during this assessment period found that radiological surveys to support on-going work were comprehensive. Significant improvements were made to steam generator work control procedures to address NRC concerns identified during the last assessment period. Internal exposure control concerns identified during the last assessment period were also addressed by the licensee this period. There were no internal exposure concerns identified this assessment period.

Licensee control and minimization of contaminated areas and contamination was good. A small percentage of the station's radiological controls area is contaminated and housekeeping has improved. However, significant problems were noted during the outage, prompting NRC discussions with station management and subsequent action by the licensee to further improve housekeeping.

The aggregate average occupational personnel exposure at the station for the past three years (1986-1988) compared favorable with industry averages. The licensee aggressively pursued resolution of ALARA concerns identified during the last assessment period. Reviews during this assessment period found that the licensee was taking action to reduce the source term and general area dose rates in containment by use of shielding and primary system decontamination. Also, cobalt-containing equipment (e.g., fuel grid straps and fuel debris screens) was being removed and replaced with non-cobalt materials. The licensee was also removing unnecessary snubbers to reduce surveillance related personnel exposure. In the area of staffing, the licensee also provided additional staff to perform ALARA reviews of on-going work. ALARA exposure goals were generated for each station department and monitored by the ALARA committee. ALARA goals for work were reasonable and were compared to actual accumulated exposures.

Although the licensee responded to the majority of ALARA concerns identified during the last period, weaknesses in the ALARA area continued this assessment period in the area of coordination, control and supervisory oversight of significant radiological tasks (e.g. steam generator work). For example, reviews during this period found that poor communications and failure to check equipment resulted in unnecessary personnel exposure due to equipment such as airlines and communication headsets not operating properly. In addition, coordination delays resulted in contractor radiation protection personnel waiting for extended periods of time in radiation areas to support workers.

The above problems appear to be due, in part, to the extensive use of contractor radiation protection personnel to oversee radiological significant tasks with minimal involvement and direct oversight by licensee personnel.

Radioactive Effluent Monitoring and Control

The licensee has in place an effective program for control of liquid and gaseous effluents. A radiological controls group reorganization during this assessment period centralized the organizational responsibilities for this functional area. This has resulted in a clearly defined management structure with responsibilities clearly assigned. This is considered a good management initiative. QA audits were thorough and of excellent technical depth to identify programmatic problems. Technical specialists were used where appropriate.

The licensee demonstrated viable approaches to technical issues as evidenced by the preparation, testing and implementation of software used in assessing radioactive effluents. No deficiencies or unacceptable practices were observed during this assessment period. Overall licensee performance in this area was good.

Environmental Monitoring

NRC review during this assessment period found that the licensee had implemented an adequate Radiological Environmental Monitoring Program (REMP). The results of QA audits of the program and REMP quality control programs were effectively used by the licensee to monitor and evaluate the performance in this area. The audits also provided effective oversight of contractor activities.

Transportation and Solid Waste

NRC review this period found that the licensee was implementing an effective radwaste and transportation program. QA audits of this area were comprehensive. Radwaste was properly stored. Overall performance was good.

Summary

In summary, the licensee is implementing a generally well defined radiological controls program. The training program contributes to a good understanding of procedures with few errors. The licensee has been generally responsive to NRC concerns as evidenced by the actions taken for the weaknesses identified during the last assessment period. However, there continues to be a need to improve coordination, control and supervisory oversight of significant radiological work activities, in particular, work being done by contractor personnel. This concern was identified during the last assessment period. Also, there continues to be a need to improve housekeeping and contamination control during outages. The internal audits of the environmental monitoring, radwaste, and transportation programs were comprehensive, and of good technical depth.

There is a need to improve the quality of audits of the in-plant radiation protection program to provide for additional technical review of program adequacy. Also, the in-plant radiation protection self-assessment program needs to be improved to focus corrective actions on the generic root cause of identified concerns. The chemistry, effluent monitoring and control, and radwaste transportation programs continued to be effectively implemented.

2. Conclusion

Category - 2

BOARD RECOMMENDATION

Licensee: Strengthen supervisory and management oversight and procedural controls for significant radiological tasks. This is a repeat recommendation from the last SALP.

NRC: None

C. Maintenance/Surveillance (455 hours, 11%)

1. Analysis

During the previous assessment period, Maintenance and Surveillance were each evaluated separately as Category 2. Generally, good control of maintenance and surveillance activities was noted with a relatively low number of unnecessary challenges to safety equipment. In maintenance, concerns were identified in the area of post-maintenance testing, trending, and procedural inadequacies. In surveillance, configuration control and procedural inadequacies were identified as areas needing improvement.

Maintenance procedures and policies were typically followed well by station personnel. Maintenance program goals were established and schedules were met. The backlog of outstanding maintenance items was well managed. Day-to-day preventive and corrective maintenance of safety related components received good preplanning and supervision. The preventive maintenance program was well developed and implemented. During this assessment period, the licensee has been developing an innovative predictive maintenance program utilizing such technology as infrared thermography. The proper use of clearances and well coordinated interface among the various disciplines (Health Physics, Quality Control, etc.) necessary to accomplished maintenance activities were observed in the field. The licensee had a strong calibration program for measuring and testing equipment (M&TE), however, weaknesses were identified in the control of M&TE including the issuance of M&TE past due for calibration for safety related work and the failure to properly segregate M&TE past due for calibration from calibrated M&TE.

Maintenance personnel are trained to work on both units and were found to be knowledgeable of station procedures and their assigned tasks. The licensee maintained a strong maintenance training program which was enhanced by the use of several training mockups, including breakers, valves, reactor coolant pump seals, snubbers, and steam generator manways.

Quality Control (QC) involvement in maintenance activities was very good. Quality Control inspectors were present during significant activities and performed in-process inspections on ongoing maintenance work activities. Discussions with QC personnel found them to be knowledgeable of activities observed.

During the current period, the licensee formalized post-maintenance testing into a station procedure which details testing requirements following corrective maintenance. This has resulted in a consistent and standardized post-maintenance test program. In the period, there were no observed instances of inadequate post-maintenance testing compared with two in the previous period.

