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RELATED CORRESPONDENCE

NEWMAN & HOLTZINGER, P.C.

1615 L STREET, N.W.

WASHINGTON, D.C. 20036

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April 6, 1988

Peter B. Bloch, Esquire
Chairman
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Dr. Walter H. Jordan
881 West Outer Drive
Oak Ridge, Tennessee 37830

Dr. Kenneth A. McCollom
Administrative Judge
1107 West Knapp
Stillwater, Oklahoma 74075

Elizabeth B. Johnson
Oak Ridge National Laboratory
P.O. Box X Building 3500
Oak Ridge, Tennessee 37830

Re: Texas Utilities Electric Company, et. al
Docket No. 50-445-CPA

Dear Administrative Judges:

I am sending along for your information and general background recently-issued INPO Reports dealing with operational aspects of the CPSES and TU Electric's responses with respect to these activities. These materials are not submitted as evidence but are for the Board's information.

Respectfully submitted,

George L. Edgar /ms

George L. Edgar

Enclosures

cc: Service List

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Erle Nye
Chairman of the Board
and Chief Executive

March 14, 1988

Mr. Zack T. Pate
President
Institute of Nuclear
Power Operations
1100 Circle 75 Parkway
Suite 1500
Atlanta, Georgia 30339

Dear Mr. Pate:

Enclosed are responses to the recommendations which were developed during INPO's corporate assistance visit which was conducted between November 30 and December 4, 1987 and INPO's preoperational review and assistance visit to our Comanche Peak Steam Electric Station (CPSES) during the weeks of November 9 and 16, 1987. As requested in your letters of January 12 and 21, 1988, the enclosed responses address each recommendation, as well as the Summary section of each report.

We appreciate the extensive effort devoted by INPO to these visits and the comprehensive and incisive observations in each report.

We have addressed each INPO recommendation to the best of our ability, taking into account the current status of CPSES. In this connection, INPO's preoperational review and assistance report notes that "Unit 1 is nearing completion and is scheduled for heatup in June 1988". Our current schedule review indicates that completion of Unit 1 will be at a later date and that neither plant heatup nor fuel load will take place within the time frame that the INPO reviewers may have had in mind in developing their recommendations. Thus, many of the activities reviewed by INPO were in initial stages of preparation, and development will continue during the months that lie ahead before operations can commence. We believe that this perspective should be helpful in evaluating the actions that we have taken and have underway in response to INPO's recommendations.

We are acutely aware that preparation for operations is a lengthy and complex process which must be carried out in a proper and timely fashion. We purposely sought out INPO's advice well in advance of operations and your recommendations will help us to give appropriate priorities to actions necessary to achieve high standards of excellence in time for plant operations.

I believe that you will find an aggressive program is being implemented to prepare Comanche Peak for operation. Your assistance in assuring that our program is proceeding in the right direction is appreciated. Part of our overall plan is to request a follow-on INPO visit a few months before anticipated fuel load to confirm the success of our efforts. It is my firm conviction that you will find a marked improvement at that time.

Finally, I can assure you on behalf of TU Electric management, that we fully subscribe to the view expressed in the INPO reports regarding the necessity for involvement by senior management in monitoring, assessing, and directing nuclear operations in order to achieve the highest standards of excellence in plant performance. INPO's reports are a timely reminder of all that this commitment entails.

Again, TU Electric is grateful for INPO's independent evaluation of our nuclear activities. I hope that you will call if you have any questions concerning the attached responses or require any further detail.

Sincerely,

EAN:kh

ATTACHMENT 1

Response to Recommendation [illegible]

INPO Letter, January 12, 1[illegible]

Subject: INPO Corporate Assistance Visit

TU Electric
March 14, 1988

Response To SUMMARY Recommendations

RECOMMENDATION TO STRENGTHEN PERFORMANCE IN THE FOLLOWING AREAS ARE CONSIDERED TO BE MOST IMPORTANT:

1. SENIOR MANAGEMENT MONITORING, ASSESSMENT, AND DIRECTION OF NUCLEAR OPERATIONS

Response to Item 1:

Senior management of TU Electric recognizes its responsibility for the safe and efficient operation of the Comanche Peak Steam Electric Station (CPSES), including the necessity for the close involvement of senior management in the monitoring, assessment, and direction of nuclear operations.

The recognition of the need for the involvement of senior management in day-to-day activities at CPSES is reflected in a number of ways. For example, the Vice Presidents for Nuclear Operations and for Engineering and Construction are stationed at CPSES: the Executive Vice President, Nuclear Engineering and Operations (NEO) spends about three days a week at CPSES; the Vice Presidents for Nuclear Engineering and Administration spend two to three days a week at CPSES; the President of the Generating Division and the Chairman and CEO of TU Electric each devote a significant portion of their time to CPSES; and the Board of Di ctors has established a five-person nuclear committee, made up of mem. s of the Board, to monitor activities at CPSES. In addition to form reports to management, meetings on specific subjects and daily comm ications, two corporate-level meetings are held weekly to discuss important CPSES activities and to consider significant issues. One meeting involves the Chairman and CEO, the President of the Generating Division, the Executive Vice President, NEO, corporate officers of TU Electric with responsibilities beyond CPSES, and, as appropriate, corporate officers within NEO. The other meeting involves the President of the Generating Division, the Executive Vice President, NEO, and the corporate NEO officers. These mechanisms help to assure senior management input at the appropriate level in decision making and in providing direction to lower-tier management.

We recognize, however, that at the time of the INPO visit, completion of design and construction of CPSES and regulatory activities relating to licensing were the principal focus of senior management involvement in CPSES activities, and that similar emphasis was not placed on preparedness for operations. It is apparent that we need to do more in this area, and the INPO recommendations served as a timely reminder. As described in the body of this response, and in the response to INPO's report on its related preoperational review and assistance visit to CPSES, we have completed or have underway numerous specific actions to enhance our preparedness for operations. The actions that have or will be taken that relate directly to senior management involvement in nuclear operations include: 1) the preparation and issuance on

February 22, 1988 of an integrated Nuclear Operations Readiness for Operations Plan, that will be supplemented with periodic reports to management on its progress; 2) the upgrading of the NEO annual objectives, starting with 1988, to identify specific goals/objectives and to require quarterly progress reviews; and 3) the setting up of a plan for specific assignments to senior managers for the monitoring and evaluation of activities in maintenance, plant operation, training, and testing.

We believe that these actions, among others, will help focus senior management's attention on the areas considered most important in preparation for operation of CPSES and will enable us to fulfill effectively our commitment to close involvement in the monitoring, assessment and direction of nuclear operations.

2. COORDINATION OF EFFORTS BETWEEN NUCLEAR GROUPS, PARTICULARLY OPERATIONS AND ENGINEERING

Response to Item 2:

TU Electric recognizes the importance to define clearly the responsibilities of organizations and individuals relating to CPSES. At the NEO Group level, this is accomplished through an NEO procedure "Organization of the Nuclear Engineering and Operations Group." The responsibilities within each of the organizations at the NEO Function (Vice Presidents) level are identified in similar documents for each major organization. In general, individual responsibilities are described in position descriptions. These formal documents are reviewed regularly and revised as necessary in light of ongoing experience.

With respect to specific detailed matters relating to definition of responsibilities and coordination of activities, which are not amenable to resolution in formal procedures and position descriptions, informal interaction and discussions among NEO organizations have been a necessary and useful mechanism to resolve questions. In order to improve the effectiveness of this communication and coordination process, particularly at the director/manager level, formal periodic meetings between directors/senior managers in Nuclear Operations and Engineering and Construction were initiated in 1987. These meetings are now held bi-monthly to discuss and decide upon detailed divisions of responsibilities, to establish priorities, and to coordinate other efforts. Their recommendations, and in some cases, major differences, are then forwarded to senior NEO management for approval or resolution. While we believe that these meetings have served a useful purpose, the comment contained in the INPO report indicates that they can be made more effective. As a result, the chairman of the meetings has been directed to review the management of the meetings in order to assure that the group acts on topics brought before the meetings in a timely fashion and with due attention to priority items.

In addition, we believe that the organizational interface assessment described in response to INPO Recommendation (2.5B-2) and summarized in the next section will identify and resolve any remaining questions concerning division of responsibilities between Nuclear Operations and

Engineering. Similar, but separate, interface assessments are already underway in other areas. For example, a review of the interface between Corporate Health Physics and the Nuclear Operations Radiation Protection organization has been completed and recommendations forwarded to the Executive Vice President, NEO for review and approval. Interface assessments in the areas of Records Management, Configuration Management, and Results Engineering are now underway and additional assessments in other areas will be made on a case by case basis. The results of the efforts described above will help identify any remedial procedural or organizational changes necessary to improve coordination of NEO activities.

3. ENGINEERING SUPPORT OF OPERATION

Response to Item 3:

TU Electric management is well aware of the importance of strong engineering support for Nuclear Operations. Previous steps taken to assure such support have included locating the Engineering organization at Comanche Peak and increasing the size of the engineering staff.

As stated in the response to INPO Recommendation (2.5B-2), a review process has been initiated to perform an organizational interface assessment between Nuclear Operations and Engineering. The scope of this assessment includes a thorough review of the charters for various organizations in Nuclear Operations and Engineering, as well as procedures which govern their work scope. A matrix of organizational interfaces will be created and work flows will be charted. Formal and informal interface controls will be identified. Identification of conflicts, and unnecessary or inefficient work flow paths will be made and corrected by procedural or organizational changes. This review will be completed and appropriate corrective action taken by December 31, 1988.

We believe that these steps will further assure appropriate support of Nuclear Operations by Engineering.

Response to Specific Recommendations

MANAGEMENT INVOLVEMENT AND COMMITMENT

RECOMMENDATION (1.2A-1)

Strengthen senior management monitoring, assessment, and direction of Nuclear Operations. Strengthen communication of senior management performance expectations to those responsible for day-to-day activities and for program developments to support Nuclear Operations. The emphasis on completion of engineering and construction work needed to obtain a license appears to have distracted from appropriate attention to operations readiness. Consequently, sufficient emphasis has not been given to preparation for operation. The lack of credible schedule for completion of the engineering and construction effort has distracted unnecessarily from efforts needed to prepare for operation. This is most evident in the development of programs and procedures needed for operation and in the preparation of plant staff personnel for operation. Example of problems reflecting the need for more effective senior management involvement include the following:

a. The action plan for start-up has not been developed in sufficient detail to permit effective direction or monitoring progress. The lack of a credible schedule for construction completion has hampered efforts to develop a start-up schedule.

b. Some senior managers do not routinely tour the station to observe day-to-day work and monitor progress toward operational readiness. For example, senior managers have not been monitoring simulator training, an area where a number of problems exist.

c. Routine reports to management often do not provide clear indications of performance results in comparison with goals or standards.

d. The training manager has been given very little guidance from line managers on their training expectations or on the effectiveness of his efforts. In fact, training needs substantial improvement.

e. Responsibilities in some areas have not clearly been defined and communicated to working level personnel. Examples of this are as follows:

   1. Four different groups believe they are responsible for dose assessment activities.

2. The split of responsibility for engineering activities has not been settled. Agreement on assignment of responsibilities was reached between the engineering and station staffs and within the station staff, but senior management has not approved their recommendation or provided alternate direction.

3. Fitness-for-duty responsibilities have not been clearly established. Three different organizations feel responsibility for the program, but their efforts have not been coordinated.

f. Nuclear goals and objectives, and follow-up on completion, need improvement to adequately address efforts needed to prepare for operation.

g. Feedback to individuals on their performance needs to be strengthened. Formal performance appraisals are often not done, and alternative methods of feedback are not used. Some managers stated their intent is to provide feedback only when performance is not acceptable.

h. Feedback on performance and planning up the chain of command is sometimes not complete or candid, and managers are not taking appropriate actions to obtain good feedback. One example is the Vice President of Nuclear Operations' expectation that all of the managers reporting to him obtain SRO licenses by 1992. Some affected managers did not know of this expectation and others believe it is not achievable. That feedback has not been clearly provided to the Vice President, and an action plan has not been developed to achieve this goal.

A lack of operational experience at the plant makes clear management direction, guidance, and assessment of activities an even more vital function than at a station with more operational experience.

Response:

As described in the response to Item 1 in the Summary section, senior management of TU Electric recognizes the necessity for its close involvement in the monitoring, assessment and direction of Nuclear Operations, and a number of mechanisms are in existence to achieve this goal.

The body of this response and the response to INPO's report on its related preoperational review and assistance visit (Attachment 2) to CPSES detail numerous actions that have been taken by TU Electric to enhance its preparedness for operations. Although many of these actions, including those set forth in the specific responses below, will serve to strengthen senior management's monitoring, assessment and direction of Nuclear Operations, the following are particularly relevant to that goal:

1. The initial integrated Nuclear Operations Readiness for Operations Plan was issued on February 22, 1988. This plan identifies those issues which must be addressed prior to operation and establishes an action plan for their successful completion. Progress on meeting the objectives of this plan will be reviewed by management on a quarterly basis.

   Additional details on the content of the Nuclear Operations Readiness for Operations Plan are provided in the response to Item 1.a, from the Response to Summary Recommendations section of Attachment 2.

2. The Executive Vice President has reviewed and approved the Nuclear Operations 1988 Objectives, which address specific items, such as the reduction in the number of temporary modifications. Action plans will be prepared for these objectives (as appropriate) and progress will be reviewed by management on a quarterly basis.

3. A plan for specific assignments to senior managers for monitoring and evaluation of activities in maintenance, plant operations, training, and testing has been developed; the plan will be completely implemented by December 31, 1988.

Specific Response to Item a:

The need for a detailed start-up plan had been recognized earlier, but its development had been limited due mainly to the effect of managerial changes taking place in the Operations Department. We recognize that this task was not given sufficient priority in light of the efforts that were being devoted to completing engineering and construction work and the associated regulatory efforts related to plant licensing. However, we believe that we are now devoting the appropriate resources to this task. In that respect, an experienced contractor was brought in and tasked with the development of a comprehensive plan which has been incorporated into the integrated Nuclear Operations Readiness for Operations Plan.

Specific Response to Item b:

A plan for specific assignments to senior managers for monitoring and evaluation of activities in maintenance, plant operations, training, and testing has been developed; the plan will be completely implemented by December 31, 1988. As a specific point of emphasis, simulator training is being completely overhauled and upgraded. Part of this process provides for extensive management coverage, which has commenced. The Operations Manager and the Director, Nuclear Training are each monitoring at least one simulator session a week. These two managers then consult to determine what upgrades are required for performance standards, instructor improvement, and scenario content. Additional monitoring and observation of the simulator training will be conducted by the Vice President, Nuclear Operations, the Manager, Plant Operations, and members of the Plant Evaluation organization.

Specific Response to Item c:

Immediate steps have been taken to add appropriate performance goals and standards into the Nuclear Operations Monthly Report. Additional performance goals and standards will be developed and included in future reports. In addition, since the recommendation is pertinent to any summary report which may be used by management for assessing relative performance, managers have been alerted to incorporate this principle into other reports for which they are responsible.

Specific Response to Item d:

It is recognized that considerable effort is required in this area, with operator training being the most urgent. As described in Item b, above, the Operations Manager is working closely with the Director, Nuclear Training on the improvement of simulator training. Similarly, other managers are providing direct input to the Training Department for their training needs.

Specific Response to Item e.1:

"Dose assessment" is a term that applies to several activities, and depending upon the specific area of interest, there are indeed, different organizations responsible for that aspect of dose assessment. Source terms and fission product release rates from core damage are provided by Nuclear Engineering. Calculation of a set of predetermined design basis dose rates, resulting from an assumed operating or accident scenario, is the responsibility of the design engineers in Engineering and Construction. Ad hoc calculation of projected plume and site area boundary dose rates for emergency drills and accident situations is the responsibility of Radiation Protection. Finally, the Corporate Health Physics organization provides the support for all of these activities, as necessary, to ensure consistency and compliance with applicable state and federal requirements.

As observed by the INPO evaluator, three of the four "groups who believe they are responsible for dose assessment activities" had met the previous week (on November 12, 1987) to discuss the interfaces and responsibilities. This interaction and discussion between the persons involved provided confirmation that the roles were adequately understood and agreed upon. Such interactions and discussions are important mechanisms for assuring effective and coordinated actions in areas involving multiple organizations, particularly to resolve details that cannot usefully be included in procedures. Additional coordinating meetings will be held periodically to insure adequate communication between the groups. Minutes of the meetings will be kept to document agreements and future action assignments.

Specific Response to Item e.2:

The plan described in the response to Recommendation (2.5B-2) will resolve this issue.

Specific Response to Item e.3:

As stated in the response to the comment regarding dose assessment (Item e.1, above), it is true that the responsibility for various aspects of the fitness-for-duty program is divided among several organizations. However, overall responsibility rests with the Vice President, Nuclear Operations. Formulation of the details of the specific implementation of various aspects of the fitness for duty program is still in progress. A single individual has been assigned by the Vice President, Nuclear Operations to coordinate the development of the program. This work is in process. A draft NEO procedure, which delineates specific responsibilities, has been prepared and submitted for comment. It is anticipated that the full fitness for duty program will be implemented at the time of security lockdown in anticipation of fuel load. This has been established as a Nuclear Operations 1988 Objective.

Specific Response to Item f:

As described in the response to Item a above, specific action plans (goals and objectives) and follow-up to prepare for start-up were incorporated into the integrated Nuclear Operations Readiness for Operations Plan which was issued February 22, 1988. Additionally, all INPO recommendations detailed in the reports from both the corporate assistance visit and the preoperational review and assistance visit were assigned to members of NEO management. Development of appropriate action plans will be completed by March 31, 1988.

Specific Response to Item g:

It is recognized that formal written performance appraisals have not been emphasized within NEO, although the concept of annual performance reporting is endorsed in NEO Policy Statement No. 7, "Departmental Goals and Objectives". In conjunction with a 1988 TU Electric objective to establish a formal performance appraisal system that will be utilized throughout the company, senior NEO management will provide input and feedback for this system to assure that it will work effectively for NEO. In addition, the requirement for an annual performance review for all exempt employees was established as a 1988 NEO Objective. Also, NEO managers have been informed that the concept of "providing feedback only when performance is not acceptable" is not adequate for the good of either the employee or the company.

Specific Response to Item h:

Feedback on performance and planning will be accomplished, in part, by a quarterly review of the status of annual objectives and the associated action plan(s). This guidance was forwarded to the NEO Vice Presidents on February 20, 1988 in conjunction with the approval of their 1988 objectives.

In addition, NEO managers have been reminded of the need to provide clear and distinct direction, guidance, and feedback to their lower-tier managers.

