

1982 Evaluation

Pilgrim
Nuclear Power
Station
Boston
Edison Company

INPO

EVALUATION
of
PILGRIM NUCLEAR POWER STATION

Boston Edison Company

January 1983

SUMMARY

INTRODUCTION

The Institute of Nuclear Power Operations (INPO) conducted an evaluation of Boston Edison Company's (BECO) Pilgrim Nuclear Power Station during the weeks of October 18 and 25, 1982. The station is located on Cape Cod Bay near Plymouth, Massachusetts. Pilgrim is a single-unit, 655-megawatt (electrical) General Electric boiling water reactor plant that began commercial operation in December 1972.

PURPOSE AND SCOPE

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

The INPO evaluation team examined station organization and administration, operations, maintenance, technical support, training and qualification, radiological protection, and chemistry. The team also observed the actual performance of selected evolutions and surveillance testing. As a basis for the evaluation, INPO used performance objectives and criteria relevant to each of the areas examined; these were applied and evaluated in light of the experience of team members, INPO's observations, and good practices within the industry.

INPO's goal is to assist member utilities in achieving the highest standards of excellence in nuclear plant operation. The recommendations in each area are based on best practices, rather than minimum acceptable standards or requirements. Accordingly, areas where improvements are recommended are not necessarily indicative of unsatisfactory performance.

DETERMINATION

Within the scope of this evaluation, the team determined that the plant is being operated safely by experienced and qualified personnel.

The following beneficial practices and accomplishments were noted:

There appears to be a strong corporate commitment to improvement of the station.

Operations and maintenance personnel demonstrated a strong sense of responsibility for safe and reliable operation of the plant.

Substantial improvements in training are planned and being implemented.

Significant progress has been made in improving plant cleanliness and preservation.

Improvements were recommended in a number of areas. The following are considered to be among the most important:

Communications and coordination among personnel need to be improved.

The plant chemistry program needs significant improvement.

The number of plant areas where access is restricted for radiological reasons needs to be reduced.

In-place training programs need to be strengthened.

Material and housekeeping conditions in the screenhouse, reactor building corner rooms, and radwaste system need to be improved.

Vacancies in the plant staff technical support group need to be filled.

In each of the areas evaluated, INPO has established PERFORMANCE OBJECTIVES and supporting criteria. All PERFORMANCE OBJECTIVES reviewed during the course of this evaluation are listed in APPENDIX II.

Findings and recommendations are listed under the PERFORMANCE OBJECTIVES to which they pertain. Particularly noteworthy conditions that contribute to meeting PERFORMANCE OBJECTIVES are identified as Good Practices. Other findings describe conditions that detract from meeting the PERFORMANCE OBJECTIVES. It would not be productive to list as Good Practices those things that are commonly done properly in the industry since this would be of no benefit to BECO or to INPO's other member utilities. As a result, most of the findings highlight conditions that need improvement.

The recommendations following each finding are intended to assist the utility in ongoing efforts to improve all aspects of its nuclear programs. In addressing these findings and recommendations, the utility should, in addition to correcting or improving specific conditions, pursue underlying causes and issues.

As a part of the second and succeeding evaluations of each station, the evaluation team will follow up on responses to findings in previous reports. Findings with response actions scheduled for future completion have been carried forward in APPENDIX I to this report. In areas where additional improvements were needed, a new finding that stands on its own merit has been written. Thus, this report stands alone, and reference to previous evaluation reports should not be necessary.

The findings listed herein were presented to BECO management at an exit meeting on November 5, 1982. Findings, recommendations, and responses were reviewed with BECO management on December 17, 1982. Responses are considered acceptable.

To follow the timely completion of the improvements included in the responses, INPO requests a written status by May 1, 1983. Additionally, a final update will be requested six weeks prior to the next evaluation.

The evaluation staff appreciates the cooperation received from all levels of BECO.

BOSTON EDISON COMPANY

Response Summary

Boston Edison (BECO) concurs with the Institute of Nuclear Power Operations' (INPO) general conclusion that Pilgrim Station is being operated safely by experienced and qualified personnel.

BECO also appreciates the acknowledgement of our strong corporate commitment to improvement of the station. This commitment is embodied in our Performance Improvement Program (PIP) document, which is on file with the Nuclear Regulatory Commission, and our aggressive reorganization of the nuclear organization from the top down. It should be noted that during the INPO evaluation, BECO was in the midst of this reorganization; a certain amount of settling down is needed before focusing on specific weaknesses and making corrections.

BECO also acknowledges that there are areas that can be improved. These areas are as follows:

1. communications and coordination among personnel
2. the plant chemistry program
3. in-place training programs
4. the number of areas where access is restricted for radiological reasons
5. vacancies in the plant staff technical support group
6. material and housekeeping conditions in the screenhouse, reactor building corner rooms, and radwaste system

These areas will be improved by aggressive actions.

BECO has not established specific completion dates in the responses because other performance improvement actions and programs at least partially address many of the recommendations. Additional actions that may be required will be identified and internally fitted into the overall program. BECO will report more fully on the progress of corrective actions and will give projected completion dates for all incomplete actions in a status report by May 1, 1983. As the INPO team observed, BECO is involved in a multi-faceted improvement program, and the evaluation provides another useful perspective. Also, BECO has requested, and INPO has agreed to provide, additional assist visits in training and chemistry to supplement the evaluation.

Boston Edison appreciates the efforts of the INPO team and believes their recommendations will be helpful in our commitment to improvement of the station.

INPO COMMENT

In recent months, BECO has developed a comprehensive Performance Improvement Program for the Pilgrim Nuclear Station and the supporting nuclear organization. The plan reflects inputs from a number of reviews by outside organizations and demonstrates an aggressive commitment by BECO management.

INPO considers it appropriate for BECO to coordinate response actions to this evaluation into the existing improvement plans. Recognizing the already substantial burden on BECO management, INPO considers it acceptable to delay determination of projected completion dates and some specific corrective actions in order to permit a coordinated approach. BECO has agreed to provide a detailed report on the status of improvements and projected completion dates for all outstanding actions by May 1, 1983.

ORGANIZATION AND ADMINISTRATION

STATION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Station organization and administrative systems should ensure effective implementation and control of station activities.

Finding
(OA.1-1) The recent reorganization of the plant staff has resulted in uncertainty among staff personnel concerning assignment of responsibilities and accountabilities. Specific responsibilities of some staff groups are still being developed and those for other groups are not clearly defined. Some personnel are assigned temporary responsibilities. As a result, some activities are not receiving appropriate attention.

Recommendation Expedite development of jurisdiction and responsibility statements for each staff group and individual position descriptions for each staff position. Inform affected personnel of their new responsibilities and the goals of the reorganization effort as soon as possible.

Response BECO will continue to develop responsibility and jurisdiction statements as part of the reorganization and, where position descriptions do not already exist or are changed, the affected personnel will be informed. The reorganization had been in place only six weeks at the time of the evaluation.

Finding
(OA.1-2) Communications from management to all levels of the plant organization need to be improved. Many persons have little confidence in the effectiveness of the recent organizational and management changes. Some supervisors had little understanding of the Performance Improvement Program (PIP) even though they were working PIP action items.

Recommendation Increase efforts to familiarize all levels of the plant staff with the factors that led to the reorganization, the expected results, and the action or support required from each member of the staff. Use periodic meetings to inform staff members of current PIP progress and to answer questions pertaining to the direction the company is pursuing.

Response BECO has established additional communications channels. These include meetings, instructions, and memoranda that are designed to communicate between all levels of the organization. Additional specific actions are described in other responses in this report. BECO will continue to communicate the reasons for reorganization and emphasize our willingness to consider any suggestion to improve the organizational structure.

MISSION, GOALS, AND OBJECTIVES

PERFORMANCE OBJECTIVE: Station mission, goals, and objectives should be established and progress monitored through a formal program.

Finding (OA.2-1)	The 1983 nuclear operations goals and objectives need expansion and need an action plan to assist in monitoring progress toward goals and objectives.
Recommendation	Extend the nuclear operations goals and objectives program to include the individuals reporting to the station manager. Develop a trackable action plan to achieve individual goals and objectives, and periodically assess progress toward objectives.
Response	The recommended improvements will be implemented. Action is currently in progress.

MANAGEMENT ASSESSMENT AND QUALITY PROGRAMS

PERFORMANCE OBJECTIVE: Management should assess station activities to ensure and enhance quality performance of all aspects of nuclear plant operation.

Finding (OA.3-1)	Action is needed to resolve the backlog of non-conformance reports (NCR) and Operations Review Committee (ORC) follow-up items.
Recommendation	Expedite resolution of the backlog of NCRs and ORC follow-up items. Track resolution of NCRs and ORC follow-up items in a manner similar to that used for quality deficiencies. Ensure that progressively senior levels of management are informed when undue delays in resolution are encountered.
Response	BECO agrees and will implement the recommended improvements, including publication of a monthly status report to senior management.

Finding
(OA.3-2)

A graduated quality program should be applied to important activities on selected balance-of-plant (BOP) equipment. Use of the full nuclear quality program for equipment important to reliability ("R" list equipment) was recently discontinued because the gain in equipment reliability was not commensurate with the administrative burden. However, a substitute quality program for "R" list equipment has not yet been developed.

