Evaluation
Report

November 1981

Beaver Valley Power Station

Duquesne Light Company

INPO

EVALUATION

of

BEAVER VALLEY POWER STATION

Duquesne Light Company

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SUMMARY

INTRODUCTION

The Institute of Nuclear Power Operations (INPO) conducted its first evaluation of Duquesne Light Company's (DLC) Beaver Valley Power Station during the weeks of July 20 and July 27, 1981. Beaver Valley Power Station consists of one 833 megawatt (net electrical) Westinghouse pressurized water reactor plant. The site is located on the Ohio River, 25 miles from Pittsburgh, Pennsylvania. The plant was placed in commercial operation in December 1976.

PURPOSE AND SCOPE

INPO conducted an evaluation of site activities to make an overall determination of plant operating safety, to evaluate management systems and controls, and to identify areas needing improvement. Information was assembled from discussions, interviews, observations, and reviews of plant documents.

The INPO evaluation team examined station organization and administration, training, operations, maintenance, radiological and chemistry activities, and site technical support. Corporate activities were not included in the scope of the evaluation, except as an incidental part of the station evaluation. As a basis for the evaluation, INPO used performance objectives and criteria relevant to each of the six areas examined; these were applied and evaluated in light of both the experience of team members and INPO's observations of best practices within the industry.

INPO's goal is to assist member utilities in achieving the highest standards of excellence in all phases of nuclear plant operation. Accordingly, the conditions found in each area were compared to best practices, rather than to minimum acceptable conditions or requirements.

DETERMINATION

Within the scope of this evaluation the team determined that the plant is being operated in a safe manner by qualified personnel. Certain beneficial practices and accomplishments were noted by the evaluation team:

Extensive efforts have been made in the development of the system training manuals.

The instrument planning aid, which contains the location of every instrument in the plant, is beneficial.

The efforts to control and minimize materials taken into containment have reduced solid waste volume significantly for the last two years.

Improvements were recommended for the following general conditions:

Management and supervisory personnel need to be more involved in observing and evaluating plant operations.

A program for the reduction of operator errors is needed.

Operator manning needs strengthening, as indicated by the current four-shift schedule.

Training for non-licensed operators needs improvement.

Preventive and corrective maintenance backlogs appear excessive.

Additional trained personnel are needed in maintenance and technical support.

Industrial safety rules need more vigorous enforcement.

Housekeeping is in need of significant improvement.

Specific evaluation findings and recommendations are contained in the accompanying DETAILS, and information of an administrative nature is included in the ADMINISTRATIVE APPENDIX. These findings were presented at an exit meeting at the plant on July 31, 1981.

Recommendations are intended to augment Duquesne Light Company's efforts to achieve the highest standards in its nuclear operations. Certain findings may reflect multiple deficiencies within a particular area. Therefore, in addressing these findings and recommendations, the company should look beyond correction of the specific deficiencies and address corrective actions toward the underlying issues.

The findings and responses were reviewed with DLC management on October 8, 1981. DLC responses are considered adequate. To follow the completion of improvements included in the responses, INPO requests written notification of status six months after the date of this report.

The evaluation team appreciates the cooperation received from all levels of the Duquesne Light Company.

E. P. Wilkinson
President

DUQUESNE LIGHT COMPANY

Response Summary

Duquesne Light Company is dedicated to the safe operation of the Beaver Valley Power Station and appreciates the INPO contribution made during the evaluation in July 1981. A new organization was in the process of being implemented at the time, and the INPO ideas and recommendations provided valuable assistance to management in identifying areas in need of improvement.

Duquesne Light Company appreciates the acknowledgment of our accomplishments in the development of system training manuals, the instrument planning, and the solid radioactive waste reduction program.

Duquesne Light Company concurs with INPO in the need for improvements and believes a major contribution to an overall improvement in plant activities was already undertaken in a major reorganizational effort through the creation of four nuclear departments reporting to a Nuclear Division Vice-President.

The number of supervisory and management positions has been increased, and the development of a management/supervisory job activity surveillance procedure is intended to increase their involvement in observing and evaluating plant operations.

The development of a critique procedure is intended to provide maximum input into the evaluations of unusual plant events by personnel involved in the event and thereby aid in the determination of the root cause of the event. Corrective actions will be taken to prevent reoccurrence, including instances of operator error.

The training for non-licensed operators was improved with the development of the Non-licensed Operator Training Program, which includes formal classroom training as well as plant system checkoffs. The program was implemented in February 1981. The first group of non-licensed operators will be available to assume shift responsibilities in December.

The current four-shift operations schedule has been reevaluated and a five-shift rotation will be implemented.

The corrective maintenance backlog has been reduced by elimination of completed and duplicate items. An evaluation of the preventive maintenance program is underway.

The shortage of trained personnel in maintenance and technical support groups is recognized; an aggressive recruiting program will be promptly undertaken.

The industrial safety program is a Company program and will be vigorously enforced at the Beaver Valley Power Station. Working conditions will be evaluated for safety during the management/supervisory job activity surveillances, and this will result in greater emphasis on industrial safety. The removal of emergency plan responsibilities from the Fire and Safety Engineer will provide for his greater involvement in the industrial safety issues.

Improvement in housekeepng will occur through the greater emphasis of the industrial safety program as previously discussed. In addition, housekeeping problems resulting from inadequate storage facilities will be evaluated and additional space provided as necessary.

Targeted completion dates for specific items where possible have been noted in the Details sections and a written status report will be provided to INPO six months from the date of this report.

DETAILS

This portion of the report includes the detailed findings. It is composed of six sections, one for each of the major evaluation areas. Each section is headed by a summary describing the scope of the evaluation. The summary is followed by the specific findings, recommendations and utility responses related to INPO's evaluation procedures. Items that relate to criteria not included in INPO procedures but that are generally recognized as desirable, accepted techniques of industry and management are listed as General Criteria. The evaluation procedures used are listed in the ADMINISTRATIVE APPENDIX.

ORGANIZATION AND ADMINISTRATION

In this area, the team evaluated the overall management of the plant from an administrative viewpoint. This encompassed an assessment of the existing directives and procedures, as well as their effectiveness.

ORGANIZATIONAL OBJECTIVES

(INPO Performance Objective OA.1)

The plant's method of promulgating goals and objectives was evaluated. This included the method of implementing actions and of providing a periodic assessment of progress.