RECOMMENDATION (1.2A-2)

Strengthen the goals and objectives program to help focus the efforts of the nuclear organization in preparing for commercial operation of the plant. The following problems were noted with the objectives that have been identified for 1987 and 1988:

a. The persons or the department responsible for accomplishment of specific nuclear operations objectives are not identified. Industry experience has shown the lack of clearly assigned responsibilities weakens accountability and timely completion of objectives. Most managers interviewed do not use the established goals and objectives as a management tool.

b. Action plans are not established to identify and schedule actions needed to accomplish several of the objectives and measure progress toward completion. For example, no action plan has been developed for the objective to complete all Unit 2 operating procedures necessary to support start-up. During the recent INPO plant assistance visit, problems were noted with alarm response procedures, abnormal procedures, and the lack of updated operational procedures. The progress being made in this area has not been adequate to support preparations for operation.

c. Some objectives are not being fully achieved. Follow-up is not adequate to identify problems in achieving objectives as noted during the recent INPO plant assistance visit. For example, weaknesses were noted in operator skills and knowledge, and instructor training and performance. These deficiencies indicate that the objective to maintain the training, qualification, and requalification programs to meet the requirements for fuel load and subsequent commercial operations is not being achieved. The current utility status indicates that the objective is being achieved.

Response:

The NEO goals and objectives program for 1988 incorporated goals/objectives directed at focusing the efforts of the nuclear organization in preparing for commercial operation of the plant. The Executive Vice President, NEO reviewed and approved these goals and objectives on February 20, 1988. In addition, specific Nuclear Operations action plans (goals/objectives) are contained in the integrated Nuclear Operations Readiness for Operations Plan which addresses actions necessary to prepare CPSES for commercial operation.

Specific Response to Item a:

The individuals or departments responsible for accomplishment of the 1988 Nuclear Operations Objectives were identified when the objectives were submitted to the Executive Vice President, NEO for approval. Their appropriate use of these goals and objectives as a management tool will be part of the scheduled quarterly review.

Specific Response to Item b:

As described in the response to Item (1.2A-1.a), the Nuclear Operations Readiness for Operations Plan was issued February 22, 1988. This plan includes the actions to be taken in order to develop, review, approve, and issue each procedure that is required to support the startup of Unit 1. The schedule for the development of Unit 2 procedures is under review.

In addition, in order to achieve timely implementation of the Nuclear Operations 1988 Objectives, the Vice President, Nuclear Operations directed his managers to develop action plans to address their approved 1988 departmental objectives.

Specific Response to Item c:

One of the Nuclear Operations Objectives for 1988 is to review the status of individual departmental objectives and action plans at the end of each quarter. This will provide a more frequent status update than had been done in the past, and will help assure that timely progress is being made.

The weaknesses noted in operator skills and knowledge and in instructor training and performance are being addressed in the overall improvements in the quality of training, as described in the response to INPO's preoperational review and assistance visit Recommendations (TQ.1-1) and (TQ.1-2). Programmatic improvements have already been made and the mechanisms for continuing review and feedback of training effectiveness will be in place by April 1, 1988.

RECOMMENDATION (1.2A-3)

Improve the content and format of periodic status reports provided to management to increase the usefulness of these reports in tracking performance, identifying problems, and monitoring the effectiveness of corrective actions. Examples of areas needing improvement are as follows:

a. Executive summaries in some reports are not effective in highlighting areas needing attention. For example, the executive summary of the Nuclear Operations Monthly Report does not provide a summary of the significant adverse trends as reflected in the performance indicator graphs that follow. Instead, the executive summary provides status of events.

b. The graphs contained in the Nuclear Operations Monthly Report do not depict acceptable levels of performance or performance goals, increasing the difficulty of determining whether actual performance as depicted is acceptable or indicative of a problem needing management attention. For example, the trend of temporary modifications as shown in the Nuclear Operations Monthly Report indicates the number of temporary modifications has been steady at approximately 700 over the last year. This graph does not provide information as to the acceptable or targeted number of temporary modifications or compare the actual number to the number expected during commercial operations, which was stated to be about 50. Providing acceptable or targeted levels of performance may provide a clearer picture to management of problems needing attention.

c. Guidance on the desired format and content of periodic reports has not been clearly provided to persons responsible for preparation of the report. Several managers interviewed stated that they recognized improvements could be made in the presentation of material in various reports, but that they had not yet communicated their desires or directions for the needed improvements.

Response:

While it is recognized that the periodic status reports could be improved, senior management believes that they provide management with meaningful information on a variety of currently important operations-related topics. As construction activities/priorities phase out and operations-related activities are increased, management reports on operational topics will be expanded and refined to reflect senior management's additional needs.

Specific Response to Item a:

We agree that the Nuclear Operations Monthly Report needs improvement to increase its usefulness to management. The report is still in the developmental stages and, as deficiencies are recognized, corrections will be made. Greater attention will be focused on upgrading the executive summary.

Specific Response to Item b:

As stated in the response to Item (1.2A-1.c), emphasis has been placed on providing performance goals and standards along with the data, so that managers may better interpret the results. Nuclear Operations has established a 1988 objective to reduce the number of temporary modification to less than 300 by August 1, 1988.

Specific Response to Item c:

Managers have been directed to review current periodic reports, to insure that personnel responsible for the preparation of those reports have guidance on format and content to the detail required and to include such guidance in their requests for future periodic reports.

MAINTENANCE

RECOMMENDATION (2.1A-1)

Strengthen corporate management monitoring and assessment of plant maintenance, and strengthen guidance and direction to correct the causes of maintenance problems. Some maintenance problems and adverse trends are reflected in the Nuclear Operations Monthly Report and in the plant assistance visit report. The Nuclear Operations Monthly Report contains detailed information, including trending information that indicates the following problems:

a. The number of control room instruments that are out of service is increasing.

b. The ratio of preventive maintenance actions to corrective maintenance is decreasing.

c. The percent of preventive maintenance items overdue is increasing.

d. The number of corrective maintenance work orders open for various reasons is well above the goals established.

In addition, the INPO plant assistance visit report indicates frequent delays in scheduled maintenance are caused by inadequate planning, work preparation, and coordination between various work groups. No indicators have been developed to reflect performance in these areas.

Recent efforts to reduce the backlog include identifying all work orders that need to be completed prior to heat-up so that resources can be focused on those requiring more immediate action. However, efforts to reduce the total number of backlogged work requests have not yet been effective.

Though corporate management was aware of the existence of maintenance problems, there was little corporate involvement in assessing the nature or causes of the problems or in developing solutions.

Response:

Corporate management involvement in the monitoring and assessment of the plant maintenance program, as well as in the guidance and direction to correct the causes of maintenance problems, will be strengthened through the following actions:

1. Corporate and plant management have recognized the need to improve the plant maintenance program and have specifically addressed improvements in this area, as shown in the Nuclear Operations 1988 Objectives and in the integrated Nuclear Operations Readiness for Operations Plan. These actions have clearly identified goals and objectives relating to maintenance. Periodic reviews by management will help to assure that timely actions are being taken, including actions on problems identified by INPO.

2. The Vice President, Nuclear Operations, through frequent discussions with the plant maintenance personnel and at weekly staff meetings, has been active in an attempt to improve the overall performance of maintenance. This effort will continue.

3. As noted in the response to Recommendation (1.2A-3), the Nuclear Operations Monthly Report will be improved through the inclusion of appropriate performance goals and standards, including those areas related to reporting on maintenance activities.

Additional Response:

Given the atypical status of operations at CPSES over the past three years, many of the items tracked in the Nuclear Operations Monthly Report are of little value at this time. Trends that would be of concern during operations, when evaluated in light of plant status and extent of construction work, are less significant.

For example, the large number of control room instruments out of service has been caused primarily by the replacement of all class 1E containment electrical penetrations. This is typical of an unusual trend at CPSES resulting from the validation of design and construction. The work of reterminating, testing and calibrating these instruments is a significant portion of the I&C backlog.

The undesirable number and age of preventive and corrective maintenance work orders has accrued largely as a function of the unusual conditions that have existed over the past two years. Nuclear Operations has established a 1988 Objective to reduce the total number of corrective maintenance work orders to less than 1800 by June 1, 1988. We expect that this emphasis will provide the needed impetus toward better management techniques in the maintenance area. Actions are also being taken to ensure that preventive maintenance will be within the criteria of the Technical Specifications by the time an operating license is received. This effort is outlined in the Nuclear Operations Readiness for Operations Plan, and will be tracked to completion in accordance with the Plan.

A Maintenance self-assessment, using the INPO guidelines, had also been completed shortly before the INPO plant assistance visit. It identified essentially the same maintenance problem areas as were identified by the INPO evaluators during the plant assistance visit. The corrective action plans being developed from the self-assessment will be incorporated into the Nuclear Operations Readiness for Operations Plan by March 31, 1988.

MATERIALS AND OUTSIDE SERVICES

RECOMMENDATION (2.2A-1)

Improve the process for determining procurement quality requirements for spare parts and other material. Specific recommendations are as follows:

a. Implement the action planned by the engineering procurement section to develop and maintain a comprehensive technical data base of spare parts and material quality requirements. Each purchase requisition for spare parts or material to be used at the station is routed through the Comanche Peak Engineering (CPE) procurement section for determination of procurement quality requirements. A backlog of 380 requisitions currently exists for CPE processing, of which 200 are identified as rush items. This level of backlog is currently resulting in a six to nine week delay in the procurement of material. Though current operation and maintenance needs are not being severely impacted by procurement delays, the process will need to be enhanced to ensure timely availability of spare parts and material for an operating unit.

b. Update the data base as new and relevant information is received from vendors. Procurement quality information is being accumulated in files for future reference, but no process now exists to update that data as new information becomes available. Instead, time consuming technical reviews are performed by CPE during each subsequent procurement to determine if there have been any vendor component changes since the last procurement. This causes unnecessary delays in obtaining needed material and spare parts.

Response:

To improve the process for determining procurement quality requirements for spare parts, a comprehensive plan will be developed and implemented to integrate the best features of existing programs (VETIP, VDI/VDC, Procurement Specification upgrade) and existing data bases (Q-List, EQML, Valve List, MMCP, etc.) into a clearly defined plant support operation. Requirements for this plan are as follows:

1. Identify design requirements for spare parts, e.g., shelf life, environmental qualification, QA requirements, dedication requirements, and tagging. Maintain the data base current by monitoring industry developments and by regularly updating design information.

2. Establish minimum inventory levels, identify and monitor procurement lead times, and maintain a stable of qualified or qualifiable spare parts sources.

3. Provide a rapid response procurement service.

To meet the requirements mentioned above, some additional actions will be taken. First, Engineering & Construction (E&C) will review and qualify or discard existing inventories of spare parts. Second, enhancements will be made to inventory control programs to keep a current spare parts inventory. E&C will maintain current knowledge of qualified suppliers and lead times. Third, E&C will streamline the current procurement process by use of pre-approved and pre-engineered procurement documents. These actions will be implemented by October 31, 1988.

DESIGN ENGINEERING

RECOMMENDATION (2.5B-1)

Finalize the vendor technical manual program to ensure the manuals effectively support operational needs of the plant. Specific recommendations are as follows:

a. Develop a plan of action for ensuring that design documents and plant procedures appropriately address vendor technical manual requirements. Contractor reviews of vendor technical manuals are currently being conducted to identify requirements contained within the manuals. To ensure these requirements are addressed in the operation of the plant, normal industry practice is to extract requirements from the manuals and include them in the appropriate station implementation documents. While there was recognition by responsible engineering and maintenance personnel that this must be done, neither a plan of action nor a schedule for this activity was identified.

b. Implement a process that ensures exceptions to vendor technical manual requirements are appropriately reviewed and approved. There are long-standing differences between the design engineering and the plant maintenance staffs regarding how exceptions to vendor technical manual requirements are to be controlled. The design engineering position has been that exceptions to vendor technical manual requirements should be processed through the design change authorizations program. Plant maintenance management feels the design change authorization program is too cumbersome and can result in time-consuming effort that is not responsive to the needs of the plant. While there is merit to each position, depending on the nature of the exceptions being considered, a procedure needs to be developed and implemented to ensure technical reviews are conducted and appropriate exceptions are approved in a timely manner when necessary.

Response:

At the time of the INPO assistance visit, an engineering review of vendor technical manuals was already in progress to identify design-related information to be controlled by Engineering. This plan will be continued to its scheduled completion of December 31, 1988.

Specific Response to Item a:

During the current review of vendor technical manuals, identification and extraction of design information will be accomplished for assignment to appropriate design documents, such as design basis documents, specifications, and drawings. Once incorporated, the design information will be controlled (and maintained consistent with current vendor information) by the existing design control procedures. The Engineering Department will review Operations procedures to ensure that appropriate references to design documents are included. These activities will be completed by December 31, 1988.

Specific Response to Item b:

When requests to change design requirements (including requests from Nuclear Operations' organizations) are submitted, these requests are processed via design change documents. This procedure is already in place and, we believe, establishes the appropriate controls required for design changes.

RECOMMENDATION (2.5B-2)

Improve support of Nuclear Operations by Comanche Peak Engineering to ensure that operations needs are appropriately addressed by the design group. Ensure plant needs are identified and addressed when developing design documents that are utilized by the plant. Consider rotating personnel between the plant and design technical staff to broaden the experience in both groups and promote better understanding of the needs of each group. Problems such as the following reflect a need for improved communication and mutual understanding between Nuclear Operations and Comanche Peak Engineering:

a. Design basis documents were produced at Comanche Peak Engineering's direction by the architect-engineer without input from plant personnel. Design engineers developing the documents had little appreciation for the potential use of these important documents by plant staff. The documents can be a valuable source of information on design limitations, system design operating modes, and other information needed by the operations staff in developing operating and maintenance procedures and directions for other activities. Portions of the documents that should have included this kind of information contained, instead, extracts of operating instructions, valve lineups and other detailed data already available to both design engineers and the plant staff.

b. Nuclear Engineering and Operations Procedure, NEO 3.03, "Preparation, Review, and Disposition of Plant Design Modifications (DMs)," does not provide for any reviews of planned design changes by the plant staff until completed design packages have been approved and issued by design engineering. Experience has shown that close coordination between design and operating staffs is needed, and that reviews of conceptual designs with the operating staff can be partially effective in ensuring that design changes are operationally acceptable.

c. Differences between the plant staff and design engineering on the need to add two startup transformers before plant startup have not been adequately addressed. The decision has been made to add the transformers, but the reasons for that decision have not been effectively communicated to the plant staff.

d. Some design engineers and managers indicated a lack of understanding of plant staff needs for documents such as electrical load lists and design basis documents that present design information in a form more easily understood by operators and others on the operations staff.

e. Meetings are currently being held among various management levels of the design engineering and nuclear operations organizations to improve communications and understanding. However, several managers stated that these meetings have not been effective.

Response:

To determine exactly what kind of improved support is required by Nuclear Operations to ensure that operations needs are appropriately addressed by the Engineering Department, a review process will be developed with the following features:

1. Nuclear Operations and Engineering and Construction will develop a listing of the organizations which share responsibilities for plant systems.

2. The charters for each of these organizations and the procedures which govern their work scopes will be thoroughly reviewed by an assessment team comprised of 1-2 senior personnel from each of the affected NEO Functions (Nuclear Operations, Engineering & Construction, and Nuclear Engineering).

3. The list of work products from each of the affected organizations, as well as the processing of those products, will be thoroughly reviewed by this assessment team.

4. A matrix of organizational interfaces will be created and work flows will be charted.

5. Formal and informal interface controls will be identified.

6. Identification will be made of redundant, overlapping, conflicting, or missing responsibilities, work products, or work controls.

7. Identification will be made of unnecessary or inefficient work flow paths.

8. Any resulting remedial procedures or organizational changes will be developed and implemented.

Additionally, within each affected organization, the ideal mix of experience and skill levels will be defined. An evaluation will be made of the experience and skill levels of assigned personnel. The difference between the ideal and the actual will be evaluated for correction through formal/informal training, on-the-job training, reassignment (including rotation of personnel, as appropriate), and recruiting.

The corrective action described above is considered to be the appropriate vehicle to address all specific problems listed by INPO under this recommendation. This review process has been initiated and will be completed by December 31, 1988.

RECOMMENDATION (2.5B-3)

Improve the maintenance of control room drawings to ensure they are readily usable by operators, changes are incorporated in a timely manner, and system temporary modification status is clearly shown. Problems that reflect a need for improved maintenance of these drawings are as follows:

a. Drawing control procedures require drawings to be updated when there are either five outstanding design change authorizations or when a design change authorization has been outstanding against the drawing for 90 days. Over 4000 drawings are past due for updating.

b. Most drawings provided for the main turbine-generator are in German and have not been sufficiently translated to enable operators to readily use them.

c. Temporary modifications are not identified on control room drawings, even though many have been outstanding for long periods of time. Consequently, there is potential for personnel to not be cognizant of all differences that exist between the plant and the drawings. Plant personnel stated that, in one case, this situation resulted in incomplete isolation of 6.9KV electrical equipment prior to performing maintenance work.

Response:

Improvements will be made to the maintenance of control room drawings by providing computer-aided-design (CAD) service to the control room. This will help provide on-line configuration as designed and as-present in the station. Some of the initial requirements of this plan are as follows:

1. Provide current drawings in the control room.
2. Show the current, as-designed configuration.
3. Show the current physical station configuration.

Specific Response to Item a:

There are approximately 1,200 Unit 1 vital station drawings which are required to be controlled. All of these drawings were updated in January 1988. Engineering and Construction staff are developing a schedule for implementation of a Computer Assisted Drawing (CAD) system in the control room which will be linked to the Engineering Department CAD. The Engineering and Station procedures used to create as-designed and as-configured control room drawings will be revised to reflect the new hardware capabilities. Reporting mechanisms and appropriate CAD staffing will be instituted to allow for rapid turnaround of station drawing changes by June 30, 1988.

Specific Response to Item b:

The Engineering Department will provide to Nuclear Operations sufficient English translations of the main turbine generator drawings to enable the operators to readily use them by June 30, 1988.

Specific Response to Item c:

The plan to address this concern involves limiting future temporary modifications in the plant to those absolutely required for continued operation. The large number of temporary modifications currently installed in the plant will be reduced by substituting fully engineered and inspected modifications.

By revising the existing station procedure on temporary modifications, NEO will strengthen station design control and configuration control by requiring fully designed and documented changes for all but a small set of temporary modifications which have been pre-approved by the Engineering Department. Procedures will be revised to provide for expedited Engineering review of changes to designed attributes of systems, and procedures will be developed to allow rapid turnaround of proposed temporary modifications.