Recommendation

Establish a graduated quality program for BOP equipment that is important from a safety or reliability standpoint. Include appropriate controls to ensure quality of workmanship and materials, including selected inspection points during maintenance, post-maintenance operability tests, and appropriate inspections and tests to enhance plant reliability.

Response

BECO agrees that some quality controls should be applied to activities associated with "non-Q" equipment. A policy statement has been issued that addresses management's desire to implement quality requirements on "non-Q" equipment. Specific controls and implementing methods are being evaluated. INPO has agreed to provide some assistance in this area.

Finding
(OA.3-3)

Management assessment programs need to be improved to include the following:

- a. periodic independent effectiveness reviews of selected programs and activities (e.g., modification program, work control system, operating experience review)
- b. an audit to ensure that all technical specification requirements are adequately addressed by surveillance tests, audits, or other routine administrative controls

Recommendation

Upgrade the quality assurance and quality control programs to include the above elements.

Response

The Nuclear Safety Review and Audit Committee is currently developing management review and audit techniques to be used to evaluate program effectiveness for safety-related Pilgrim activities. Implementation of these reviews is expected in 1983.

BECO will perform an audit to affirm that all technical specification requirements are adequately addressed.

INDUSTRIAL SAFETY

PERFORMANCE OBJECTIVE: Station industrial safety programs should achieve a high degree of personnel safety.

Finding
(OA.5-1) The industrial safety program needs upgrading to reduce the number of injuries and lost-time accidents. Accident reports seldom reflect substantive follow-up action.

Recommendation Conduct more substantive accident/near-accident investigations to identify the root causes of accidents and to develop corrective actions. Trends of accident/near-accident types should be analyzed to identify generic safety problems. Use the results of accident investigations as a basis for training station personnel and improving overall attention to industrial safety.

Response BECO is recruiting a safety engineer who will have functional responsibility to the corporate safety official. Part of his duties will be to assist in the conduct of substantive accident/near-accident investigations, identify the root causes, trend these causes, and advise management.

BECO has instituted a program in which the responsible group leader and first-line supervisor meet with their vice president to review any lost-time accident.

Finding
(OA.5-2) **Plant personnel need training in fire protection and fire prevention.** The trailer complex that contains the document control center (DCC) contains significant amounts of combustible material, yet the DCC personnel interviewed were not familiar with the operation of available fire equipment. The plant fire brigade observed during the evaluation was not sufficiently familiar with the plant layout and their fire brigade duties.

Recommendation Improve training of plant personnel in fire prevention and fire protection. Improve training of fire brigades in plant layout, location of fire fighting equipment, and coordination of brigade efforts. Use monitored drills to improve and evaluate brigade proficiency.

Response The recommended improvements will be implemented. Action is currently in progress.

DOCUMENT CONTROL

PERFORMANCE OBJECTIVE: Document control systems should provide correct, readily accessible information to support station requirements.

Finding (OA.6-1)	An excessive period of time is required to make permanent changes to station procedures. Although high priority changes can be made in one day, routine changes often require two months. Both the document processing capability and the review process contribute to the delay.
Recommendation	Evaluate the adequacy of document processing facilities to support timely processing of documents and make changes. Identify and correct the problems contributing to the lengthy technical reviews.
Response	The recommended improvements will be implemented. A new process notifies upper management of extraordinary delays. BECO is developing an action plan to correct this problem.

Finding (OA.6-2)	Improvements are needed in the handling and storage of permanent records. Backlogs exist in microfilming documents for permanent storage. The computer system used to index document locations and equipment used to view microfilmed documents are sometimes unreliable. They degrade the ability of the DCC to retrieve records needed by station personnel. These problems have led to development of backup retrieval systems and have increased the workload and volume of material in the already overcrowded DCC. In addition, the volume of hard copy documents is increasing because of problems in identifying and destroying duplicate copies of documents that have been microfilmed.
Recommendation	Improve the reliability of the computer records system and microfilm readers in order to reduce the extensive need for backup retrieval systems. Reduce the backlog awaiting permanent storage. Improve the identification and elimination in the DCC of those documents that have been microfilmed. Reduce the volume of unnecessary documents and material stored in the DCC.
Response	New records management software has recently been purchased and installed on the records management computer. Nuclear organization personnel will be trained as required. The records backfit project to film all permanent records has been started. An effort to reduce the volume of material stored in the DCC has also been initiated.

Finding
(OA.6-3)

Controlled copies of procedures are not always current. A recent quality assurance audit revealed numerous problems with missing and out-of-date controlled procedures. The following factors contribute to the document inaccuracies:

- a. Copyholders are responsible for maintenance of the procedure volumes, but no index listing the effective revisions of procedures is provided to ensure the copies are current.
- b. A periodic review of controlled procedure volumes to check their accuracy is not conducted.
- c. Station procedures and the quality assurance manual do not agree on assignment of responsibility for maintaining controlled procedure volumes current.
- d. The average two-month period to process a procedure change and the typing of procedure changes both on-site and off-site contribute to difficulties in maintaining an accurate status of revisions. Different changes to the same procedure can be in progress on site and off site at the same time.

Recommendation

Assign clear responsibility for maintenance of procedures, and eliminate conflicting information in present documents. Provide controlled procedure copyholders with information showing the effective revision of all procedures. Periodically verify that controlled procedure volumes are current. Consider consolidating administrative processing of procedures under one group, and reduce the time required to process procedure changes.

Response

The recommended improvements will be implemented. The policy for handling controlled documents will be promulgated by an organization level procedure. BECO will also add word processing equipment in 1983 to help speed up the process, and the quality assurance department will audit to ensure controlled procedures are kept current.

OPERATIONS

OPERATIONS ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The operations organization and administrative systems should ensure effective control and implementation of department activities.

Finding
(OP.1-1) The number of licensed operators is not sufficient to accommodate the demands of vacation, sick leave, and an effective continuing training program without the use of excessive overtime. Scheduled training for licensed operators is frequently missed or postponed.

Recommendation Take action to provide additional licensed operators to relieve the current shortage.

Response Several operators will complete license training under a new, improved training program in the near future. BECO is studying additional steps that may be taken.

Finding
(OP.1-2) The chief operating engineer (COE) is not assigned sufficient administrative and technical support personnel to allow adequate time for personal supervision of plant activities.

Recommendation Pursue filling the vacant day-watch engineer position with a senior licensed individual. In addition, provide the COE with technical support personnel in accordance with the PIP revised organizational structure.

Response An administrative assistant has been assigned to the chief operating engineer. The budget has additional personnel approved for 1983. BECO plans to assign a day-watch engineer when additional licensed personnel are available for shift duties.

Finding
(OP.1-3) Shift technical advisors (STAs) have not been effectively integrated into the shift organization. Cooperation and support between plant operators and STAs need significant improvement. The STA's ability to provide assistance in off-normal situations may be adversely affected by this situation.

Recommendation Take steps to more effectively integrate STAs into the shift organization. Specific recommendations for consideration are as follows:

- a. Assign STAs to operating shifts during plant outages.
- b. Have STAs make recommendations concerning plant operation to the watch engineer rather than directly to plant operators.
- c. Increase the involvement of the STAs in normal shift operating and maintenance activities.

Response STAs will remain on shift during outages other than extended refueling outages. To further improve the relationship, the STAs will participate jointly with operations in future training programs such as specialized technical specifications training and simulator requalification. STAs have been instructed to work with the watch engineers to resolve concerns about plant operations and maintenance activities.

CONDUCT OF OPERATIONS

PERFORMANCE OBJECTIVE: Operational activities should be conducted in a manner that achieves safe and reliable plant operation.

Finding
(OP.2-1) **Excessive control room traffic often distracts operator attention from shift activities and control board monitoring.** This is caused in part by the location of the operating supervisor's desk in the center of the control room where all maintenance requests and tagouts are processed. In addition, personnel routinely pass through the control room to reach the reactor building.

Recommendation Implement the current performance improvement plan to relocate shift coordination activities to a room outside the control panel area. In the interim, take action to reduce pass-through traffic in the control area.

Response The recommended improvements will be implemented. When the control room improvement plan is complete, access to the control room will be rigidly enforced and restricted. In the interim, control room traffic will be limited to necessary business.

Finding (OP.2-2)	The practice of having the operating supervisor (control room senior reactor operator) process maintenance requests, tagouts and administer the plant surveillance program detracts from his ability to effectively supervise control room activities.
Recommendation	Continue with current plans to staff the position of shift coordinator, and assign that position the responsibilities of processing maintenance requests and tagouts. Shift coordinators should be knowledgeable of systems and plant operation so they can provide substantive relief to the operating supervisor.
Response	The position of shift coordinator has been approved. Specific requirements for this position are currently being evaluated. The position will be staffed when plant improvements to relocate shift coordination activities outside the control room are completed.

Finding (OP.2-3)	Defective or out-of-tolerance instrumentation and controls are not adequately identified so that operators are alerted to the condition. In addition, the yellow sticker system presently used to denote disabled control room annunciators does not ensure that all disabled annunciators are identified.
Recommendation	Establish a method to clearly and consistently identify defective or out-of-tolerance instrumentation.
Response	The applicable procedures will be revised to correct the concerns stated in the finding.