Finding (Criterion E)

Although annual performance appraisals are performed for supervisors, and position descriptions do exist, the appraisals are not based on position descriptions.

Recommendation

Revise the performance appraisal guidelines to require that future evaluations of supervisors be based on their position descriptions.

Response

New appraisal forms are being developed and will be implemented in 1982. The Nuclear Division is also preparing personnel rating guidelines based on job descriptions as well as other factors related to performance and job qualifications for 1982.

ORGANIZATIONAL STRUCTURE

(INPO Performance Objective OA.2)

The administrative organization of the plant was evaluated. The following key areas were reviewed: organization structure, position description utilization, performance evaluations and workload distribution.

Finding (General Criterion)

The existing organizational structure does not promote efficient plant operation. Some individuals are not able to define their relationships and responsibilities to other organizational units. Division of work is not balanced, and the span of control of certain supervisors appears excessive.

Recommendation

It is understood that Duquesne Light has a revised organizational structure under development. Concurrent with the implementation of the new organizational structure, reporting relationships and responsibilities should be more clearly defined.

Response

The implementation of the new organizational structure includes definition of reporting relationships and responsibilities. This will be accomplished by January 1982.

MANPOWER RESOURCES

(INPO Performance Objective OA.3)

The ability of management to fill all job positions with qualified people was evaluated.

Finding (Criterion A)

Manpower planning and recruiting efforts have not yet provided a sufficient number of qualified people to fill all required positions. As a result, many positions are filled with contractors and consultants on a continuing basis.

Recommendation

Initiate an aggressive recruiting program to fill authorized staff positions.

Response

The Company will initiate an aggressive recruiting program with the objective of having more than 90 percent of the Nuclear Division positions filled by July 1, 1982.

ADMINISTRATIVE CONTROLS

(INPO Performance Objective OA.4)

An evaluation was made of the administrative system and procedures that are established for the operation and maintenance of the plant. This evaluation included an assessment of the effectiveness of these administrative controls.

1. **Finding** (General Criterion)

   Increased involvement of management and supervisory personnel in observing and evaluating many aspects of plant operation is needed.

Recommendation

Management review of the present program of formal inspections and the results of recent inspections is recommended. The degree to which the plant is being covered by inspections, the objective of the inspection as compared to the qualifications of the inspector, the documentation of inspection results, and the effectiveness with which results are translated into maintenance actions or correction of operational deficiencies should be considered. Appropriate changes should be made to ensure improvement in plant conditions.

Response

Increases in the number of management and supervisory personnel in conjuction with the implementation of an activity surveillance program will ensure evaluation and improvement of plant operation. This activity surveillance program addresses all of the recommended items above.

2. Finding (General Criterion)

Personnel should be held more fully accountable for their performance or for the full scope of their responsibilities.

Recommendation

The present procedures defining responsibilities and accountabilities should be reviewed to ensure they accurately convey the intentions of management. Appropriate revisions should be accomplished in an expeditious manner. Subsequently, measures should be implemented to monitor and ensure that personnel are held fully accountable for their job performance.

Response

Nuclear Division Directive No. 1, General Authority and Responsibilities, has been revised to include the responsibility for all employees to satisfy the requirements of their positions as described in Nuclear Division Directives, Station Administrative Procedures, applicable Job Descriptions, and any other administrative procedures related to the performance of assignments at the Beaver Valley Power Station.

The directive also indicates that employees will be held accountable for their performance as described in the documents listed above.

MANAGEMENT QUALITY PROGRAMS

(INPO Performance Objective OA.5)

The ability to monitor existing conditions and ongoing plant activities was evaluated.

Finding

No findings were made in this area.

SURVEILLANCE PROGRAM

(INPO Performance Objective OA.6)

The program to accomplish required surveillance, inspection, and testing was reviewed. The evaluation included the acceptance criteria, review of results, and identification of off-standard conditions.

1. **Finding** (Criterion A)

   Controls are needed to ensure timely completion of operating surveillance tests.

   Recommendation

   Administrative controls should be established to ensure the timely completion of surveillance tests. Consideration should be given to assigning scheduling and monitoring responsibility for surveillance testing to non-shift personnel.

   Response

   Uncompleted surveillance testing will be noted on the master schedule, STA log, and personnel shift turnover logs. These controls are expected to be in effect by November 30, 1981. Non-shift personnel are scheduling the surveillance testing.

2. **Finding** (Criterion C)

   Management controls are needed to ensure that proper tests are run prior to return of equipment to service.

   Recommendation

   The requirement for post-maintenance testing should be specified on the Maintenance Work Request (MWR) by qualified non-shift personnel prior to removal of the equipment from service. This should reduce the administrative requirements on shift supervisors and still permit them to check the testing requirements specified.

   Response

   The requirement for post-maintenance testing will be specified on the Maintenance Work Request by qualified non-shift personnel prior to the Maintenance effort. This will be implemented by November 30, 1981.

INDUSTRIAL SAFETY

(INPO Performance Objective OA.7)

The review of industrial safety included interviews with key personnel and extensive tours through the plant.

Finding (Criteria A, B, C, and D)

Although an industrial safety program is in effect, considerable improvement is needed. Policies promulgated by management, such as the wearing of protective clothing at the water treatment plant or the wearing of hardhats, are often not followed or enforced. Numerous safety hazards are present throughout the plant with little evidence of employee involvement in correcting the problems.

Recommendation

An aggressive commitment to the enforcement of existing safety rules and directives should be adopted by management.

Response

The Duquesne Light Company Industrial Safety Program is well-defined and will be enforced by management. Orders have been issued to all station personnel to ensure their awareness of safety rules and compliance to these rules. Management inspections and tours are conducted weekly to ascertain that the wearing of protective clothing and hardhats as well as compliance with many other safety requirements are being followed and enforced.

An aggressive commitment to the enforcement of existing safety rules and directives has been adopted and will be enforced by management.

TRAINING AND QUALIFICATION

The team evaluated the training organization, administration of training programs, training resources, and training effectiveness. Training programs for the following job classifications were also evaluated: licensed operators, non-licensed operators, shift technical advisors, mechanical and electrical maintenance personnel, and instrument and control technicians.

During the evaluation, the team noted that an extensive effort has been made to prepare the system training manuals used for operations personnel. Areas that require improvements are identified in the findings listed below.

TRAINING ORGANIZATION
(INPO Performance Objective TQ.1)

The team examined the organization used to develop, implement, and evaluate training activities.