As indicated in the response to Item (1.2A-3.b), a 1988 Nuclear Operations Objective has been established to reduce the number of temporary modifications to 300 or less by August 1, 1988.

HUMAN RESOURCES

RECOMMENDATION (2.7A-1)

Implement an effective management development and career planning program to develop sufficient numbers of capable, qualified management and supervisory personnel to support plant operations. The nuclear organization is not currently using formal or interim measures that focus on management and career development, such as addressing personal development goals or reviews in regular personnel appraisals. It is recognized that such a program is under development by the personnel organization and work is in progress to establish a data base of incumbent qualifications and experience. To date, however, involvement by the nuclear organization in the development of the proposed program has occurred only on a limited basis. Nuclear involvement will be necessary to ensure the program addresses nuclear needs adequately and is implemented effectively. The following key elements should be addressed in implementing the program:

a. Periodic reviews of corporate short and long-range plans to determine staffing needs and the demand for key personnel.

b. Identification and selection of candidates for key positions in the nuclear organization based on the knowledge, skills, and experience needed for each position and the qualifications and growth potential of possible candidates.

c. Involvement of key nuclear managers in identification of potential candidates throughout the nuclear organization and appropriate consideration of the need to broaden experience by rotation of assignments.

d. Individual development plans to prepare candidates for rotation or promotion in a timely manner.

e. An individual performance appraisal program to provide constructive feedback to employees concerning their performance and professional development. Many managers interviewed indicated they are not currently performing formal performance appraisals due to a lack of time and emphasis by senior management. This will be an essential element of implementing the proposed program.

f. Evaluations of the success of the program in meeting personnel requirements, including periodic reviews with all levels of corporate management.

Response:

As noted in the recommendation, a Human Resources Management System (HRMS) for NEO has been under development. The ultimate goal of the NEO HRMS is the stated INPO recommendation: provide an effective management development and career planning program to develop sufficient numbers of capable, qualified management and supervisory personnel. However, the project is structured to phase in the various elements that are required/desired by NEO over a two to three year period.

The 1988 objectives for the HRMS project are as follows:

1. Complete data collection and reporting for all exempt NEO employees.

2. Develop and disseminate to senior NEO management a Management Selection & Development Process.

3. Research career development opportunities and present the options to senior NEO management.

Senior NEO management and the cognizant Personnel Department management met in February 1988 to establish the 1988 Objectives and priorities for the HRMS project. The HRMS project manager intends to elicit the support and involvement of NEO management on a more frequent basis in 1988. Members of the nuclear organization have been on the project development committee since its inception and have supplied many man-hours of input from the nuclear organization perspective.

Specific Response to Item a:

These periodic reviews are performed annually as part of the standard TU Electric business agenda. Short and long-range plans are considered when determining staffing requirements.

Specific Response to Items b, c, and d:

A formal Management Selection & Development Process will be finalized and presented to senior NEO management by May 31, 1988. This process will provide management with tools to use to address selection and development of high potential candidates. Once these candidates are identified, their individual development needs can be addressed through training or appropriate job assignments.

Specific Response to Item e:

The response to this item is discussed in the response to Recommendation (1.2A-1.g). The intention is to develop a performance appraisal system that will have the commitment of senior NEO management and that will be readily recognized and utilized as an important management tool.

Specific Response to Item f:

Feedback and evaluation of the NEO HRMS is a vital part of making the program fit the organization. Evaluation will be integrated into every phase of the program. The HRMS Project Manager will provide reviews to Personnel and NEO corporate management.

NUCLEAR SAFETY ASSESSMENT

RECOMMENDATION (2.8-1)

Strengthen the corporate Operations Review Committee assessment of station activities related to nuclear safety. Problems noted include the following:

a. The Operations Review Committee membership lacks expertise in areas such as chemistry, radio chemistry, emergency planning, metallurgy, and non-destructive examination. In addition, only one committee member has recent operational experience, and neither of the two alternates assigned have equivalent experience. The method of designating alternates to the committee does not ensure the above areas of expertise will be available when a member is absent. A provision exists to use advisors to provide needed expertise, but this has yet to be fully utilized.

b. Operations Review Committee members are not periodically involved in activities such as quality assurance audits, audit checklist preparation, Site Operations Review Committee meetings, and observation and operational evolutions or tests that could enhance the review effort. Committee members rely on information provided in various site reports without the benefit of periodic personal observation of the activities described in these reports. This reduces the effectiveness of the committee review, because some material provided for review is deficient in detail and clarity, as noted by committee members. Deficient reports include Site Operations Review Committee minutes, the Nuclear Operations Monthly Report, and a quality trend report. Improvements to several of these reports are in progress. Industry experience has shown that operations review committees are most effective when periodically involved in these types of activities.

c. Several items important to monitoring the safety of plant operations are not yet incorporated into the Operations Review Committee process. For example, the committee does not review technical specification changes, planned special tests or evolutions, personnel performance problems (except as highlighted as adverse trends in the monthly trend report summary), analyses of procedure changes, and safety evaluations. Although these reviews are not yet required, phasing in of these reviews as the plant approaches commercial operation may improve the effectiveness of the committee.

It is recognized the Operations Review Committee chairman is working to address the problems related to committee membership and the quality of information provided to the committee.

Response:

As noted in the INPO recommendation, the chairman of the Operations Review Committee has reviewed the membership of the Committee and its assessment activities. His review resulted in a number of recommendations for strengthening the functioning of the Committee. These recommendations, which have been approved by NEO management, and are described in the specific responses below, will be incorporated into the ORC program and completed by August 31, 1988.

Specific Response to Item a:

The lack of expertise of the current ORC membership in certain areas has been recognized and a revised membership proposed to the Executive Vice President, NEO. The revised membership will enhance the ORC's expertise in areas such as chemistry, radiochemistry, emergency planning, and metallurgy. If specific expertise is required (such as NDE), the ORC will make use of outside advisers.

In the proposed membership, every internal member has been assigned an alternate. The alternate in this case will assure that the ORC does retain its expertise in a given area, even when a regular member is absent.

Specific Response to Item b:

ORC will have more active participation in the activities listed in this item. The members will be encouraged to attend SORC meetings, observe QA audits, observe training programs in action, and participate in periodic walkdowns of the plant site.

Specific Response to Item c:

The ORC intends to extend into areas not currently being evaluated. Some of the areas are identified below:

1. Review of plant events

2. Review of industry events (INPO, NRC Bulletins, etc.)

3. Review of WOG, NSAC, and EPRI activities aimed at improving plant safety

4. Plant trend monitoring

5. Recommendations of special QA audits for selected departments

6. Examination of recurring QA, Operations and Emergency Plan issues

7. Independent evaluations of lessons learned and their implementation at site

These activities are important to assure that adverse trends are recognized and mitigated.

INDUSTRIAL SAFETY

RECOMMENDATION (2.10A-1)

Implement the planned Nuclear Engineering and Operations industrial safety program at the site. Ensure the program includes elements such as appropriate on-site company medical facilities and services, published policies and procedures, and training appropriate for each organization at the site. Consider Emergency Medical Technician training for medical emergency response teams. Clearly define contractor and utility responsibilities for industrial safety, including contractor adherence to station industrial safety policies.

Currently, the construction contractor is responsible for most industrial safety activity on site. Work is in progress to transfer responsibility for industrial safety to Nuclear Engineering and Operations (NEO). An NEO industrial safety program is in draft form, but has not been approved or implemented. An executive safety committee has been established, as has a site safety committee; however, committees are not yet functioning. Currently, safety inspections or audits are not being performed by TU safety personnel.

Problems noted during the INPO plant visit reflect the need for improved industrial safety performance and strengthening of the NEO industrial safety capability.

Response:

The revised NEO policy statement and the NEO procedure on the Industrial Safety Program were issued on February 20, 1988. All additional procedures necessary to implement the program shall be developed and implemented by July 1, 1988. Elements of the program include the following:

1. Onsite medical facilities/services
2. Appropriate training for each organization on site
3. Appropriately trained medical emergency response teams
4. Safety standards applicable to all TU Electric and contractor employees
5. Safety audits to be conducted by functional area managers/supervisors

In March, 1988, a TU Electric industrial safety representative will be named who will report to the corporate safety organization but will be dedicated to the monitoring and assistance of the Industrial Safety Program at CPSES. The commencement of his onsite responsibilities will also take place in March.

Responsibility for direction of the onsite contractors' industrial safety program will transition from the contractors to TU Electric starting on June 1, 1988 and will be completed by July 1, 1988. Additional statements concerning TU Electric's emphasis on industrial safety will become a standard part of contracts.

The NEO Senior Safety Committee is fully functional. The INPO evaluator was provided minutes from recent committee meetings. Although the NEO Executive Safety Committee is not yet fully functional, its charter has been established and it is expected to be fully functional by July 1, 1988.

TRAINING AND QUALIFICATION

RECOMMENDATION (2.11C-1)

Strengthen senior corporate and plant management involvement in the monitoring and assessment of training and qualification activities of plant personnel. Several training-related recommendations in the plant evaluation reflect a need for improved training effectiveness. Increased management involvement is needed to assist in identifying needed improvements and to help ensure that improvement efforts have the intended effect. Examples where additional involvement could be helpful are observations of ongoing training, both in the simulator and the classroom or laboratory, and assessment of operator performance in the simulator.

Corporate and senior plant managers stated that they have had limited involvement with training, and most recognized that their involvement needs to be substantially strengthened.

Response:

The overall monitoring and evaluation plan referenced in the response to Recommendation (1.2A-1.b) provides for specific assignments for the Vice President, Nuclear Operations and plant management in the monitoring and assessment of training activities. Although the examples cited by the INPO evaluator relate to the operator simulator training, we recognize that these comments also apply to other areas of training at CPSES (maintenance, radiation protection, I&C, chemistry and non-licensed operator training). Monitoring and evaluation of these areas have been addressed in the plan which has been developed; the plan will be completely implemented by December 31, 1988.

RADIOLOGICAL PROTECTION

RECOMMENDATION (2.12A-1)

Strengthen corporate support and guidance of radiological protection program developments needed to prepare for operation. To a large degree, the corporate organizations have the role of providing requested assistance and do not function in the needed role of providing review, assessment, and guidance to ensure the effectiveness of station efforts. The following areas need to be addressed:

a. Corporate organizations need to take a more aggressive role in achieving radiological protection improvements needed for start-up and operation. Problems in radiological protection readiness include a lack of needed facilities and procedures for local personnel frisking and protective clothing issue, storage of reusable tools and equipment, processing of radioactive waste, contaminated laundry operation, and respirator cleaning and issue. Corporate support and direction could be particularly useful in the following areas:

   1. Development of a coordinated radiological protection action plan -- Though corporate and plant personnel had an understanding of the improvements needed to prepare for operations, their estimates of the magnitude of effort required to implement the needed improvements were considerably lower than recent industry experience shows is reasonable. Consideration should be given to obtaining information from similar plants that have recently completed start-up to better define the effort required to implement needed improvements.

   2. Development of policies and procedures -- A large number of procedures still need to be written, and some current procedures are not consistent with accepted industry practice.

   3. Interactions with engineering to complete needed permanent or interim facilities.

b. The division of responsibility between the plant organization and other organizations supporting radiological protection needs to be defined. Radiological protection functions are performed or are intended to be performed by Comanche Peak Engineering, Nuclear Engineering, and Administration. Individuals interviewed indicated that overlapping responsibilities exist in several areas. An example area is dose assessment. All these support organizations and the plant appear to have some responsibility for dose assessment. The current set of Nuclear Engineering and Operations procedures provide some guidance on division of responsibilities, but do not contain sufficiently detailed information on responsibility for specific functions. A recent meeting was held by supervisors within the three support organizations to identify overlaps and recommend an appropriate division of responsibilities. Agreement was reached in many areas, but the results of this effort have not yet been endorsed or approved by management.

Response:

The Corporate Radiation Protection organization is responsible both for providing technical support to the station and for reviewing, assessing, and providing guidance for radiation protection (R.P.) programs. Recent activities of this organization have focused primarily on providing support to the station in the development and maintenance of R.P. programs. The actions described in the specific responses below will be taken by the Corporate R.P. organization to strengthen their role of providing review and assessment of station R.P. programs.

Specific Response to Items a.1-3:

The station R.P. Section has developed a Radiation Protection Action Plan to ensure that all functions necessary for plant startup are completed in a timely manner. The Corporate R.P. organization will independently review this action plan and provide station R.P. management with input to the plan. Specifically, an operational readiness review of all radiological protection programmatic areas will be conducted by the Corporate R.P. organization. The objective of this review will be to ensure that adequate policies, procedures, facilities, equipment, and other resources needed for the startup and operation of CPSES are identified and in place prior to Unit 1 fuel load. Input from other utilities will be included in the review, either by direct participation in the review by individuals from other utilities (if appropriate arrangements can be made) or by the assessment of the review results and of the R.P. action plan by individuals from utilities that have recently completed plant startup. Upon completion of the review of each programmatic area, a report of results and findings and proposed recommendations will be submitted to station R.P. management for evaluation and will be used to update and maintain the R.P. action plan, as necessary. This review will be completed by July 1, 1988.

Specific Response to Item b:

This item is the same as the deficiency discussed in Recommendation (1.2A-1.e.1) and is answered under that item.

Additional Response:

The basic question raised by this recommendation relates to the capabilities of the Corporate R.P. organization to effectively provide for the review and assessment of station programs while continuing to provide technical support for all of the currently supported areas. An evaluation of the existing Corporate R.P. organization is underway to ensure that adequate resources are available to provide for continuing guidance and support for such areas as radiation protection, emergency planning, and radioactive waste management. Existing NEO jurisdictional statements for this organization will be reviewed to ensure that the functions of reviewing, evaluating, and monitoring the implementation of station programs are clearly defined. This evaluation will be completed by July 1, 1988.

EMERGENCY PREPAREDNESS

RECOMMENDATION (2.14A-1)

Strengthen corrective action for emergency preparedness problems. Many deficiencies noted in prior program reviews, inspections, and drill and exercise reports remain unresolved. Some items remain open from the 1985 exercise, 35 items remain open from the January 1987 full scale exercise, and none of the items from September 1987 drill have been posted to the tracking system. Though an emergency preparedness commitment tracking system exists, it is not being used effectively to resolve identified problems. The following weaknesses contribute to the lack of effective correction action:

a. The format of the commitment tracking list is simply a running computer log of identified problems. It does not reflect corrective action status, dates that items are posted or completed, or assignment of corrective action responsibilities outside the emergency preparedness group.

b. The tracking list is distributed internally to the emergency preparedness staff and not to those outside the department who need to take the corrective action.

c. No regular report on corrective action status is provided to management.

d. The emergency preparedness group does not analyze the list to identify recurring problems, determine fundamental causes, and initiate appropriate corrective actions. Recurring problems noted include some in communications, on-site and off-site notifications, on-shift medical response, operation of access control points, and flow of information through emergency facilities.

As a related matter the emergency plan has not been updated since 1985. It should be reviewed to ensure it is still current.

Specific Response to Item a:

The Emergency Preparedness Action Item Tracking System has been placed on an IBM AT computer, using a data base program which provides greater flexibility in tracking and correcting items. All applicable items were added to the data base, the status was updated, responsible persons were assigned, and completion dates have been scheduled.

Specific Response to Item b:

Distribution of copies of applicable items for review and update will be made to the responsible persons, both inside and outside the Emergency Planning group, at least monthly. This activity commenced on February 26, 1988.

Specific Response to Item c:

Regular reporting on corrective action status is provided to management through the Emergency Planning Monthly Report. The information contained in the tracking system described under Item a above is used in preparing this report.

Specific Response to Item d:

The identification and analysis of recurring problems has been an ongoing effort by the emergency preparedness organization. Although there is no documentation to support the somewhat subjective judgements, much of the training and subsequent drill scenarios have been influenced by these analyses. The review and follow up of recurring problems will continue.

Additional Response:

Regarding the final comment of this Recommendation, revision 9 to the CPSES Emergency Plan was approved on April 24, 1986. Revision 10 is to be issued approximately May 1, 1988.

RECOMMENDATION (2.14A-2)

Take additional actions to ensure that the post-accident sampling system (PASS) will reliably obtain and analyze reactor coolant and containment gas samples under accident conditions, and that core damage estimates can be obtained from PASS data. Address the following problems:

a. The post-accident sampling system has never been demonstrated operational. The Unit 1 start-up group has not determined the testing that should be performed before critical operations and has not included the system on the start-up schedule.

   Currently, system meters and radiation monitors are out of calibration, some light bulbs are burned out so that it is impossible to determine sample flow path, some values are improperly tagged, and other valves are not tagged. The pH and conductivity meters have not been calibrated. The chemistry and I & C departments disagree on the appropriate calibration interval for these instruments, and no interval has been selected.

b. Procedures for operation of the system and assessment of core damage have been in revision for nearly 18 months. Some chemistry technicians identified a lack of needed specific direction in current procedures. Most of the technicians have not been trained in the use of the countroom computer and the multichannel analyzer.

c. A preventive maintenance program, appropriate maintenance training, and spare parts stock have not been established.

d. A time and motion study is needed to evaluate total accumulated dose under severe accident conditions. The results of the study need to be compared with current exposure criteria.

Specific Response to Item a:

The operability of the PASS was demonstrated to the NRC as evidenced by NRC Inspection Report 85-01. However, its operability will be verified again prior to initial criticality. A test program will be developed and implemented. All valves will be properly tagged and indicating lights will be replaced as necessary by April 1, 1988. Once the system is removed from a layup condition, the radiation monitor, system meters, pH and conductivity meters will be placed on the appropriate calibration schedule, targeted for June 15, 1988. All of these items are included in the Nuclear Operations Readiness for Operations Plan.

Specific Response to Item b:

Chemistry procedures for the operation of the system have been issued. The procedure for assessment of core damage will be issued prior to July 29, 1988. Any deficiency in the degree of specificity in current procedures will be resolved by August 26, 1988. Of the eight technicians requiring training in the use of the countroom computer and the multichannel analyzer, five will be trained prior to April 1, 1988. The others are new hires and will receive the training later in the year, consistent with their individual training plans. Refresher training for all chemistry technicians will be completed by December 30, 1988.

Specific Response to Item c:

Development of a preventive maintenance program for the PASS has been initiated and will be implemented by September 23, 1988. This will include a review of spare parts required and any specialized training necessary.

