ENCLOSURE 1

INITIAL ALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

REPORT NOS. 50-334/91-99
50-412/91-99

DUQUESNE LIGHT COMPANY

BEAVER VALLEY POWER STATION UNITS 1 & 2

ASSESSMENT PERIOD:

JANUARY 1, 1991 - JUNE 13, 1992

BOARD MEETING DATE: JULY 28, 1992

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of their facilities' performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on July 28, 1992, to review the observations and data on performance, and to assess licensee performance in accordance with the guidelines in NRC Manual Chapter NRC-0516, "Systematic Assessment of Licensee Performance," dated September 28, 1990. The SALP Evaluation Criteria utilized by the Board are attached.

This report is a combined assessment for Beaver Valley Units 1 and 2 for the period of January 1, 1991, through June 13, 1992.

The Beaver Valley Power Station SALP Board members were:

CHAIRMAN:

C. W. Hehl, Director, Division of Reactor Project (DRP)

MEMBERS:

R. Blough, Chief, Projects Branch No. 4, DRP
R. Cooper, Director, Division of Radiation Safety and Safeguards (DRSS)
W. Lanning, Deputy Director, Division of Reactor Safety (DRS)
L. Rossbach, Senior Resident Inspector, Beaver Valley
J. Stolz, Director, PD I-4, Office of Nuclear Reactor Regulation (NRR)
A. DeAgazio, Project Manager, PD I-4, NRR

II. SUMMARY OF RESULTS

II.A Overview

The licensee continued to operate both units in a safe manner. Continued strong performance in operations was characterized by excellent operator performance and management oversight. Outstanding performance also continued in the emergency preparedness and security areas.

Significant improvements were noted in radiological controls as previous weaknesses were thoroughly addressed and resolved while program strengths were further enhanced. The licensee's aggressive ALARA controls, low cumulative exposures, and effective management involvement and oversight were indicative of the superior performance.

Continued good maintenance support for the reliability of plant equipment was provided. However, based on continuing problems with work procedure quality and implementation, a decline in performance occurred since the last assessment period. The number of personnel errors, their significance, and resulting impact on plant operations were indicative of the inconsistent performance during this assessment period.

The engineering organization continued to provide good technical support to the station. Management support and involvement were good in promoting ongoing improvement programs and in conducting self-evaluation audits to identify and correct weaknesses. However, the lack of timeliness and adequacy in performing certain engineering evaluations and operability assessments was noted as a weakness.

The safety assessment and quality verification programs functioned well to improve quality and promote safety. However, performance in initiating proper corrective actions for identified concerns was mixed. Weaknesses were exhibited in the thoroughness and documentation of technical issue resolution and operability assessments. Improvements were noted toward the end of the assessment period following the licensee's review and implementation of the guidance provided in NRC Generic Letter 91-18, "Resolution of Degraded and Nonconforming Conditions and Operability."

II.B Facility Performance Analysis Summary

Functional Area	Rating, Trend Last Period	Rating, Trend This Period
1. Plant Operations	1	1
2. Radiological Controls	2	1
3. Maintenance/Surveillance	1	2
4. Emergency Preparedness	1	1
5. Security and Safeguards	1	1
6. Engineering/Technical Support	2, Improving	2
7. Safety Assessment/Quality Verification	1	2

Previous Assessment Period: September 1, 1989 through December 31, 1990

Present Assessment Period: January 1, 1991 through June 13, 1992

III. PERFORMANCE ANALYSES

III.A Plant Operations

III.A.1 Analysis

During the previous SALP, the plant operations area was rated Category 1 based on a demonstrated clear, conservative safety perspective with effective management oversight and involvement. Superior performance was demonstrated by the reduced incidence and impact of personnel errors by operations personnel. Operator response to plant transients and events was a notable strength.

During this assessment period, operations management oversight and attention to operations on a daily basis were evident. Management involvement was particularly evident during the performance of major evolutions. At daily planning meetings, chaired by the Operations Managers, operational priorities and perspectives were clearly communicated and understood. Management's conservative philosophy toward 10 CFR 50.72 notifications was appropriate.

The licensee has maintained its previous outstanding level of operational performance. The facility continued to be operated in a safe and conservative manner while each unit exceeded its respective record for days of continuous operation. Proper safety perspective was displayed by management such as in the decision to shut down Unit 1 following the discovery of a small unidentified leak, significantly less than the technical specification allowed leak rate. Also of note was the decision to manually trip the reactor from a subcritical condition prior to troubleshooting the rod control system so as to avoid an inadvertent transient. However, a significant occurrence of deficient performance was observed. Specifically, management involvement in thoroughly resolving the erratic indications of a temporary source range neutron monitor prior to regaining operable permanent monitors was weak. The decision to continue loading fuel with a suspect detector in service was made without a definitive means of determining detector operability.

The high experience level and professionalism of the licensed operators continued to be an asset to safe operation of both units. The routine use of Unit 1 licensed operators to perform the duties of auxiliary operators, as permitted by staffing levels, provided positive results as well as helped maintain operator in-plant system knowledge. Licensed operator response to events has continued to be excellent. For example, licensed operators demonstrated superior performance by their immediate response, diagnosis of probable cause, and corrective actions during a reduction of spent fuel pool water inventory. Excellent operator performance was evident in response to a circulating water pump trip and subsequent rod control system malfunction. Operator action in response to a loss of main feedwater event was also

indicative of sound operational performance. The operators' timely and correct action during both of these events averted the need for reactor trips. Operator response to the three automatic reactor trips during this assessment period was prompt and appropriate. Operator response to transients and mitigation of component failures continues to be a strength.