Also during this period, the licensee developed and formalized a maintenance trending program. Where repeated corrective maintenance was noted, a multidisciplinary group (Maintenance, Instrumentation and Control, Operations, Engineering, etc.) determined whether a design change or increased preventive maintenance was appropriate. This multidisciplinary review is a notable strength and has led to a number of design changes.

The quality of maintenance and surveillance procedures has improved. Ongoing review has improved human factors considerations and the level of detail in many of the procedures. In the last assessment period, several events were attributed to procedure deficiencies. During this period, none of the challenges to safety systems was evaluated to have been caused by procedure inadequacies.

Maintenance activities were generally well planned and organized. During outages, frequent meetings were held with the various departments to ensure that the maintenance and surveillance activities were well coordinated. The skill of the permanent maintenance technicians and contracted craft was evident by a low number of repairs that required rework. One maintenance activity that was particularly noteworthy was the repair of a tube leak in a Unit 2 steam generator (SG) caused by a foreign object. The licensee organized a Foreign Object Search and Retrieval (FOSAR) team and brought in a full-size SG mockup. Use of the mockup allowed the FOSAR team to develop the necessary tools and techniques necessary to dislodge and remove the object with minimal radiation exposure. Conversely, errors made by maintenance technicians delayed the recovery from the Unit 2 first refueling outage. An unaccounted for seal pressure ring on the Reactor Vessel Level Indicating System rendered that system inoperable and required that the unit be shut down and cooled down. Shortly thereafter, the discovery of an incorrect flow orifice and a lack of a required orifice in the resistance temperature detector manifold required Unit 2 to be shut down and cooled down again.

During power operation, plant housekeeping improved as compared to the previous period. However, during the Unit 2 refueling outage, housekeeping was weak. Excessive numbers of tools and parts and various other debris were observed in the radiologically controlled areas. There was also a continuing problem with unrestrained equipment such as ladders and large tool cabinets being left adjacent to equipment important to safety. Additional management oversight and training for outage personnel concerning site housekeeping requirements is required to improve housekeeping during outages.

Of the several thousand surveillance tests performed at both units during the period only three technical-specification-required surveillance tests were missed due to administrative/personnel errors. The licensee maintained a very good program to ensure that surveillance tests were performed as scheduled.

There were eight challenges to safety systems caused by personnel errors during surveillance testing, including two reactor trip and one safety injection. Five events were caused by operators and three by maintenance or I&C technicians. The two reactor trips and three inadvertent Engineered Safety Feature (ESF) actuations occurred due to failure to follow the surveillance procedures as written. The SI resulted when licensed operators failed to properly assess plant conditions prior to authorizing a surveillance test to be performed. An emergency electrical bus was inadvertently de-energized by electricians due to an inadequate review of electrical schematic diagrams. An automatic feedwater isolation occurred due to insufficient preplanning. Licensee senior management recognized the increase in personnel errors and conducted comprehensive event root cause analyses. Implementation of corrective actions commenced late in the assessment period. Two additional events were caused by mistakes made by operators during the conduct of post maintenance testing. Combined with the events during surveillance testing, this is indicative of a weakness in attention to detail by operations personnel during the conduct of routine tests.

Weaknesses were identified in management oversight of worker and operator overtime during the Unit 2 outage such that licensee procedures and Technical Specification Limits were exceeded. In three instances licensed operators worked overtime in excess of Technical Specification limits. The licensee limits on overtime for personnel not covered by NRC requirements were often exceeded. In many cases first line supervisors of safety related work were on shift for five or more weeks, seven days a week, 12 hours a day. Two events during the outage (a safety injection and a reactor trip) were directly attributed to decisions made by a supervisor who worked over 60 consecutive 12 hour days. The authorization of overtime in excess of Technical Specification limits was pervasive and not limited to unusual circumstances. The assignment to work on activities perceived to be on the outage critical path was felt to be sufficient justification for all necessary overtime. As mentioned above, mistakes during two maintenance activities directly caused the extension of the

outage by approximately three weeks. Senior site management did not approve the excessive overtime and, in the case of the plant manager, was not aware of the authorization of the use of overtime in excess of Technical Specification limits.

In summary, licensee activities associated with maintenance were well controlled. Improvements in post-maintenance testing, trending, and procedures were noteworthy. However, the high number of unnecessary challenges to safety systems during surveillance testing due to personnel error indicates need for further improvements. Continued emphasis on housekeeping during outages is needed. Management oversight and control of overtime during outages also requires improvement.

2. Conclusion

Category - 2

Board Recommendation

Licensee: None

NRC: None

D. Emergency Preparedness (296 hours, 7%)

1. Analysis

During the previous assessment period the licensee was rated Category 1 based upon the strong performance of the emergency response organization during the partial participation exercise, the licensee's positive, timely and technically correct approach to the findings of the Emergency Preparedness Implementation Appraisal (EPIA), and the continuing close relationship with offsite agencies.

During this assessment period, a partial participation and a full participation exercise were conducted in October 1988 and August 1989, respectively. In addition, a routine safety inspection of program activities was performed. This included a comprehensive review of revisions to the emergency action levels (EAL) and walkthroughs of several shift operating staffs to demonstrate use of new EAL's in classification of events. No violations were issued this SALP period.

In both exercises it was noted that positive command and control of all emergency response facilities (ERF) was demonstrated by the respective manager, communications and notifications between the ERF's were efficient, staff members demonstrated good use of implementing procedures and record-keeping, and accurate and timely protective action recommendations were issued to offsite authorities. The licensee's ability to implement the Emergency Plan and Implementing Procedures was effectively demonstrated.

The new EAL's, which were developed in response to NRC initiatives provide the operations staff with a straightforward approach to event classification. Accurate and consistent demonstrations to classify emergency conditions, formulate protective action recommendations, perform dose calculations based upon source term information, and immediately notify offsite authorities were observed among all shifts . Also Region I determined that audits had been thorough, adequate in scope and in accordance with regulations. The licensee's implementation of corrective actions has been timely and effective, consistently meeting schedules.