Specific Response to Item d:

A time and motion study has been conducted, as documented by a January 1983 report of the results and comparison with the regulatory criteria. We have reviewed the results of the time and motion study in light of current system and structural modifications and have concluded that the study remains valid.

RECOMMENDATION (2.14A-3)

Improve emergency public information performance in providing timely, accurate, and complete information to the media and the public. Strengthen procedures and training to support emergency news center activities.

Emergency preparedness drills have identified the following problems:

a. News releases distributed at the emergency news center did not provide accurate information. For example, information concerning injured personnel, the location of a bomb explosion, and the number of ambulances responding to the site was incorrect.

b. Timely information was not provided at news center briefings; it was not until five hours into the emergency that the majority of information concerning plant status was released to the media.

Public information training, other than participation in drills, has not been conducted since 1984. Training for company spokesmen has not been conducted since April 1986. The company spokesman during September 1987 drill lost control of the briefing with the media.

Procedures supporting the emergency news center have not been revised in 20 months. Some news center activities are not adequately addressed by procedures. For example, media monitoring and rumor control procedures have not been prepared. Procedures for collecting information from call-ins and the media, and for responding to rumors or false information are needed.

Equipment in the emergency news center is not regularly tested to ensure it remains operable.

Response:

There has been a continuing effort to improve public information performance through training and procedures where required. Efforts include the actions described below.

Specific Response to Item a:

Information distributed at the new center was not accurate because of problems in timely data communications between groups in the emergency organizations, in delays and inaccurate information introduced in the execution of the scenario, and in interpretation and execution of procedures. These problems are being addressed in the 1988 Emergency Preparedness Training Program now under way through the drills and seminars which make up that program.

Specific Response to Item b:

Additional training for news center personnel and for company spokespersons is in progress. Procedures supporting the emergency news center are under revision. See below for additional comments.

Response to the Additional Comments:

Spokesperson training was conducted by a professional consultant on January 13, 1988. This training will be provided twice more before the NRC graded exercise. Refresher training will be provided as required.

Additional team training for public information personnel will be completed by September 1, 1988.

The procedure describing all elements of public information control and release during emergency conditions is in the process of revision and will be issued by May 1, 1988. This procedure revision will incorporate the INPO recommendation.

A method to test and ensure operability of emergency news center equipment will be developed and implemented by September 1, 1988.

ATTACHMENT 2

Response to Recommendations in

INPO Letter, dated January 21, 1988

Subject: INPO Preoperational Review and

Assistance Visit

TU Electric
March 14, 1988

Response to SUMMARY Recommendations

RECOMMENDATIONS WERE MADE IN A NUMBER OF AREAS. THE FOLLOWING ARE CONSIDERED TO BE AMONG THE MOST IMPORTANT AREAS IN NEED OF IMPROVEMENT :

1. MANAGEMENT DIRECTION AND ASSESSMENT

a. A fully developed action plan has not been prepared to prioritize and focus efforts on activities which must be completed prior to station startup.

Response to Item 1.a:

TU Electric acknowledges the need for a well organized and carefully directed plan to proceed smoothly into the readiness for operations phase of the project. As described more fully in the response to Recommendation (OA.1-1), a comprehensive Nuclear Operations Readiness for Operations Plan has been developed and the initial issue was provided to appropriate managers on February 22, 1988. The Plan brings together all identified activities and programs from sources such as INPO 85-001, "Performance Objectives and Criteria for Operating and Near-term Operating License Plants", specific comments from the INPO assistance visit, NUREG-1275, and TU management directives. Each activity is assigned a duration, based upon the experience of other similar activities, other utility input, or best estimate, and is prioritized and linked to an appropriate project milestone. Early and late start and completion dates are then computed, and activities are linked according to dependencies and restraints. The computer data base is capable of supporting multiple sort and display requirements, including detailed networked schedules. It is capable of being updated regularly with progress toward completion and the addition of new items as they are identified.

Direct management attention has contributed to the development of this plan, is being applied to its implementation, and will be focused on its progress and current status. As will be seen by the individual responses to the INPO recommendations, initiation of necessary activities did not await issuance of the plan. In every program area, activities have been pursued aggressively, some to completion. By careful management attention to the implementation of this plan, we are confident that the deficiencies identified in the INPO visit will be corrected.

b. High standards have not been established for some important station activities including the following:

(1) operator performance in the control room and the simulator
(2) radiological protection program policies
(3) material conditions in areas turned over to operations
(4) industrial safety program training, safety meetings, and station inspection tours

Response to Item 1.b:

It is TU Electric's intent and management commitment that only the highest of standards be accepted in the operation and maintenance of CPSES. Two factors that contributed to some of the deficiencies observed by INPO have been the lengthy delay from the anticipated fuel load in 1984 and the lack of a licensed Operations Manager during the latter part of that period. These two factors took a greater toll on operational performance than was recognized. The current Operations Manager, previously licensed and experienced at Palo Verde, obtained a current license on CPSES in December 1987. He began immediately to initiate changes in the Operations department based on his experience, his participation in the license training program and on the INPO observations. As discussed in the response to Recommendation (OP.2-1), he has established standards, defined responsibilities, and participated directly in the training of operators to communicate these standards. In addition, monitoring of performance in the control room and the simulator now includes observations by the Manager, Plant Operations and the Vice President, Nuclear Operations. Additional actions to improve operator knowledge, proficiency and performance are detailed in the responses to recommendations in the Operations (OP) and Training and Qualification (TQ) sections of this report.

Conservative radiological protection program policies, consistent with current industry experience and practice, have been established at CPSES in the past and will be maintained as a strong management commitment. These policies are articulated in NEO Policy Statements No. 19, "Radiation Protection Program", and No. 20, "Maintaining Radiation Exposures as Low as Reasonably Achievable". There is an ongoing effort to implement the appropriate radiological controls requirements and to practice radiological controls techniques at a time that will be of most benefit to the plant. The responses to Recommendations (RP.1-2) and (RP.1-3) discuss some of the specifics regarding implementation of radiological protection program policies.

Material conditions in areas turned over to Operations have not been maintained at established standards due to the large amount of construction rework activity that has resulted from the corrective actions emerging from the extensive review programs. As discussed in the response to Recommendation (MA.2-1), renewed management attention has been devoted to inspecting areas for cleanliness, safety and adequate material condition, and the standards for the material condition of the plant have been emphasized to the auxiliary operators for prompt identification of deficiencies. The Construction organization is also cooperating and has implemented a self-inspection program of its own. These efforts have resulted in an improvement in the cleanliness and general material condition of areas turned over to Operations.

NEO Policy Statement No. 27, "Industrial Safety", was issued February 20,1988. At the same time, NEO Procedure 2.22, "Industrial Safety Program" was issued to provide implementation for the policy. As reported in the response to Recommendation (OA.5-1), Station Administrative Procedure STA-211, establishes additional detail for the implementation of the standards in these documents, including training, safety meetings and station inspection tours.

c. Management assessment and review of existing programs has not been effective in upgrading deficiencies that can adversely affect station operations. Exemplifying this problem are the following:

(1) Procedural problems in operations and maintenance continue to exist and minimal corrective action has been taken over the last several years.
(2) Some programs to control equipment status have not been developed or effectively implemented.
(3) Knowledge deficiencies exist in the operations, chemistry, and radiological protection staffs.
(4) The ability to plan, schedule, coordinate, and obtain spare parts for daily maintenance activities is weak.

Response to Item 1.c:

Many of the deficiencies identified are the result of management's concentration on the actions necessary to satisfy plant design, construction and licensing concerns so that management resources for maintaining the operational perspective were diluted. In addition, sweeping organizational, programmatic and personnel staffing changes over the past several years had generated an administrative workload that, given the schedule uncertainties of plant completion, led us to devote primary attention to construction and engineering tasks. The INPO visit was helpful in providing an impetus to renew a sense of urgency with respect to preparation for operations and to accelerate the development and implementation of plans that had not received sufficient priority.

Many procedure upgrades, although identified, were being held back pending the completion of the design review process. This practice has been discontinued and the backlog will be cleared in accordance with priorities established in the Nuclear Operations Readiness for Operations Plan. Regular management review of this plan will assure adequate progress and the procedural requirement for Station Operations Review Committee review of procedures will assure adequate quality.

A consolidation and simplification of equipment status control has been placed in effect, which will bring about a better developed sense of ownership and centralized direction of plant operations and work control. Specific activities are described in the responses to Recommendations (OP.1-1): Operations responsibilities for current plant conditions, (OP.3-2): improvement of the implementation of the station clearance program, (OP.3-3): locked valve program, (OP.5-2): load lists, and (MA.2-1): increased emphasis on maintaining equipment turned over to Operations. Management attention and direction are being applied to the statusing and control of plant equipment.

Significant changes are being made to the overall training program.

primarily for licensed operators and auxiliary operators, but also in individual departmental areas of interest, which will upgrade the knowledge level of all plant personnel. Specific management attention is being devoted to Operations department training, as described in the responses to Recommendations (OP.2-1): standards for conduct of operations, (OP.4-1): operator control of the plant during abnormal and emergency conditions, (OP.4-3): licensed operator knowledge weaknesses, and (OP.4-4): auxiliary operator training. The additional training for the chemistry and radiological control staffs, as described in the responses to Recommendations (CY.2-1) and (RP.3-1), includes management involvement and supervision.

Management attention to the planning, scheduling, coordination and procurement of spare parts for daily maintenance activities has resulted in some improvement for urgent requirements. The response to Recommendation (MA.1-1) discusses improvements in the work control process (i.e., planning, scheduling and coordination). The response to Recommendation (MA.9-1) discusses some of the activities that have taken place to improve parts procurement. Additional improvements are required and are expected to be realized when the Master Equipment List is available in a useful form.

2. OPERATIONS READINESS AND ABILITY TO OPERATE AND CONTROL THE PLANT

a. Shift operating crew performance was weak on the simulator and during a transient at the station.

Response to Item 2.a:

The personal attention of the Operations Manager and the Director, Nuclear Training has been applied to improving the performance of simulator training. This is reinfor ed by periodic reviews by the Manager, Plant Operations and the Vice President, Nuclear Operations. The details of actions that have been taken are described in the responses to Recommendations (OP.2-1): standards of performance and (OP.4-1): ability to control abnormal conditions and plant casualties. The Operations Manager has explicitly instructed shift operating crews during their training periods concerning expected standards of performance. With the continued management attention being provided by active participation in training, routine inspections and monitoring, better interpretation and implementation of those standards will result.

b. Auxiliary operators did not monitor and operate plant equipment in a consistent and adequate manner.

Response to Item 2.b:

The response to Recommendation (OP.4-4) describes the actions that have been taken to improve auxiliary operator training, qualification and performance. Additional detail is provided in the speci c response to Item (TQ.1-1.b). Licensed Senior Reactor Operators have been assigned to assist in this effort. The Requalification Cycle training for Auxiliary Operators has also been upgraded to emphasize specific routine and abnormal watchstanding duties.

c. Operations personnel have not assumed full control of systems and equipment turned over to the plant.

Response to Item 2.c:

At the time of the INPO visit, there was some confusion about which systems were under Operations control and which were under Startup control because the extensive construction activities had necessitated returning control of many systems to either Startup or Construction. As discussed in the response to Recommendation (OP.1-1), this confusion has been remedied through updating and consolidating the system status book, and Operations personnel are now in full operational control of those systems released by Construction. Managers will be alert to correct any indications of a recurrence.

3. TRAINING PROGRAM IMPLEMENTATION

a. Simulator training does not provide challenging scenarios or effective feedback to improve operator performance.

Response to Item 3.a:

As noted in Item 2.a, above, the Operations Manager and Director, Nuclear Training have become intimately involved in the observation and critiques of simulator training. They are working closely together to establish standards of performance for both operators and instructors and to provide scenarios that will be challenging and meaningful. As operator performance is evaluated and new training needs are identified, appropriate changes are made to the curriculum. The responses to Recommendations (TQ.1-2): instructor training and (TQ.8-1): teamwork and diagnostic skills, also discuss actions being taken to improve the performance of instructors in providing appropriate feedback and to improve the ability of operators to work as a team. A training visit for INPO to train simulator instructors is scheduled for July 1988. Senior managers, such as the Vice President, Nuclear Operations and the Manager, Plant Operations will continue to observe and critique simulator training.

b. Some important industry events are not effectively communicated to station personnel. As a result, some personnel are not aware of relevant industry events.

Response to Item 3.b:

The Performance Evaluation Section currently reviews all significant industry experience reports and provides appropriate extracts, with identified applicability to CPSES, to the cognizant managers and supervisors for further distribution. The individual supervisors decide what material is put on "required reading", added to departmental training, or otherwise provided to the working level personnel. The Training department incorporates material which has relevanc: to CPSES into the appropriate curricula.

However, this has apparently not been adequate to get the information to the working level personnel. As a means of improving the distribution of the information, and perhaps providing it in a more easily remembered form, corporate media communications specialists will assist the Performance Evaluation personnel to produce a pilot program of brief television tape segments highlighting recent industry events having significance and relevance to CPSES. These tapes will be made available to all supervisors for use in safety meetings or departmental training sessions. This will supplement the current publication of IOER summaries that is being provided.

As discussed in the response to Recommendation (OE.3-1), effectiveness reviews will include sampling of working level knowledge of recent industry events.

c. A continuing training program for station personnel has not been implemented in support of plant startup.

Response to Item 3.c:

The Training Administrative Procedures (TRA-series) contain descriptions of the initial and continuing training programs for each department and for some training programs that cross departmental lines (e.g., General Employee Training, Radiation Worker Training, etc.). These training programs are in effect, and are being conducted. As a consequence of some observations from the INPO visit, each department is reexamining the training programs they currently have in effect and is reviewing the need to update and strengthen them.

d. Instructor training has not been effectivly implemented for simulator training, on-the-job training, and laboratory/mock-up training.

Response to Item 3.d:

A comprehensive instructor training program, to cover all expected instructional scenarios is in the process of development. This is described more fully in the response to Recommendation (TQ.1-2). The complete program will be ready for implementation by December 1988. However, as a matter of priority, the simulator instructor portion will be implemented by September 1988. As discussed under Item 3.a, INPO will provide training to the simulator instructors in July 1988.

e. General employee training is not being conducted to keep employees aware of radiation protection, safety, and administrative policies and procedures.

Response to Item 3.e:

All new employees receive General Employee Training (GET), which includes radiation protection, safety, and administrative policies and procedures. Successful completion of such training is one of the elements required to obtain authorization for unescorted access to the protected area. To maintain unescorted access authorization, the employee must complete the training or pass an exemption examination each year. Before taking the examination, the employee is provided updated training materials to study which include current requirements, policies and procedures. The examination is updated as materials change, thus ensuring that successfuly passing the examination provides a measure of certainty that the employee has the requisite current knowledge.

Due to the high level of construction activity, the protected area access requirements were relaxed. Apart from the normal site access badge, there are no special access requirements at present. As a consequence, some personnel have not maintained their GET qualification current. The need to restore the current qualification of all personnel who will need unescorted access to the protected area at the time of security "lockdown" is recognized. Supervisors have been notified monthly of those personnel whose qualifications have lapsed. The requirement has been established to have all necessary personnel fully qualified at least 120 days before fuel load.

Response to Specific Recommendations

OPERATIONS

RECOMMENDATION (OP.1-1)

Clearly establish the operations department responsibilities on Unit 1 for current plant conditions. The following are examples of operators not clearly understanding their current responsibilities

a. On-shift supervisors do not know what systems are the responsibility of the Operations Department and what systems have been turned back to startup or construction. A current list of turned-back systems is not available in the control room.

b. On-shift supervisors do not know if non-operational personnel, such as individuals assigned to startup, are permitted to operate Unit 1 components.

c. The division of responsibilities between the Startup Group and the Operations Department is not described in station procedures. For example, both the Startup Group and Operations Department issue clearances on Unit 1 components. Neither group maintains records of the other group's clearances.

Response:

In recognition of the importance of making the transition from a construction environment to the operational environment, Nuclear Operations has taken positive steps to assure that on-shift operations personnel are aware of their responsibilities and are in control of the conduct of activities that could affect those systems or components for which they are responsible. Specific actions related directly to the INPO findings are described below.

Specific Response to Item OP.1-1.a:

The Control Room is maintaining a status book of systems under Operations or Startup control to identify custody status. In addition, Startup will assign a Shift Test Director to coordinate the Operations and Startup Interface in the Control Room at any time there is significant testing activity.

Specific Response to Item OP.1-1.b:

Station Administrative Procedure, STA-601, "Authority for Equipment Operation" has been revised to address all systems in Nuclear Operations (including Startup) custody. Qualified operators will start, stop and otherwise manipulate all equipment in Unit 1 and Unit 2. The previous practice of allowing Startup or other organizations, under some circumstances, to operate plant equipment in the custody of Nuclear Operations has been stopped.

Specific Response to Item OP.1-1.c:

Station Administration Procedure, STA-605, "Clearance and Safety Tagging" is being revised to incorporate Comanche Peak Startup Administrative Procedure, CP-SAP-5, "Safety Tagging Procedure". This revision will provide a single station tagging and clearance procedure that is common to all of Nuclear Operations. Training of station personnel will be required prior to implementation. (Estimated completion date April 15, 1988).

Daily work coordination meetings were being held and were witnessed by INPO during their visit, but had not included Startup as a participant. Startup is now attending these meetings and is taking an active role in work scheduling with Operations and Maintenance.

Weekly meetings between Operations and Startup to handle interface matters have been held since December 1, 1987. These meetings include the Shift Operations Manager and the Lead Startup Engineer. The meetings are used to discuss system and component testing in progress and planned for the near future. They also address problems at a managerial level that have not been resolved during daily work coordination meetings. These meetings have resulted in a much greater participation by Operations personnel in the overall conduct and control of testing. They have also improved the understanding that Operations is in charge of the plant.

Other Startup procedures will be reviewed for incorporation into Operations programs. The intent is for similar activities to be controlled from the Control Room under a single program. For instance, all temporary modifications will be brought under a single procedure. (Estimated completion date June 1,1988).

The Operations Manager has been added to the Joint Test Group. This will assure Operations involvement in Startup Test Procedure development. The expected result is better coordination between Operations and Startup procedures, and advance information for use in Operations training prior to major testing.

RECOMMENDATION (OP.2-1)

Establish and enforce standards for the conduct of operations. A lack of standards in many areas contributed to the performance problems observed during simulator training. Areas where standards are lacking include roles and responsibilities of operators and the shift technical advisor, operator acknowledgement and reporting of alarming conditions, as well as shift crew communications and teamwork. The following examples of problems observed during simulator training illustrate the need for standards in the above areas:

a. Roles and responsibilities

1. Reactor operators (RO) do not understand when they should take actions to ensure the plant is safe without obtaining prior permission from the supervisor. For example, in a simulated loss of all component cooling water to the reactor coolant pumps, an RO requested permission to trip the reactor and the pumps. The supervisor did not grant permission before the pumps tripped automatically, causing a reactor trip. The reactor and the pumps need to be tripped quickly to prevent pump damage in this situation.