Finding

There were no findings in this area.

TRAINING ADMINISTRATION
(INPO Performance Objective TQ.2)

The team examined the training department's administrative guidance for the qualification of plant personnel.

Finding

There were no findings in this area.

TRAINING FACILITIES AND EQUIPMENT
(INPO Performance Objective TQ.3)

The team examined the materials and resources available to support the delivery of quality training for nuclear plant personnel.

Finding

There were no findings in this area.

NON-LICENSED OPERATOR TRAINING

(INPO Performance Objective TQ.4)

In the area of non-licensed operator training, the team examined the training program and training practices used to initially qualify non-licensed operator candidates and to maintain and improve the qualifications of existing non-licensed operators.

1. **Finding** (Criterion I)

   The performance of non-licensed operators needs to be periodically evaluated and assessed.

   Recommendation

   Structured, periodic retraining of non-licensed operators should be conducted to reinforce fundamentals and to ensure they are cognizant of changes and modifications to plant equipment, procedure changes, and industry operating experiences that could affect their job performance.

   Response

   Steps are being taken to measure periodically the performance of non-licensed operators against job-related standards, knowledge, and skills. Identified deficiencies will be addressed during requalification training.

2. **Finding** (Criterion J)

   Periodic retraining is needed for non-licensed operators to update and increase their skills and knowledge.

   Recommendation

   Performance of non-licensed operators should be periodically measured against job-related standards, and knowledge or skill deficiencies should be addressed during non-licensed operator requalification training.

   Response

   For those operators who will not be licensed, periodic retraining will be provided. This program will be implemented by April 1982.

LICENSED OPERATOR TRAINING

(INPO Performance Objective TQ.5)

The team examined the training program and training practices used to initially qualify reactor and senior reactor operator candidates to operate the nuclear power plant.

Finding

There were no findings in this area.

LICENSED OPERATOR REQUALIFICATION TRAINING
(INPO Performance Objective TQ-6)

In this area, the team examined licensed operator requalification training to determine if an effective program exists to maintain a high level of knowledge and skill in individuals licensed as reactor or senior reactor operators.

Finding (Criterion B)

Evaluation of reactor and senior reactor operators' job performance needs to be incorporated into their requalification program.

Recommendation

Performance of licensed operators should be periodically measured against job-related standards, and knowledge or skills deficiencies should be addressed during licensed operator requalification training.

Response

Steps are being taken to improve the evaluation of licensed operating personnel and to address identified deficiencies during the requalification training program. While subjective appraisals have been utilized at Beaver Valley, added emphasis will be placed on objective evaluation as well.

SHIFT TECHNICAL ADVISOR TRAINING
(INPO Performance Objective TQ.7)

In this area, an evaluation was performed to determine if the shift technical advisor (STA) has the qualifications necessary to enhance plant operational safety by providing effective technical assistance to the operating shift personnel during normal, abnormal, and emergency operating conditions.

Finding (Criterion D)

Although a program is in place to update the knowledge of STAs currently standing shift, the STAs have not received comprehensive training on all plant systems and general operating procedures.

Recommendation

Shift technical advisors should be trained on all power plant systems, system interrelationships, and general operating procedures.

Response

The Duquesne Light Company program for the interim STAs provided them with an understanding of the Beaver Valley Power Station core physics, NSS system details, and major secondary systems that would or could be utilized to mitigate the consequences of an accident.

It provided for a review of the emergency plan and also provided extensive training in normal, abnormal, and accident conditions, utilizing the Surry simulator. This program was the first step in meeting a benchmark of excellence.

Permanent STAs will be on shift in mid-1982 and are presently undergoing a rigorous training program. We are currently providing additional training to the interim STAs.

MAINTENANCE PERSONNEL TRAINING
(INPO Performance Objective TQ.8)

In this area, the team examined the training program for developing and maintaining the skills and knowledge necessary for maintenance personnel to perform their assigned job functions.

Finding (Criterion F)

The retraining program for I & C, electrical and maintenance personnel should include training on plant modifications and maintenance-related operating experiences.

Recommendation

Structured, periodic retraining of maintenance personnel should be conducted to update skills and knowledge affected by changes and modifications to plant equipment, maintenance experiences, and maintenance-related licensee event reports.

Response

Retraining of maintenance personnel will be conducted to update skills and knowledge when required by changes and modifications to plant equipment and will include maintenance experiences and maintenance-related licensee event reports.

OPERATIONS

The areas evaluated within the Operations Department included organization and administration, tagout practices, the conduct of shift operations, the use of procedures, plant status controls, facilities and equipment, and shift turnover. It should be noted that observations during this evaluation were limited to shutdown activities.

OPERATIONS ORGANIZATION AND ADMINISTRATION
(INPO Performance Objective OP.1)

An evaluation was performed to determine if a clearly defined operations organization exists and if assignments of responsibilities and authorities are adequate for accomplishing required tasks. Areas reviewed included organization, job descriptions, shift administrative assignments, written and oral instructions, and miscellaneous administrative programs.

1. **Finding** (Criterion A.5)
   Increased Operations Department manning is needed to provide adequate opportunity for formal training.
   Recommendation
   Implement a shift rotation that allows more time for formal training.
   Response
   The current four-shift schedule in the operations group has been reevaluated for adequacy against present and planned training programs. A five-shift rotation will be implemented.

2. **Finding** (Criterion D)
   The practice of having shift supervisors or control room operators answer incoming phone calls to the plant after normal working hours, complete security work permits, schedule shift manning, and complete time sheets detracts from their ability to supervise control room activities.
   Recommendation
   Evaluate administrative and clerical responsibilities currently assigned to shift supervisors and control room operators to identify those duties that should be performed by non-shift personnel.
   Response
   For the short term, the administrative and clerical responsibilities have been assigned to shift personnel trainees. An additional shift position has been established to relieve the shift supervisor of routine clerical and administrative duties. These positions will be filled by December 15, 1981.

3. **Finding** (Criterion E)
   The amount of overtime worked by nuclear control operators, nuclear operators, and startup operators is considered excessive.

Recommendation

Correct the underlying causes of excessive overtime incurred by operators. Implement a program to monitor overtime and to prevent excessive overtime.

Response

The implementation of the five-shift rotation should correct the underlying causes of the excessive overtime incurred by operators.