PLANT STATUS CONTROLS

PERFORMANCE OBJECTIVE: Operational personnel should be cognizant of the status of plant systems and equipment under their control, and should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

Finding (OP.3-1)	Current shift turnover practices do not ensure a complete and comprehensive turnover of plant status. Nuclear plant operators and auxiliary operators rely on informal notes and memory to pass on pertinent information. Turnovers by these operators are often too brief for an effective transfer of information.
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- Recommendation** Expand the existing turnover requirements to include the following:
- a. Provide adequate space on turnover sheets to record pertinent plant status information.
 - b. Utilize the existing turnover sheets in lieu of the presently used notes and desk pad comments to guide the turnover process.
 - c. Include a review of outstanding tagouts as part of the operator turnover.
 - d. Require operators to perform a walkdown of control panels incident to shift turnover.

INPO's Good Practice OP-201, "Shift Relief and Turnover," could be of assistance in this area.

Response The recommended improvements will be implemented. Action is currently in progress, including development of an expanded turnover sheet and a more formal record of watch activities, and the enforcement of control panel walk down requirements.

Finding
(OP.3-2) **Independent position verification is needed for safety-related components that are repositioned following maintenance or testing.** It is recognized that independent verification is performed on selected systems following an extended outage.

Recommendation Revise procedures to require an independent verification of the position of all safety-related components that are repositioned following maintenance or testing. Consideration should also be given to conducting independent verification of important non-safety-related valves following maintenance and testing.

Response Procedures will be revised to incorporate the recommended improvements. Action is currently in progress to determine an effective way to make the needed changes.

Finding
(OP.3-3)

Operators cannot readily determine what lifted leads and jumpers exist in the plant. Tracking of jumpers and lifted leads that originate with a maintenance request is particularly difficult. A periodic physical review of lifted leads and jumpers is not conducted.

Recommendation

Document the placement of lifted leads and jumpers in the temporary modification record book. Identify lifted leads and jumpers with temporary modification tags. Conduct a periodic physical review of outstanding lifted leads and jumpers to ensure that an index accurately identifies all installed temporary jumpers and lifted leads, tags are properly attached, and tagged leads and jumpers are installed as intended.

INPO's Good Practice OP-202, "Temporary Bypass, Jumper, and Lifted Lead Control" could be of assistance in this effort.

Response

A log documenting lifted leads and jumpers will be established and maintained in the control room. Additional controls to address the recommendations will be implemented after further evaluation.

Finding
(OP.3-4)

The status of effective danger and test tagouts cannot be accurately determined. A number of tags in the plant could not be correlated to authorized tagouts, and tags are sometimes not completed and posted as specified. The status of posted tags is not periodically verified.

Recommendation

Strengthen the controls used for authorization, placement, and removal of danger and test tags so that operations personnel can quickly and accurately determine the tagout status. Perform periodic reviews of outstanding tagouts to verify the following:

- a. Only needed tagouts remain effective.
- b. Authorized tags are posted as specified.
- c. Tagged equipment is properly aligned.
- d. No unauthorized tags are present.

INPO's Good Practice OP-203, "Procedures for the Protection of Employees Working on Electrical and Mechanical Components" could be of assistance in this effort.

Response

The recommended improvements will be implemented. INPO Good Practice OP-203 is being reviewed to determine how the recommended improvements can best be integrated into existing BECO policies.

Finding
(OP.3-5) Many control room and auxiliary panel indications and controls were obscured by tags that were hung on adjacent switches. The large size of the tags contributes to this problem.

Recommendation Correct current conditions where tags obscure lights and switches. Obtain and use smaller tags or other means that will not obscure control board lights or switches.

INPO's Good Practice OP-203, "Procedures for the Protection of Employees Working on Electrical and Mechanical Components" could be of assistance in this effort.

Response Smaller tags have been ordered to replace the existing tags. Implementation will occur once the tags are received and procedures changed.

Finding
(OP.3-6) Some aspects of the caution tag system need improvement. The following problems were noted:

- a. A log or record is not kept of caution tags posted in the plant.
- b. There is no periodic review of caution tags for continued applicability and legibility.
- c. Caution tags are used for purposes other than conveying operating precautions or temporary instructions.
- d. Numerous improperly completed caution tags were found hanging throughout the plant.

Recommendation Revise the caution tag procedure to address the problems identified above. A periodic review of caution tags should be implemented.

INPO's Good Practice OP-203, "Procedures for the Protection of Employees Working on Electrical and Mechanical Components" could be of assistance in this effort.

Response A log documenting the status of caution tags will be maintained in the control room. Additional controls are being evaluated. BECO will review OP-203 and report, in the May 1 status report, how specific improvements will be achieved.

OPERATOR KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE: Operator knowledge and performance should support safe and reliable plant operation.

Finding
(OP.4-1)

Operator knowledge needs improvement in the following areas:

- a. automatic reactor trips and containment isolation
- b. factors affecting core reactivity during startup
- c. basic heat transfer principles as they relate to plant parameters and secondary plant efficiency

Recommendation

Improve operator requalification training to include the specific areas listed above. Emphasize practical application of basic reactor theory and heat transfer principles.

Response

The overall operator training and requalification program is under active review. When revised, it will include the recommended training.

Finding
(OP.4-2)

Operation of the condensate demineralizer system needs to be improved. During backflushing, resin is often deposited on the HPCI room floor. This appears to be caused by a combination of design, procedure deficiencies, and a lack of operator proficiency on the system. Corrective actions to prevent spillage have been delayed pending approval and installation of design changes.

Recommendation

Continue with efforts to implement appropriate design changes. In the interim, revise applicable operating procedures to ensure that they provide adequate instructions to operators. Train operators to ensure that they understand the systems involved and the correct operating methods to prevent resin spills. Ensure adherence to approved procedures for these operations.

Response

The recommended improvements will be implemented. Action is currently in progress. The condensate demineralizer system is being redesigned to eliminate the possibility of resins being transported to the HPCI room. This modification effort should be completed in the spring of 1983.

OPERATIONS PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Operational procedures and documents should provide appropriate direction and should be effectively used to support safe operation of the plant.

Finding
(OP.5-1)

The following Good Practice was noted: Operating procedures include a descriptive section prior to procedural steps that describes general system function, automatic system response, latest system modifications, and interlocks associated with system operation.

Finding
(OP.5-2)

The following Good Practice was noted: Controlled copies of operating procedures are posted at operating stations throughout the plant in locations that are especially convenient for operator reference.

Finding
(OP.5-3)

Uncontrolled notes, graphs, portions of procedures, and sketches are posted throughout the plant. A method is needed to authorize and update these operator aids.

Recommendation

Implement an administrative program to control posted operator aids. This program should include authorization of posting and periodic review to ensure that posted aids are current and legible. The number of posted operator aids should be minimized.

Response

A program is underway to remove unauthorized documentation posted throughout the station. A program will be developed to replace such documents with authorized documents, where appropriate, and to maintain posted documents current and legible. The possible features of this program are currently being evaluated.

Finding
(OP.5-4)

Some aspects of operating procedures need improvement. The following are examples:

- a. Cautions often follow the steps to which they apply.
- b. Notes and cautions sometimes contain action steps.
- c. Some action steps contain excessive numbers of subparagraphs.

Recommendation

Plant operating procedures should be reviewed to identify and correct these areas.

Response

The review plan for operating procedures is being developed and will be implemented in the near future. The examples identified in the finding will be addressed during the review.

Finding
(OP.5-5)

Alarm response procedures need to be upgraded. Several annunciators on the main control boards are not included in the alarm response procedures. In addition, several procedures contain technical inaccuracies.

Recommendation

Review alarm response procedures to ensure that they address all installed annunciator alarms and contain accurate information.

Response

The recommended improvements will be implemented. Action is currently in progress.

Finding
(OP.5-6)

Special orders and caution tags are often used to provide direction on equipment operation. This information should be incorporated into applicable operating procedures.

Recommendation

Review the outstanding special orders and caution tags and incorporate those which provide directions on equipment operation into properly approved operating procedures. Discontinue the use of special orders and caution tags as a means to provide operating instructions for other than temporary situations.

Response

The recommended improvements will be implemented. Action is currently in progress.

OPERATIONS FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE: Operational facilities and equipment should effectively support plant operation.

Finding
(OP.6-1)

A more effective means of communicating between the control room and operators in the plant is needed. Several instances were observed where inadequate communications delayed performance of surveillance tests and plant operations. This is due in part to the high communications traffic on the plant paging system.

Recommendation

Action should be taken to provide operations personnel with improved methods of communication. Consideration should be given to the following:

- a. Enforce more disciplined use of the plant paging system to decrease the amount of non-operational activity.
- b. Provide operations personnel with multichannel portable communication equipment.
- c. Provide supervisors with individual pagers.

Response

Action will be taken to improve communications for operators. Management will restate the policy on use of the paging system by unauthorized personnel as unacceptable conditions occur. An additional system is being evaluated to improve the paging system by identifying isolated nuisance users. Several types of portable communications systems, including pagers, are being evaluated.

Finding
(OP.6-2)

Many plant valves and components are not identified with permanent and distinguishable labeling.

Recommendation

The present labeling should be expanded to valves and components throughout the plant.

Response

The recommended improvement will be implemented. Action is currently in progress.

Finding
(OP.6-3)

The operation and material condition of radwaste facilities need significant improvement. A number of systems designed to process radioactive waste are not operational or are operating in a degraded condition. These include the concentrator, reactor cleanup resin processing equipment, the condensate demineralizer backflushing equipment, and the flat bed filters. Although a radwaste improvement program has been developed, the program has not yet been authorized, and responsibility for its implementation has not been assigned.