2. The divisions of responsibilities between the RO and balance-of-plant (BOP) operator for control room panels is not well defined. The RO and the BOP operator monitored and operated controls on the same control panels, occasionally interfering with each other. In one instance, during a steam generator tube rupture, both operators manipulated controls at an emergency core cooling panel. Aa a results, the BOP operator did not observe steam generator levels declining in the intact steam generators.

3. The shift technical advisor (STA) did not assist the shift supervisor in understanding plant conditions. In one exercise, the STA determined that a steam generator tube rupture had occurred but did not inform the shift supervisor who was unaware of this condition. The only support that the STA provided to the shift supervisor was checking the critical safety function status trees on two occasions. The STA was involved with off-site dose calculations for most of the exercise and did not monitor overall plant conditions.

b. Alarm acknowledgement and reporting

1. Operators acknowledged and silenced numerous alarms without reporting or acting on the alarms. Examples of alarms acknowledged but not reported included pressurizer relief tank temperature, level, and pressure alarms, power operated relief valve tailpipe temperature alarm, and rod control urgent failure alarm. This practice can result in not taking necessary actions on important alarms.

2. Operators did not periodically walk down annunicator panels to ensure all alarms were expected for respective plant conditions.

c. Communications and teamwork

1. In an exercise involving a steam generator tube rupture, the BOP operator rapidly injected auxiliary feedwater without informing the RO or supervisor. As a result, pressurizer level and pressure rapidly decreased leading the assistant shift supervisor to order reinitiation of safety injection.

2. In one exercise, the BOP operator reduced turbine load but did not inform the RO. As a result, average reactor coolant temperature increased to the technical specification limiting condition for operation. Several minutes later, the RO realized that a power mismatch existed between the primary and secondary systems and manually inserted control rods to compensate for the mismatch.

3. The assistant shift supervisor not require the operators to acknowledge or report completion of direct emergency operating procedure actions.

Response:

Many of the shortcomings identified in this recommendation had been recognized, and activities leading to their correction were underway at the time of the INPO visit. The Operations Manager completed his license training in December 1987, and has since that time been able to concentrate on the important issues of establishing high standards of professionalism, operational proficiency and adequacy of procedures.

The Operations Manager, and the Director, Nuclear Training have personally observed at least one day of simulator training each week during Requalification Cycles 88-1 and 88-2. They have met regularly to review needed improvements in the establishment and enforcement of standards of performance. This action will be supplemented by regular observations by the Vice President, Nuclear Operations, the Manager, Plant Operations and the Performance Evaluation Group.

The Operations Manager has reviewed simulator performance evaluations for 1987, the 1987 requalification tests, and the results of the 88-1 and 88-2 requalification cycle observations and has noted weaknesses in the following broad categories:

Knowledge and execution of Emergency Operating Procedures

Communications practices

Alarm acknowledgement

Coordination between operators

The corrective action for these deficiencies has been incorporated into subsequent training and into the procedures to which they apply. Throughout this report, where reference is made to corrective action being taken in Requalification Cycle training, the same corrective action has been evaluated and incorporated into the appropriate initial operator qualification training program.

The specific INPO observations were reviewed and discussed with members of the Shift Operations organization. This was completed as part of the

Requalification Cycle 88-1 and Operations Review Class given by Operations management.

In addition to the specific corrective actions mentioned in the responses below, one of the activities being considered prior to the INPO visit was an "Operations Code of Ethics". Such a statement of principles of commitment to operational excellence is expected to enhance the sense of professionalism and teamwork. A draft version, completed December 31,1987, has been discussed with the Vice President, Nuclear Operations. The Shift Operations Manager and one shift supervisor attended an INPO Shift Reactor Operator Peer Workshop in February on this subject to aid in finalizing a Code of Ethics for CPSES operators containing the elements suggested in the INPO materials provided at various workshops that have addressed the subject. Estimated completion date for this activity is July 1,1988.

Specific Response to Item OP.2-1.a:

Operations Department Administrative Procedure, ODA-102, "Shift Complement Responsibilities and Authorities" has been revised to address the deficiencies noted by INPO and to define the roles and responsibilities of each watch station. This revision specifically states that the Reactor Operator is responsible for and is authorized to perform all immediate/initial actions called out in approved Alarm Response, Abnormal Operating and Emergency Response Guideline procedures without prior Unit Supervisor permission. Similar guidance is provided to the balance of plant reactor operator and the auxiliary operators to define the circumstances in which they are expected to act in accordance with written procedures without further specific direction. Training will be completed at the end of Requalification Cycle 88-2 (March 21,1988).

The balance-of-plant (BOP) operator for control room panels is currently called the Relief Reactor Operator at CPSES. The specific responsibilities for this operator are included in STA-102, including the requirement that he coordinate his actions with the Reactor Operator. Coordination is also addressed in the communication guidelines, discussed in the specific response to Item (OP.2-1.c).

The roles and responsibilities of the Shift Technical Advisor (STA) have been reviewed and defined for normal and emergency conditions. These have been incorporated into ODA-102. Training procedures for STAs also require updating and revision as a result of an organizational transition that took place in 1987. These procedures will be updated by July 1, 1988 to incorporate the latest INPO guidelines. In the interim, the STAs have been, and will continue to be, involved with the shift crews in one simulator training session per week. During these emergency drills, they are trained in the proper execution of their roles for the particular scenario. Formal training for STAs in their responsibilities, particularly with respect to abnormal and emergency conditions, is scheduled for Requalification Cycle 89-3, commencing July 1, 1988.

Specific Response to Item OP.2-1.b:

Procedure ODA-407, "Guideline on Use of Procedures", has been revised to include guidance on procedure use, alarm procedure use and response. The concepts were introduced into Requalification Cycle 88-1 and will be emphasized on a continuing basis.

The reporting of alarms acknowledged is specifically addressed in the new communications guidelines discussed below in the specific response to Item (OP.2-1.c).

During the training sessions regarding alarm responses and corrective action, the Operations Manager has reviewed with operators the need to regularly evaluate alarms present against known conditions. This includes periodic walkdown of the control boards and annunciator panels, particularly following transients. Unexpected alarms then receive special attention.

Specific Response to Item OP.2-1.c:

A new Station Administrative Procedure, "Communication Guidelines" has been prepared (based on INPO Good Practice OP-212) and submitted to SORC for review. The concepts were introduced into Requalification Cycle 88-1 and will be emphasized on a continuing basis. The consistent use of the principles identified in this procedure (i.e., informing other watchstanders of actions being taken, acknowledging direction, reports, and completion of actions, and the use of consistent terminology) will improve the overall teamwork of shift crews and other personnel involved in operations and maintenance. The clear definition of responsibilities discussed in the specific response to Item (OP.2-1.a) will also improve the understanding of duties, upon which teamwork depends. Emphasis on the continuing application of these principles of communication and teamwork will be included in simulator training sessions and in routine monitoring of operator and maintenance worker performance.

RECOMMENDATION (OP.3-1)

Establish a method to track active technical specification limiting conditions for operation (LCO). An administrative program to track active LCOs does not exist. In addition, operators are not required to log entry and exit from LCO action statements. An LCO tracking mechanism is needed to help maintain tight control of technical specification equipment status to prevent technical specification violations.

Response:

The requirement for operators to log entry and exit from LCO action statements currently exists in Operations Department Administrative Procedure ODA-301, "Operating Logs". This procedure also includes provisions for identifying equipment in a degraded mode or active LCOs at the time of shift turnover. However, the procedure will be revised to define the requirements more clearly. (Expected completion date April 1, 1988).

Since the plant has not achieved a status where technical specification actions would be useful or meaningful, this requirement has not been implemented in the control room. However, during simulator training, the proper logging practices should have been enforced more consistently. This has been stressed in Requalification Cycle 88-1 and 88-2, and will continue.

A detailed and formalized system/method is being established to define the requirements for logging and tracking equipment status, both for that equipment which is regulated by technical specifications and that which is not. This system will include the tracking of active LCOs for the existing mode as well as those affecting higher modes of operation. It will be in place by June 1, 1988. In addition, a computer program, part of the Operator Aids System, will be developed to assist in tracking the status of LCO requirements. (Estimated completion date December 31, 1988).

An Operations work control program has been developed which includes specific elements to ensure that the status of equipment and systems operability is promptly reported to the Shift Supervisor. Initial implementation was on March 1, 1988, with full implementation expected by May 1, 1988.

RECOMMENDATION (OP.3-2)

Improve the implementation of the station clearance program. Coordination problems and lack of attention to detail caused errors while implementing clearances. Also, the sequence of component isolation is not properly considered in some cases. In addition, some personnel do not understand or respect the clearance program. The following examples illustrate these problems:

a. An auxiliary operator removed a danger tag from the incorrect valve during a partial clearance on the hydrogen seal oil system.

b. An inadequate clearance was used to support replacing oil seals on a steam generator wet layup recirculation pump. The maintenance planner requested the power be tagged-off and that the suction and discharge valves be closed but not tagged. Operations tagged the power off and tagged the suction and discharge valve shut. However, the system was not drained and, as a result, water spilled from the system when the pump flange was unbolted.

c. Interviews indicated that a number of operators were not familiar with the pump isolation problem identified in SER 12-84, "Heater Drain Pump Expansion Joint Failure". This SER highlighted the need to isolate pump discharge valves before suction valves on centrifugal pumps due to the potential for overpressurizing pump suction piping if the discharge check valve leaks through. Operators questioned stated that they do not always ensure a pump discharge valve is shut before shutting a pump suction valve.

d. Some contractor personnel operated danger tagged valves in the hydrogen seal oil system without authorization. They had not received any training prior to working on site. In another instance, a danger tag associated with the startup clearance program was used as an information tag with the danger and high voltage warnings blackened out.

Response:

INPO stated at the exit briefing that the Station Administrative Procedure STA-605, "Clearance and Safety Tagging", was fundamentally adequate. The observations of several inadequacies in the implementation and at least one direct violation of the procedure have been addressed as symptomatic of a general lack of appreciation or understanding for the importance of clearance tagging to personnel and equipment safety.

At the direction of the Manager, Plant Operations, all work group supervisors reviewed the clearance and safety tagging procedure with personnel during safety meetings.

Additional actions have been taken as described below.

Specific Response to Item OP.3-2.a:

At the safety meetings and in Requalification Cycle 88-1, particular emphasis has been placed on attention to detail, both in preparing safety tag clearances, hanging the tags and clearing the tags.

Specific Response to Item OP.3-2.b:

A work control group has been established to enhance coordination and communications between Operations, Maintenance, I&C and Startup regarding clearance tagging and clearance tag processing. This group is functioning now, but full implementation will take place by May 1, 1988.

Specific Response to Item OP.3-2.c:

A revision to STA-605 will be issued by May 1, 1988 to incorporate comments from the INPO observations and from reviews by the Operations Manager. This revision will include establishment of a single tagging system and will accommodate revisions that have been made to procedures regarding work control and post work testing. It will specifically include proper sequencing of isolation valves to avoid unexpected hazards.

Specific Response to Item OP.3-2.d:

As discussed in the response to Item (OP.1-1.b), the practice of allowing personnel other than operators to manipulate valves and operate equipment has been stopped. Personnel have been reminded (via the safety meetings) that use of danger tags for purposes other than those intended is an unacceptable practice.

RECOMMENDATION (OP.3-3)

Establish criteria for locking valves, and resolve discrepancies between the locked valve procedure, system operating procedures and flow diagrams. INPO 85-017, Guidelines for the Conduct of Operations at Nuclear Power Stations, should be of assistance in this effort. The following are examples of problems observed:

a. During a review of five systems, several discrepancies were noted between the locked valve procedure, the system operating procedure (SOP) and the flow diagram. For example, safety injection valves 8810A through D (reactor coolant system cold leg injection valves) are required to be locked in the throttled position according to the flow diagram and SOP. The locked valve procedure does not include these valves.

b. Many valves in non-safety systems, such as the auxiliary steam, heater drain, and turbine lube oil purification systems, are locked. An excessive number of locked valves reduces the significance of locked valves and can hinder timely operation of the valves in an emergency.

c. Operations interviewed were unaware of any criteria to determine which valves should be locked.

Response:

A preliminary review of the locked valve program will be completed by September 1, 1988. This review will result in upgrading existing instructions to a procedure that will include a clear statement of the criteria for determining which valves should be locked valves, using the guidance of INPO 85-017, "Guidelines for the Conduct of Operations at Nuclear Power Stations." After drawing changes and a majority of Design Change Authorizations are incorporated into the drawings, the final review of the program will be completed to identify necessary changes. When the project milestone date for fuel load is published, the final review will be targeted for 90 days prior to fuel load.

Specific Response to Item OP.3-3.a:

The preliminary review will attempt to identify and correct all examples of discrepancies between drawings and procedures. This will necessarily be a continuing process until the design documents are "frozen".

Specific Response to Item OP.3-3.b:

Locked valves in non-safety systems are designated for strict administrative control. TU Electric agrees that an excessive number of locked valves reduces the significance of the program and can hinder timely operation in an emergency. The final criteria for designating locked valves will be consistent with INPO 85-017.

Specific Response to Item OP.3-3.c:

The criteria for locking valves will be established as stated above, and included in the locked valve procedure. In addition, the procedure will list opposite each valve, the basis on which it was included in the locked valve category (i.e., Technical Specifications or Administrative). Review of this procedure with the operators will be included as part of the Operations Manager's regular "Operations Review".

RECOMMENDATION (OP.4-1)

Improve the ability of licensed operators to control the plant during abnormal conditions and plant casualties. Ensure each shift team can effectively execute actions required by the emergency operating procedures. Increase management involvement in simulator training to reinforce expected levels of operator performance. Significant crew performance problems were observed during simulator training. The following are examples of problems experienced by operating crews during simulator training:

a. The crews did not recognize that a steam generator tube rupture had occurred during any of the three exercises that included this casualty.

b. In one exercise, the crew failed to recognize a stuck-open pressurizer safety valve even after the pressurizer relief tank ruptured from overpressure and pressurizer level rapidly increased.

c. In two exercises involving loss of all component cooling water to the reactor coolant pumps, the crews did not trip the reactor and the reactor coolant pumps. The pumps tripped on high current causing a reactor trip.

Response

In order to improve the ability of licensed operators to control the plant during abnormal conditions and plant casualties, heavy emphasis has been placed on working each shift crew as a team and evaluating each team against consistent criteria. The close personal attention of the Operations Manager has been devoted to the task of building the operating crews into coherent and professional groups that are fully capable of executing the actions required by the emergency operating procedures. The following specific actions have been taken:

The Operations Manager has worked with the Director, Nuclear Training throughout Requalification Cycles 88-1 and 88-2 to develop expected responses to given transients and abnormal conditions. These responses are then included in the simulator evaluation criteria used for the critiques at the end of each simulator session. This will continue for subsequent requalification cycles.

The Operations Manager and Director, Nuclear Training have jointly worked on the development of long-range plans to enhance training of all Operations personnel. A schedule of standards and procedure revisions has been provided to Training to assist in the development of training material. The schedule is based upon the 1988 and 1989 requalification cycles. A majority of the deficiencies will be addressed prior to October 1, 1988, but the new standards will require extensive training and simulator time. This training will extend into the first quarter of 1989.

Once each Requalification Cycle, a block of time will be set asic for "Operations Review", which will be conducted by Operations manag ent, to discuss new policies and to emphasize standards. This time i also used to address the transfer of standards practiced in the simulator to use in the plant and to review plant incidents involving operations personnel.

Shift Supervisors have been charged with the responsibility for the performance of their crew, and will be expected to identify problems and possible corrections. This was emphasized during Requalification Cycle 88-1 and is continuing.

An Assistant Shift Supervisor and two Reactor Operators will work together in the plant and on the simulator to reinforce the team concept. The Shift Supervisor or a fourth man has been incorporated into simulator training to add a sense of realism.

Team evaluations on the simulator will be run each Friday to be witnessed by a member of plant management, the Operations Manager or Manager, Plant Operations. This has been done during Requalification Cycles 88-1 and 88-2 and will continue through 1988 and 1989.

The Training Administrative Procedures (TRAs) describing the Requalification Program will be revised to incorporate Operations management involvement in requalification performance and material presented. (Expected completion date April 15, 1988). The procedure revisions will address the concerns of INPO and correct the deficiencies noted in Items (OP.4-1.a, b, and c).

Specific Response to Item OP.4-1.a:

The steam generator tube rupture scenario was included in the simulator casualty drills for Requalification Cycle 88-1. All crews were able to identify the casualty from the symptoms provided and were able to enter the Emergency Operating Procedures at the appropriate point. New (Revision 1A) Westinghouse Owners Group Emergency Response Guidelines (ERGs) have been received and will be incorporated into CPSES Emergency Operating Procedures by July 1, 1988. Training on the new procedures will include steam generator tube rupture identification and response. This will be conducted during Requalification Cycles 89-3 and 89-4.

Specific Response to Item OP.4-1.b:

The new ERG revision (see Item (OP.3-3.b)) will include a step to specifically look for stuck open primary safety valves as part of the RCS Integrity verification. This training will be conducted during Requalification Cycles 89-3 and 89-4.

Specific Response to Item OP.4-1.c:

As discussed in the response to Item (OP.2-1.a), clarification has been provided to reactor operators regarding their authority and responsibility to carry out steps of procedures without specific approval from the shift supervisor. The Abnormal Operating Procedure (ABN) for reactor coolant pump malfunctions has been revised to provide better guidance to the operator upon total loss of component cooling water.

RECOMMENDATION (OP.4-2)

Improve the ability of licensed operators to prevent an inadvertent criticality during start up. The following problems underscore the lack of preparation to prevent this occurrence:

a. During two reactor startup exercise, the reactor was inadvertently taken critical below the rod insertion limit. In both startups, control rods were pulled continuously until the first doubling of neutron count rate with few pauses and then to criticality with few additional pauses in rod motion. This method did not allow a careful approach to criticality.

b. The reactor startup procedure does not incorporate alternate methods such as inverse count rate monitoring or multiple doubling checks to monitor the approach to criticality. The procedure also does not require periodic pauses in rod motion to allow subcritical multiplication to increase neutron count rates to a stable level.

c. The operators have not been given simulator exercises during requalification training that would challenge their ability to recognize and prevent an inadvertent criticality.

d. Many operators are not familiar with industry events concerning inadvertent criticalities.