4. **Finding** (General Criterion)

The Operations Department does not have clerical assistance. This situation places an excessive administrative burden on supervisors, who are required to perform routine clerical tasks.

Recommendation

Provide the Operations Department with appropriate administrative and clerical support.

Response

A clerk has been permanently assigned to the Operations Department to provide necessary administrative and clerical support.

OPERATIONS FACILITIES AND EQUIPMENT

(INPO Performance Objective OP.2)

The plant facilities and equipment were evaluated to verify that equipment was accessible; programs existed to maximize equipment availability; the working environment was conducive to safe, efficient plant operation; and communications equipment was adequate.

Finding (Criterion D)

In many areas of the plant, the paging system cannot be understood.

Recommendation

Evaluate the location and number of paging system speakers to determine areas of poor coverage. Take corrective action as required.

Response

The page party audibility tests were performed and deficiencies identified and reported. Repairs are currently in progress and, upon completion, a re-test will be performed.

CONDUCT OF SHIFT OPERATIONS

(INPO Performance Objective OP.3)

An evaluation was performed to determine if shift operations are conducted in a safe and reliable manner. Areas reviewed included operator activities, station cleanliness and order, operator response to abnormal conditions, logkeeping practices, reliability of control room instrumentation, and operator awareness of plant conditions.

1. **Finding** (Criterion D)

   Control room operators do not appear to have a high degree of confidence in the accuracy of their instruments. Delays in restoring out-of-service alarm modules to normal service are common. Many instruments are overdue for calibration.

   Recommendation

   Implement an aggressive program to routinely monitor and correct instrument calibration deficiencies and out-of-service alarms. Provide feedback to station management when corrective work is not completed promptly.

   Response

   Restoration of all out-of-service alarm modules is in progress and is targeted for completion by the end of the second refueling. Additionally, increased emphasis and priority will be given to future out-of-service alarms. The existing problems with Category I calibrations have been identified as non-standard practices in the dating of stickers and out-of-date procedure frequency requirements. There are no out-of-date calibrations on Category I instrumentation. The software changes will be issued prior to each procedure performance. Calibration frequencies for non-safety-related control room instrumentation are being reviewed with the completion scheduled for May 1982.

2. **Finding** (Criterion K)

   Persons passing through the control room to the Nuclear Shift Operating Foreman's desk and the Nuclear Shift Supervisor's office sometimes distract the control room operators from their normal duties by engaging them in casual conversation. This situation also contributes to the high noise level noted in the control room on several occasions.

   Recommendation

   Implement more stringent policies for control room access.

   Response

   Measures have been implemented to significantly reduce control room traffic. These measures include utilization of the on-shift administrative assistant (see Response OP-1) to screen unnecessary visits. Shift turnover for auxiliary operators is now performed outside the control room. Some operations/maintenance interface activities in the control room have been eliminated. Minimizing control room distraction will be a continuing management review function.

3. **Finding** (General Criterion)

   Analysis of past Licensee Event Reports and operational problems observed during the evaluation shows a large number of operator errors. Increased management attention is needed in identifying the fundamental causes of these errors and implementing corrective measures.

Recommendation

Institute an aggressive program to analyze operating experiences and provide feedback of the lessons learned to all operations personnel. Additionally, emphasize to each individual his responsibilities and accountabilities for the safe and reliable operation of the plant.

Response

A critique procedure has been written and implemented. Included are guidelines for dissemination and review of the critique results. Corrective actions to prevent recurrence will be identified as a result of the information gathered in the critique. The root cause will be addressed in determining corrective actions.

The responsibilities and accountabilities for safe and reliable plant operation were discussed with operations personnel by station management and are included in the station administrative procedures.

PLANT OPERATIONS PROCEDURES

(INPO Performance Objective OP.4)

The use of procedures to conduct safe and reliable operations was evaluated. Areas reviewed included management policy for the use and revision of procedures, and the content and clarity of operational procedures.

Finding

There were no findings in this area.

PLANT STATUS CONTROLS

(INPO Performance Objective OP.5)

The methods of maintaining plant status controls in support of equipment availability and safe, reliable plant operations were evaluated. Areas reviewed included administrative guidance on status controls, actual practices in use, and the responsibilities of senior licensed operators for reviewing and monitoring plant status.

1. **Finding** (Criterion C)

   The methods of maintaining plant status need to be formalized to ensure that comprehensive plant status is communicated from one shift to another.

   Recommendation

   Formalize guidance for annotating valve diagrams and plant status boards. These methods of conveying plant status should be kept current and reviewed during shift turnover.

Response

Formal guidance will be provided for maintaining the plant safety and non-safety-related status boards. Review of the status boards will be incorporated into the shift turnover checklist. This action will be completed by November 30, 1981. Guidance on use of valve diagrams currently exists in the station manual.

2. **Finding** (Criterion J)

Unapproved caution tags, drawings, and operating curves are posted throughout the plant.

Recommendation

Develop and implement a policy to prevent the posting or use of uncontrolled labels, curves, notes, and instructions. This policy should include a mechanism to ensure that any necessary posted materials remain current and reflect approved operating information.

Response

An operating aid index is being developed to control operating in-plant procedures and tables. In-plant drawings will be added to the listing of the station controlled copy drawings and will be revised according to their procedures. The above actions will be completed by November 30, 1981.

3. **Finding** (General Criterion)

Operations personnel need more effective management direction to ensure the timely return of a unit to power operation after a unit outage.

Recommendation

Assign an appropriate manager overall responsibility for minimizing delays and problems during plant startup preparations and startups.

Response

Increased operating organization input and detail will be included in future plant scheduling. This increase in scope will be utilized by all station organizations to better coordinate group actions.

A startup manager will be utilized for extended outage recovery operations.

SHIFT TURNOVER

(INPO Performance Objective OP.6)

The team examined the shift turnover process to determine if a continuous and correct understanding of plant conditions was conveyed between all shift positions.

1. **Finding** (Criterion B)

Turnover checksheets are needed for shift positions outside the control room. The checksheets used by control room operators need to be expanded to ensure that complete plant status is communicated.

Recommendation

Evaluate the shift turnover process and revise the turnover sheets to include all items appropriate for a complete turnover, including inoperative equipment, operations and testing planned or in progress, and reviews of pertinent logs/records. A separate turnover sheet should be established for each shift position.

Response

In addition to the existing control room personnel turnover lists, checklists will be provided for all permanent watch station locations. Additionally, the turnover checklists will be expanded to include the recommendation items. Action will be completed by November 30, 1981.