There were no reactor trips caused by operator error or inattention to detail; however, there were five engineered safety feature (ESF) actuations attributed to operator performance. These ESF actuations were generally of minor safety significance. One actuation, due to the inadequate review of a maintenance work request, did, however, result in a safety injection into the reactor coolant system during cold shutdown conditions. Another exception to good operator performance occurred early in the SALP period when the safety function of the control room habitability system was lost when operations personnel mistakenly closed the breakers for two Unit 1 outside air exhaust dampers. The lack of procedural controls over the restoration of the motor control center, as well as operator reliance on past experience, contributed to the incorrect positioning of the breakers and subsequent opening of the dampers. This event was, however, later identified as a result of the followup by the operating shift. The licensee's corrective action for the loss of control room habitability was considered prompt and comprehensive.

Operations' assessment of events and associated root cause determinations was well developed and technically sound. In particular, the licensee's analysis of a feedwater isolation on high steam generator level discovered unique circumstances which involved the vacuum drag of water from a storage tank into the Unit 1 steam generators, and the investigation into the cause of main feedwater pump trip and associated loss of all main feedwater flow was considered thorough.

The outage management performance was excellent with the exception of the previously mentioned temporary source range detector incident. Station management demonstrated excellent safety perspective in the planning and conduct of the refueling outages. Prior to the Unit 2 outage, a comprehensive safety review was performed by the licensee to assess and manage shutdown risk. A defense-in-depth concept was used during schedule development which pre-established and maintained key safety system availability beyond technical specification requirements. The functional status of safety systems and delineation of the priority train was documented on a human factored status sheet and reviewed during every shift outage meeting and daily manager meeting. Nuclear safety and quality were emphasized over outage schedule. Evolutions with the potential for safety implications were identified and appropriately addressed through the use of an "Infrequently Performed Test and Evolution" (IPTE) procedure. The implementation of the IPTE procedure to formally identify the responsibilities and requirements of personnel involved in such evolutions resulted in a high degree of management involvement in the safe planning, control, and execution of the service water/spent fuel pool temporary modification.

The licensed operator requalification program was excellent with improvements in operator performance noted since the last assessment period. Written requalification examinations and

operating tests for Unit 1 were administered to eight senior reactor operators (SRO) and eight reactor operators (RO), in addition to one SRO initial examination. All operators passed all portions of the written examinations, although one RO initially failed the job performance measures portion of the operating exam. The written requalification examinations developed by the licensee were well prepared and of good quality. The candidates and operators were well prepared for the exams. During the Unit 2 simulator requalification retake examination, management involvement was evident in the simulator scenario validation. A detailed quality assurance check of the simulator scenarios was performed by the training department. Superior performance was demonstrated by the operators during the simulator requalification retake exam which indicated that the training program was effective and well implemented.

The licensee made considerable progress in correcting and resolving deficiencies in procedures and program documents identified during emergency operating procedure (EOP) inspections conducted in the previous assessment period. Based on completion of the corrective actions, satisfactory upgrades had been made to EOPs and program documents.

Housekeeping at both units was excellent during the assessment period and remained good during outages despite the high level of work activities. Early in the assessment period, minor deficiencies were exhibited in the control of tools and materials within work areas. Improvements were noted late in the assessment period. Radiologically controlled areas were found to be clear of excessive debris and tools.

Summary

Overall, operational performance was superior, with operations being safely performed by a professional and knowledgeable staff. The absence of any reactor trips caused by operator error and excellent response to plant transients and events were indicative of superior operator performance. Management involvement and oversight continued to be strong, with one noted exception regarding source range detectors. Management performance in the planning and conduct of the refueling outages including shutdown risk assessment was excellent. The operator training program was effective and well implemented.

III.A.2 Performance Rating Category 1

III.B Radiological Controls

III.B.1 Analysis

During the previous SALP, the radiological controls area was rated Category 2. Strengths included a well qualified and stable technical staff, an effective initial and continuing training program for radiological controls technicians, and effective internal exposure controls, ALARA, and audit programs. Areas for improvement included supervisory oversight of plant activities, ALARA review process, technician awareness of details of ongoing jobs, and the quality of chemistry laboratory performance.

Radiological Protection

The areas of strength noted during the previous assessment period remained strong and in some cases performance level improved. Most of the weaknesses were also addressed and the problem areas eliminated. Management oversight of in-plant radiological activities, previously a weakness, was observed to be excellent during this period. There were nearly continuous plant inspections by health physics supervisors. Management was also visibly involved in ALARA briefings, plant meetings, planning meetings, and similar activities involving ongoing plant work. There was also frequent presence of managers and supervisors at the job sites. The staff's awareness of the details of ongoing jobs has also improved considerably over the previous period, and is now considered a strength. The high turnover rate of health physics technicians observed during the previous period has been reduced, and the dependence on a significant number of long-term contractor technicians is being phased out. A weakness observed in this area was the lack of adequate oversight, control, and accountability of keys to locked high radiation areas. The licensee initiated corrective actions, but the effectiveness of these actions had not been evaluated by the end of the SALP period.

Response to incidents was prompt and technically thorough. For example, an incident involving the use of a contaminated bucket as a stool, resulting in unplanned personnel exposures, received prompt response from the health physics staff and from site management. The dose assessments and root cause analysis were thorough.

The audit and self-assessment programs continued to be a strength and showed improvements over a previously good performance level. Audits performed by the Quality Assurance (QA) department were of high quality and were conducted by well qualified and trained personnel. The QA surveillance program was also well conducted, with frequent and good quality surveillances of health physics activities being routinely undertaken. The Radiological Controls department's internal surveillance program was also very effective, and response to all surveillance and audit findings was prompt and complete.