Response:

As discussed in the specific responses below, operators will be provided improved procedural guidance and additional training to respond to the indications of approaching criticality and to recognize when there is likelihood of premature criticality.

Specific Response to Items OP.4-2.a and b:

Integrated Plant Operating Procedure IPO-002, "Plant Startup from Hot Standby to Minimum Load" will be revised to specify that a reactor criticality review be conducted at each 50 steps of rod movement and to incorporate inverse count rate plots, multiple doubling checks and enhanced operator guidance. (Estimated completion date April 1, 1988).

Specific Response to Item OP.4-2.c:

Training will be developed in the area of response to inadvertent criticality after the proposed revision to IPO-002 and all Technical Specifications which apply. It will be scheduled for Requalification Cycle 89-1. INPO Case Studies on inadvertent criticality will be used as a basis for the classroom portion of training, and specific scenarios will be practiced in the simulator involving inadvertent criticality. Subsequent Requalification Cycles will continue to include this topic.

Specific Response to Item OP.4-2.d:

Industry events concerning inadvertent criticality will be the basis for much of the classroom training and scenario development described in the sections above.

RECOMMENDATION (OP.4-3)

Identify the extent of licensed operator knowledge weaknesses and provide training to upgrade weak areas. The following are examples of knowledge deficiencies observed during simulator training:

a. Procedures and technical specifications

1. During an exercise involving a steam generator tube rupture with a stuck-open steam generator relief valve, the assistant shift supervisor had difficulty finding the applicable emergency operating procedure (EOP). Transition steps that would have directed him to the correct procedure were overlooked.

2. During a plant cooldown, following a steam generator tube rupture, the assistant shift supervisor directed that safety injection be reinitiated rather than manually actuating the required components as directed by the EOPs.

3. One shift team referred to the incorrect technical specification to determine required actions after attaining criticality below the rod insertion limit.

b. System knowledge

1. Reactor operators had difficulty operating the reactor makeup system in the manual mode and did not understand the flow path for emergency boration.

2. Reactor operators demonstrated knowledge weaknesses with the rod control and rod position indication systems. One operator misaligned control rods and another misinterpreted rod position indications.

3. The operators did not understand why only three steam dump valves would open while they were cooling down the plant. They did not recognize that the low-low average temperature interlock prevents operation of more than three steam dump valves.

c. Integrated system response

1. In an exercise involving a failed reference temperature instrument from the turbine, power increased to greater than 100 percent and average reactor coolant temperature increased to its technical specification limiting condition. The balance of plant operator decreased turbine load causing average temperature to further increase, which aggravated the transient.

2. In an exercise involving the loss of a diesel bus, the operators did not understand why the load sequencer for the diesel generator actuated. One crew considered the actuation to be spurious. The sequencer had properly actuated due to loss of power on the diesel bus.

Response:

An initial assessment of training program needs has been determined through the evaluations of simulator performance and discussions between the Operations Manager and Director, Nuclear Training described in the response to Recommendation (OP.4-1). This will be supplemented by continuing evaluations and adjustment of the training curricula.

The results of last year's requalification program and annual test weaknesses have been reviewed and corrective training has been incorporated in Requalification Cycles 88-1 and 88-2. (Completion date March 21, 1988). As requalification progresses, additional evaluation results of both simulator and classroom performance will be used to assist in determining the content of follow-on training and enhancements to procedures.

Specific Response to Item OP.4-3.a:

Procedural compliance and use of the Technical Specifications will be emphasized more strongly in requalification training curricula and simulator scenarios. Familiarity with and facility with the emergency operating procedures will be rehearsed during all requalification training.

Specific Response to Item OP.4-3.b:

The specific system knowledge deficiencies regarding the manual mode of operating the reactor makeup system, the control rod and control rod position indicating system, and the steam dump system have been reviewed in recent training sessions. Each requalification training cycle reviews and reinforces system knowledge for selected systems.

Specific Response to Item OP.4-3.c:

The knowledge deficiencies concerning integrated system response are a combination of inadequate knowledge and inadequate communication between operators. Both of these issues are being addressed in each requalification training cycle, with the primary emphasis on effective communications between the operators and between the operators and the supervisors.

RECOMMENDATION (OP.4-4)

Provide closer supervisory oversight of and involvement with auxiliary operator (AO) performance to prepare them for plant operation. Performance problems were observed with AOs during rounds and other activities. The AOs did not receive formal training on rounds or plant systems prior to qualification, and their performance on rounds has not been monitored by their supervisors. The following are examples of performance problems observed:

a. One AO did not check oil levels on the station service water pumps. These pumps were the only major operating pumps on the watchstation.

b. One AO did not know how to silence, acknowledge, or reset alarms on two fire panels. The same AO allowed the diesel fire pump to operate without a flow path for greater than two minutes, contrary to procedure.

c. Some AOs only recorded required parameters on their round sheets without thoroughly checking equipment and plant areas for abnormal conditions.

d. None of the AOs routinely tested local panels for burned out annunciator bulbs.

Response:

An evaluation of all Auxiliary Operators and Reactor Operators for ability and technical knowledge required for their job classification will be complete by April 1, 1988. Common weaknesses discovered during operator evaluations will be analysed and used to tailor the training programs to correct the deficiencies noted.

The Shift Supervisors have been instructed to assign the Unit 2 Assistant Shift Supervisors to work with Auxiliary Operators (AOs) and to observe rounds and log taking. The Operations Manager is monitoring AO progress.

The initial definition of a training course for AOs has been completed and the first several AO Requalification Training Cycles have been developed. These will be used throughout 1988.

All Auxiliary Operators will have completed (or exempted by testing) a systems course by August 1, 1988. This systems training will be complemented by additional training identified by the evaluation process.

Existing procedures (Abnormal Conditions Procedures (ABN), System Operating Procedures (SOP), Integrated Plant Operating Procedures (IPO) and Emergency Response Guidelines (ERG)) are being reviewed for those specific actions required of the Auxiliary Operators. These will be incorporated into specific training for the AOs during the 1989 requalification cycle training sessions.

Operations Department Administrative Procedure ODA-301, "Operating Logs" contains standards of logkeeping that will be stressed during AO Requalification Training during 1988. (Expected completion date June 1, 1988).

The Operations department has set aside 4 to 8 hours per week during the Auxiliary Operators' Requalification Training to focus on operational standards, plant events and industry events related to the AO.

Specific Response to Items OP.4-4.a, b, c, and d:

Each of the observed deficiencies is presently included as an item of proper watchstanding routine in ODA-301. The training emphasis will focus on enforcing existing requirements.

RECOMMENDATION (OP.5-1)

Review and revise operational procedures to ensure they are technically adequate to support plant operations. Many operational procedures contain technical deficiencies and have not been maintained current. The following are examples of problems noted:

a. Many alarm procedures lack sufficient guidance to be useful to operators responding to alarms. Some of the procedures provide little guidance beyond dispatching an operator to investigate. In some cases, the probable causes listed for the alarms are not the most likely causes. For example, the probable causes listed for a residual heat removal (RHR) pump high discharge pressure alarm are improper valve lineup and fouled heat exchanger. More probable causes such as leakage through an isolation valve or reactor coolant system pressure perturbation while on shutdown cooling are not listed in the procedure.

b. Many abnormal procedures contain technical deficiencies. For example, ABN 104A, "RHR System Malfunction", does not address any of the industry lessons learned from loss of RHR during mid-reactor coolant loop operation. Examples of lessons not incorporated in this procedure include not starting a second RHR pump until the reason for the loss of the first pump is known, and actions to take if a pump becomes air or steam bound. Other examples of abnormal procedures with technical deficiencies include ABN 301A "Instrument Air System Malfunction" and AB 103A, "Excessive Reactor Coolant Leakage" ABN 301A does not describe adverse consequences to the plant on loss of instrument air and ABN103A does not address reactor coolant system temperature change as a possible cause of the symptoms for excessive reactor coolant leakage.

c. Many operational procedures have not been revised for greater than three years. A substantial backlog of procedure comments exists that have not been incorporated into the procedures.

Response:

A schedule has been developed to review and revise as necessary, all Operations procedures except Alarm Response (ALM), by September 1, 1988. This review will assure that technical deficiencies are corrected and that lessons learned from industry are incorporated, including the examples identified by INPO. The backlog of outstanding procedure comments will be reduced. Priority will be given to assure that all procedures necessary to support plant heatup, Emergency Response Guidelines and Integrated Plant Operating Procedures are revised and training has commenced by September 1, 1988.

Specific Response to Item OP.5-1.a:

The Alarm Response Procedures Manual (ALM) for the control room will be completely revised by December 1, 1988, with the majority of the procedures completed prior to plant heatup or October 1, 1988, whichever is earlier. The revision will assure that the operator is provided adequate guidance in responding to alarms. The ALMs for local alarms will be completed by April 1, 1989. Probable causes will be reviewed and revised to incorporate the latest experience available through industry reports.

Specific Response to Item OP.5-1.b:

CPSES began a major revision process for all Operations department procedures on September 1, 1987. Each of the procedures listed in this item have been revised to correct the deficiencies noted by INPO. These revisions were in process at the time of the visit. Update of the RHR procedure to incorporate issues developed as a result of NRC Generic Letter 87-12 will be completed after data is obtained from a flow vortex test, scheduled after plant heatup. Procedures dealing with RCS mid-loop operation and loss of RHR will be complete by April 1, 1989.

Specific Response to Item OP.5-1.c:

The backlog of procedure comments that has accumulated is being reduced rapidly by the procedure revision effort described in the response to Item (OP.5-1.b) and by the streamlining of the process by which changes (as opposed to complete revisions) of procedures are processed. Each shift crew has been given responsibility for several systems to coordinate all procedure reviews, system walkdowns and required design modification reviews. This is expected to reduce the backlog of procedure changes and to enhance a sense of professionalism among the operators.

RECOMMENDATION (OP.5-2)

Develop controlled load lists/drawings and procedures to enable operators to readily identify loads on electrical panels and busses. This information is needed to enable operators to respond to a loss of a bus, isolate a ground, and understand the consequences of tagging out a breaker. Existing plant electrical drawings and procedures are not adequate for these purposes. The following problems were observed:

a. Two supervisors were unable to identify the specific loads off a breaker on a vital DC bus with information available in the control room. The supervisors traced the circuity through three drawings with the third drawing referencing another drawing not available in the control room. A similar situation occurred when trying to identify the power supply to a pressurizer pressure transmitter.

b. While performing clearance reviews, an operator was unable to locate the specific load off a 120 volt AC breaker that was included in the clearance request. The drawing with the needed information was not available in the control room.

c. Procedures have not been developed to identify deenergized loads when an electrical bus is lost. For example, during an observed loss of a startup transformer, no procedure was available to enable the operators to readily identify deenergized loads when the electrical busses supplies by the transformer were lost.

Response:

Operations and Comanche Peak Engineering (CPE) have defined the vital Station Drawings and other drawings needed by the Control Room to support clearances, tagging, equipment isolation and operations. CPE is developing a schedule for implementation of actions, including implementation of the Computer Assisted Drawings (CAD) system in the Control Room. Graphic terminals will be provided in the control room to display vital station drawings and link with the ACCESS (Automated Configuration Control & Equipment Support System) computer system. The ACCESS database and data processing software will be enhanced such that electrical load information will be readily available. Procedures will be revised to ensure the continued update of ACCESS for plant modifications.

Enhancement of the database will be completed by July 1, 1988. Enhancement of the data processing software and the addition of graphic terminals to the control room will be completed by September 1, 1988.

New Abnormal Operating Procedures will be written to address loss of load and loss of DC busses and to enhance existing alarm and abnormal procedures. (Expected completion date December 1, 1988).

Specific Response to Items OP.5-2.a and b:

The combination of updated hard copy vital station drawings and the availibility of a CAD terminal will provide the necessary drawing information to the control room. The ACCESS data base and processing software will allow operators to quickly determine what loads are supplied from a given source, or to determine the power supply for a given load.

Specific Response to Item OP.5-2.c:

Procedures will be provided for the operational use of the ACCESS software to determine load interrelationships. However, the development of Abnormal Operating Procedures for actions to follow when a particular bus is lost will provide the operational direction necessary.

TRAINING AND QUALIFICATION

RECOMMENDATION (TQ.1-1)

Identify knowledge and skill weaknesses of current job incumbents and provide training to correct identified weaknesses in time to support plant startup. This training should include industry and plant events, plant modifications, procedure changes and should be provided on a continuing basis. This should be a coordinated effort between the training department and the station departments. The following are examples of knowledge and skill weaknesses noted:

a. Some licensed operators demonstrated knowledge and skill weaknesses in the simulator. Examples are as follows:

   1. In two exercises dealing with a failure of the reactor makeup control system to operate in any mode except manual, both reactor operators (RO) were unable to operate the system (even utilizing the procedure) without help from the instructor. One student attempted to figure out the system by looking at a station drawing detailing the control logic, but could not read the drawing. The resulting delays in injecting boron into the reactor coolant system (RCS) contributed to problems encountered in controlling average temperature.

   2. In one reactor startup exercise, the RO did not notice that the rod selector switch was still positioned for shutdown bank E. He actuated the rods-out switch and shutdown bank E group position indicator stepped to step 230. The RO then reinserted shutdown bank E to step 228. The RO incorrectly stated the rods were now at step 228. By design, the rods will not move out beyond step 228. Thus, when the RO repositioned the bank demand counter to 228, the rods actually moved in to step 226.

b. Auxiliary operators exhibited some performance problems as well as inconsistencies during the conduct of their rounds. The following items are contributing factors:

   1. Auxiliary operators are not required to demonstrate proficiency in watchstanding and making rounds prior to qualification.

   2. Auxiliary operators are not provided training on systems they are responsible for monitoring during rounds prior to qualification.

c. Some plant chemistry personnel were weak in their knowledge of basic laboratory terms. For example, they were unfamiliar within the following:

   1. purpose of control charts

   2. definition of self-absorption

3. difference between precision and accuracy

d. Maintenance personnel were not prepared to effectively work in radiological controlled areas. The following problems were observed during maintenance work in a simulated radiologically controlled area:

   1. While donning protective clothing, three workers had to be coached on each step of the procedure governing the proper wearing of clothing designed to protect workers from radioactive contamination.

   2. The protective hoods worn by workers did not cover all areas of the face around the respirator nor a sufficient amount of the neck and shoulder area to protect workers from skin contamination during work activities.

   3. Four workers were asked at the entrance to the work area what their administrative radiological dose limits were for the job. None of these workers could correctly state the 300 millirem limit although this limit was written on the individual dose card issued to each worker.

e. Training and qualification programs are not implemented for electrical and mechanical maintenance personnel. The following items were noted during interviews with electrical and mechanical maintenance supervision:

   1. There is no formal process to qualify electrical and mechanical maintenance personnel.

   2. Supervisors have no means of verifying assigned personnel are qualified.

   3. Training for electrical and mechanical maintenance personnel consists of following experienced personnel on the job for a period which does not ensure personnel develop and demonstrate skills and knowledge necessary to perform the task associated with the position.

f. Some plant radiation protection technicians demonstrated knowledge and skill weaknesses. During interviews, answers to questions concerning the following issues were not consistent with station procedural guidance or requirements.

   1. personnel contamination level at which station policy requires investigation

   2. definition of "hot spot"

   3. definition of "facial contamination"

During maintenance work in a simulated radiologically controlled area, the following skill problems were observed:

1. A radiation protection technician instructed the worker to walk onto the contaminated area step-off pad while wearing a hood, a pair of coverall, and a pair of plastic booties. The step-off pad clearly stated "remove protective clothing before stepping here."

2. The radiation protection technician instructed the worker to remove his outermost rubber show covers, one of the items most likely contaminated, while wearing only a pair of thin cotton glove liners which do not provide protection from contamination. This action increases the likelihood of contaminating the worker's hands.

g. Some plant personnel were weak in their knowledge of industry events. Examples are as follows:

1. Licensed operators were not familiar with industry events involving creation of a bubble in the reactor vessel during natural circulation.

2. Some auxiliary operators were weak in their knowledge of motor-operated valves and associated industry events. The auxiliary operators stated they had not been trained on motor-operated valves and associated industry events.

3. Four of five radiation protection technicians could not recall significant radiological events dealing with spent fuel pool dives, refueling cavity entries, radioactive resin processing activities, and work near radioactive waste storage tanks. These evolutions have created unplanned high radiation exposures to personnel at other plants.

4. Some chemistry technicians were weak in their knowledge of industry events concerning resin intrusions and their effects.

Response:

A formal methodology for assessing skill and knowledge weaknesses has been developed. This methodology resulted from the standards development project for INPO Accreditation which began in December 1985. The standards resulting from the project are called the "Accomplishment-Based Curriculum Development System".

Diagnostic Front-End Analysis is employed in the assessment of knowledge, skills and abilities to determine skill and knowledge weaknesses that have training solutions. This system of analysis is consistent with INPO 87-007, "Human Performance Evaluation System", in that root cause of performance problems is determined in order to develop appropriate solutions.

Training solutions identified from these assessments result in changes to the training curriculum.

Inputs from design modifications, industry and plant operating experience, procedure changes, department requests, Quality Assurance findings, commitment tracking, INPO, NRC, etc. are utilized to initiate these assessments.

A formal training Configuration Management System to status and track these inputs has been established. Curriculum changes identified by this process may result in revised training materials, simulator changes and/or training equipment changes.

Training Committees will be established among departments/sections to provide coordination, prioritization, and feedback for identified knowledge and skill weaknesses of job incumbents. The committees will be formed and commence meetings by April 1, 1988. They will meet regularly to provide current updates to plant and departmental training needs.

Specific Response to Item TQ.1-1.a:

Specific actions being taken to correct weaknesses observed in licensed operator performance, particularly in the simulator, are addressed in the responses to Recommendations (OP.2-1), (OP.4-1), (OP.4-2), and (OP.4-3). Increased emphasis on the use of the manual-manual mode of reactor makeup control is planned for requalification training during calendar year 1988. With respect to the INPO observation concerning the rod control system, it should be noted that at CPSES, the rods may physically be moved to 230 or 231 steps, depending on lead screw thermal expansion. Thus, the operator's action and report were correct.

Specific Response to Item TQ.1-1.b:

Auxiliary operator performance problems are addressed in the responses to Recommendations (OP.2-1) and (OP.4-4).