2. **Finding** (Criterion C)

A review of the control boards should be performed regularly during shift turnover.

Recommendation

Revise the turnover procedure to require a general review of the control room panels by all control room personnel and supervisors. This review should be conducted jointly between the oncoming and off-going operators during the turnover process or immediately after turnover by the oncoming operator.

Response

The existing turnover check sheets will be revised to include control panel walkdowns by control room personnel. This action will be completed by November 30, 1981.

TAGOUT PRACTICES

(INPO Performance Objective OP.7)

Tagout practices were evaluated to determine if they ensured protection of personnel and equipment. Areas reviewed included clearance approval procedures, respect for and understanding of the tag systems, independent verification of tagged safety-related equipment, and tag auditing procedures.

1. **Finding** (Criterion B)

The provision for signing clearances "off log" for testing is being abused. Many tags have been temporarily removed for periods in excess of three months although the clearances are still in effect.

Recommendation

Strictly enforce the administrative policies currently promulgated for signing clearances "off log."

Response

The clearances signed "off log" were removed or reestablished as appropriate. Review of the "off log" clearances will be performed weekly by station management to ensure that the requirements are enforced.

2. **Finding** (Criterion G)

   The interval between the audits of the caution tag system needs to be reduced to ensure effective management of the system.

   Recommendation

   Perform an audit of the caution tag system at a frequency similar to that used for the audit of the clearance tag system.

   Response

   The caution tag audit system frequency has been changed to quarterly review for all accessible tags. Additionally, other logging systems were reviewed against the criterion for performance frequency.

MAINTENANCE

The evaluation encompassed the maintenance organization, preventive maintenance program, work control system, maintenance history, control and calibration of test equipment, procedures, facilities, and equipment.

MAINTENANCE ORGANIZATION AND ADMINISTRATION
(INPO Performance Objective MA.1)

The maintenance organization and administrative programs were evaluated to determine their effectiveness in supporting safe plant operations. Areas reviewed included the organization structure, staff size, assignment of authorities and responsibilities, training, and certain administrative programs.

Finding (Criterion A)

The instrument and control supervisor position and many engineering positions in the instrument maintenance department are not filled. Most engineering or supervisory positions in the electrical and mechanical maintenance departments are filled by persons with less than one year's experience or are vacant.

Recommendation

See recommendation under OA.3. Criterion A.

Response

See response to OA.3.

MAINTENANCE FACILITIES AND EQUIPMENT
(INPO Performance Objective MA.2)

The location, size, and condition of offices, work areas and storage spaces were examined. In addition, the number, type, condition, and location of maintenance tools and equipment were reviewed.

1. **Finding** (Criterion A)

   Storage for plant maintenance equipment needs improvement.

   Recommendation

   Evaluate plant storage needs and take corrective action as found necessary.

   Response

   The areas presently in use have been reviewed and actions are being taken to optimize their usage. The subject of Beaver Valley storage areas has been reviewed and recommendations have been submitted to engineering for evaluation.

2. **Finding** (Criterion C)

   The maintenance shop areas were not neat and orderly. A considerable amount of clutter was observed on work benches and in the work area.

The decontamination facility in the potentially contaminated shop was cluttered.

Recommendation

Action should be taken to upgrade the cleanliness and storage of equipment in the shop areas.

Response

Recent increases in maintenance supervisory personnel (see MA.3, Finding 2) along with implementation of the management surveillance program and the housekeeping program have resulted in improved housekeeping.

WORK CONTROL SYSTEM
(INPO Performance Objective MA.3)

The effectiveness of the work control system was evaluated. The system functions were checked to see if they promote adequate identification of potential work; define and authorize work to be performed by the maintenance groups; provide for planning, scheduling and control of actual work; and have a mechanism to input the maintenance results into an equipment history file for future evaluation.

1. **Finding** (General Criterion)

   A large volume of outstanding work was identified. Many items have been outstanding for a considerable period of time.

   Recommendation

   Outstanding work should be reviewed on a periodic basis, and a plan should be developed to systematically reduce its volume. Management attention should be directed toward reducing obstacles to timely completion of maintenance work and improving performance in this area.

   Response

   A management review of the outstanding work identified approximately one-half the Maintenance Work Requests were either invalid or previously completed. An additional 20 percent required station shutdown conditions to be performed. Revisions to the inputting methods for the MWR Backlog Report were made to ensure that it is kept current. A periodic review of the outstanding work to be performed will be made to ensure that the list is kept current.

2. **Finding** (Criterion G)

   First-line maintenance supervisors' access to work sites is restricted by security requirements to the extent that supervisory tours in vital areas are infrequent.

   Recommendation

   Management should ensure that supervisors conduct surveys of maintenance activities during and after performance of work to ensure the expected results are achieved and good housekeeping practices are maintained. Efforts should be made to reduce the impact of security restrictions on supervisory personnel.

Response

The addition of four supervisors to the maintenance organization has increased the supervisor/worker ratio and enables closer job follow and inspections. The security restrictions for supervisory personnel were removed.

MAINTENANCE PROCEDURES

(INPO Performance Objective MA.4)

The team evaluated the degree to which procedures enhance the quality and effectiveness of maintenance activities. Procedures and manuals were examined to determine the types of maintenance covered, scope, level of detail, review and approval process, document control requirements, and methods of revision.

Finding (Criterion A)

Vendor manuals used in the work spaces and in the field are often not controlled copies. Controlled copies are maintained by the document center. However, because of the location of the document center, they are seldom used by maintenance personnel.

Recommendation

Controlled copies of all manuals used in the performance of safety-related or critical balance-of-plant work should be maintained in the shop areas.

Response

A file of controlled copies of vendor manuals has been provided in the maintenance work area.

MAINTENANCE HISTORY

(INPO Performance Objective MA.5)

The ability of maintenance history records to support maintenance evolutions was reviewed. Areas covered were the equipment included in maintenance history, content and accessibility of records, history review and evaluation methods, implementation of an equipment performance program, and procedures for program implementation.

Finding

There were no findings in this area.

PREVENTIVE MAINTENANCE

(INPO Performance Objective MA.6)

The team evaluated the effectiveness of maintenance in optimizing equipment reliability and performance. The preventive maintenance (PM) program was assessed to determine if it was well defined and effectively implemented. Other areas of review included criteria used to determine the equipment to be included in the program, frequency of maintenance, effectiveness of program control, coordination, and adequacy of individual procedures.