Recommendation

Implement the radwaste facility improvement program with a high priority. Assign responsibility for this project to a designated manager with sufficient visibility and authority to ensure timely restoration of the radwaste systems to normal service. Since close coordination of refurbishment activities and normal operations will be required, consideration should be given to assigning the radwaste coordinator to report to the manager responsible for the radwaste improvement programs.

Response

A comprehensive program to improve the radwaste function has been authorized. Different areas of this program are currently assigned to individual supervisors. BECO plans to assign overall responsibility for this project to a higher level manager in the near future.

Finding
(OP.6-4)

While significant improvement in plant cleanliness is evident, several areas of the plant require additional attention. These areas include the following:

- a. high pressure coolant injection quadrant
- b. traveling screen house
- c. chemistry laboratory
- d. instrumentation and control workshop
- e. some areas of the radwaste facilities

Recommendation

Continue to place emphasis on improving plant cleanliness. Particular attention should be given to the areas identified above.

Response

An ongoing program to upgrade station appearance and cleanliness will continue. The areas of concern above are those that have not yet been refurbished, but to which BECO plans to commit resources.

MAINTENANCE

PLANT MATERIAL CONDITION

PERFORMANCE OBJECTIVE: The material condition of the plant should be maintained to support safe and reliable plant operation.

Finding (MA.2-1)	The material condition of the screenhouse needs improvement. Numerous salt water leaks exist, and corrosion of equipment and structures is extensive. Housekeeping needs improvement. Inadequate lubrication appears to be contributing to frequent traveling screen failures.
Recommendation	Initiate more aggressive action to identify and repair leaks and other material deficiencies in the screenhouse. Clean and preserve equipment and structures, and improve housekeeping. Review the screen lubrication program, and use periodic inspections to ensure proper housekeeping and material preservation.
Response	The recommended improvements will be implemented. Action is currently in progress.

WORK CONTROL SYSTEM

PERFORMANCE OBJECTIVE: The control of work should ensure that identified maintenance actions are properly completed in a safe, timely, and efficient manner.

Finding (MA.3-1)	Numerous long-standing material deficiencies exist in the plant. Significant contributing factors include lack of effective reporting of equipment deficiencies and inadequate response in correcting reported items.
Recommendation	Emphasize the need to identify and repair material deficiencies in an expeditious manner. Implement a deficiency identification system to improve reporting of deficiencies for repair. INPO Good Practice MA-301, "Plant Material Deficiency Identification", could be of assistance in this effort. Implement a more effective maintenance work priority system to ensure that important deficiencies are corrected first and less important deficiencies are tracked until they can be repaired. Monitor and trend the maintenance backlog to aid in work and resource planning.

Response The recommended improvements will be implemented. Action is currently in progress. A priority system associated with maintenance requests is an example of the specific improvements planned.

PREVENTIVE MAINTENANCE

PERFORMANCE OBJECTIVE: The preventive maintenance programs should contribute to optimum performance and reliability of plant equipment.

Finding
(MA.5-1) Although some preventive maintenance activities are being performed, the program is not fully developed or implemented. The present program identifies fewer than 150 activities, of which about two-thirds are vibration readings. Authorization procedures for performing scheduled preventive maintenance and methods for recording completed work appear to be unnecessarily cumbersome.

Recommendation Expand the preventive maintenance program to encompass all equipment important to plant operation. Ensure that the administrative portion of the program includes methods to efficiently authorize and document preventive maintenance.

Response The recommended improvements will be implemented. The preventive maintenance program is currently under development.

MAINTENANCE PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Maintenance procedures should provide appropriate directions for work and should be used to ensure that maintenance is performed safely and efficiently.

Finding
(MA.6-1) The content and usage of maintenance procedures need to be upgraded.

Recommendation Review present procedures and revise them as necessary to ensure that they provide adequate guidance to perform tasks effectively. A checklist should be established and used to ensure uniformity during the review. The following items should be considered:

- a. the need for on-the-job verification that selected procedural steps are properly completed

- b. adequacy of instructions to specify the degree of procedural adherence required
- c. the need for pre-closure inspections and verifications
- d. identification of appropriate sign-offs to ensure work is properly completed

Response

The review plan for maintenance procedures is being developed and will be implemented in the near future. The examples identified in the recommendation will be addressed during the review. In addition, as procedures are used in the field, needed improvements are regularly being identified and completed.

MAINTENANCE FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE: Facilities and equipment should effectively support the performance of maintenance activities.

**Finding
(MA.8-1)**

Improvement is needed in traceability records, shelf life controls, and availability of stock items and supplies. Plant activities and equipment reliability are sometimes affected because of ineffective stockroom practices.

Recommendation

Improve storeroom procurement and handling methods. Consideration should be given to the following specific improvements:

- a. Establish controls to ensure that maintenance and environmental requirements for stored material and equipment are adequately addressed.
- b. Ensure that issued Q-list materials can be traced to end-use in the plant.
- c. Provide a system that permits the on-site stockroom to more easily obtain standard items, e.g., consumables or "standard" vendor items.
- d. Revise existing purchase authorization methods to eliminate redundant or unnecessary technical reviews wherever practicable.
- e. Establish a more convenient method of withdrawing items from the stockroom than the current purchase requisition. Consider using an issue/return ticket that includes minimum part identification information and fewer approval signatures.

- f. Establish stock levels and automatic reorder procedures based on historical demand.

Response

BECO has established a Spare Parts/Materials Management Task Force. This task force is comprised of members from the nuclear engineering department, nuclear operations support department, nuclear operations department, quality assurance department, stores department, and training department. Many of the recommendations that INPO has suggested are already being examined. The others will also be addressed by the task force.

TECHNICAL SUPPORT

TECHNICAL SUPPORT ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The technical support organization and administrative systems should ensure effective control and implementation of department activities.

Finding
(TS.i-1)

Completion of some station technical support tasks is adversely impacted by vacancies in the technical group staff. Resolution of operational problems with reactor building drain systems has required inordinate personal involvement of the operations and maintenance chief engineers due to the lack of engineering personnel in the technical group. Only six of seventeen authorized technical positions in the technical group are filled, and five of those are assigned to perform reactor engineering tasks.

Recommendation

Fill the vacant positions as soon as practicable. In the interim, consider the temporary reassignment of personnel from other company groups to the station technical group. The position of lead plant engineer should be filled on a priority basis.

Response

BECO is attempting to fill the lead plant engineer and other technical staff vacancies on a priority basis. Additional temporary assignments of personnel are not needed until a clearer definition of technical support staff responsibilities is developed. Action is in progress to define appropriate technical support staff responsibilities.

OPERATING EXPERIENCE REVIEW PROGRAM

PERFORMANCE OBJECTIVE: Industrywide and in-house operating experiences should be evaluated and appropriate actions undertaken to improve plant safety and reliability.

SOER STATUS

The status of Significant Operating Experience Report (SOER) recommendations is as follows:

Number of Recommendations

26
45
80

Action Taken

Satisfactory
Not applicable
Pending

The following recommendations are pending action:

<u>SOER Number</u>	<u>Recommendation Number</u>
80-1	1,2
80-2	2
80-4	1,2,3
80-6	1,2,3,6,7,8,10
81-2	1,2,3,4,5,6
81-3	2
81-8	1,2,3,4
81-9	1,2a,b,c
81-10	1
81-13	1,3,4,6,7,8,9,10,11,12,13,14,15
81-14	1,2,3,4
81-15	1a,b,c,2a,3
81-16	1,2,3
82-2	1,2,3,4,5,6,7
82-4	1,2,4,5,6
82-6	2b,3,5
82-8	1,2,4
82-9	1,2,3,4,5,6,7,8

An update on the status of each recommendation listed in the "pending action" category shown above is requested in the six-month follow-on response to this report. In addition, the status of each immediate action (red tab) SOER recommendation received subsequent to this evaluation should be included in the six-month follow-on response. A tabular summary, similar to that above, is requested.

Finding (TS.3-1)	Provisions for tracking corrective actions that result from operating experience reviews need improvement. Tracking of commitments resulting from Pilgrim LERs began three months ago. Corrective actions from industry SERs and SOERs and other in-house investigation reports are not tracked.
Recommendation	Implement plans to track corrective actions on site. The existing program that tracks in-house commitments should be expanded to cover planned corrective actions resulting from review of SERs and SOERs as well.
Response	The recommended improvements will be implemented. Action is currently in progress.

Finding
(TS.3-2) **Distribution of operating experience information is not effectively performed.** A procedure has been developed for screening and disseminating operating experience information, but it has not been fully implemented.

Recommendation Implement procedures to ensure applicable operating experience information is distributed to all affected personnel.

Response The recommendation will be implemented. Action is currently in progress.

Finding
(TS.3-3) **The operating experience review program does not include timely notification to other utilities of significant Pilgrim events with generic implications.**

Recommendation Implement guidelines on the use of NOTEPAD to inform other utilities of possible generic events at Pilgrim.

Response The recommendation will be implemented. Action is currently in progress.

Finding
(TS.3-4) **Plant participation in the NPRDS program has not been adequate to ensure the timely reporting of component failures and to ensure the engineering data base is current.** Failure reports have not been submitted since the third quarter of 1981.

Recommendation Enter the backlog of failure information and engineering base data into NPRDS, and resume routine NPRDS participation.