The training programs for health physics technicians and for general employees continued to be strong. The lesson plans for initial contractor technician training have been extended and improved, and the new plans represent a significant improvement. The practical factors part of the general employee training was also improved based on audit findings, and the improved program appears to have addressed the audit concerns. A new ALARA training course was offered at the end of the assessment period for all first line supervisors, work planners, and outage schedulers. The continuing training program remained good, as did the plant systems training for the health physics technicians. A weakness observed in the training program was the lack of a good method for evaluation of the student's mastery of the practical parts of the training program. The licensee initiated actions to correct this weakness, but the effectiveness of these actions had not been assessed by the end of the SALP period.

Efforts in the area of ALARA during routine and outage operations were very good during this period, and the results of these efforts were in many cases outstanding. Job coverage during radiologically significant work was very good, and mockup training was used effectively. Very good control of access into the radiological areas, ALARA briefings and ALARA controls, and effective job coverage contributed to the low station exposures. Closed circuit television was used throughout containment to reduce personnel exposures resulting from direct surveillances and job coverage. Source term reduction efforts included changes in shutdown chemistry to increase removal of radioactive contamination from the system and reduction of cobalt-containing components used in the system, such as the use of lower cobalt fuel assemblies. The threshold for determining the benefit of dose reduction measures relative to their cost was lowered significantly, which would allow the justification of many ALARA measures that would previously have been unjustifiable on financial grounds. The result of the above efforts was a decrease in total site radiation exposure and the lowest Unit 2 outage exposure to date. One minor weakness observed in the area of source term reduction was the absence of an effective program to closely track source term changes and to document engineering evaluations of source term reduction measures.

Radiological Environmental Monitoring Program (REMP) And Radioactive Effluents Control Program

The licensee implemented all areas of the Radiological Environmental Monitoring Program (REMP) effectively and implemented an effective quality assurance and quality control program to assure the quality of the REMP sample analysis. The licensee maintained an excellent meteorological monitoring program to ensure that the meteorological instrumentation and equipment were operable, calibrated, and well maintained.

The licensee has in place a very effective Radioactive Effluent Control Program (RECP). All areas in the liquid and gaseous effluent control program, including the Offsite Dose Calculation Manual, and the calibration and testing of radioactive effluent and process monitors were excellently implemented. Management oversight in the conduct of the effluent control program by the Health Physics Department was noteworthy. Specialists were

designated and assigned to a RECP, with responsibilities according to their particular area of expertise. As a result, the RECP was enhanced. The air cleaning systems were tested, met Technical Specification requirements, and were well maintained.

The licensee has in place an effective quality assurance program and procedures to ensure effective implementation of both the REMP and RECP. The QA audits of both programs thoroughly assessed the licensee's activities and revealed no safety significant findings. A system was in place to ensure follow-up of any findings requiring resolution.

Radwaste and Transportation

The radwaste organization was stable and fully staffed by qualified personnel. An effective training program for the staff was implemented, and the audit and surveillance programs were good. Shipping records were well maintained and were of high quality, and control and tracking of scaling factors used for waste classification were thorough and technically sound. Quality control on shipments was also quite thorough, and audits of vendors were also good. However, quality assurance oversight was limited to transportation activities, which resulted in weak oversight of the processing of liquid and solid radwastes. Tracking of training of site personnel was also weak.

Summary

The radiological controls program showed significant improvements in all areas that were identified as weaknesses during the previous assessment period, and the previously strong areas remained strong. Management oversight of in-plant activities was excellent. Overall performance was very good, with the exception of isolated program elements, particularly control of keys to locked high radiation areas and assessment of the effectiveness of practical training. Response to incidents was prompt and technically thorough. The radiological environmental monitoring and radioactive effluent controls programs were both of high quality. The radwaste and transportation programs were good; however, quality assurance oversight was weak in the area of processing liquid and solid radwastes.

III.B.2 Performance Rating Category 1

III.C Maintenance and Surveillance

III.C.1 Analysis

During the previous SALP, the maintenance and surveillance area was rated Category 1. Maintenance and surveillance activities were performed well with a high degree of management involvement. Programmatic strengths were observed in preventive and predictive maintenance, surveillance scheduling, and worker training. Significant improvements in root-cause analysis, post-maintenance testing, and material condition were also observed. Particularly noteworthy was the significant reduction of events resulting from personnel error.

Maintenance

Overall, management support of maintenance continues as a strength and resulted in a generally effective maintenance program that contributed toward the safe and reliable operation of both units. Management support of maintenance was evident in the continued procedure upgrade program, development of an improved maintenance request system, and the procurement and use of mockups for steam generator work and reactor coolant system leak repair. Maintenance policies were clearly stated and were effectively disseminated through training and direct observation by first line supervisors. Staffing was appropriate. Operating and outage work activities were well coordinated through maintenance planning and daily interdepartmental supervisory meetings. There was strong and effective management involvement in the preparation and implementation of work for refueling outages. Senior site management was effectively involved in daily refueling outage planning meetings. In support of improving safety, the independent safety evaluation group worked with the outage manager in preparing a thorough evaluation of shutdown risk and planned outage maintenance activities to minimize shutdown risk.

Although work was usually well planned, there were several examples of inadequate maintenance work instructions which indicate a weakness in maintenance planning and procedure quality. For example, an auxiliary feedwater pump steam admission valve set pressure was incorrectly set when the work instructions did not specify a set pressure. This in turn caused an inadvertent engineered safety feature actuation. Another inadvertent engineered safety feature actuation occurred because troubleshooting instructions did not instruct technicians on the final setting for a feedwater bypass flow control valve controller or to coordinate with operations the restoration of lifted leads. Post-maintenance testing checklists did not specify adequate testing of a supplemental leak collection and release system damper. Additionally, a lack of installation details led to a temporary containment penetration seal being installed that did not meet the maintenance procedure specifications. Errors caused by inadequate procedures are being addressed by the licensee's procedure upgrade program. However, instruction for activities such as troubleshooting and post-

maintenance testing rely on individualized job specific instructions prepared by the maintenance planner.