1. **Finding** (Criterion A)

   The preventive maintenance program should be more effectively implemented as evidenced by several examples of plant material condition.

   Recommendation

   The preventive maintenance program should be reviewed to establish the maintenance actions and frequencies appropriate to maintain and upgrade plant material condition.

   Response

   An in-depth evaluation of the existing preventive maintenance program has been completed. Increased emphasis will be placed on plant inspections. Changes to procedures and schedule frequencies will be required to fully implement the revised program by May 1982.

2. **Finding** (General Criterion)

   A considerable backlog of overdue preventive maintenance exists.

   Recommendation

   The existing backlog of PMs should be rescheduled or cancelled on a case-by-case basis. Management should establish and use appropriate mechanisms to ensure that future PM backlog is minimized.

   Response

   The existing backlog has been reviewed and program revisions instituted. The backlog is being adjusted as a result of the revisions and PMs will be rescheduled and a new backlog status established by May 1982.

CONTROL OF MEASUREMENT AND TEST EQUIPMENT

(INPO Performance Objective MA.7)

The team evaluated the adequacy and effectiveness of methods used for calibration and control of test equipment and instrumentation. Specifically, methods used for identifying, calibrating, storing, issuing, transporting, and using measurement and test equipment were examined. Procedures establishing and governing the calibration program and existing calibration records were also reviewed.

Finding

There were no findings in this area.

CONTROL OF SPECIAL PROCESSES

(INPO Performance Objective MA.8)

The qualification and control of personnel, procedures, equipment, and material were evaluated to ensure the quality of welding processes.

Finding (Criterion D)

Routine preventive maintenance needs to be performed on welding machines and welding ovens.

Recommendation

Initiate appropriate periodic calibration, inspection, cleaning, and adjustment to ensure that equipment related to the welding process functions as designed.

Response

Preventive maintenance, inspection, and calibration will be performed on welding machines and controlled electrode ovens, and they will be incorporated into the PM program by June 1982.

RADIOLOGICAL PROTECTION AND CHEMISTRY

Radiological Protection and Chemistry were evaluated by reviewing the performance of radiological protection training, personnel dosimetry, external and internal radiation exposure, radioactive contamination control, and chemistry.

A number of good practices were observed in radiological protection. These practices included an effective solid waste reduction program, the requirement that workers demonstrate practical abilities during radiation worker training, positive controls over the issue and use of portable radiation survey instruments, and detailed guidelines for installation of temporary shielding.

The most significant problem areas were the need for a formalized radiation exposure reduction program (ALARA), a more active involvement of the ALARA coordinator in exposure reduction, unnecessary generation of radioactive effluents due to systems leakage, and training of plant chemists.

MANAGEMENT OF RADIOLOGICAL PROTECTION
(INPO Performance Objective RC.1)

An evaluation was performed to determine the effectiveness of the management of the radiological protection program.

Finding

There were no findings in this area.

RADIOLOGICAL PROTECTION TRAINING
(INPO Performance Objective RC.2)

Radiological protection training programs were evaluated to ensure that personnel have the knowledge and practical abilities necessary to implement radiological protection practices effectively.

Finding (Criterion B.1)

Contract laborers involved in the packaging and shipment of radioactive waste should be trained to perform all functions of their job. Specifically, personnel were not trained with regard to the burial site criteria, applicable regulations and plant radioactive waste procedures. It is understood that the plant has plans to staff the radioactive waste group with permanent operations personnel.

Recommendation

Staff the radioactive waste group with trained personnel as soon as possible. In the interim, train contract labor personnel in the above items.

Response

A formal radioactive waste shipment training program will be instituted in November 1981 and completed by May 1982. Interim training has been conducted for personnel engaged in radioactive waste shipments.

PERSONNEL DOSIMETRY

(INPO Performance Objective RC.3)

An evaluation was performed to verify that personnel radiation exposures were being accurately determined and recorded.

Finding (Criterion C.4)

Comprehensive quality controls are needed for the plant's thermoluminescent dosimetry (TLD) system. Blind, spiked TLDs were not being submitted to dosimetry technicians to check the accuracy of the TLD processing system. The plant formerly used a program of quality control checks, but stopped after participating in a nationwide program that showed acceptable performance.

Recommendation

Reinstitute the program for testing the TLD processing system.

Response

The program for testing the TLD processing system will be reinstituted in November 1981.

EXTERNAL RADIATION EXPOSURE

(INPO Performance Objective RC.4)

An evaluation was performed to determine if the plant was minimizing personnel external radiation exposure.

1. Finding (Criterion A)

   A formal personnel radiation exposure reduction program (ALARA) is needed. While significant exposure reduction efforts were implemented for some specific jobs during the 1980 outage, approximately 500 man-rem of the plant's 550 man-rem of exposure in 1980 resulted from work that received no input from the ALARA coordinator. It is understood that the procedure for ALARA implementation is under review.

   Recommendation

   Expand the ALARA coordinator's involvement in the ALARA program to include preplanning for specific jobs, following exposure trends, and initiating corrective action if exposure trends or accumulations are excessive. Exposure goals should be established for jobs with significant anticipated exposures. Overall annual exposure goals are recommended.

Response

A Radcon procedure for ALARA implementation has been prepared and has been reviewed by the On-site Safety Committee. Radcon personnel are being trained to the new procedure. Exposure goals will be established by January 1982, and trend analyses will be performed.

2. **Finding** (Criterion B.1)

Multiple point calibrations need to be performed on portable radiation survey instruments.

Recommendation

Calibration procedures should be changed to incorporate the guidance given in sections 4.1 and 4.22 of ANSI N 323-1980 "Radiation Protection Instrumentation Test and Calibration."

Response

All Radcon instrument procedures are being revised or rewritten to incoporate multipoint calibration requirements. These procedures will be revised or rewritten by November 30, 1981.

3. **Finding** (Criterion B.3)

The sources used for calibrating radiation survey instruments are not capable of delivering the exposure rates necessary for calibration of high-range instruments.

Recommendation

Establish a program of periodic calibrations for high-range instruments. Guidance in ANSI N 323-1980 should be used as a basis for incorporating these changes.

Response

High-range instruments are currently sent to a vendor for periodic calibrations.