Appropriate management involvement in the EP program is provided at the corporate and site levels. Changes made to the Emergency Plan and procedures received proper management attention and did not decrease the overall effectiveness of the program. Further, corporate management is frequently involved in those emergency preparedness activities relating to coordination with offsite support groups. This includes interfaces on a regular basis with officials from the States of Pennsylvania, Ohio, and West Virginia as well as meetings with members of the local community.

Corrective actions in response to plant events consistently have been effective. For each degraded plant condition requiring use of EAL's, the onshift staff promptly and properly made the Unusual Event (UE) classification . In all cases notifications of offsite organizations were also prompt. Operators were very conservative in evaluating events. For example, a fire at a nearby industrial facility triggered one UE due to possible toxic gas release. In two other instances, the onsite release of a flammable or toxic gas initiated a UE classification based on conservative estimates of potential concentration. Similarly, the control room staff's response to other initiating conditions during the period (also classified as Unusual Events) showed timely resolution and the same conservative philosophy.

All positions within the emergency response organization are identified and authorities and responsibilities well defined. A viable training program is also defined and implemented with dedicated resources. Personnel are well trained and qualified for the positions to which they are assigned. Criteria for personnel to qualify as members of the response organization includes classroom instruction as well as performance based training. It was noted during the exercises and conduct of walkthroughs that personnel demonstrated a thorough knowledge of implementing procedures, and these procedures and established policies were rigidly followed. In addition to the Director, Emergency Preparedness, eleven (11) full-time site and contractor staff were assigned to maintain routine activities and efficiently implement the program. The training department staff is also actively involved in the program by providing support during exercise scenarios and qualification of response personnel.

Emergency response facilities were appropriately maintained throughout the period and were effectively used to support exercise response. A new Joint Media Center was designed and constructed. During the 1989 exercise it provided improved capability for the licensee in dealing with media and outside public relations personnel.

In summary, the licensee has provided the resources, staffing, and leadership necessary to effectively implement a quality emergency preparedness program. Demonstration of emergency response by key decision makers during actual events, exercise scenarios, and walkthroughs continues to be strong. The close working relationship between the licensee and local communities was evident throughout the period. The licensee has clearly demonstrated good initiatives and made a substantial effort to ensure all programmatic areas are well maintained.

2. Conclusion

Category - 1

BOARD RECOMMENDATION

Licensee: None

NRC: None

E. Security (236 hours, 6%)

1. Analysis

During the previous assessment period, the licensee's performance was rated as Category 1 and no major regulatory issues or violations were identified by the NRC. Some startup problems were encountered with new systems and equipment, largely as a result of integrating Unit 2 with Unit 1 and implementing the established physical security program for both units. Maintenance of security systems and equipment was also found to be sparse early in that assessment period. More aggressive management attention to the security program occurred during the later portion of the period and that concern was resolved.

During this assessment period there was one routine unannounced physical security inspection conducted by region based inspectors. Routine inspections by resident inspectors continued throughout the period. No regulatory issues or violations were identified and a continuation of aggressive management attention to the program was apparent.

The licensee developed and implemented an excellent screening program to expedite the plant access authorization process for contractor employees during this period. The screening program is carried out by security personnel and was particularly helpful in processing the large number of contractor personnel who were needed for the outage during this period. The licensee also modified the fitness-for-duty program, adding a requirement for chemical testing of all personnel prior to granting unescorted access to the site protected area. In conjunction with the fitness-for-duty program, the licensee also conducts periodic onsite searches for drugs with drug detecting dogs. Further program modifications are in progress to conform to the NRC's new rule.

Staffing of the licensee's proprietary organization remained consistent with the previous period and was adequate to carry out program needs as evidenced by the licensee's performance during the period. The four proprietary shift supervisors who were hired and placed onshift during the last period to provide contractor oversight in response to an NRC concern appear to be very effective. They conducted frequent post checks to reduce personnel related deficiencies, provided feedback to the training program to strengthen potentially weak areas and maintained continuity on program and equipment status to preclude potential problems from becoming major issues. Security management also remained active in Region I Nuclear Security Association and other organizations engaged in nuclear plant security matters which demonstrates program support from senior licensee management.

Staffing of the contract security force was ample as evidenced by the limited use of overtime. Morale was very good and the turnover rate in the force remained low (about 12%). Members of the force were very professional in appearance and demeanor, especially the dedicated response force. The training program continued to be administered by four, full-

time, experienced instructors. Lesson plans were current and accurately reflected the commitments in the NRC approved security program plans. Training facilities were well maintained and instructional aids were utilized extensively. A proprietary training coordinator was assigned to oversee the contractor's training program and to ensure it is maintained current. This is evidence of the licensee's intent to maintain an effective and professional training program. Program implementing procedures and instructions continued to be updated, when required, based on feedback from training and security operations supervision to provide the security force with current, clear and concise directions. Members of the security force were found to be very knowledgeable of their duties and responsibilities when interviewed by NRC personnel. Contractor supervisory and administrative staffing was also sufficient for the work load. During the period, the licensee conducted a security related Emergency Drill which included a response from the local law enforcement agencies (LLEA). The drill was conducted in a very professional manner and the security force and LLEA response was exemplary. The drill scenario was very realistic and well developed. The post drill critique was very professional and provided meaningful training for the security force and the LLEA. The training and qualification program is very effective as indicated by the small number of personnel errors that occurred during the period and the excellent performance of the force during the emergency drill.

The NRC required annual audit of the security program, performed by the licensee's quality assurance group, was comprehensive in scope and depth. In addition to the NRC required audit, the licensee also continued to conduct self assessment of the program utilizing security management, proprietary shift supervisors and onsite QA personnel. Corrective actions on findings and recommendations, identified during audits and self assessment, were prompt and effective, with adequate follow-up to ensure their proper implementation. The NRC believes that the licensee's commitment to implement a high quality and effective security program coupled with a comprehensive audit and self-assessment program are major contributing factors in the licensee's excellent enforcement history.

The number of security related events during this period decreased significantly compared to previous periods. With Unit 2 now operational and fewer contractor personnel on site, security related problems have also decreased. The NRC believes that the decrease is also due to a very capable and well qualified proprietary organization and a strong training program.