Significant resources have been allocated to the procedure upgrade program. Management and implementation of the procedure upgrade program were transferred from a contractor to the licensee to further improve the quality of the revised procedures. The licensee is on schedule for completion of the project and progress is noticeable as 45% of maintenance, surveillance, and calibration procedures have been upgraded. Improvements in technical content and human factor considerations were evident in the procedures processed through the upgrade program although an instance of inadequate installation instructions was noted in the procedure for the temporary containment penetration seal.

The performance of maintenance personnel was generally good; however, a few performance deficiencies were noted and indicate a tendency for workers to proceed with work in cases of unclear or incomplete instructions. These include both of the engineered safety feature actuations previously mentioned, as well as an engineered safety feature actuation due to a technician replacing a spring on a river water pump breaker cell switch. This work was outside the scope of the procedure as was the case where a mechanic adjusted an auxiliary feedwater pump governor without a work order during a surveillance test. Except for these performance deficiencies, observations of maintenance activities showed that the technicians were well trained and skilled. The licensee's efforts to improve performance included revisions to technician training and retraining programs and the development of a self-checking training program to help reduce human errors. Improved performance was observed toward the end of the assessment period.

Development of the preventive maintenance program is continuing and is providing some positive results such as in the formal implementation of a preventive maintenance program for the main steam isolation valves and main feedwater regulating valves during this assessment period. Implementation of these additions to the preventive maintenance program helped to increase the reliability of these components and contributed to reducing the number of plant transients previously experienced due to their failure. However, deficiencies in the material condition of some motor operated valves were identified in an NRC inspection of valve operators which were not included in the motor operated valve preventive maintenance program. The licensee immediately incorporated these valves in the preventive maintenance program and assessed these deficiencies.

The procurement program activities were properly performed, and the staff was well trained. The licensee improved the efficiency of their parts and material tracking by implementing a new bar coding system. The licensee made a significant effort to strengthen the commercial grade procurement and dedication process, and it was generally consistent with industry guidance. However, the program was not fully supported with approved, effective procedures.

Surveillance

Overall, it was determined that the licensee maintained a well managed surveillance program. Staffing levels were appropriate and the staff was well trained. Tests were conducted in a timely and well organized manner. Of the several thousand technical specification required surveillance tests performed at both units during the assessment period, none were missed due to scheduling errors. An in-depth inspection of several safety systems determined that surveillance tests were adequately measuring safety functions and demonstrated that the system safety functions would be fulfilled under accident conditions.

Good technical reviews identified several examples of nonconservative test methods or inadequate surveillance procedures. These were promptly corrected by the licensee. However, an example of inadequate and untimely corrective actions for design control and test deficiencies in the supplemental leak collection and release system was identified. In this instance, ineffective communications between the plant test and operations group and inappropriate followup of an earlier engineering finding led to an improper mode change.

Although surveillance tests were generally performed well, several examples of performance deficiencies were identified. These included, among others, an inadvertent engineered safety features actuation that occurred when an operator caused a technician to lift the wrong lead during a surveillance. This occurred despite a thorough test prebrief and adequate lead labeling. A Unit 1 reactor trip occurred due to the reversing of two leads in the main feedwater control valve circuit after calibration. The color scheme of the leads was non-standard and the procedure did not require the leads to be labeled.

The inservice inspection (ISI) program was generally well conducted. Nondestructive examinations met applicable codes and standards except for one indication that was not identified through the liquid penetrant exam. ISI personnel were qualified and, except for this one exam, their examinations met their program and commitments. A licensee auditor identified that a longitudinal weld was not in the first ten year Unit 1 ISI program. Additional uninspected welds were identified six days later by the licensee. However, corrective actions were inadequate because the plant changed modes before the deficiencies were corrected and because reviews did not promptly identify all uninspected welds. Comprehensive corrective actions were taken subsequent to this event. The licensee's corrective actions included a detailed and critical ISI self-assessment that identified several Unit 1 and 2 component supports that were also not examined. Actions to detect erosion/corrosion in plant components met their program and commitments.

Extensive Unit 1 steam generator tube eddy current and plug examinations demonstrated a strong safety perspective. The Unit 2 steam generator eddy current examination program met requirements and industry standards and was well implemented. The decision to inspect 100% of the tubes in each steam generator was indicative of the licensee's intent to maintain the plant in a safe condition.

Summary

Maintenance and surveillance programs continued to be effective in supporting safe plant operations. Strong and effective management involvement in the preparation and implementation of work for refueling outages was apparent. However, mixed performance was noted during maintenance activities. Staffing and the performance of maintenance personnel were generally good; however, performance deficiencies occurred where workers proceeded with unclear or incomplete instructions. Positive results in the preventive maintenance program as implemented were noted; however, some motor operated valves needed inclusion in the program. Procurement program activities were properly performed and significant efforts to strengthen the commercial grade procurement and dedication process were made. The inservice inspection program was generally well conducted; however, inadequate corrective action resulted in an insufficient review of ISI findings before a plant mode change. Extensive steam generator tube eddy current and plug examinations demonstrate a strong safety perspective.

III.C.2 Performance Rating Category 2

III.D Emergency Preparedness

III.D.1 Analysis

During the previous SALP, the emergency preparedness (EP) area was rated Category 1. Strengths included classification of events, emergency exercise performance, EP Department staffing, Emergency Response Organization (ERO) depth, and effective training. The effort to upgrade the Joint Public Information Center (JPIC) and the Alternate Emergency Operations Facility was noteworthy. No EP inadequacies were identified.