The January 1988 revision to the Auxiliary Operator Fundamentals Course includes specific training in the area of watchstanding and conduct of rounds. Training Administrative Procedure TRA-202, "Auxiliary Operator Training" is being revised and will include specific methods of evaluating watchstanding skills and knowledge. It will also require that AOs have completed that portion of the Auxiliary Operator Systems Course applicable to each watchstation before qualification on that watchstation. This revision is scheduled to be complete by September 30, 1989.

The Auxiliary Operator Walkdown Program provides Auxiliary Operators with training on systems they are responsible for, and is required prior to watchstation qualification. Normally, the AO trainees attend formal classroom training on these same systems prior to completing the walkdown requirements. However, this is not required by TRA-202, and there are some AOs that have not received formal classroom training. This problem was compounded by sending 13 Auxiliary Operators to Braidwood for approximately one year of "start-up plant experience". Although the disruption of the normal training cycle is recognized as undesirable, the value of the practical experience is generally regarded more highly than strict adherence to a structured classroom/walkdown schedule.

Specific Response to Item TQ.1-1.c:

Refresher training for chemistry personnel, as described in the response to Recommendation (CY.2-1), will include emphasis on basic laboratory terms.

Specific Response to Item TQ.1-1.d:

Maintenance personnel will be prepared to perform work in radiologically controlled areas in accordance with the actions described in the response to Recommendation (RP.3-1). This will include practice in donning and removing protective clothing, including proper fit of hoods and closure of all openings, and will emphasize the importance of individual responsibility for knowledge of administrative limits.

Specific Response to Item TQ.1-1.e:

A specific program for training and qualification of mechanical and electrical maintenance personnel will be in place by June 1, 1988.

A project was begun in June 1987 to update all Training Administrative Procedures (TRAs). It is scheduled for completion in June 1988. A "qualification path description" is defined by the Job-Task Analysis process. This qualification path will be the formal process by which electrical and mechanical maintenance personnel are qualified.

A computerized report generation system has been developed by the Training department and will be made available to the supervisors at a remote terminal by July 31, 1988. This report system will directly access the training database and give the supervisor the most up-to-date status of personnel qualification available.

The Job-Task Analysis and the overall design of training program content for electrical and mechanical maintenance personnel will be complete by December 31,1988. In the interim, specific training needs will be addressed on a case-by-case basis as identified by the departmental assessments and the Training Committees.

Specific Response to Item TQ.1-1.f:

Radiation protection technicians are periodically scheduled for refresher training in accordance with Training Administrative Procedure TRA-301, "Radiation Protection Section Training Program". A RP Specialty Training session, "Contamination Control", is scheduled for December 1988. It will specifically cover the definition of "facial contamination" and will review the personnel contamination level at which station policy requires investigation. Another RP Specialty Training session, "Surveys and Posting", specifically covers the definition of a "hot spot". It will be delivered during 1988 at a time most convenient to overall radiation protection section needs.

"Dry run" training for plant personnel is described in the response to Recommendation (RP.3-1). During this training, which is for the benefit of radiation protection technicians as well as other radiation workers, skills will be observed and corrective action taken as necessary.

Specific Response to Item TQ.1-1.g:

Appropriate industry events (i.e., those that have a direct significance and relation to CPSES and to the individual's job performance) are included in the various training curricula. In addition, those that are evaluated by the Induscry Operating Experience Review group are distributed to managers and supervisors for further reveiew and discussion at the working level. As discussed in the response to Recommendation (OE.3-1), recognizing that there is a deficiency in the exposure and/or retention of this information at the working level, additional steps will be taken to improve the presentation of this material.

The specific items identified by INPO during the assistance visit have been reviewed with the appropriate personnel.

RECOMMENDATION (TQ.1-2)

Implement an initial and continuing instructor training program that includes instructional techniques used in laboratory, simulator, and on-the-job settings. Personnel assigned as instructors should be trained in areas appropriate to their job assignments. Also, the program should include weaknesses noted during periodic evaluations of instructor's performance. INPO 82-026, Technical Instructor Training and Qualification, should be of assistance in this effort.

Response:

An initial and recurrent instructor training program based on Job-Task Analysis that includes instructional techniques used in classroom, laboratory, simulator and on-the-job settings has been initiated as part of the preparation for INPO Accreditation.

This Job-Task Analysis and training development meets the standards of the Accomplishment-Based Curriculum Development System. The curriculum identified for curriculum development instructors and for procedures/methods writers has been developed and introduced into the training program.

The project was begun in January 1987. A vendor was selected and placed under contract to assist in development in February 1987. INPO 82-026, "Technical Instructor Training and Qualification", was used as an initial scoping document for the project. The total project is scheduled for completion in December 1988.

RECOMMENDATION (TQ.8-1)

Develop the teamwork and diagnostic skills needed by licensed operators to perform their job functions to control the plant during off-normal conditions. Provide classroom training in the fundamentals of these skills and develop simulator scenarios that train operators to diagnose and respond to a variety of plant events. Current training only focuses on normal plant operations.

The following problems are attributed to the lack of teamwork and diagnostic skills training:

a. During 1987, licensed operator requalification training consisted of only seven scenarios that exercised emergency operating procedures. Of those seven scenarios, for involved steam generator tube ruptures. However, in three of three observed simulator exercises, the team was unable to diagnose the existence of a steam generator tube rupture.

b. Operators have not been adequately trained on the simulator to recognize conditions that can lead to a premature criticality. For example, two of two teams failed to recognize the reactor was going to achieve premature criticality and permitted the reactor to achieve criticality with a startup rate in excess of the administrative limits.

c. The operators had difficulty using the emergency operating procedures to mitigate the consequences of multiple failures. For example, when given an exercise involving a small break loss of coolant and a design basis steam generator tube rupture, both observed teams failed to transition through the various emergency operating procedures to the proper procedure for the tube rupture.

d. One reactor operator started a load reduction at 10 megawatts per minute and did not inform the other reactor operator. Control rods were in manual and average reactor coolant temperature increased greater than the technical specification limiting condition for operation.

e. The only person on the team aware of a design basis tube rupture (460 gpm) condition was the shift technical advisor (STA). The STA was not involved in the activities of the team and did not know the team was unaware of the tube rupture.

f. In one design basis steam generator tube rupture exercise, a reactor operator was distracted by unnecessarily trying to help the other reactor operator at another part of the control board and allowed steam generator level to decrease (about 15 percent narrow-range level) in all three intact generators.

INPO Good Practice TQ-503, Developing Teamwork and Diagnostic Skills, could be of assistance in this effort.

Response:

Teamwork and diagnostic skills training are being developed as part of the Reactor Operator, Senior Reactor Operator/Shift Supervisor training project for INPO Accreditation. Job-Task Analysis is being employed that meets the standards of the Accomplishment-Based Curriculum Development System. This project was begun in December 1987. The first products are prioritized to be Fuel Handling to support initial fuel load and Diagnostics and Team Skills to support initial operations. These first products are scheduled to be ready to introduce into initial and requalification training in August 1988.

This project utilized INPO Good Practice TQ-503, "Developing Teamwork and Diagnostic Skills", as an initial scoping document. The methodology meets the standards for outputs now required by NRC License Requalification examinations.

In light of weaknesses identified during the 1987 Annual Exam, the INPO Simulator Assessment, and INPO Recommendation (TQ.1-1), training in teamwork and diagnostic skills has been introduced in the 1988-1989 requalification cycles. This training is based on standards developed by Operations and guidelines based on subject matter from INPO, EPRI and vendors. The results of RO and SRO Job-Task Analysis, when completed, will be used to validate the developed material.

Additional actions that have been taken relative to developing teamwork and diagnostic skills are described in the responses to Recommendations (OP.1-1): better control of plant conditions, (OP.2-1): improved standards for the conduct of operations, (OP.4-1): improved ability to control the plant during abnormal conditions and plant casualties, (OP.4-2): improved ability to prevent an inadvertent criticality, (OP.4-3): correction of knowledge weaknesses, and (OP.4-4): improved AO performance and better supervisory oversight.

Specific Response to Item TQ.8-1.a:

After identifying in 1986 that simulator training had not included sufficient exposure to the plant in its most likely configuration and the need to emphasize good routine watchstanding practices, additional emphasis was placed on normal operation in 1987. The last requalification cycle of 1987, however, was dedicated to preparation for the annual exam. This consisted of training on emergency scenarios which required extensive use of the Emergency Response Guidelines.

Emphasis on normal operation will continue to be necessary as the plant prepares for fuel load and initial startup. However, it is recognized that additional training in the area of emergency operations is necessary. This will be accomplished by using scenarios that include multiple event malfunctions during the last 30 minutes to one hour of simulator training.

Specific Response to Item TQ.8-1.b:

The failure to recognize and respond properly to conditions leading to premature criticality is recognized as a significant skill and knowledge deficiency. In order to correct this deficiency, the following actions will be taken by June 1, 1988:

- A comparison of actions in Initial Startup Test Procedure ISU-001, "Initial Fuel Load Sequence", will be made to Integrated Plant Operating Procedure "IPO-002, Plant Startup from Hot Standby to Minimum Load". If appropriate, additional guidance will be added to IPO-002.

- A review of industry events regarding premature criticality will be performed to extract appropriate lessons to be learned.

- Appropriate training will be developed and administered in the areas of recognition of and proper response to premature criticality, based on the lessons learned from industry experience and any changes to IPO-002.

Specific Response to Item TQ.8-1.c:

The operators' inability to use the Emergency Response Guidelines with facility is recognized as a generic skill and knowledge deficiency, as well as a deficiency in the licensed operator training program.

Additional training in the use and background of the Emergency Response Guidelines will be developed using material supplied by the Westinghouse Owners Group and information contained within INPO Guideline 86-026, "Guideline for Simulator Training". This training, along with increased emphasis on emergency scenarios, will be included in Replacement License Training and will be administered in requalification training during the 1988 calendar year.

Specific Response to Items TQ.8-1.d through f:

The need for specific guidelines in communications, as well as clearly defined roles and responsibilities for all control room personnel, has been recognized.

See the specific response to Item (OP.2-1.a) regarding the action that has been taken to define roles and responsibilities, and the specific response to Item (OP.2-1.b) regarding the promulgation of communications guidelines. Also, see the response to Recommendation (OP.4-1) concerning the use of an Operations Review seminar conducted by the Operations Manager to provide continuing current emphasis to these areas.

RECOMMENDATION (TQ.8-2)

Train simulator instructors to identify and critique performance problems during simulator training. Numerous operator performance problems were noted during simulator observations which were not critiqued. Also, the critiques usually did not identify methods operators could use to prevent recurrence of errors made during training exercises or methods to improve performance. The following are examples of problems observed with simulator post-exercise critiques:

a. Performance of two teams of operators was considered to be satisfactory by the instructor even though both operating teams demonstrated the following significant performance problems:

   1. Operators did not recognize the reactor was being taken critical below the rod insertion limit.

   2. Once critical, the operators took no action to reduce the startup rate and thus exceeded the administrative limit for startup rate.

   3. Operators failed to diagnose a failed boron instrument even though the reading of 374 ppm on the instrument should have increased by 1100 ppm due to boron addition.

b. Operators were provided an opportunity to discuss their performance only after the instructors had discussed all of the errors they observed. In fact, during one critique, the instructor discouraged self-critiques of performance problems by the operators. These practices can result in an unwillingness by the operators to further discuss their performance.

Response:

TU Electric agrees with the importance of having simulator instructors capable of detecting and properly critiquing operator errors in the course of simulator training. In recognition of this, Simulator Scenario Guides have been developed to assist the instructor in anticipating operator performance and to provide performance standards for a given evolution. These guides outline the operators' expected responses and indicate any situations where possible operator error is likely. They were provided to INPO, as requested, prior to the site visit, but were not used. The INPO scenario content was provided to the instructors the evening before the exercise, thus leaving insufficient time for development of instructor guides appropriate to the scenario.

Regardless of what factors may have contributed to the observed failure to identify specific performance problems during the critique, it is recognized that additional training in the area of simulator instructor technique is necessary.

Recommendations by INPO on an effective method for conducting post exercise critiques, based on their observations at Arkansas Nuclear One, have been field tested during requalification cycle 88-1. This method worked well, and plans are to continue using this method.

Training development for simulator instructors is a sub-project of the instructor training development project, described in the response to Recommendation (TQ.1-2). This sub-project, handled as "Special Settings for Instruction", is scheduled on a priority basis within the overall project for completion by September 1988.

As described in the responses to Recommendations (OP.2-1) and (OP.4-1), the Operations Manager and Director, Nuclear Training have committed to regular (weekly) evaluations of simulator training. Critiques of participant and instructor performance are facilitated and evaluated. The simulator instructors also participate in the weekly "Operations Review" conducted by the Operations Manager.

INPO has been requested to provide a training session for simulator instructors. This has been scheduled for July 1988.

Specific Response to Item TQ.8-2.a:

The current participation by the Operations Manager and the Director, Nuclear Training in selected critiques of simulator exercises is assisting instructors in recognizing inadequate student performance and in making appropriate assessments of the relative seriousness of various events in evaluating overall performance. This will be reinforced in the instructor training program.

Specific Response to Item TQ.8-2.b:

Under the present critique methodology, students are encouraged to participate in the critique in an interactive exchange, facilitated by the instructor (or another suitable person, such as the Operations Manager, if present). This encourages students to identify their own performance as adequate or inadequate and to take responsibility for it.

RADIOLOGICAL PROTECTION

RECOMMENDATION (RP.1-1)

Establish and implement an integrated action plan that will ensure all radiation protection functions necessary for plant startup are completed in a timely manner. The plan should be developed to be compatible with the station startup schedule. Establish milestones and realistic goals to assist in monitoring progress. Assign responsibilities to the key personnel involved in implementing the plan.

It is recognized that radiation protection supervisors have established some informal preliminary plans and, in some cases, have developed time charts for certain projects. However, efforts to coordinate and track radiation protection department support preparations have been limited. The following planning problems were noted:

a. Plans to support contamination control

   1. Plans for local personnel contamination frisking areas and local protective clothing issuance points have been considered but not fully developed.

   2. Little progress has been made to establish a radiologically controlled area (RCA) tool crib, although the need to control contaminated tools and equipment through this approach has been recognized. Also, RCA tool stocking requirements have not been determined.

b. Plans to support radioactive material control

   1. Plans have not been fully developed for storage areas for radioactive materials and equipment such as contaminated lead blanket shielding, contaminated scaffolding, instrument and control test equipment, and outage-related equipment and tools.

   2. Although contingency plans have been considered for providing temporary radioactive waste processing, radioactive laundry, and respirator cleaning trailer facilities during initial stages of plant operation, these plans are not coordinated and developed sufficiently to establish support facilities and radiological protection requirements.

   3. Plans to provide alternate breathing air in lieu of the unusable plant breathing air system are not firmly set.

Response:

An action plan for ensuring that all Radiation Protection functions necessary for plant startup are completed in a timely manner has been developed and integrated into the Nuclear Operations Readiness for Operation Plan.

The informal preliminary plans noted by the INPO representative have been integrated into the overall plan. Milestones and goals have been linked to key project milestone dates. In addition, firm "late start" and "late finish" dates have been assigned to account for the variability and uncertainty of the project schedule. Functions have been segregated into specific responsibility areas for completion of the required action. Task durations and interrelationships have been determined.

As described in the response to the Corporate Assistance Visit Recommendation (2.12A-1), the Corporate Radiation Protection organization will provide an independent review of this action plan and provide input to the Station management. This comprehensive review will include utility peer evaluation, whenever possible.

Specific Response to RP.1-1.a:

Identification of contamination frisking station locations and protective clothing issuance points will be completed by July 1, 1988.

Procedures to control radiologically controlled area (RCA) tools and to determine RCA tool stocking requirements will be prepared by August 1, 1988.

The facilities and equipment required to support radioactive tool control will be determined by December 31, 1988 and their acquisition and installation will be scheduled at that time in the Nuclear Operations Readiness for Operations Plan.

Specific Response to RP.1-1.b:

Procedures to control storage areas for radioactive materials and equipment will be prepared by August 1, 1988.

The facilities and equipment required to support radioactive equipment storage will be determined by December 31, 1988 and their acquisition and installation will be scheduled at that time in the Nuclear Operations Readiness for Operations Plan.

Contingency plans for temporary radioactive waste processing, radioactive laundry, and respirator cleaning will be prepared by November 1, 1988.

Plans for the provision of alternate breathing air will be prepared by November 1, 1988.

RECOMMENDATION (RP.1-2)

Continue to develop and implement routine policies that will enable good radiological protection performance in radiologically controlled areas (RCA) on a daily basis. Review current station and radiation protection department policies to determine their effectiveness based on established industry standards. Ensure policies will provide effective daily guidance and will be fully implemented prior to plant startup. The following examples of radiological protection policies have not been fully developed:

a. authorization and inventory of radioactive material storage

b. requirements for controlling, inventorying, and marking of RCA tools

c. specific controls of contaminated vacuum units and portable air-filtration ventilation units

d. selection of markings on and types of waste segregation containers at contaminated area exits

e. requirements for personnel contamination monitoring after exiting contaminated areas

f. requirements for respirator issuance, tracking, and follow-up

g. requirements for radioactive material marking and labeling

Response:

The efforts of the Radiation Protection Manager, as supervised by the Manager, Technical Support and the Vice President, Nuclear Operations, are consistently devoted to the development and implementation of routine policies that will assure good radiological protection performance on a daily basis. All current station and radiation protection department policies are in the process of review to determine effectiveness based on established industry standards. As plant conditions permit, the implementation of particular portions of the radiation protection program progresses appropriately. Prior to plant startup, all radiation protection program procedures and policies will be fully implemented.

Specific Response to Items RP.1-2.a through g:

Station Administrative Procedures STA-652, "Radioactive Material Control", STA-656, "Radiation Work Control", and STA-659, "Respiratory Protection Program" will be revised by June 1, 1988. These revisions will specifically include:

- Guidance for authorization and inventory of radioactive material storage areas.

- Requirements for controlling, inventorying, and marking of RCA tools.

- Specific controls for contaminated vacuum units and portable air-filtration ventilation units.

- Guidance for the selection of markings on and types of waste segregation containers at contaminated area exits.

- Requirements for personnel contamination monitoring after exiting contaminated areas.
- Requirements for respirator issuance, tracking, and follow-up.
- Requirements for radioactive material marking and labeling.