Response BECO will resume NPRDS participation in the near future.

PLANT MODIFICATIONS

PERFORMANCE OBJECTIVE: Plant modification programs should ensure proper review, control, implementation, and completion of plant design changes in a safe and timely manner.

Finding
(TS.4-1)

The following Good Practice was noted: Training programs, procedure revisions, and critical drawing updates are planned, scheduled, and completed concurrently with the physical installation of plant modifications. Tasks associated with these items are tracked effectively with the same scheduling system used for outage planning.

REACTOR ENGINEERING

PERFORMANCE OBJECTIVE: On-site reactor engineering activities should ensure optimum nuclear reactor operation without compromising design or safety limits.

Finding
(TS.5-1)

Reactor coolant chemistry parameters do not appear to be adequately considered when assessing nuclear fuel performance. Reactor engineering personnel were not aware of chemistry trends indicating the potential existence of pinhole fuel leaks.

Recommendation

Train reactor engineering personnel on the use of chemistry parameters to monitor fuel performance. Strengthen the review of chemistry conditions as a part of routine fuel performance assessment. Improve working communications between the reactor engineering and chemistry groups.

Response

BECO agrees that better communications should be established between the chemistry and reactor engineering groups and feels that both groups should be cognizant of off-gas isotopic relationships. Action will be taken to ensure that reactor engineering personnel understand the use of relevant chemistry parameters to monitor fuel performance and to ensure that chemistry parameters are carefully considered during regular fuel performance analyses.

TECHNICAL SUPPORT PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Technical support procedures and documents should provide appropriate direction and should be effectively used to support safe operation of the plant.

Finding
(TS.7-1)

Technical support activities are sometimes not effectively coordinated between the several station and corporate groups involved. Redundant, and sometimes conflicting, procedures for processing safety evaluations, plant design change requests, drawings, and field revision notices have been issued by the station staff, the nuclear engineering department, and the startup management groups. The lack of unifying procedural guidance for the nuclear organization has been recognized as a problem, and corrective action has been initiated as part of the PIP.

Recommendation

Complete the action plan development scheduled under item II 8.A of the PIP. The four activities discussed above should be specifically addressed in this plan. Ensure that changes to individual implementing procedures in interface areas are coordinated with all involved groups.

Response

The recommended improvements will be implemented. Action is in progress in the PIP.

TRAINING AND QUALIFICATION

TRAINING ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The training organization and administrative systems should ensure effective control and implementation of training activities.

Finding (TQ.1-1)	Instructor technical knowledge and classroom teaching techniques need improvement. Weaknesses were noted in instructor knowledge of Pilgrim events. In addition, instances were noted in which previously developed lesson guides were not used, advance preparation was minimal, and classroom time was not used constructively.
Recommendation	Develop and implement measures to improve the instructional and technical capabilities of instructors. Involve training managers and plant department managers in monitoring training for lesson content and quality of instruction.
Response	A trainer certification program will be developed. As each course is conducted, the training manager, appropriate training group leader, and applicable discipline chief will monitor the course at least once to evaluate instructional methods and course content.

Finding (TQ.1-2)	Operations personnel do not receive effective training on industry operating experiences. Applicable industry operating experience reports are neither provided to the training department nor incorporated into regular training sessions.
Recommendation	Establish a system to provide the training department with information on industry experience reports such as SOERs, LERs, SERs, and O&MRs. Provide training on industry operating experiences to operations personnel during regularly scheduled operator training each shift cycle.
Response	The station technical advisors have recently been assigned the task of receiving and reviewing applicable industry operation experience reports. A Plant Operations Experience Assessment Committee (POEAC) has been appointed to screen significant events and select those to be transmitted to other BECO personnel for action. The training department will provide POEAC with a list of written criteria to be used to determine if SOERs, LERs, SERs, and O&MRs have a potential training application at Pilgrim Nuclear Power Station. Applicable material will be incorporated into training programs.

NON-LICENSED OPERATOR TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE: The non-licensed operator training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

Finding
(TQ.2-1)

The recently developed nuclear auxiliary operator (NAO) continuing training program does not cover all aspects of the NAO job.

Recommendation

Expand the NAO requalification program to include such information as applicable procedure revisions, modifications, operating experience, radwaste system problems, and job-specific radiation protection training.

Response

The recommended improvement will be implemented. Action is currently in progress.

LICENSED OPERATOR TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE: The licensed operator training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

Finding
(TQ.3-1)

The licensed operator requalification program needs to be strengthened. The portions of the current requalification program that pertain directly to operator duties are covered in an annual simulator session, a presentation on major outage modifications, and in a short classroom series. A limited number of topics are covered, and the depth of coverage is not appropriate for a substantive requalification effort. Some weaknesses in operator knowledge have resulted. Requalification candidates have not attended a number of scheduled sessions, and delays in the requalification schedule have been necessary.

Recommendation

Provide additional formal instruction in the licensed operator requalification program. INPO's guideline "Nuclear Power Plant Requalification Program for Licensed Personnel" (GPG-02) could be of assistance. Strengthen coordination between the training and operations organizations to ensure that training is completed as scheduled.

Response

The recommended improvement will be implemented. Action is currently in progress.

MAINTENANCE PERSONNEL TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE: The maintenance personnel training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

Finding
(TQ.5-1)

Improvements are needed in initial maintenance and technician training programs. Structured training in plant systems and components has not been conducted for mechanics, electricians, nuclear technicians, and nuclear control technicians. In addition, on-the-job training (OJT) programs used to qualify these personnel do not adequately define the training tasks to be accomplished. Training is required on some tasks that are not part of the employee's job. Measurable standards are not provided for successful completion of OJT tasks.

Recommendation

Provide formal training on plant systems and components for maintenance crafts and technicians. Review OJT programs to eliminate unnecessary training efforts and establish more meaningful requirements for achievement of necessary skills. Program elements that should be included as part of this effort include the following:

- a. listing of tasks to be performed, simulated, observed, or discussed
- b. skill and knowledge standards
- c. assurance that individuals have demonstrated competency in specified tasks prior to performing those tasks without supervision

The following INPO documents could be of assistance in this effort: "Guidelines for Mechanical Maintenance Personnel Qualification" (GPG-05); "Guidelines for Electrical Maintenance Personnel Qualification" (GPG-07); and "Guidelines for Instrumentation and Control Technician Qualification" (GPG-08).

Response

The recommended improvements will be implemented. Action is currently in progress.

TECHNICAL TRAINING FOR MANAGERS AND ENGINEERS

PERFORMANCE OBJECTIVE: The technical training program for engineers and managers should broaden overall knowledge of plant processes and equipment as a supplement to position-specific education and training.

Finding
(TQ.6-1)

Plant engineers and technical managers receive little classroom or on-the-job training in plant systems, integrated operations, and other subjects pertaining to their jobs. Weaknesses were noted in identification of codes and standards applicable at Pilgrim, understanding the importance of chemistry to fuel performance, and basic system knowledge.

Recommendation

Provide structured training in plant systems and operations, and in job specifics for technical managers and new engineers. Review the knowledge and skills of current engineers and managers and, where appropriate, provide upgrading training to support current and anticipated assignments. INPO document "Technical Department Programs for Technical Staff and Managers" (INPO 82-022) could be of assistance in this effort.

Response

INPO 82-022 is being used to evaluate training of engineers and technical managers. Where deficiencies in engineer and technical manager knowledge are found, they will be corrected by appropriate training.

GENERAL EMPLOYEE TRAINING

PERFORMANCE OBJECTIVE: The general employee training program should develop a broad understanding of employee responsibilities and safe work practices.

Finding
(TQ.7-1)

The general employee training program does not provide workers with adequate knowledge and skills to comply with plant safety procedures and prescribed radiological procedures and practices. Much of the material presented is out of date and does not agree with current plant procedures. Instructional techniques, course content, testing, and training aids need improvement. Necessary practical abilities are not demonstrated or evaluated in the course of training. This situation is recognized by the training organization, and a revised program is under development.

Recommendation Continue with development and implementation of the proposed revision to the general employee training program. Identify and correct errors in training materials. INPO's "Guidelines for General Employee Training" (INPO 82-004) could be of assistance in this effort.

Response The recommended improvements will be implemented. Action is currently in progress.

RADIOLOGICAL PROTECTION

RADIOLOGICAL PROTECTION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The organization and administrative systems should ensure effective control and implementation of the radiological protection program.

Finding
(RP.1-1)

Measures prescribed for controlling spread of contamination and radiation exposure are sometimes not applied in an effective and consistent manner. Examples include the following:

- a. Control and use of step-off pads is not consistent throughout the station.
- b. Postings are frequently not removed when conditions have changed and they are no longer required.
- c. Some postings do not adequately inform personnel of radiological hazards.

Recommendation

Develop and enforce improved methods to ensure that step-off pads are controlled and used consistently. Health physics technicians and supervisors should regularly inspect all posted plant and yard areas to ensure that radiological postings provide current information and adequate instructions for access. The condition of step-off pads and other access point materials should be checked routinely. Problems noted should be promptly corrected.

Response

The recommended improvements will be implemented. Action is currently in progress.

Finding
(RP.1-2)

Personnel contaminations and radiological incidents are not documented and analyzed in a manner that ensures identification and correction of basic causes. Although a reporting system exists, it is not often utilized.