INTERNAL RADIATION EXPOSURE

(INPO Performance Objective RC.5)

An evaluation was performed to determine if the plant was minimizing personnel internal radiation exposure.

Finding

There were no findings in this area.

RADIOACTIVE EFFLUENTS

(INPO Performance Objective RC.6)

The program to minimize releases of radioactive effluents to the environment was evaluated.

Finding (General Criterion)

Valve leakage is adding unnecessarily to the volume of radioactive effluent that must be processed.

Recommendation

Minimize the volumes of radioactive effluents generated by promptly repairing leaks.

Response

The addition of the Radioactive Waste Disposal Coordinator position will provide full-time supervision for upgrading and improving the efficiency of the waste processing systems to minimize effluents.

Additionally, several formal and informal leakage identification and repair systems currently exist. These will be augmented with a new valve leakage repair tracking system. This system will be in effect by November 15, 1981.

SOLID RADIOACTIVE WASTE

(INPO Performance Objective RC.7)

An evaluation was performed to determine if the plant was minimizing solid radioactive waste volumes.

Finding

There were no findings in this area.

TRANSPORTATION OF RADIOACTIVE MATERIAL

(INPO Performance Objective RC.8)

An evaluation was performed to determine if the plant met the requirements for transporting radioactive materials.

Finding

There were no findings in this area.

RADIOACTIVE CONTAMINATION CONTROL

(INPO Performance Objective RC.9)

Procedures to minimize contaminated equipment and areas in the plant and to minimize personnel contamination were evaluated.

Finding

There were no findings in this area.

CHEMISTRY

(INPO Performance Objective RC.10)

The chemistry program was evaluated to determine if accurate measurements and effective control of chemistry parameters were being maintained.

1. **Finding** (General Criterion)

   The plant chemists hired within the last year have not received training in basic nuclear physics or reactor theory as specified in the training procedure. Chemists should also receive systems training. A retraining program is needed.

   Recommendation

   Reinstitute nuclear physics as part of chemistry training. Provide specific training in plant systems, and establish a retraining program for chemistry personnel.

   Response

   A formal training program will be developed for chemists to familiarize them with plant systems and nuclear physics. Retraining on applicable system modifications will be conducted by June 1982.

2. **Finding** (General Criterion)

   The two exhaust hoods in the chemistry laboratory used for analysis of radioactive samples were not providing specified exhaust flow.

   Recommendation

   Repair the exhaust hoods. Consider installing flow indicators and establishing a routine check of the hood exhaust flow.

   Response

   Repair actions and flow indication purchase were in progress prior to the evaluation visit and finding. Hood air flow has been reestablished and the flow meter is on order. Additionally, other chemistry exhaust hoods were verified to have sufficient flow.

3. **Finding** (General Criterion)

   Chemistry laboratories appeared cluttered and disorderly. Equipment labeled as radioactive was not adequately segregated from non-radioactive materials.

   Recommendation

   Remove unnecessary equipment and material from the laboratories. Segregate radioactive materials from non-radioactive materials.

   Response

   A laboratory cleanup has been conducted and unnecessary equipment removed. The hot lab has always been a controlled area separated into three radioactive control levels. This segregation is not absolute, as some apparatus must be utilized in all three areas.

TECHNICAL SUPPORT

An evaluation was conducted to determine the effectiveness of the on-site technical support function. Specific areas evaluated included organizational structure and size, plant efficiency and reliability, assessment of operating experiences, coordination of plant modifications, and reactor engineering activities.

ON-SITE TECHNICAL SUPPORT ORGANIZATION AND ADMINISTRATION
(INPO Performance Objective TS.1)

An evaluation was performed to determine if on-site technical support is effectively organized and adequately staffed. The capability to perform all assigned duties and responsibilities, and training to enhance engineering skills were examined.

1. **Finding** (Criterion A-4)

   Reactor engineering tasks need to be better organized and more clearly defined. These tasks are currently performed by four different supervisors at the plant and one supervisor at the corporate office.

   Recommendation

   Reactor engineering tasks should be defined and written into job descriptions and qualifications. An organization should then be formulated to support these tasks and provide responsibility and accountability for task completion.

   Response

   The position of Reactor Engineer will be deleted in the new station organization scheme. Reactor engineering duties will be reassigned to the Testing Group, the Operations Group, and the Analytical Services Group as appropriate. Reactor engineering responsibilities for each of these groups will be clearly defined and documented during this reassignment evolution.

2. **Finding** (Criterion C)

   Technical support personnel need more effective continuing training. Although some general training has been provided for test engineers and design engineers, no commitment to an ongoing program to improve and develop skills, maintain personnel cognizant of the state-of-the-art changes, and provide specific plant systems training was evident.

   Recommendation

   Implement a training program for on-site technical support personnel. The program should address plant systems and components, specialized engineering knowledge and skills, and management techniques. On-site technical support personnel should also be encouraged to attend seminars and conferences within the areas of their responsibility.

   Response

   A formal training program will be developed for technical support personnel, as noted in the above recommendation, during 1982.

PLANT EFFICIENCY AND RELIABILITY

(INPO Performance Objective TS.2)

An evaluation was performed to determine if an on-site program exists to optimize plant thermal efficiency and reliability by routinely monitoring plant performance.

Finding (Criteria A through E)

There were no findings in this area.

NUCLEAR OPERATING EXPERIENCE EVALUATION PROGRAM

(INPO Performance Objective TS.3)

An evaluation was performed of the programs for reviewing in-house operating events as well as those occurring throughout the nuclear industry. The reporting, review, and follow-up corrective actions for in-house events were examined, along with the method of disseminating the information, both to appropriate personnel and to the industry. For industrywide events, examination was made of sources of information reviewed, the screening process employed in surveying events, and the disposition of events relevant to the plant.

1. **Finding** (Criteria A through G)

   The program to review and evaluate in-house and industry operating experiences needs to be more fully implemented.

   Recommendation

   Establish a formal program to ensure that in-house and industry operating experiences are reviewed and evaluated, and that appropriate actions are identified and completed in a timely manner. The program should include coordination of the activities in this area currently being performed by the Incident Report System, Training Supervisor, Technical Advisory Engineer, On-site Safety Committee, and the Licensing and Compliance Group. It should permit tracking all actions or recommendations that evolve from this program. Nuclear NOTEPAD or other methods should also be used more effectively to notify the industry of those in-house events judged to have generic significance.

   Response

   The program for review of in-house and industry operating experiences will be fully implemented by January 1982.