Two emergency classifications were made during this SALP period. An Unusual Event was declared on January 18, 1991, due to an unisolable leak in the Unit 1 reactor coolant system. An Unusual Event was declared on May 1, 19[illegible], due to inadvertent safety injection into the Unit 2 reactor coolant system. Event recognition and entry into the Emergency Plan were timely. For these events, the licensee properly implemented the Emergency Plan in making event declarations and notifications.

Two emergency exercises were conducted during this SALP period. Performance during the February 1991 partial participation emergency exercise was proficient. There were excellent on-site analysis and response, timely classification and notifications, appropriate task prioritization, thorough communications between Emergency Response Facilities (ERF), timely personnel accountability, excellent briefing and control of in-plant damage repair teams, and excellent discussion of recovery activities. Prior concerns were demonstrated to

be resolved. There were no exercise weaknesses; seven minor items involving communications, and contamination and exposure control were identified for potential improvement.

The June 1992 full-participation emergency exercise performance benefitted from excellent briefings by the Recovery Manager and strong Operations Support Center (OSC) efforts to restore equipment prior to Technical Support Center (TSC) activation. Previous areas for improvement were acceptably demonstrated, and only six minor areas for potential improvement were noted. There were, however, exercise weaknesses in control of on-site damage control teams (team priorities and briefings) and in communication of field team data leading to failure to consider use of potassium iodide. The licensee was evaluating these matters at the end of the assessment period.

Both the 1991 and 1992 scenarios were challenging. In particular, the very challenging 1992 scenario provided a good environment for licensee self-assessment and showed a clear management commitment to identifying potential problem areas; this was a program strength. Administration of the drill/exercise program was good. Four station drills involving all ERFs were conducted in 1991 in addition to the other, smaller scale drills required by the emergency plan There was no requirement for periodic Emergency Response Organization (ERO) member participation in drills/exercises, but good rotation was nonetheless evident. ERO members were required to participate in a drill/exercise prior to being initially placed on the ERO call list.

Incorporation of operations' expertise into EP activities was evident. An example was the selection of a qualified senior reactor operator (SRO) to head the EP Department. Station and corporate management involvement in EP was evident in maintenance of emergency response qualifications, review and approval of emergency plan and procedure changes, participation in drills and exercises, and interfaces with state and local agencies. When local fire departments decided to continue to respond to events, but to not participate in related licensee training, licensee management became involved in the effort to resolve this potential problem. This issue was resolved shortly after the end of the assessment period.

EP training was effective. ERO staffing was ample: four individuals were qualified in each ERO position except for one in which three persons were qualified. The training program was well-defined. Classroom training was conducted throughout the year. Lesson plans were properly controlled, accurate, and well detailed.

Emergency response procedures, facilities, equipment, and supplies were well maintained. A discrepancy in the list of ERO-qualified individuals for emergency call-out was quickly corrected. Also, there was no way to verify ERF positive pressure and no periodic tests of ERF HEPA filter effectiveness. The licensee quickly initiated a corrective action plan to add filtration tests and a means of verifying ERF positive pressure.

The licensee's 1991 audit was thorough, appropriate in scope and content, combined Technical Specification and 10 CFR 50.54(t) reviews, and received wide management distribution. Off-site interface results were available to state and county officials. A positive initiative was noted in the licensee's plans for a technical expert exchange with other licensees (e.g. in 1992, the licensee plans to send an EP Specialist to another nuclear power plant to observe and conduct audit functions). It is too soon to determine the associated benefit on performance.

EP staffing was ample and had an excellent discipline mix that included health physicists and former SROs. Designation of a licensee specialist for each county in the 10-mile Emergency Planning Zone (EPZ) facilitated communications and was a program strength. The EP Department assisted in the development and conduct of training for state and local officials, local law enforcement, and the media. Commitment tracking and resolution of issues were effective as evidenced by the timely and appropriate licensee response to areas for improvement from the 1991 exercise. Causal analysis was performed on program deficiencies where appropriate. For example, the EP Department identified the root problems associated with a QA-identified deficiency concerning Technical Support Center document control and established a corrective action plan.

Summary

The licensee implemented an effective EP program. Response to events was appropriate and timely. Management was effectively involved. There were strengths in self-assessment (the 1992 emergency exercise), other EP training, liaison with the surrounding county and state organizations, and causal analysis. Corrective actions were timely and appropriate. A need to improve OSC/ROC control of emergency repair teams and in-field radiation assessment communications was identified near the end of the period.

III.D.2 Performance Rating Category 1

III.E Security and Safeguards

III.E.1 Analysis

During the previous SALP, the security and safeguards area was rated Category 1 based on a very effectively implemented and performance-oriented security program as evidenced by appropriate management attention to and support for the program, the allocation of resources for necessary program upgrades and staffing, an excellent enforcement history, and an effective training program.

During this assessment period, the licensee sustained this level of performance. Upgrades and enhancements of security systems and equipment were continued and included upgrades to the protected area barriers and the intrusion detection and the alarm assessment systems. The expenditure of resources for these capital improvements was indicative of management's continuing commitment to maintain an effective security program.

The security staff maintained effective communications with other station departments and met daily with maintenance to review security maintenance requirements, prioritize maintenance work, and to discuss potential interface problems. The station-supplied corrective and preventive maintenance support for security equipment was very aggressive and resulted in excellent on-line availability for security equipment, thus reducing the need for compensatory measures and attendant overtime. This rapport and support further reflected management's commitment to an effective program.