Recommendation

Revise the current radiological incident reporting system to simplify reporting. Ensure that radiological incidents and personnel contaminations are regularly reported and analyzed to identify needed corrective actions. All personnel should be informed of the appropriate reporting threshold levels established by supervision.

Response

The recommended improvements will be implemented. Action is currently in progress.

Finding (RP.1-3)	Lighting and housekeeping conditions in some radiologically controlled areas need to be improved to reduce radiological and industrial safety hazards. Areas of concern include the drywell, radwaste truck lock, reactor building corner rooms, and radwaste equipment rooms.
Recommendation	Restore lighting in the affected areas. Complete current plans to repair drywell lighting during the next refueling outage. Continue with current plans to clean up these areas.
Response	The recommended improvements will be implemented. Action is currently in progress.

Finding (RP.1-4)	<p>Personnel often do not adhere to prescribed radiological procedures. Examples of practices that need improvement include the following:</p> <ul style="list-style-type: none"> a. Frisking is often ineffective; contamination detected during frisking is sometimes not removed. b. Adherence to requirements of radiological area postings is sometimes inadequate. c. Radiation Work Permit instructions are sometimes not followed. d. Protective clothing used by personnel for work in contaminated areas is sometimes inadequate.
Recommendation	Improve general employee training to ensure that routine radiological control practices are adequately covered. Emphasize the importance of following procedures and posted instructions. Strengthen the role of supervisors in monitoring and correcting improper radiological control practices.
Response	The recommended improvements will be implemented. Action is currently in progress.

EXTERNAL RADIATION EXPOSURE

PERFORMANCE OBJECTIVE: External radiation exposure controls should minimize personnel radiation exposure.

Finding
(RP.4-1)

Radiation exposure reduction measures are needed for handling and processing radioactive waste. A number of potential improvements to reduce exposure associated with waste handling operations involving resin and sludge have been identified, but not implemented.

Recommendation

Analyze current radioactive waste handling methods and implement improvements that have a potential for reducing dose to personnel.

Response

The recommended improvements will be implemented. Action is currently in progress.

Finding
(RP.4-2)

Radiation exposures for routine plant work are not effectively being minimized. Radiation exposure estimates and goals are not utilized for jobs where they would be appropriate. Pre-planning to reduce exposure by methods such as postings, shielding, and minimizing worker stay times is sometimes not performed or carried out effectively. Recent reassignment of ALARA duties appears to be a contributing factor to the lack of defined responsibilities in this area.

Recommendation

Implement a structured program to ensure routine use of effective exposure reduction measures for plant maintenance and operations activities. Provide radiological engineering support for this effort as necessary.

Response

The recommended improvements will be implemented. Action is currently in progress.

Finding (RP.4-3)	Radiation survey instruments are sometimes not available for use when needed. A number of instruments need repair, but repairs are not effectively pursued. Location of available instruments is often not known.
Recommendation	Repair or replace defective radiation survey instruments to ensure that adequate numbers and types are available for required surveys. If needed, develop a means of accountability for instruments.
Response	The recommended improvements will be implemented. Action is currently in progress.

INTERNAL RADIATION EXPOSURE

PERFORMANCE OBJECTIVE: Internal radiation exposure controls should minimize internal exposures.

Finding (RP.5-1)	Whole-body counting equipment is sometimes not operated in a manner that ensures uptake of radioactive material will be detected and accurately measured. The following are examples: <ul style="list-style-type: none">a. Thyroid detectors are not being used.b. Some technicians lack proficiency in equipment operation and do not use plant procedures.c. Data indicates that methods for conducting source checks need improvement.
Recommendation	Resume use of thyroid counters. Ensure that technicians who perform whole-body counts are proficient on the equipment and that procedures are used when needed. Investigate and implement appropriate changes to improve the accuracy of source checks.
Response	The thyroid detectors for both whole-body counters were out for repair during the INPO evaluation. Since that time, the thyroid detector for the primary whole-body counter has been repaired and placed in service. The thyroid detector for the backup whole-body counter will be placed in service following receipt and installation of ordered equipment. Additional training will be performed as necessary for those health physics technicians who perform whole-body counts. Prior to the INPO evaluation, a purchase order was issued for a new whole-body counting phantom and calibration sources. This new equipment will improve the method for performing calibrations and source checks.

PERSONNEL DOSIMETRY

PERFORMANCE OBJECTIVE: The personnel dosimetry program should ensure that radiation exposures are accurately determined and recorded.

Finding (RP.8-1) Natural background radiation exposure is not subtracted from all thermoluminescent dosimeter (TLD) readings. As a result, the plant may be reporting higher occupational radiation exposures than are actually being received.

Recommendation Subtract the background exposure dose when determining the occupational dose received at the station.

Response The procedures for TLD readout will be reviewed to determine if natural background exposure to personnel TLD badges is significant and, if so, can be subtracted from personnel badge readings.

Finding (RP.8-2) Extremity dosimeters are not used during radwaste processing activities where there appears to be a significant potential for personnel to receive extremity doses.

Recommendation Ensure adherence to existing plant requirements for wearing extremity dosimeters.

Response The recommended improvements will be implemented. Action is currently in progress.

RADIOACTIVE CONTAMINATION CONTROL

PERFORMANCE OBJECTIVE: Radioactive contamination controls should minimize the contamination of areas, equipment, and personnel.

Finding (RP.9-1) Frisking facilities need improvement. Examples are as follows:

- a. Some friskers are inoperative or overdue for calibration. They are checked only weekly for proper operation.
- b. No frisker is available at the exit from the augmented offgas (AOG) building.

- c. Friskers near the drywell access are located in a high background area. Workers rely on these instruments for whole-body frisking. They routinely don street clothing before exiting the reactor building and frisking in low background areas.

Recommendation Check friskers for operability more frequently. Provide an effectively shielded frisking area reasonably close to the drywell entrance. Provide friskers at the AOG building exit.

Response During plant tours, the calibration and operability of friskers will be verified. Current plans are to relocate the drywell frisking booth to a lower background area. During plant operation, frisking in the AOG building is precluded due to high background. However, double sets of protective clothing are worn when inside the building, and the outer set is removed prior to leaving the building. During non-operating periods with planned work in the AOG building, a frisker will be present at the building exit.

Finding
(RP.9-2) There are many contaminated areas in the plant where use of full protective clothing and respiratory protection are required for routine activities such as periodic inspection. Extensive clean-up of contaminated areas is evident since the last refueling outage, but continued strong emphasis is needed to ensure progress continues now that the clean-up work force has been reduced in size.

Recommendation Continue clean-up efforts to the point that routine access to plant equipment and systems is not substantially impeded by requirements to wear extensive protective clothing and respiratory protection.

Response The recommended improvements will be implemented. Action is currently in progress.

CHEMISTRY

CHEMISTRY ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The organization and administrative systems should ensure effective implementation and control of the chemistry program.

Finding (CY.1-1)	Additional personnel may be needed in the chemistry department to support and implement a comprehensive chemistry program.
Recommendation	Evaluate the projected workload of the plant chemistry organization to determine if additional supervisory and technical personnel or reassignment of responsibilities are needed.
Response	The recommendation will be implemented. Action is currently in progress.

Finding (CY.1-2)	The chemistry department does not have adequate storage facilities. The chemistry laboratory contains such items as unused equipment, repair parts, design change components, calibration standards, and radioactive samples.
Recommendation	Provide storage facilities to support chemistry department needs.
Response	The recommendation will be implemented. Action is currently in progress.

Finding (CY.1-3)	The environmental controls in the chemistry and health physics counting rooms are inadequate. Calibration and operation of sensitive counting room equipment is adversely affected by high ambient temperatures.
Recommendation	Evaluate and correct the environmental control problems in the counting rooms.
Response	The recommendation will be implemented. The required Engineering Support Request has been submitted.

Finding
(CY.1-4) **Housekeeping in the chemistry facilities needs improvement.**
Accuracy and sensitivity of laboratory analyses could be affected.

Recommendation Increase supervisory attention to good housekeeping practices.

Response This recommendation has been implemented.

Finding
(CY.1-5) **Chemistry sampling procedures are needed to ensure safe and proper sampling of plant systems and tanks.** Presently, samples are being collected without formal procedural guidance.

Recommendation Complete planned development and implementation of chemistry sampling procedures.

Response The recommended action will be completed. Action is currently in progress.

Finding
(CY.1-6) **Chemistry data are not routinely trended or evaluated by the plant staff to aid in correcting or identifying out-of-specification conditions, problems with plant systems, and analytical problems.**

a. Oxygen concentrations in the condensate and feedwater are increasing. The day-to-day data points are scattered, indicating a potential analytical problem.

b. Boron concentration in the reactor water is increasing.

Recommendation Initiate a formal program for trending of plant chemistry data. Include comparison with applicable limits or expected ranges for each parameter. Trends should be reviewed routinely for potential problems.

Response The recommended improvements will be implemented. Action is currently in progress.

CHEMISTRY PERSONNEL QUALIFICATION

PERFORMANCE OBJECTIVE: The chemistry qualification program should ensure that chemistry personnel have the knowledge and practical abilities necessary to implement chemistry practices effectively.