2. **Finding** (Criteria G.2 and G.3)

   Disposition has not been made on all the recommendations contained in Significant Operating Experience Reports (SOERs) issued since August 1980. The following status summary was determined during the evaluation:

   - Twenty recommendations were not applicable to Beaver Valley.
   - Action on 27 recommendations was appropriate.
   - Action on 15 recommendations listed below is pending.

SOER NUMBER	RECOMMENDATION NUMBERS
81-1	2
81-4	2, 2a, 2b, 3
81-5	1, 4
81-6	1, 1a
81-7	1
81-8	1
81-12	1, 2, 3, 4a, 4b

Recommendation

Complete and document action taken on each SOER recommendation listed and so indicate in the response.

Response

The review of the fifteen SOER recommendations has been completed. This review indicated that twelve items have been completed or are not applicable and the remaining three are under engineering evaluation. These three SOERs are 81-5, 81-7 and 81-8. The status of these will be provided in our follow on responses six months from the date of this report.

PLANT MODIFICATIONS

(INPO Performance Objective TS.4)

An evaluation was made of the plant design change process, including temporary alterations, to determine if design changes are being implemented in a safe and timely manner. Determinations were made as follows:

Finding (Criterion I)

Final document revisions need to be completed and issued in a more timely manner.

Recommendation

Implement the requirements of section 6.14.7 of Engineering Management Performance Objectives For Nuclear Projects 2.8, titled "Handling of Design Change Packages."

Response

The drawing update activities for Beaver Valley drawings have been ongoing; however, to expedite this task, a consultant has been retained to assist with the records update task which will bring this effort into compliance with EMP (Engineering Management Procedures) 2.8.

ON-SITE REACTOR ENGINEERING

(INPO Performance Objective TS.5)

An evaluation of reactor engineering was made to assess the use of appropriate procedures, use of the plant process computer and control of software, dedication to the maintenance of fuel clad integrity, and the involvement of reactor engineers in refueling outage activities. Determinations were made as follows:

Finding (Criterion B)

Important variables in the plant process computer need to be updated as appropriate, and routinely and independently checked and verified. Program software is not controlled by approved procedures.

Recommendation

Establish a program to effectively manage computer program software and all changes to it. The program should include the following elements:

- o determination of the variables and calculations important to plant operation
- o review of each change to the computer to determine potential significance
- o routine, independent verifications of engineering calculations
- o timely update of software to accommodate changes in plant or reactor core design.

Response

A review is currently being conducted to identify those variables and calculations important to station operation. These variables will be periodically checked through the establishment of formal surveillance procedures. This program will be in effect by January 1982.

The review of the data base changes will be formalized by the issuance of a procedure to the station operating manual, which require OSC review. This will be in effect by January 1982.

Along with the review for important plant variables and calculations noted above, a periodic check of these engineering calculations will be performed through the establishment of appropriate surveillance procedures by November 30, 1981.

A procedure will be issued to the station operating manual which describes the method and requirements necessary to revise the software of the plant process computer by November 30, 1981.

ADMINISTRATIVE APPENDIX

I. LISTING OF AREAS EVALUATED

ORGANIZATION AND ADMINISTRATION

OA.1 Organizational Objectives
OA.2 Organizational Structure
OA.3 Manpower Resources
OA.4 Administrative Controls
OA.5 Management Quality Programs
OA.6 Surveillance Program
OA.7 Industrial Safety

TRAINING AND QUALIFICATION

TQ.1 Training Organization
TQ.2 Training Administration
TQ.3 Training Facilities and Equipment
TQ.4 Non-licensed Operator Training
TQ.5 Licensed Operator Training
TQ.6 Licensed Operator Requalification Training
TQ.7 Shift Technical Advisor Training
TQ.8 Maintenance Personnel Training

OPERATIONS

OP.1 Operations Organization and Administration
OP.2 Operations Facilities and Equipment
OP.3 Conduct of Shift Operations
OP.4 Plant Operations Procedures
OP.5 Plant Status Controls
OP.6 Shift Turnover
OP.7 Tagout Practices

MAINTENANCE

MA.1 Maintenance Organization and Administration
MA.2 Maintenance Facilities and Equipment
MA.3 Work Control System
MA.4 Maintenance Procedures
MA.5 Maintenance History
MA.6 Preventive Maintenance
MA.7 Control of Measurement and Test Equipment
MA.8 Control of Special Processes

RADIOLOGICAL PROTECTION AND CHEMISTRY

RC.1 Management of Radiological Protection
RC.2 Radiological Protection Training
RC.3 Personnel Dosimetry
RC.4 External Radiation Exposure
RC.5 Internal Radiation Exposure
RC.6 Radioactive Effluents
RC.7 Solid Radioactive Waste
RC.8 Transportation of Radioactive Material
RC.9 Radioactive Contamination Control
RC.10 Chemistry

TECHNICAL SUPPORT

TS.1 On-site Technical Support Organization and Administration
TS.2 Plant Efficiency and Reliability
TS.3 Nuclear Operating Experience Evaluation Program
TS.4 Plant Modifications
TS.5 On-site Reactor Engineering

II. BEAVER VALLEY POWER STATION PERSONNEL CONTACTED

Manager, Nuclear Operations
Station Superintendent, Nuclear
Results Coordinator
Nuclear Chief Engineer
Office Manager, Nuclear
Quality Control Supervisor
Material Control Supervisor
Technical Supervisor, Nuclear
Nuclear Station Operations Supervisor
Senior Engineer (Industrial Safety)
Senior Engineer - Design Control
Senior Engineer - Refueling
Assistant Office Manager
Shift Technical Advisors
Procedures Engineer
Test Engineers
Nuclear Shift Supervisors
Nuclear Station Operations Foreman
Nuclear Control Operators
Computor Supervisor
Nuclear Training Supervisor
Start-up Operators
Senior Engineer, Planning and Scheduling
Radiation Control Supervisor
Dosimetry Foreman
Corporate Health Physicist
Chemistry Supervisor
Senior Chemists
Radiation Control Foreman
ALARA Coordinator
Solid Waste and Transportation Supervisor
Maintenance Supervisor
Instrument and Control Supervisor
Welding Engineer
Planning and Scheduling Consultant
Storeroom Supervisor
Maintenance Foreman
Instrument Engineer
Meter and Calibration Repairman
Training Instructors
Maintenance Training Instructors