Supervisory security staff were well trained and qualified security professionals who closely monitored the program and ensured that it was carried out effectively and in accordance with NRC regulations, as evidenced by an excelient enforcement history. A new Director of Security was selected during this period after the previous director resigned. The strong performance observed previously in this functional area was unaffected by this change. Effective management planning was evidenced by the comprehensive strike contingency plans developed in anticipation of a potential security officer strike.

Station security personnel continued active participation in groups engaged in nuclear plant security matters and also maintained excellent rapport and liaison with state and local law enforcement agencies. Security force staffing was consistent with program needs, as evidenced by the minimal use of overtime. The security officers demonstrated a very professional demeanor and a thorough and comprehensive knowledge of their duties, the station, and its systems. This resulted in a very positive attitude toward the program by other station staff. The turnover rate in the force remained very low. The continuing strong demonstration of these attributes reflected the licensee's resolve to implement an effective and high quality program.

The training and requalification program was well developed and administered by full time, highly qualified instructors. Lesson plans were kept current and accurately reflected the commitments in the NRC-approved program plans. Well-equipped and well-maintained facilities were provided on-site for personnel training. The training program was very effective as evidenced by a minimum number of personnel errors and contributed to the overall success of the security program.

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 that audit, the licensee also continued to conduct self-assessments of the program utilizing security management, proprietary shift supervisors, and on-site QA personnel. Corrective actions on findings and recommendations, identified during formal audits and self-assessments, were prompt and effective, with adequate follow-up to ensure their proper implementation. The annual audit and self-assessment programs continue to contribute to the licensee's excellent enforcement history and are further evidence of the licensee's commitment to implement an effective security program.

The licensee's event reporting procedures were clear, consistent with reporting requirements, and well understood by the supervisory staff. There were three events requiring prompt reports during the period. Two were the result of inoperative equipment and one was due to an inattentive officer. All event reports were submitted in a timely manner and provided adequate detail for NRC analysis.

The licensee submitted four security program plan changes during this period. The revisions were technically sound and demonstrated a thorough knowledge and understanding of NRC requirements and security objectives.

Summary

In summary, the licensee continued to maintain a very effective, high quality, and performance-oriented program. Management attention and support were clearly evident in all aspects of the program implementation and resources were appropriately allocated to continue system and equipment upgrades. In addition, a well-trained, professional staff was retained and self-assessments were conducted to monitor program implementation. These efforts reflected the licensee's commitment to a high quality and effective security program.

III.E.2 Performance Rating Category 1

III.F Engineering/Technical Support

III.F.1 Analysis

During the previous SALP, the engineering and technical support area was rated Category 2, improving. Strengths were identified in management support of the development and implementation of programs and procedures to improve both the quality and timeliness of support activities. It also included the relocation of all support personnel onto the plant site. It identified instances of weakness in the lack of thoroughness and inquisitiveness in engineering review activities which resulted in data inconsistencies, errors in the use of the design control modification process, and an incorrect assumption in the use of non-safety-related equipment to control the environment for safety-related equipment.

Corrective actions made to address the weaknesses identified during the last assessment included an extensive audit of the design control program which involved the direct efforts of quality assurance, engineering/technical support, and management personnel. Management required that Engineering take the approved corrective actions to overcome the identified weaknesses and deficiencies within designated time frames. During this assessment period, all corrective actions had been addressed although some had not yet been fully implemented.

Engineering and technical support are provided to the plants through the onsite Operations Nuclear Services and Corporate Nuclear Services organizations. Corporate Nuclear Services provided engineering and technical support in the areas of information services, materials and standards, electrical, mechanical, controls, nuclear, and plant engineering. The licensee's engineering and technical support (E&TS) organizations were staffed with trained professionals with demonstrated in-depth knowledge and experience in all disciplines. Most of the work was performed onsite using a cadre of staff personnel complemented by contractor personnel who perform directly under the direction of the staff. Additional staffing was provided by qualified onsite contractors for the more complex, manpower-intensive plant modifications. All work was under the direction and control of plant staff. Staffing was adequate to achieve significant reductions in the numbers of the backlog of engineering work items. For example, during 1991 the backlog of technical evaluation reports was reduced by over 50%. Placement of engineering personnel in various operations support positions has strengthened the organization, in particular, the effective use of engineering personnel in the procurement department.

The engineering training program was comprehensive. Since the last assessment period, there has been increased emphasis in training the staff in the performance of 50.59 safety evaluations, technical evaluation reviews, configuration control, root cause analyses, project management, and systems engineering. The training program now incorporates industry guidelines for training and qualification of engineering support personnel, including board qualifications examinations for certain positions. As a consequence of improved training,

better procedures, and management attention, the number of engineering and field change notices per design change package have been reduced significantly.

Management involvement in assuring quality was evident throughout the engineering and technical support area. Ongoing activities on long-range programs, such as Unit 1 cable separation, safety systems functional evaluation (SSFE) (eight systems completed to date/one this period), and design basis establishment continued as scheduled. Much emphasis was placed upon resolving all outstanding SSFE issues during this period. Activities on newer programs and procedures to enhance E&TS were also implemented. These included a digitized drawing system, a computerized performance indicators program, the project manager (management) program, the minor modification program, and constructability reviews by field engineers for all modification packages. A high degree of management involvement was evident in the planning, control, and implementation of the alternate fuel pool cooling temporary modification. Proper safety perspective was displayed and descriptive safety assessments were performed.