Three security event reports were submitted to the NRC in accordance with 10 CFR 73.71 during the period. One event involved a security officer who was inattentive on post, another involved a vital area barrier that had been degraded because of maintenance and the third involved the failure to reactivate an intrusion detection system zone after a test. All events

were identified by routine security patrols or checks within a reasonable time and did not results in significant security vulnerabilities. However, each event was similar to those that had occurred in previous assessment periods. This area requires management attention to ensure that corrective actions implemented for an event are sufficiently comprehensive to apply to similar evolutions and address the root cause of the event.

The licensee submitted three security plan revisions under the provisions of 10 CFR 50.54p during this period. The revisions were minor in nature and did not decrease the overall effectiveness of the plan.

In summary, the licensee continues to maintain a very effective and performance oriented security program. Management attention to and support of the program is clearly evident in all aspects of program implementation. The efforts expended to maintain an effective program during this period are commendable and demonstrate the licensee's commitment to a high quality security program. An area that requires additional management attention is the comprehensiveness of corrective actions for security events.

2. Conclusion

Category - 1

BOARD RECOMMENDATION

Licensee: None

NRC: None

F. Engineering/Technical Support (472 hours, 12%)

1. Analysis

During the previous SALP assessment period, the licensee's performance in the Engineering Support was rated as a Category 2. The primary weakness cited in the previous SALP report was the lack of a program for the prompt resolution of the deficiencies and inconsistencies in the Emergency Operating Procedures (EOPs). This was attributed to site management's inattention to detail in validation, verification and implementation of high quality EOPs.

The Nuclear Engineering Department provides engineering support to the plants. The staffing of the engineering group was good. Contractor personnel were assigned to provide services on a task basis and each task is supervised by the cognizant engineering group supervisors. The licensee does not use contractors for most of the required engineering.

By performing 80% to 90% of the engineering work "in house," the licensee has built a stable engineering force and a high level of plant specific experience. The increasing demands for engineering support due to Safety System Functional Evaluations (SSFE) for updating Unit 1 design basis and licensing documents has caused the licensee to authorize 25 additional engineering personnel to support this task. This initiative is viewed as a positive management commitment to engineering and plant safety.

An effective interface between engineering (onsite) and plant personnel exists in Beaver Valley Units 1 and 2. The lead engineers on a project are responsible not only for the design and the installation but also for the ongoing operation of the affected equipment/system. This provides a close working relationships between engineering and operations personnel.

The licensee site management's initiatives to improve the plant safety and performance was evidenced by the following examples: 1) The licensee has established an erosion/corrosion inspection program based on industry information and the plant operating experience; and 2) The licensee has developed a SSFE team approach to update the design basis and licensing documents for Unit 1. The SSFE reports were found to be thorough and complete and the system studies are progressing aggressively.

Another significant initiative includes the initiation of a full scale Probabilistic Risk Assessment (PRA) for each unit (exceeding the scope of Generic Letter 88-20). The PRAs are planned to be maintained current and used as an engineering tool. In addition, the licensee constructed a working mockup of applicable charging system piping to study the phenomenon of hydrogen buildup in charging pump suction lines. These initiatives are indicative of a commitment to long-term, strong performance in engineering and technical support.

The licensee has been generally responsive and continues to demonstrate sensitivity to implementing NRC initiatives during this assessment period. For example: 1) The EOP deficiencies identified during the previous SALP period were corrected in a timely manner during this assessment period. 2) The licensee's review and evaluation of NRC Information Notice 86-53 regarding "Improper Installation of Heat Shrinkable Tubing" were timely, thorough and technically sound. 3) In a recent heightened NRC effort to obtain implementation status on all TMI actions, the licensee fully cooperated and provided a timely and accurate response. Furthermore, the licensee has also responded properly to a large number of bulletins. Major responses include those addressing fatigue cracks in steam generator tubes, pressurizer surge line thermal stratification, molded case circuit breakers and thermal stresses in pipes connected to the reactor coolant system.

The licensee has established a viable system for controlling the engineering workload, for establishing and revising priorities, and controlling the activities of the engineering organization to meet current plant requirements. Good site management overview of the engineering activities is provided through periodic reviews of project status. Priorities are

formally established through a set of weighting factors that include nuclear safety significance, regulatory requirements, industrial safety, cost/benefits, efficiency and other management considerations. The priority system generally has been effective in the performance of engineering activities in a timely manner to support plant requirements; however, a few exceptions have been noted. These include the following: 1) The engineering evaluation and submittal of an amendment request regarding ultimate heat sink temperature took almost a year to complete. This resulted in the issuance of an amendment under emergency circumstances by the staff. 2) The engineering staff took ten months to evaluate a vender identified valve problem which potentially impacted containment isolation capability.

The engineering support in response to plant events and technical issues continues to improve and show strength. For example: 1) In October 1988, problems were identified with the environmental qualification of gaskets in the Unit 2 power operated relief valve limit switch position indicators. The gaskets were replaced with new ones after careful analyses without impacting plant operations. 2) At the time of the North Anna steam generator tube plug event, Unit 2 was in the first refueling outage. Excellent engineering support enabled the repair of the most susceptible Unit 2 steam generator tube plugs prior to issuance of NRC requirements, without impacting the outage schedule. 3) High quality support was evident in the prompt engineering response to the May 18, 1989 reactor trip and safety injection at Unit 1. Design changes and modifications were completed in the ATWS mitigating system and the Unit was returned to power on May 21, 1989.

In spite of the above good performance, weaknesses were noted in the licensee's ability to provide quality work for some activities. For example: 1) The licensee did not conduct an adequate engineering review for thermal overload relays and differential pressure testing requirements for motor operated valves in response to Bulletin 85-03. 2) Deficiencies in procurement, review and classification of commercial grade items for Category I use led to the installation of an incorrect gasket in a Unit 1 steam generator manway. 3) Inadequate resolution of safety related cable separation in Unit 1 led to repeat violations. Corrective actions were still in progress at the end of the period.