**Finding
(CY.2-1)**

The present method of training and qualifying chemistry personnel does not ensure adequate knowledge in the following areas:

- a. vendor specifications applicable to plant systems
- b. technical specifications
- c. plant procedures
- d. abnormal operations
- e. analytical theory
- f. theory and operation of counting equipment (including computer-based equipment)
- g. data interpretation and evaluation
- h. chemistry quality control and preventive maintenance
- i. laboratory safety

Recommendation

Develop and implement a training program for chemistry personnel that provides a working knowledge of the above areas. This program should contain documented exercises and written examinations that demonstrate knowledge of the above areas.

Response

A training program will be implemented to ensure identified needs are adequately addressed.

**Finding
(CY.2-2)**

A chemistry retraining program has not been formalized or implemented for chemistry personnel. Retraining in the following areas should be included:

- a. basic technical materials
- b. plant equipment changes
- c. use of laboratory equipment
- d. procedural changes

- e. pertinent industry operating experiences
- f. weaknesses in the plant chemistry program

Recommendation Implement a chemistry retraining program that covers, as a minimum, the above areas.

Response The training department will expand the initial training program to provide for the recommended retraining.

CHEMISTRY CONTROL

PERFORMANCE OBJECTIVE: Chemistry controls should ensure optimum chemistry conditions during all phases of plant operation.

Finding (CY.3-1) Routine analysis for proper chemical concentrations of acids and caustics is not performed during the following:

- a. receipt inspections of bulk acids and caustics.
- b. long-term storage in plant acid and caustic tanks
- c. resin regeneration of the make-up water system

Recommendation Implement a chemical analysis program for determining and maintaining the proper concentrations of acids and caustics under the above noted conditions.

Response The recommended action will be completed.

Finding (CY.3-2) Chemical parameters in some plant systems are permitted to remain outside limits recommended by plant procedures for extended periods of time. Examples of systems and parameters involved include the following:

- a. plant heating boiler (nitrite)
- b. turbine building closed cooling system (nitrite)
- c. reactor water (silica)
- d. demineralized water (silica)

Recommendation Identify and correct out-of-specification chemistry conditions in a timely manner.

Response The recommended improvement will be implemented. Action is currently in progress.

Finding (CY.3-3) Improvements are needed in monitoring the performance of demineralizers in removing impurities from the flow stream. In some cases demineralizer performance degradation will only be detected by analysis of tanks that receive water from the demineralizer.

Recommendation Implement an improved program to periodically monitor and evaluate plant demineralizer performance.

Response The recommendation will be implemented. Action is currently in progress.

LABORATORY ACTIVITIES

PERFORMANCE OBJECTIVE: Laboratory and counting room activities should ensure accurate measuring and reporting of chemistry parameters.

Finding (CY.4-1) The chemistry quality control program needs to be improved to ensure that analyses are performed accurately.

Recommendation Develop and implement a chemistry quality control program that ensures analyses are performed with the required degree of accuracy. The following areas should be addressed:

- a. increased use of split samples with concentrations comparable to normal plant samples
- b. use of spiked samples to test the performance of analysts
- c. use of standards in conjunction with sample analyses
- d. shelf life control of reagents, standards, and chemicals
- e. trending of key quality control data and evaluation of quality control activities

Response BECO agrees that the chemistry quality control program needs to be improved. Possible improvement actions are being evaluated. The recommendations listed above will be addressed in the improved program.

Finding (CY.4-2) A program for preventive maintenance on chemistry laboratory and on-line equipment is needed. Preventive maintenance specified in individual instrument technical manuals is not consistently performed.

Recommendation Develop and implement a preventive maintenance program for chemistry laboratory and on-line instrumentation.

Response All chemistry equipment will be evaluated to determine applicability and possible extent of preventive maintenance. Appropriate preventive maintenance will be established.

Finding (CY.4-3) Some samples are collected and analyzed without assurance that the sample is representative of the contents of the system. Examples where non-representative samples are suspected include the standby liquid control tank, waste neutralizing tank, and condenser tail pipe pits.

Recommendation Incorporate proven sampling techniques into the plant sampling procedures to ensure representative sampling of the contents of systems.

Response The recommendation will be implemented. Action is currently in progress.

Finding (CY.4-4) Analytical methods for determining chemical concentrations in plant systems should be examined and improved. Problem areas noted during the evaluation include the following:

- a. Methods of accounting for impurities in laboratory water used for preparing standards, reagents, and samples are not in place.

- b. Standards are not used to develop a working curve for the silica analysis.
- c. Laboratory and on-line conductivity meters are not routinely calibrated.
- d. Calibration checks are not routinely performed on laboratory balances and pipettes used to prepare reagents, samples, and standards.
- e. The method used for chloride analysis does not have the needed accuracy and precision.
- f. The pH meters are routinely calibrated using only one buffer.
- g. Gamma ray peaks with a data unreliability of greater than 60 percent are discarded without proper evaluation as to the validity of the peak.
- h. The method used for silica analyses does not have the sensitivity to measure the 10-ppb procedural limit for demineralized water.

Recommendation Evaluate analytical methods currently used for sensitivity, accuracy, precision, calibration, interferences, contaminants, and good laboratory practices. Upgrade or replace the present analytical methods as appropriate.

Response The recommended improvements will be implemented. Action is currently in progress.

Finding (CY.4-5) **The waste collection tank and waste sample tanks are not sampled and analyzed for organics.** In addition, controls are needed to ensure that oil is not pumped from turbine building sumps to the hotwell.

Recommendation Implement controls, including appropriate analyses, to prevent organic intrusions into the condensate, feedwater, and reactor water systems.

Response The major source of oil leaks into the turbine building sumps has been eliminated. Only small amounts of oil are now present in the sumps. BECO is evaluating available analytical equipment and methods to prevent organic intrusions and will implement controls as recommended.

CHEMICAL AND LABORATORY SAFETY

PERFORMANCE OBJECTIVE: Work practices associated with chemistry activities should ensure the safety of personnel.

Finding (CY.5-1)	Some relief valves have been removed from the condensate and feedwater sampling system. This could result in full system pressure at the point of sampling.
Recommendation	Perform a safety evaluation on removal of relief valves from the condensate and feedwater sampling system, and take appropriate action to reinstall the relief valves or approve a design change.
Response	The recommended action will be completed.

APPENDIX I

Summary of Outstanding Response Action from Previous Evaluation (1981)

ENGINEERING SUPPORT

(INPO Procedure TS-702, Revision 2)

1. **Finding** (Reference Criterion A)

A plant performance improvement program has not been developed to take advantage of the performance data currently being collected and monitored by the Shift Technical Advisors (STA).

Recommendation

Develop a plant performance program. The program should include modeling, data analysis, mechanisms for improving efficiency and reliability, and responsibility assignments.

Response

We concur with the need for a more effective plant performance improvement program. With STA training scheduled to be completed in July and the addition of two Performance Engineers by January 1, 1982, this function will be re-emphasized and expanded to include the above.

Status

One performance engineer position has been filled. Vacancies still exist for one performance engineer and one performance technician. It is estimated these positions will be filled by June 1983. The performance monitoring effort has been expanded. A formal program is expected to be in place by December 1983.

3. **Finding** (Reference Criterion D)

The facilities available for document control are not adequate to support the necessary and expected effort.

Recommendation

Review the long-term needs of the on-site Information Resources Management Group and provide additional work and storage space as required. Provide appropriate areas for use and protection of controlled drawing sets throughout the plant, especially in the I&C Shop area adjacent to the control room.

Response

The planned administration building expansion addresses some of this issue. Appropriate areas for use and protection of controlled drawings in the I&C shop area will be provided by January 1, 1982.

Status

Site preparation has started for the new administration building. The building will be completed and adequate facilities provided for document control by September 1983. Improvements for the use and protection of controlled drawings have been completed.

NON-LICENSED OPERATOR TRAINING
(INPO Procedure TQ-242, Revision 2)

2. Finding (Reference Criterion C)

The training program for Nuclear Auxiliary Operators is not fully implemented.

Recommendation

Implement a structured training program that includes appropriate fundamentals and system checkouts for Nuclear Auxiliary Operators.

NOTE: INPO guidelines referenced above address the development of this program.

Response

Boston Edison agrees and a course outline has been developed and materials are being prepared to implement the program. This program is scheduled to commence July 1, 1981.

Status

A program outline has been developed and approved. The program has not yet been conducted, and lesson plans have not yet been prepared to support presentation of the program. It is expected that the first class will be presented in the first quarter of 1983.

LICENSED OPERATOR TRAINING
(INPO Procedure TQ-243, Revision 2)

Finding (Reference Criterion I)

A program of technical, supervisory, and administrative training to address the increased responsibilities of senior reactor operators has not been developed.

Recommendation

Develop and implement a training program for senior reactor operators that addresses their increased duties and responsibilities.

NOTE: "INPO Guidelines For Qualification Programs at Operational Units for Nuclear Power Plant Licensed Operators" (Document Number GPG-03) could provide a basis for this program.

Response

Boston Edison agrees with the recommendation and the program will be developed and should commence during the next requalification training cycle.

Status

The program has not been developed. It is scheduled for development and implementation in the first quarter of 1983.

MAINTENANCE PROCEDURES

(INPO Procedure MA-403, Revision 2)

Finding (Reference Criterion A)

Vendor instruction manuals used extensively for control of work on safety-related and important non-safety-related equipment are not formally reviewed and approved.

Recommendation

Prior to use in safety-related or important non-safety-related work, vendor instruction manuals should be reviewed and approved in a manner equivalent to that provided for plant procedures. This review should consider applicability of the manual to the work to be performed, accuracy and suitability for controlling work, and established quality check points.