Generally good engineering approaches and resolutions of technical issues from a safety standpoint were demonstrated throughout the period. Many high quality modifications were accomplished with few problems. Good root cause analyses were conducted to determine solutions to problems, such as design changes needed to resolve Unit 1 feedwater pipe elbow cracks, by the development of a long-term program for the control of clams and mussels in river water heat exchangers, and by the development of an ultrasonic steam generator tube verification methodology, and the coordination of activities associated with the extensive retubing/plugging of Unit 1 recirculation spray heat exchangers (RSHX). The development and use of systems engineering oversight continued to provide positive results. The oversight of the river water system and its associated flow testing program was strong and comprehensive.

Despite the good performance described above, engineering weaknesses during this assessment period included some instances of a lack of thoroughness and timeliness in certain activities including operability determinations. These included weaknesses in the timeliness, documentation and operability determinations of the Unit 1 low-temperature over-pressure protection system; the lack of documented technical justification for an operability determination of a river water pump coupling failure; the followup and resolution of longitudinal welds omitted from the Unit 1 ISI program; the lack of thoroughness in not properly assessing the impact of replacement Unit 2 emergency diesel generator (EDG) sequencing circuit relays; the lack of verification in the Unit 1 RSHX tube replacement/ plugging lists (caused an unscheduled shutdown); and in root cause evaluation for erratic Unit 1 source range instrumentation. Most of these examples of weaknesses did not represent any immediate safety concerns in the operation of the plant. However, the improper configuration of the Unit 2 EDG sequencing relays was of safety significance.

Engineering and technical support staff have performed effective reviews and followup of information on industry events. For example, walkdowns of the auxiliary feedwater system

in response to an information notice identified a potential overpressure condition on recirculation valves. Industry refueling experience described in information notices was incorporated in refueling procedures in a comprehensive and technically sound manner. A strong and comprehensive program for assuring adequate service water flows was developed in response to a generic letter concern. The potential for auxiliary feedwater lubrication oil coolers to operate above end bell bolt design pressure was identified and the evaluation of shutdown risk in accordance with the information notice and NUMARC guidelines was thorough.

Generally, the quality of engineering design reviews and technical support for licensing issues continued to be good; however, there were several cases where the quality of the support provided was weak. These instances are further discussed in the Safety Assessment/Quality Verification section. The high quality usually evident was demonstrated by the followup to and completion of engineering analyses related to the discovery and verification of thermal stratification in the main feedwater piping under certain operating conditions as a root cause of pipe failure.

Summary

In summary, the engineering and technical support organizations continued to provide good support to the station; however, the rate of improvements noted in the previous SALP did not appear to be sustained. Management support and involvement were good in promoting ongoing improvement programs and in conducting self-evaluation audits to identify and correct weaknesses. An effective and comprehensive engineering training program was in place. The use of the systems engineering, project management, minor modification, and constructability reviews were positive initiatives. The lack of timeliness and adequacy in performing certain engineering evaluations and operability assessments was a weakness.

III.F.2 Performance Rating Category 2

III.G Safety Assessment/Quality Verification

III.G.1 Analysis

During the previous SALP, the safety assessment/quality verification area was rated Category 1. Strengths were identified as superior management oversight, assessment, and control in promoting activities to improve safety and quality, a positive attitude emphasizing safety and quality over production and schedule, the overall quality of LERs, and a well-performing QA organization. Other strengths noted were the continued dedication of

significant resources to programs and initiatives to assure quality, and the effectiveness of the various safety committees.

During the current SALP period licensee performance in this area was generally strong; however there were lapses in corrective actions, operability determinations, and root cause determination. Site management maintained its previous level of involvement and control of day-to-day activities. The continuation of the plant material condition inspection program by senior management has heightened management presence within the plant and resulted in improved plant physical condition and general housekeeping. Management involvement is also evident by support for improvements such as additional staffing of system engineers, followup and resolution of previous Safety System Functional Evaluation (SSFE) findings, development of an ultrasonic steam generator tube inspection methodology, and implementation of a program to confirm the validity of eddy current inspection of steam generator tubes.

The licensee has effective programs to assure the safety of site nuclear activities and changes to the facility. Safety evaluations prepared under 10 CFR 50.59 are high quality, and the preparers and reviewers are knowledgeable. Management oversight of programs to promote safety and quality continued to be effective. For example, the plant material condition inspection program by management continued to be implemented and provided positive results. Housekeeping, especially during outages, was excellent.

The licensee's performance in initiating proper corrective actions for identified concerns was mixed. Substantial corrective actions were implemented to address cable separation issues via the licensee's "Cable Separation Issues Resolution Program Plan." The commitment of substantial resources was evident by the more than 20,000 documented cable inspection records and the dedicated inspection task force of 50 engineering and quality assurance (QA) personnel. Significant examples of inadequate corrective actions were, however, identified. Corrective actions were not taken for two electrical deficiencies identified by licensee calculations. Supplemental leakage collection and release system deficiencies identified by the licensee's engineering and surveillance programs were not resolved promptly, and the licensee failed to take prompt and adequate corrective actions in response to a QA auditor's finding that a weld in the low-head safety injection system was not in the inservice inspection (ISI) program. However, corrective actions subsequent to this event were comprehensive.

The offsite review committee (ORC) provided effective oversight of site activities and in particular its review of corporate strategic plans associated with long-term modifications. The onsite safety committee (OSC) reviewed issues to an appropriate depth for the safety significance of the issue. The OSC's use of subcommittees to evaluate issues was effective in identifying issues for the committee's review. LERs were of high quality. The operations assessment group performed thorough and in-depth event analysis and root cause determinations for Licensee Event Reports (LERs). However, one example of inadequate root cause determination was identified. The licensee's initial troubleshooting to determine

the root cause of the failure of one of two permanently installed source range detectors was ineffective.