In addition, as indicated in the summary of unplanned shutdowns, plant trips and forced outages at the end of this report, deficiencies in engineering activities resulted in a reactor trip at Unit 1 and two reactor trips and a forced shutdown at Unit 2. Proper review and evaluation of vendor-supplied engineering details could have disclosed errors in the Unit 1 backup scram system, the Unit 2 rod control system, and in the Unit 2 feedwater control valve which could have averted these events.

Strengths were identified in the licensee's Inservice Inspection (ISI) program. The licensee maintains a certified Level III examiner for review of vendor data and oversight of vendor activities in the area of nondestructive examination. Improvements were noted in the ISI vendor training and examination program. A team of engineers was formed during the Unit 2 first refueling outage dedicated to expedite the disposition of ISI discrepancies.

In summary, the licensee responded positively to the concerns identified in the previous SALP report, and the licensee's response to NRC initiatives has been timely and thorough in most cases. Management initiatives to improve plant safety and performance were evident during this SALP period. The engineering support in response to plant events and technical issues continues to improve. However, some areas were identified where the timeliness and quality of engineering support could be improved. Also, it appears that better attention to vendor-supplied engineering details with more emphasis on independent evaluations could reduce the number of plant transients. Although improvement has been observed in some areas, continued management attention is warranted to achieve overall improved performance.

2. Conclusion

Category - 2

BOARD RECOMMENDATION

Licensee: None

NRC: None

G. Safety Assessment/Quality Verification (192 hours, 5%)

1. Analysis

In assessing this area, the SALP Board considered attributes which are key contributors in assuring safety and verifying quality, for example implementation of management goals, planning of routine activities, worker attitude, and management involvement. This area received a Category 2 rating in the last assessment period. Strengths were identified in the Unit 2 self-assessment program, management oversight, safety committees and quality verification programs. Weaknesses were identified in the quality of LERs, and quality and technical depth of the QA organization.

Significant resources continued to be dedicated to the assurance of quality. In the previous period, the licensee completed a Safety System Functional Evaluation (SSFE) of the Unit 1 AFW system. The SSFE was a broad based technical review involving over 3000 man hours of effort and was modeled after the NRC Safety System Functional Inspection. During this period, three additional SSFE's were completed on the Quench Spray System, the emergency diesel generators and the River Water System. Two

more SSFE's were in progress on the Recirculation Spray and Residual Heat Removal systems. The licensee's program is a strong initiative to enhance operability of key safety systems and yield long-term improvement in safety.

In the licensing area, the licensee demonstrated a good working knowledge of applicable regulations, guides, standards and generic issues, and has not exploited use of exemptions or reliefs as convenient costcutting means. The licensee's prompt and thorough responses to NRC safety initiatives (such as bulletins, generic letters, information notices) are commendable. When audits were performed by the staff on two bulletins and two other plant specific issues, licensee personnel, with the support of contractors, consistently demonstrated competence in the subject matters, aggressiveness to resolve disputes and openness to communication. Over 50 licensing actions were completed including several that required major NRC and licensee efforts such as natural circulation cooldown, increased limit of fuel enrichment, core design change, and schedular extension of several license conditions. The licensing staff maintains open and frank communication with the NRC on a day-to-day basis, and is sensitive to NRC's safety concerns. Such a proactive attitude is indicative of the licensee's emphasis on safety.

A significant safety initiative is the licensee's decision to complete and maintain current a Probabilistic Risk Assessment (PRA) on each unit. The Unit 2 PRA was nearly complete at the end of the period, and the Unit 1 PRA was scheduled for completion in 1990. Upon completion, the PRA's should significantly contribute to safety by enabling evaluation of the effects of out-of-service equipment, proposed modifications and other system changes.

The licensee continued to have in place a formal and systematic approach to root cause analysis which forced a broadbased approach to event review and which led to higher quality analyses. The ISEG (Independent Safety Evaluation Group) computer program compares reactor trip response to a standard trip without other failures. The program greatly facilitates the identification of equipment failure or unexpected component response following a reactor trip event and provides a database for trending studies. This program is a notable initiative which enhances the licensee's ability to assess plant response to events and during this period led to the rebuilding of all 18 Unit 1 steam dump valves, changes to some Unit 2 relay settings, and the replacement of certain fuse types. The ISEG also initiated Formal Human Performance Evaluation System (HPES) reviews of personnel error caused events. The HPES conclusions gave good insight into the contributory factors to personnel error and led to several procedure enhancements. The use of ISEG to review trips, personnel error caused events, and repetitive component problems gives good evidence that ISEG is used as a management tool by senior site management.

Management oversight varied in quality. Strengths were noted in senior management involvement in improving availability of safety related

components and systems, promoting accountability and sense of ownership, ensuring participation in industry initiatives to learn from other utilities, and keeping abreast of regulatory issues to be aware of potential problems. Several programs such as the SSFE and the Design Basis Reconciliation Program instituted by management have produced tangible results in safety and compliance. Management performance was weak in controlling overtime and maintaining oversight of work in radiologically controlled areas during the Unit 2 refueling outage. Prioritization and timeliness in addressing technical issues were mixed. Also, management did not resolve the low technical quality of QA audits of the radiation protection program noted in the previous SALP report. The increase in the incidence of personnel error caused events was identified in the middle of the period, but corrective actions by management were not successful in preventing additional such events in the final months of the period.

The licensee's safety evaluations (SEs) under 10 CFR 50.59 were found to vary in quality. The SEs for permanent plant modifications were thorough and of high quality while the SEs for some temporary modifications exhibited weakness with superficial evaluations. In one instance a temporary modification on a Unit 2 emergency diesel generator air start system involved an unreviewed safety question, in that it allowed the indefinite operation of the air compressor without the associated air dryer. However, the licensee instituted programmatic enhancements, including training for all personnel involved in approving SEs, and was successful in improving SE quality by the end of the period.

The various station safety committees functioned well during the period. The Onsite Review Committee (OSC) adequately performed its assigned responsibilities. Reviews were generally thorough and in depth. Weaknesses identified in the OSC review of temporary modifications showed improvement near the end of the assessment period. The Offsite Review Committee (ORC) includes members of senior corporate personnel and continued to be an effective and aggressive organization. Examples of the ORC's management tools include the SSFE program and the unit specific PRAs mentioned above. The onsite location of senior corporate personnel and engineering support groups continued to enhance the effectiveness of senior management oversight and technical support.