Response

The Integrated Work Control System, utilizing the Erection Control Sheet concept, will implement the above recommendations by requiring an Operations Review Committee review of processes required by vendor manuals not previously reviewed. These reviews will be required by September 1, 1982.

Status

The task was of a greater scope than expected. A revised implementation plan is currently under development.

MAINTENANCE HISTORY

(INPO Procedure MA-405, Revision 2)

Finding (Reference Criterion D)

Mechanical, electrical and I & C maintenance history records are maintained but are not reviewed on a systematic basis. Equipment failures and "as found" out-of-specification instrumentation are not routinely evaluated. The potential necessity for more frequent preventive maintenance or calibration is not being recognized.

Recommendation

A program should be instituted for the systematic review of maintenance history records. Reviews should be used to identify equipment performance trends, adjust preventive maintenance frequency, and improve equipment reliability.

Response

This recommendation has been incorporated as a requirement of the Preventive Maintenance Program.

Status

The new PM program is still incomplete. A new work request system that will include equipment identification and history for trending and tracking is planned. It is scheduled for implementation by June 1983.

MAINTENANCE FACILITIES AND EQUIPMENT
(INFO Procedure MA-408, Revision 1)

3. Finding (Reference Criterion C)

I & C office and work areas do not adequately conform to the needs of the organization. Normal access to the control room through the I & C shop disrupts work and may be a safety hazard for technicians due to crowded conditions. Office space for the I & C supervisor is inadequate and hinders effective work.

Recommendation

An alternate means of access to the control room should be established and utilized to prevent disruption of activities in the I & C shop. Arrangement of the shop should also be reviewed and adjusted to provide suitable office space and areas for storing and using prints.

Response

The planned administrative building expansion should vacate offices in the plant and allow for relocation of some of the facility. In the meantime, a temporary trailer facility has been established.

Status

The planned administrative building is presently under construction. Its completion is tentatively scheduled for late 1983.

ALARA PROGRAM

(INFO Procedure RC-502, Revision 1)

Finding (Reference Criterion D)

The ALARA program does not include a system for establishing specific exposure goals for major tasks or a method for tracking exposure accumulation on such tasks to monitor progress against the goals.

Recommendation

Expand the existing ALARA program to include a system for establishing exposure goals and monitoring exposure during major tasks. The exposure goals and tracking system should also include provisions for evaluation and corrective action, when necessary, for exposure accumulation in excess of the goals.

Response

This aspect of the ALARA program is being developed and will be implemented during the 1981 refueling outage.

Status

Plans have been made to acquire the software necessary to track accumulated task exposures. Implementation is expected by the end of 1983. Presently there is no formal ALARA program, nor are exposure goals for plant jobs being utilized. However, BECO now requires supervisors to consider ALARA factors in planning and executing work involving radiation exposure. Supervisors will be rated on their performance in this area.

APPENDIX II

Performance Objectives Reviewed

ORGANIZATION AND ADMINISTRATION

OA.1 Station Organization and Administration

Station organization and administrative systems should ensure effective implementation and control of station activities.

OA.2 Mission, Goals, and Objectives

Station mission, goals, and objectives should be established and progress monitored through a formal program.

OA.3.1 Management Assessment

Management should assess and monitor station activities to ensure effective performance of all aspects of nuclear plant operation.

OA.3.2 Quality Programs

Quality programs should ensure the effective performance of activities important to nuclear safety.

OA.4 Personnel Planning and Qualification

Personnel programs should ensure that station positions are filled by individuals with proper job qualifications.

OA.5 Industrial Safety

Station industrial safety programs should achieve a high degree of personnel safety.

OA.6 Document Control

Document control systems should provide correct, readily accessible information to support station requirements.

OA.7 On-site Nuclear Safety Review Committee

Review of station nuclear activities by a knowledgeable interdisciplinary group should ensure achievement of a high degree of nuclear safety.

OPERATIONS

OP.1 Operations Organization and Administration

The operations organization and administrative systems should ensure effective control and implementation of department activities.

OP.2 Conduct of Operations

Operational activities should be conducted in a manner that achieves safe and reliable plant operation.

OP.3 Plant Status Controls

Operational personnel should be cognizant of the status of plant systems and equipment under their control, and should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

OP.4 Operations Knowledge and Performance

Operator knowledge and performance should support safe and reliable plant operation.

OP.5 Operations Procedures and Documentation

Operational procedures and documents should provide appropriate direction and should be effectively used to support safe operation of the plant.

OP.6 Operations Facilities and Equipment

Operational facilities and equipment should effectively support plant operation.

MAINTENANCE

MA.1 Maintenance Organization and Administration

The maintenance organization and administrative systems should ensure effective control and implementation of department activities.

MA.2 Plant Material Condition

The material condition of the plant should be maintained to support safe and reliable plant operation.

MA.3 Work Control System

The control of work should ensure that identified maintenance actions are properly completed in a safe, timely, and efficient manner.

MA.4 Conduct of Maintenance

Maintenance should be conducted in a manner that ensures efficient and effective plant operation.

MA.5 Preventive Maintenance

The preventive maintenance programs should contribute to optimum performance and reliability of plant equipment.

MA.6 Maintenance Procedures and Documentation

Maintenance procedures should provide appropriate directions for work and should be used to ensure that maintenance is performed safely and efficiently.

MA.7 Maintenance History

The maintenance history should be used to support maintenance activities and optimize equipment performance.

MA.8 Maintenance Facilities and Equipment

Facilities and equipment should effectively support the performance of maintenance activities.

TECHNICAL SUPPORT

TS.1 Technical Support Organization and Administration

The technical support organization and administrative systems should ensure effective control and implementation of department activities.

TS.2 Surveillance Testing Program

Surveillance inspection and testing activities should provide assurance that equipment important to safe and reliable plant operation will perform within required limits.

TS.3 Operations Experience Review Program

Industrywide and in-house operating experiences should be evaluated and appropriate actions undertaken to improve plant safety and reliability.

TS.4 Plant Modifications

Plant modification programs should ensure proper review, control, implementation, and completion of plant design changes in a safe and timely manner.

TS.5 Reactor Engineering

On-site reactor engineering activities should ensure optimum nuclear reactor operation without compromising design or safety limits.

TS.6 Plant Efficiency and Reliability Monitoring

Performance monitoring activities should optimize plant thermal performance and reliability.

TS.7 Technical Support Procedures and Documentation

Technical support procedures and documents should provide appropriate direction and should be effectively used to support safe operation of the plant.

TRAINING AND QUALIFICATION

TQ.1 Training Organization and Administration

The training organization and administrative systems should ensure effective control and implementation of training activities.

TQ.2 Non-Licensed Operator Training and Qualification

The non-licensed operator training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

TQ.3 Licensed Operator Training and Qualification

The licensed operator training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

TQ.4 Shift Technical Advisor Training and Qualification

The shift technical advisor training program should develop and improve the knowledge and skills to perform assigned job functions.

TQ.5 Maintenance Personnel Training and Qualification

The maintenance personnel training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

TQ.6 Technical Training for Managers and Engineers

The technical training program for engineers and managers should broaden overall knowledge of plant processes and equipment as a supplement to position-specific education and training.

TQ.7 General Employee Training

The general employee training program should develop a broad understanding of employee responsibilities and safe work practices.

TQ.8 Training Facilities and Equipment

The training facilities, equipment, and materials should effectively support training activities.

RADIOLOGICAL PROTECTION

RP.1 Radiological Protection Organization and Administration

The organization and administrative systems should ensure effective control and implementation of the radiological protection program.

RP.2 Radiological Protection Personnel Qualification

The radiological protection qualification program should ensure that radiological protection personnel have the knowledge and practical abilities necessary to effectively implement radiological protection practices.

RP.3 General Employee Training In Radiological Protection

General employee training should ensure that plant personnel, contractors, and visitors have the knowledge and practical abilities necessary to effectively implement radiological protection practices associated with their work.

RP.4 External Radiation Exposure

External radiation exposure controls should minimize personnel radiation exposure.

RP.5 Internal Radiation Exposure

Internal radiation exposure controls should minimize internal exposures.

RP.6 Radioactive Effluents

Radioactive effluent controls should minimize radioactive materials released to the environment.

RP.7 Solid Radioactive Waste

Solid radioactive waste controls should minimize the volume of radioactive waste and ensure safe transportation of radioactive material.

RP.8 Personnel Dosimetry

The personnel dosimetry program should ensure that radiation exposures are accurately determined and recorded.

RP.9 Radioactive Contamination Control

Radioactive contamination controls should minimize the contamination of areas, equipment, and personnel.

CHEMISTRY

CY.1 Chemistry Organization and Administration

The organization and administrative systems should ensure effective implementation and control of the chemistry program.

CY.2 Chemistry Personnel Qualification

The chemistry qualification program should ensure that chemistry personnel have the knowledge and practical abilities necessary to implement chemistry practices effectively.

CY.3 Chemistry Control

Chemistry controls should ensure optimum chemistry conditions during all phases of plant operation.

CY.4 Laboratory Activities

Laboratory and counting room activities should ensure accurate measuring and reporting of chemistry parameters.

CY.5 Chemical and Laboratory Safety

Work practices associated with chemistry activities should ensure the safety of personnel.