The licensee continued to use the Independent Safety Evaluation Group (ISEG) effectively in providing site management with meaningful and independent insights and recommendations. The ISEG performed quality reviews and followup of selected plant and industry events and information contained in Information Notices, Generic Letters, Bulletins, and NUMARC guidelines. This was exemplified by the ISEG and outage management's thorough evaluation of shutdown risk for the Unit 2 refueling outage. Additional reviews identified the need for changes to the auxiliary feedwater system, service water system, and refueling procedures. The resulting corrective actions were thorough and timely.

Overall, the QA program was well documented and effectively implemented by knowledgeable personnel. Management attention to deficiencies in QA records storage and records verification requirements was prompt and immediate corrective actions were implemented. Audits and surveillances, such as in radiological controls and engineering, were comprehensive and conducted by well-qualified individuals. The auditor exchange program in which radiological controls professionals from other utilities participated in audits was a good initiative. QA audits were improved in that performance-based inspection criteria were added to the audit checklists. Strong quality assurance/quality controls participation during outage activities was evident.

Weaknesses were observed in technical issue resolution and operability assessments. The specific examples are discussed in the Engineering and Technical Support area. However, improvements in operability assessments were noted following the licensee's review and implementation of the guidance provided in Generic Letter 91-18, "Resolution of Degraded and Nonconforming Conditions and Operability." These included the prompt declaration of inoperability of both diesels after finding failed relays in one diesel load sequencer and declaring systems inoperable after finding various support welds missing from the ISI program. The licensee's self assessment has also recognized the inconsistent performance within the maintenance department and has resulted in corrective action such as the start of a self-checking training program. This training was initiated at the end of the assessment period and its effectiveness has not yet been assessed.

The licensee's submittals to support license amendments, exemptions, and generic and other plant-specific licensing issues generally are good quality with regard to thoroughness and clarity. This exemplified the quality of licensing department staffing and the competent knowledge and support provided to that staff by other site personnel. However, on several occasions, it was necessary for the NRC to seek additional technical information that should have been provided with the initial submittal. For example, the license amendment application to increase the allowable control rod drop time associated with the use of VANTAGE 5H fuel failed to recognize that the increase in the consequences of the locked rotor accident required staff review and approval. This same application contained insufficient information for the staff to review the revised meteorological dispersion used.

Another application related to reactor coolant pump start criteria contained no technical evaluation of the change and was rejected by the staff.

SUMMARY

The licensee continued to implement effective Safety Assessment and Quality Verification programs. The continuing SSFE program, the well-functioning ORC and OSC, the strong 50.59 safety evaluation program, effective review and followup to industry and site events, and QA organization performance are strengths. However, corrective actions to identified deficiencies were not always prompt or adequate. An example of inadequate root cause determination occurred, and weaknesses in operability assessments were noted. However, improved operability assessments were evident toward the end of the assessment period.

III.G.2 Performance Rating Category 2

IV. SUPPORTING DATA AND SUMMARY

IV.A. Licensee Activities

During the assessment period, both Beaver Valley units operated safely. Site records were set for days of continuous operation for both units. Unit 1 experienced two unplanned shutdowns and two automatic reactor trips. One unplanned shutdown occurred on January 17, 1991, due to a small reactor coolant system leak. An Unusual Event was declared and the unit was taken to cold shutdown for repairs. The other unplanned shutdown was made due to inadequate river water flow through a recirculation spray heat exchanger. This was caused by biofouling of the heat exchanger by Asiatic clams. Unit 2 experienced one automatic reactor trip.

A refueling outage was completed for each unit during the assessment period. The Unit 1 eighth refueling outage took place from April 12 to July 17, 1991. The Unit 2 third refueling outage began on March 13, 1992, and ended on schedule on May 12 for a total of 59 days. Major activities during both outages included core refueling, moisture separator reheater internals replacement, 100% eddy current testing of the steam generators, and surveillance testing.

IV.B. NRC Inspection and Review Activities

During this assessment period, there were two full-time NRC resident inspectors assigned to the site.

Several periodic inspections were performed by regional inspectors in the areas of Maintenance, Emergency Preparedness, Security, Engineering, and Radiological Controls.

NRC team inspections were conducted in the following areas:

- Two Emergency Preparedness Inspections conducted on February 26, 1991, and on June 9, 1992, to observe the partial participation exercises.

- Vendor Inspector Inspection from March 4 to March 8, 1991, to assess the licensee's activities related to the procurement and dedication of commercial-grade items.

- Electrical Distribution System Functional Inspection conducted from November 6 to December 6, 1991, to determine if the electrical distribution system is capable of performing its intended function.

- Motor-Operated Valve Inspection conducted from April 20 to April 24, 1992, to evaluate the adequacy of the licensee's program in response to NRC Generic Letter 89-10.

ATTACHMENT 1

SALP EVALUATION CRITERIA, PERFORMANCE CATEGORIES AND TRENDS

The following evaluation criterion were used, as applicable, to assess each functional area:

1. Assurance of quality, including management involvement and control.
2. Approach to the identification and resolution of technical issues from a safety standpoint.
3. Enforcement history.
4. Operational and construction events (including response to, analyses of, reporting of, and corrective actions for).
5. Staffing (including management).
6. Effectiveness of training and qualifications program.

The performance categories used when rating licensee performance are defined as follows:

Category 1. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

Category 2. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3. Licensee management attention to or involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection efforts.

Category N. Insufficient information exists to support an assessment of licensee performance. These cases would include instances in which a rating could not be developed because of insufficient licensee activity or insufficient NRC inspection.

The SALP Board may assess a performance trend, if appropriate. The trends are:

Improving: Licensee performance was determined to be improving during the assessment period.

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

Trends are normally assigned when one is definitely discernable and a continuation of the trend is expected to result in a change in performance during the next assessment period.