Prepared in accordance with the evaluation methodology presented in NUREG-1022, "Licensee Event Report System," the overall quality of LERs was found to be very good. Weaknesses were found in only two of the LERs reviewed during the period. Generally the LERs provided good documentation of event analyses, root cause determinations and corrective actions.

In the previous report, the QA organization was described as lacking depth in its audits, but was improving at the end of the period. The licensee has since then incorporated performance based attributes in the QA audit plans, and improvements were noted in sampled QA audits.

The performance in the area of Radiological Controls was mixed with good audits in effluent monitoring, transportation, and environmental monitoring but weaker performance in QA surveillance and radiation performance.

The involvement of QC in day to day work activities continued to be a strength. Field inspectors for QC continue to closely and independently monitor all work on safety related equipment. The QC material receiving inspection program was thorough and well implemented.

In summary, effective management was evident in promoting activities which would improve safety and quality. The licensee demonstrated a positive attitude to comply with NRC safety initiatives, and often went beyond mere compliance to achieve a higher level of safety and quality on its own. The SSFE, programmatic root cause analysis program, and proactive licensing staff are examples of the licensee's positive attitude. Weaknesses were identified in the resolution of the previously identified low technical quality of QA audits in the radiation protection program, in the implementation of corrective actions to prevent additional events caused by personnel error, and in management's oversight of overtime and of work in radiologically controlled areas.

2. Conclusion

Category - 2

BOARD RECOMMENDATION

Licensee: None

NRC: None

H. Training Programs

1. Analysis

In the previous period, the area of Training Programs was evaluated as Category 3. Significant weaknesses were noted in licensed operator training with high examination failure rates and EOP knowledge weaknesses. These deficiencies led to the NRC evaluation that the requalification program was unsatisfactory. Other training activities were found to be generally sound.

Significant improvements were noted during the current period and the licensee's requalification training program was assigned an overall program rating of satisfactory in December, 1988. This rating was based on the results of requalification examinations administered to twelve licensed operators (6 SROs and 6 ROs) from Unit 1 during the week of December 12-16, 1988. Eleven of the twelve operators passed these exams and there was close agreement between the NRC and the licensee on the

grading of the exam. The individual who failed, subsequently passed a requalification retake exam in July, 1989. This overall performance is indicative of increased emphasis in the area of requalification training, which is in sharp contrast to that demonstrated during the previous SALP evaluation period. It was noted that in the previous SALP period, management oversight and involvement was minimal, however towards the end of the period, an increase in management involvement was apparent. This continuation of management attention and involvement is evidenced by the satisfactory training program evaluation results.

Management involvement was also demonstrated by the commitment to have a Unit 2 simulator in place by March, 1991. Also, the vacant Manager of Training position was filled by a temporary employee familiar with the accreditation process and other training programs. This individual has brought a reliable outside perspective to the licensee's training program. Evidence of his and other managers' involvement during the requalification examination was noted throughout the week of the examination.

Licensee preparation for the requalification exam was found to be very good. Examination materials submitted to the NRC allowed the exam to be generated with relative ease. This supported the licensee's previous commitment to upgrade the requalification program, including learning objectives, lesson plans and examination development. There were, however, some problems identified with the materials submitted for the replacement examination administered in August, 1988. However, the majority of these problems dealt with editorial concerns vice technical content. These identified problems were subsequently corrected as demonstrated by the materials submitted for the requalification examination four months later. Again, this demonstrates management involvement in the assurance of developing and maintaining a training program that meets high quality standards.

The licensee's training department adequately reviews LERs and industry events and incorporates them in the lesson plans. They provide sufficient training to the station nonlicensed staff in order to prevent the occurrence or mitigate the effects by recognition and proper operator actions. They are aggressively pursuing the goal of 100% training of all station nonlicensed staff during the current year.

The Training and Operations departments interact well in identifying training needs. An Operations Training Committee, consisting of Operations and Training personnel, develop detailed training objectives. In preparation for the NRC administered requalification examination, the Operations and Training personnel jointly developed Job Performance Measures and training on the newly revised EOPs. The EOPs had undergone review and necessary revision as called for in a BVPS EOP Action Plan. Several human factors deficiencies had previously been identified in an EOP inspection during the previous SALP evaluation period. These identified deficiencies had been attributed to a lack of quality assurance reviews and poor management oversight. Based upon the usage of the EOPs during the conduct of the requalification exam, which extensively utilizes the EOPs, it was evident that appropriate changes had been made to the EOPs.

Non-operator training activities continued to be effective. Training for maintenance personnel, emergency preparedness, the security force engineers and radiation protection was good. The team building training given to operators and maintenance personnel was a noteworthy initiative.

In summary, significant improvements have been made in the area of licensed operator training. All management positions have been filled and as a result, management involvement and oversight of training program activities has increased, especially in the area of the requalification program. Previously identified weaknesses dealing with EOP procedural deficiencies as well as licensed operator usage problems have been corrected. Corrections/improvements to the EOPs and subsequent usage by licensed operators were demonstrated during the conduct of the December, 1988 requalification examination, which resulted in a satisfactory program evaluation. Non-operator training activities continued to be effective throughout the period.

2. Conclusion

Category - 2

BOARD RECOMMENDATION

Licensee: None

NRC: None

SUPPORTING DATA AND SUMMARIES

A.1 Licensee Activities

This assessment period started with both units operating at 100% power. A Unit 1 reactor trip and safety injection occurred on June 7, 1988, when a non-licensed operator inadvertently tripped a reactor coolant pump breaker instead of the intended air compressor breaker. Two additional Unit 1 reactor trips occurred on June 9 and June 11, during plant startup evolutions, due to feedwater control problems which resulted in low-low steam generator water levels. Operator error contributed to the June 9 trip, and the June 11 trip resulted from component failure. A Unit 2 reactor trip occurred on July 27 on negative neutron flux when several control rods fell into the core during maintenance troubleshooting activities due to component failure.

Both units were taken off-line on August 23 following an apparent offsite chlorine release which caused the air bottles in the control room emergency pressurization system to partially discharge and the declaration of an Unusual Event. Units 1 and 2 returned to power operations on August 24 and 25, respectively. In September, Unit 1 began a core life extension program which would include limiting power to 90% with load swings to 50% on weekends. The program was designed to move the scheduled refueling outage to Fall, 1989, and thus establish separation from the Unit 2 refueling in Spring, 1989. Unit 2 experienced two additional trips on September 20, 1988, and February 12, 1989, due to unrelated hardware failures and shut down on March 17, 1989, for the first refueling outage.

On November 25, 1988, Unit 1 shut down for approximately nine (9) weeks due to RCS and steam generator manway leaks. Unit 1 tripped on January 17, 1989, due to licensed operator error during post-maintenance testing. Another Unit 1 trip was experienced on February 13, due to component failure. The last Unit 1 trip in this period occurred on May 18. A design flaw in the recently added backup scram system caused the steam dump valves to open when the system was de-energized. The excess steam flow initiated at 89% power caused both a reactor trip and safety injection. The design was corrected and Unit 1 operated without further incident for the rest of the assessment period.

Unit 2 experienced problems during recovery from the first refueling outage. A small gasket left in a sensing line rendered the reactor vessel indicating system inoperable and orifices were mis-installed or omitted in the RCS. In both cases, the unit was returned to cold shutdown to effect repairs; Unit 2 was returned to power operations on June 3. No additional trips were experienced in the assessment period, although Unit 2 did declare an Unusual Event and shut down on June 21 for about three weeks in response to a steam generator tube leak.

A.2 Direct Inspection and Review Activities

Two NRC resident inspectors were assigned to the site throughout the assessment period. The total inspection time for the period was 3,964 hours (resident and region based inspectors) for an annualized inspection time of 3,172 hours. The distribution of inspection activities is presented in Section E below. Team inspections were conducted to assess the licensee's emergency preparedness program (May 31 - June 2, 1989) and the annual emergency preparedness exercises (October 24-26, 1988 and August 1-3, 1989).

B. Criteria

Licensee performance is assessed in selected functional areas, depending on whether the facility is in a construction, preoperational or operating phase. Each functional area normally represents areas significant to nuclear safety and the environment, and are normal programmatic areas. Special areas may be added to highlight significant observations.

One or more of the following evaluation criteria were used to assess each functional 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. Reporting and analysis of reportable events.

6. Staffing (including management).

7. Training and qualification effectiveness.

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 so 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 are 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 to be strained or not effectively used so that minimally satisfactory performance with respect to operational safety is being achieved.

The SALP Board may assess a functional area to compare the licensee's performance during the last quarter of the assessment period so that during the entire period in order to determine the recent trend. The SALP trend categories are as follows:

The trend, if used, is defined as:

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period and the licensee had not taken meaningful steps to address this pattern.

C. Unplanned Shutdowns, Plant Trips and Forced Outages

Date	Power Level	Root Cause	Functional Area	Description
Unit 1				
6/07/88	100	Personnel Error	Maintenance/ Surveillance	Nonlicensed operator tripped wrong breaker (RCP) during a surveillance test which caused low RCS flow trip and low pressurizer level SI.
6/09/88	17	Personnel Error	Operations	Licensed operator did not reset feedwater isolation signal during startup which led to low steam generator level reactor trip.
6/11/88	13	Component Failure	N/A	Spurious trip of breaker to motor of discharge valve of main feedwater pump led to low steam generator level reactor trip.
1/17/89	90	Personnel Error	Operations	Licensed operator read and gave orders to perform wrong step in post maintenance test.

2/13/89	90	Component Failure	N/A	Failure of electro-pneumatic transducer in feedwater control system caused feedwater control valve to fail partly closed leading to low steam generator level reactor trip.
5/18/89	89	Design Error	Engineering/ Technical Support	Error in wiring logic of recently installed backup scram system caused, upon energization, steam dumps to go open leading to scram and SI.
Unit 2				
7/27/88	100	Design Error	Engineering/ Technical Support	Trip occurred during attempts to troubleshoot failed card in rod control system. Vendor misunderstanding of own wiring logic led to wrong recommendation for licensee course of action.
9/20/88	100	Component Failure	Maintenance/ Surveillance	Trip occurred during surveillance test due to card failure in one channel while one other channel was tripped for test.
2/12/89	65	Component Failure	Engineering/ Technical Support	Internals failure of a main feedwater control valve led to high steam generator level, turbine trip and reactor trip.
5/17/89	5	Personnel Error	Maintenance/ Surveillance	Improperly installed pressure seal ring in reactor vessel level indicating system led to return to cold shutdown for repairs.
5/27/89	0	Personnel Error	Maintenance/ Surveillance	Performance of surveillance test despite not meeting required initial conditions caused low pressure trip.
6/03/89	20	Personnel Error	Maintenance/ Surveillance	Incorrectly installed and missing RCS manifold orifices led to shutdown for resolution.

6/21/89	100	Component Failure	Engineering/ Technical Support	Steam generator tube leak due to part from failed feedwater valve caused shutdown for repair.

D. Enforcement Activity

Functional Area	No. of Violations in Each Severity Level V	IV	III	II	I	Total
A. Plant Operations		1				1
B. Radiological Controls						
C. Maintenance/Surveillance		3				3
D. Emergency Preparedness						
E. Security						
F. Engineering/Technical Support		3				3
G. Safety Assessment/ Quality Verification		1				1
	0	8	0	0	0	8

E. Inspection Hour Summary

	Actual	Annualized	Percent
Plant Operations	1975	1580	50
Radiological Controls	338	270	9
Maintenance/Surveillance	455	364	11
Emergency Preparedness	296	237	7
Security	236	189	6
Engineering/Technical Support	472	378	12
Safety Assessment/Quality Verification	192	154	5
TOTAL	3964	3172	100

F. Licensee Event Report Causal Analysis

Functional Area	Number By Cause Code A	B	C	D	E	X	Total
Unit 1							
Plant Operations	4				4		8
Maintenance/Surveillance	1	1		1	3	2	8
Radiological Controls							0
Engineering/Technical Support							0
Safety Assessment/ Quality Verification							
Unit 1 Total	5	1	0	1	7	2	16

Functional Area	Number By Cause Code A	B	C	D	E	X	Total
Unit 2							
Plant Operations	3	1	2		4		10
Maintenance/Surveillance	8			2	5		15
Radiological Control	1				2		3
Engineering/Technical Support		1					1
Safety Assessment/ Quality Verification							
Unit 2 Total	12	2	2	2	11		29

Cause Codes:

		Combined Total
A	Personnel Error	17
B	Design, Manufgacturing, Construction or Installation Error	3
C	External Cause	2
D	Defective Procedures	3
E	Component Failure	18
X	Other	2

The following common mode events were identfied:

Approximately one-third of the events were attributed to personnel error:

N/A is used to indicate that the cause of the event could not be clearly assigned to particular SALP functional area.

ENCLOSURE 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

NOV 21 1989

Docket Nos. 50-334
50-412

Duquesne Light Company
ATTN: Mr. J. D. Sieber
Vice President
Nuclear Group
Post Office Box 4
Shippingport, Pennsylvania 15077

Gentlemen:

Subject: Systematic Assessment of Licensee Performance (SALP)
Report Nos. 50-334/88-99 and 50-412/88-99

The NRC SALP Board has assessed the performance of activities at the Beaver Valley Power Station, Unit 1 and Unit 2, for the period June 1 1988, through August 31, 1989. The results are documented in the enclosed SALP Board Report. A meeting at the Beaver Valley Emergency Response Center, Shippingport, Pennsylvania to discuss this assessment will be scheduled by separate correspondence.

At the SALP meeting you should be prepared to discuss our assessments, and your plans to improve performance. This meeting is intended to be a candid dialogue wherein any comments you may have regarding our report may be discussed. Additionally, you may provide written comments within 20 days after the meeting.

This report has been placed in the Public Document Room. Following our meeting and receipt of your response, the final SALP Report and your response will be placed in the Public Document Room.

Your cooperation with us is appreciated.

Sincerely,

W T Russell

William T. Russell
Regional Administrator

Enclosure:
SALP Report Nos. 50-334/88-99 and 50-412/88-99

8912060328 LP

ENCLOSURE 3

BEAVER VALLEY POWER STATION
SALP MANAGEMENT MEETING ATTENDEES
DECEMBER 12, 1989

NAME	ORIGIN	TITLE
P. Wilson	NRC	Acting Senior Resident Inspector
J. Beall	NRC	Senior Resident Inspector
E. Wenzinger	NRC	Branch Chief, PB4, DRP
W. Kane	NRC	Director, DRP
C. Cowgill	NRC	Section Chief, Branch No. 4, DRP
P. Tam	NRC	Senior Project Manager, NRR
J. Stolz	NRC	Project Director, NRR
T. Noonan	DLCo	General Manager, Nuclear Operation
J. Crockett	DLCo	General Manager, Corporate Nuclear Services
S. Fenner	DLCo	Manager Quality Assurance
W. Lacey	DLCo	General Manager Nuclear Operation Services
J. Carey	DLCo	Executive VP - Operations
J. Sieber	DLCo	V.P. Nuclear Group
K. Grada	DLCo	Manager, Nuclear Safety
R. Cook	PA-DER	PWR Group Leader
R. Janati	PA-DER	Nuclear Engineer
J. Sasala	DLCo	Director, Nuclear Communications

ENCLOSURE 4

Duquesne Light Company Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077-0004

JOHN D. SIEBER
Vice President - Nuclear Group

(412) 393-5256

January 3, 1990

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Systematic Assessment of Licensee Performance (SALP)
Report Nos. 50-334/88-99 and 50-412/88-99

Gentlemen:

On December 12, 1989 a SALP meeting was held to discuss the NRC SALP Board assessment report for Beaver Valley Power Station, Unit 1 and Unit 2. The SALP report, dated November 24, 1989, assessed station activities for the period June 1, 1988 through August 31, 1989.

Attached are our comments concerning the report and our plans to improve performance as discussed at the SALP meeting.

If you have any questions concerning this matter, please contact my office.

Very truly yours,

J. D. Sieber
Vice President
Nuclear Group

Attachment

cc: Mr. J. Beall, Sr. Resident Inspector
Mr. W. T. Russell, NRC Region I Administrator
Mr. P. Tam, Sr. Project Manager
Mr. R. Saunders (VEPCO)

DUQUESNE LIGHT COMPANY
Nuclear Group
Beaver Valley Power Station
Units 1 and 2

Reply to SALP Report

NRC SALP Report Nos. 50-334/88-99 and 50-412/88-99 dated November 24, 1989 provided the SALP Board assessment of activities at Beaver Valley Power Station, Unit 1 and Unit 2 for the period of June 1, 1988 through August 31, 1989. The Summary of Results on pages 3 and 4 of the SALP Report provided an overview of our program strengths and weaknesses. As summarized, "The challenge for the licensee is to reduce the number of unplanned trips and transients by reducing the number of personnel errors. Also, the licensee needs to strengthen management oversight and self-assessment capabilities in the area of radiological controls."

The following plans to improve our performance have been completed or are expected to be completed during 1990:

- We have implemented a formal Human Performance evaluation System for systematically evaluating human performance problems.

- We have completed a single-point failure analysis which will be used to reduce reactor trips through enhanced tagging, maintenance, testing or operating procedures.

- We are evaluating methods to highlight critical procedural steps which have the potential for producing reactor trips or ESF actuations.

- The Operations Department is being re-organized to strengthen the areas of operational support and assessment.

- We have evaluated Operations' staffing levels against similar dual-unit facilities and find that our shift staffing levels are adequate. However, to ensure that there are sufficient qualified personnel for the future, we are planning to start a new class for licensed operator training during 1990.

- We will review our Radiological Control supervisory staffing prior to the Unit 2 refueling outage scheduled for September 1990, to determine if staff assignments can be changed to provide more direct Duquesne Light Company supervisory oversight.

- We will evaluate the feasibility of implementing "Rad Con Quality Assessors" to provide Duquesne Light Company supervisory oversight of critical tasks.