RECOMMENDATION (RP.1-3)

Review radiological protection procedures and verify all procedural guidance is clearly stated and instructions are consistent with good industry practices. All radiation protection procedures, both administrative and instructional, should establish a consistently high level of performance. The following problems were noted which should be addressed in the procedure upgrade program:

a. One procedure on personnel decontamination requires follow-up whole-body counting only if a positive nasal smear is found to be equal to or above 1,000 disintegrations-per-minute (dpm). Industry experience has shown internal contamination can occur in cases where nasal contamination is not present. Typical industry practice is to perform a whole-body count when facial contamination is present. Also, the procedure provides no clear direction to investigate personnel contaminations less than 20,000 dpm. Most personnel contamination levels are considerably less than 20,000 dpm in operating plants. Investigations of contamination incidents at levels below 20,000 dpm can be important in identifying and correcting program weaknesses.

b. The draft procedure of the respiratory protection program should reference corporate policy on the implementation of engineered controls as an alternative to mandatory respirator usage. Presently, the procedures do not address the use of engineered controls such as glove bags, portable containments, and portable ventilation equipment.

c. The procedure on radiological incident and problem reports should require documentation and investigation of radiological protection incidents that may point to program problems. Presently, the procedures do not address the documentation and investigation of incidents such as the unauthorized presence of radioactive materials outside the radiologically controlled area.

d. The procedure on dry radioactive waste minimization should provide clear guidance on sorting, survey, and release requirements for bags of trash from radiologically controlled areas. Presently, procedural instructions do not clearly state that each item of radioactive waste should be individually checked and surveyed to determine if beta radiation is present. Industry experience has shown that radioactive material may not be detected on individual items if only the bag is surveyed because of shielding by the contents of the bag and by the bag itself.

Response:

Radiation Protection procedures are reviewed regularly (at least every two years) and revised as appropriate to increase efficiency, to ensure a consistently high level of performance and to upgrade to established industry standards. TU Electric is fully committed to conservative radiological protection policies, to reflecting this conservatism in our procedures, and to instilling the practice of this conservatism through training and consistent management oversight and involvement.

The specific examples cited regarding procedural inadequacies have been reviewed, and current revisions are considered consistent with accepted industry practice, as explained in the specific responses.

Specific Response to Item RP.1-3.a:

The problem identified refers to Instruction HPI-402, "Personnel Decontaminatin and Skin Dose Determination", which states: "Positive smears (>1000 dpm) require bioassay analysis." (Emphasis supplied). However, the conservatism to which personnel are trained and on which a decision to do an optional bioassay would be based, is contained in Instruction HPI-500, "Bioassay Program", which requires that whole body counts (WBC) be performed in the case of "any accidental internal exposure, whether real or suspected ...". HPI-500 also cautions and states that "Negative nasal smears should NOT be used as the only basis for waiving bioassay analysis."

Instruction HPI-402 requires that personnel contaminations greater than minimimum detectable activity (1000 dpm) be documented, evaluated and reviewed by a Radiation Protection Supervisor. It further requires that "Personnel found with any detectable contamination will be decontaminated using the guidance in Section 4.2;..." A 20,000 dpm contamination level is defined by this instruction as a "Serious Personnel Contamination", and requires the additional action of preparing a Radiological Incident/Problem Report.

Specific Response to Item RP.1-3.b:

The current Health Physics Instruction HPI-905, "Selection and Use of Respiratory Protection Equipment", states:

> "4.3 Selection considerations: Upon determination that engineering controls, such as process, containment, and ventilation are not feasible, or cannot be applied, respiratory protection may be used."

The draft of Station Administrative Procedure STA-659, "Respiratory Protection Program", has been revised to contain reference to and to specifically state the policy contained in NEO Policy 37, "Respiratory Protection", i.e., "Only when such controls (engineering control measures such as process, containment and ventilation) are not reasonably achievable will the use of respiratory protection devices be permitted."

Specific Response to Item RP.1-3.c:

Procedure HPA-108, "Radiological Incident/Problem Report", states that such reports "will be used to provide the framework for identifying unusual or abnormal occurrences associated with the radiation protection program at CPSES." The listing of problem areas for which a Radiological Incident/Problem Report (RIPR) should be initiated, is not intended to be all-inclusive, but it does include administrative control violations such as "violation of radiological warning signs or barriers". In the next revision of HPA-108, the specific problem of unauthorized presence of radioactive materials outside the radiologically controlled area will be added to the list of typical administrative control violations.

Specific Response to Item RP.1-3.d:

Procedure HPA-118, "Dry Active Waste Minimization" states that "Bags of waste reading less than 10 mrem/hr at contact should be opened for inspection in a low background area. Items of waste reading less than 1000 dpm/probe area above background should be placed in a green plastic bag and disposed of as non-radioactive waste." It further states: "Bags of waste reading greater than 10 mrem shall not be opened, and shall be disposed of as radioactive waste." These instructions clearly specify that when the outer bag survey produces radiation levels less than 10 mrem/hr, the individual items must be surveyed. Radiation protection technicians (users of this procedure) are familiar with the fact that this survey is for the purpose of detecting beta radiation that might have been shielded by the bag.

RECOMMENDATION (RP 1-4)

Upgrade and complete facilities needed to support radiological protection activities. Ensure these facilities are operational, that necessary procedures are issued, and personnel are trained to use the facilities prior to plant operation. Currently, several facilities have significant limitations in support capabilities, and plans to upgrade these facilities have not been fully formulated. The following are examples of problems noted:

a. The hot machine shop has no area for large item decontamination. In addition, the hot machine shop does not contain a crane to handle heavy items, has limited access and low ceilings, and has floor drains connected to Unit 2 drain tanks.

b. Plans have not been formulated to achieve access through the containment equipment hatch, although the bottom of the hatch is elevated more than 20 feet above the outside ground level.

c. Solid radioactive waste processing areas and facilities have not been fully developed, including areas for sorting, compaction, storage, solidification, and resin dewatering.

d. Respirator washing, drying, and storage facilities have not been established.

Response:

Facilities necessary for radiation protection activities needed to support initial plant operation are essentially complete. However, because some facilities have limited capability, the following upgrades will be accomplished prior to receipt of an operating license:

Rerouting of the Hot Shop drain line from the Unit 2 Floor Drain Tank to the Unit 1 Floor Drain Tank.

Addition of a filter-demineralizer system to process liquid waste

Addition of piping and valves required to allow a service contractor to process spent resins and concentrates

Addition of portable waste storage containers/ modules for interim storage of radioactive waste

Longer range plans include a design modification request to provide a facility (new building) for the following processes:

Spent resin packaging

Spent cartridge filter packaging

Liquid waste solidification

Liquid waste processing

Contaminated laundry services

Respirator decontamination and storage

Storage of re-usable radioactive materials (Outage supplies)

Dry active waste (DAW) sorting and packaging

Large item decontamination/machine shop facilities (RCP parts, outage scaffolding, etc.)

Construction of this facility will begin after receipt of an operating license.

Specific Response to Item RP.1-4.a:

Work on large items requiring decontamination will be accomodated on a case basis with the facilities available until the first refueling outage. The new facility will be ready by that time. In an emergency, this activity could be performed in the fuel building rail bay. The current hot machine shop facilities, although recognized as less than ideal, are adequate for the majority of small item tasks expected. The drain problem will be corrected prior to fuel load.

Specific Response to Item RP 1-4.b:

Planning activities for each outage will address the radiological controls requirements for moving equipment into and out of the containment via the elevated equipment hatch. The measures to be taken will be highly dependent on the activities planned for each outage.

Specific Response to Item RP.1-4.c:

Solid radioactive waste processing facilities which provide areas for sorting, compaction, and storage will be included in the new building. Existing facilities are adequate until the first refueling outage. Solidification and resin dewatering activities, for the forseeable future, will be contracted to vendors, using vendor supplied equipment.

Specific Response to Item RP 1-4.d:

Respirator washing and drying will be done with the available facilities for the immediate future. As a contingency, this service may also be contracted. Facilities for respirator storage are presently available. Additional storage will be included in the new building.

RECOMMENDATION (RP 3-1)

Train plant workers, through classroom sessions and practical training, on their responsibilities under the radiological protection program. Consider providing simulated radiological work exercises for those workers expected to perform routine jobs in radiation or radioactive contamination areas. These simulated exercises could include evolutions such as steam generator work, change-out of radioactive filters, and reactor coolant pump seal work. During these exercises, implement as many requirements of the radiological protection program as practical to ensure the program will be effective during actual radiological conditions. Reinstate general employee and radiation worker training for key radiation workers well in advance of plant startup. Problems observed during a simulated radiological work evolution include the following:

a. Workers were not familiar with the administrative dose limits assigned to them for this job.

b. Several workers were not familiar with the radiation and contamination levels anticipated in the work area which were written on the radiation work permit.

c. Workers had to be coached during each step of the donning and removal of protective clothing; also, workers were not familiar with the use of contaminated area step-off pads. Instructions provided by radiation protection technicians were not always consistent with good industry practice.

d. Job planning and preparation problems led to lengthy work delays in areas that, during plant operations, will be radiologically controlled.

Response:

As an essential part of the ALARA radiation protection program, the training of personnel to minimize exposure and potential for contamination will be emphasized in the months prior to actual commencement of operations. From 1983 through 1986, an effective dry-run training program was conducted that included training of over 100 mechanics, electricians and I&C technicians. The training was discontinued due to schedule uncertainties; but will be resumed, using similar successful techniques. Plant radiation workers will be trained on a continuing basis through classroom sessions and practical training, on their responsibilities under the radiological protection program. This training will include simulated radiological work exercises for those workers expected to perform routine jobs in radiation or radioactive contamination areas. Eventually these simulated exercises will include such activities as steam generator work, changeout of radioactive filters, and reactor coolant pump seal work. Included in the Nuclear Operations Readiness for Operations Plan are the following scheduled activities relative to radiological training:

- Dry-run training will be conducted at least monthly with plant personnel throughout 1988, beginning March 1, 1988. This training will be patterned after the dry-run training done between 1983 and 1986.

- ALARA mock-up training, which will implement as many requirements of the radiological protection program as practical, will be initiated by June 1, 1988.

- Radiation considerations will be integrated into maintenance job planning activities by November 1, 1988.

The number of active radiation workers at CPSES was reduced in January 1987 from approximately 700 to 100 based on lack of current need. For these active radiation workers, General Employee Training (GET) and Radiation Worker Training (RWT) has been continued. The training necessary to provide sufficient active radiation workers prior to plant startup will be completed at least six months prior to fuel load. This training has commenced.

Specific Response to Item RP.3-1.a:

The retraining effort for radiation workers will emphasize each individual's responsibility for the knowledge of his/her own administrative dose limits for the assigned task.

Specific Response to Item RP.3-1.b:

As part of the radiation worker training, the importance of reading and understanding the radiation work permit (RWP), including the expected radiation and contamination levels in the work area, is being stressed.

Specific Response to Item RP.3-1.c:

Until such time as there is a high confidence level that persons assigned to work in contaminated areas have mastered the techniques of removing protective clothing, CPSES will continue to provide coaching assistance at step-off areas. Periodic monitoring of radiation protection technician performance will assure that the coaching provided is consistent with good industry practice.

Specific Response to Item RP.3-1.d:

As discussed in the response to Recommendation (IA.1-1), a work control group has been established to improve the planning process for work. ALARA personnel will commence working with Planning and Scheduling and with the work control group (see the response to Recommendation (RP.4-2), below) to implement ALARA considerations into planning activities.

RECOMMENDATION (RP.4-2)

Implement the station's ALARA program and ensure it is fully functional to support plant startup. While it is recognized that the ALARA supervisor and the ALARA technicians have only recently been selected, the following problems were noted:

a. ALARA personnel job functions

   1. The job functions of both the ALARA supervisor and ALARA technicians are not formalized.

   2. ALARA personnel are not routinely attending periodic work planning meetings nor observing routine maintenance and operations work activities to increase job scope familiarization. Also, job "dry-runs" under simulated radiological conditions have not been scheduled in anticipation of power operations.

b. ALARA support functions

   1. Controls for temporary shielding have not been fully developed.

   2. The mechanisms for the filing and storing of job history ALARA information, such as radiological conditions encountered and lessons learned from previous evolutions, have not been formally decided.

c. ALARA program implementation

1. Some specific job planning for anticipated routine job activities such as steam generator work and radioactive filter change-outs are only in the initial stages of development. This planning is behind the schedule originally projected. ALARA personnel have no firm plan for completion.

2. Experience gained from initial job specific planning efforts has not been consistently documented for future use.

Response:

The ALARA program at CPSES was initiated in 1983 with the naming of an ALARA Coordinator and formation of the Station ALARA Review Group (SARG). The first set of station exposure goals were promulgated late in 1984. Installation of the primary startup sources for Unit 1 in 1985 included both ALARA pre-job planning and post-job debriefing. From 1983 to 1985, ALARA Program procedures were developed and implemented, and an ALARA Technician with specific responsibilities was named. The SARG has met routinely since 1983, and in early 1986, the first ALARA Briefs newsletter was published to inform plant personnel and to raise the level of ALARA awareness. Also in 1986, an Engineering ALARA Coordinator was named to formally participate in the plant ALARA program. In anticipation of a greater need for ALARA support during plant operation, in mid-1987, an ALARA Supervisor and one additional ALARA Technician were assigned, thus doubling the number of personnel in radiation protection specifically assigned to ALARA. The explicit responsibilities of this group are still being formalized. Detailed activities are included in the Nuclear Operations Readiness for Operations Plan.

Specific Response to Item RP.4-2.a:

Specific job responsibilities of additional ALARA personnel will be formalized by May 1, 1988.

ALARA planning activities will be initiated with the Planning and Scheduling group by November 1, 1988.

The Radiation Protection Manager presently attends the Operations plan of the day meetings and is alert to identify any work activities that need ALARA considerations in the current environment. At the commencement of hot functional testing, the ALARA personnel will be tasked with specific attendance at work planning meetings and on-the-spot review of maintenance activities in progress to identify conditions requiring additional ALARA considerations.

Dry-run training will be conducted monthly throughout 1988 and into 1989 until the start of plant operations.

Specific Response to RP.4-2.b:

The temporary shielding program (procedures and equipment) will be established by July 1, 1988.

A Radiation Work Permit (RWP) job history file will be established by July 1, 1988.

Specific Response to RP.4-2.c:

Initial planning for known recurring radiation work, such as routine valve maintenance and filter changeout will be complete by November 1, 1988. Initial planning for more complex jobs, such as steam generator work and RCP seal maintenance, will be completed by December 31, 1988.

The RWP job history file contains the documentation for ALARA pre-job planning and post-job debriefing. With the computerized work order data base currently in use, any work order requiring radiological controls references the RWP by number, so that it is readily identifiable for work planning on future jobs.

MAINTENANCE

General Comment: As noted by INPO in Recommendation (MA.2-1), TU Electric completed a maintenance self-assessment in November 1987, shortly before the INPO assistance visit. This self-assessment was based on INPO 85-038, "Guidelines for the Conduct of Maintenance at Nuclear Power Stations". It identified essentially the same maintenance problem areas as were identified by INPO in the assistance visit. At the time of the INPO visit, action plans were being formulated for all deficiencies noted in the self-assessment. These action plans will be fully developed and will be incorporated into the overall Nuclear Operations Readiness for Operations Plan by March 31, 1988. The Readiness for Operations Plan is described in the Summary Section of this report and in the response to Recommendation (OA.1-1).

RECOMMENDATION (MA.1-1)

Improve the work control system's effectiveness in supporting plant maintenance activities. Assign responsibilities and accountabilities for work control functions such as prioritizing, planning, scheduling, testing, and support. Improve planning of scheduled work activities to identify necessary items such as clearances, parts, tools and other support so that job delays are minimized. Improve scheduling so that the weekly schedule can be used to coordinate activities among organizations such as operations, the various maintenance departments, and later on, health physics. Upgrade performance monitoring of the work control process. Problems observed included the following:

a. Examples where additional planning would have reduced work delays include the following:

1. Spare parts and special tools needed to perform a pressurizer level transmitter calibration were not identified in the work document.

2. Special tools needed to change oil on a containment spray pump were not identified.

3. Torque valves needed to tighten bolts on an instrument air compressor were not provided.

4. The rigging and tools needed to perform work on a sump pump were not specified on the work document.

5. Unnecessary work delays were noted resulting from failure to identify all needed parts when tasks were worked the first time. For example, a Limitorque operator was worked five times and placed on parts hold six times in a sixteen month period for

parts that should normally be stocked. These parts should have been identified, ordered, and made line items in the warehouse when the problem was first identified.

b. Scheduling and coordination of maintenance work needs to be improved. Examples of problems noted include the following:

1. The weekly schedule is not used as a basis for issuing clearances and setting plant conditions. Clearances are hung without consideration of priorities or job sequencing. For example, work on a motor-operated valve required electrical maintenance to perform signature analysis followed by a motor-operator overhaul by mechanical maintenance. When electrical personnel attempted to perform the signature analysis, the mechanical maintenance clearance was already hanging which prevented signature analysis. This lack of sequencing resulted in a two-day delay.

2. Several examples were observed where clearances were not obtained as needed. For example, a turbine building sump pump that was to be electrically disconnected required three attempts over a three-day period to obtain a clearance. These delays were reportedly due to lost paperwork.

3. The weekly schedule is used by supervisors as a weekly work list and not as a day-to-day schedule. This prevents using the schedule as a sequencing or scheduling document by other organizations such as operations.

4. Scheduling meetings are conducted generally for status updates without any individual or organization clearly in charge. This results in lack of coordination of activities and resolution of problems that arise. For example, during one scheduling meeting, the possibility of using temporary service air was discussed as a method to alleviate coordination problems with air compressor work. Several options were discussed but nobody was assigned to resolve the issue.

5. The various scheduling inputs are not coordinated to minimize system or component outage time. For example, construction work on the station instrument air compressors was not coordinated with preventive and corrective maintenance, resulting in the equipment being tagged several times in a three-week period. In addition, mechanical maintenance was required to work an emergency work order on one air compressor to allow the construction work to be completed in the desired time frame on the other air compressor. This resulted in several hours of lost work effort since the mechanical maintenance team had already started work on another task and had to be diverted to the emergency work order. Component outage scheduling would have prevented this problem.

c. Indicators used for monitoring work control performance are very general and in some cases use inconsistent data, making identification of problem areas difficult to determine. Additionally, some useful information to evaluate performance, such as performance-to-schedule comparisons, delays due to parts, availability of engineering support, and clearance delays are not tracked. Examples of the types of problems noted include the following:

1. In the weekly status report, a graph is presented to display the status of required work to be performed versus a goal. Since the "required" work and the "goal" are based on two different sets of data, the graph is not usable as an indicator.

2. Performance indicators are not identified that measure performance of planners, supervisors, foremen or workers in meeting the work schedule. Thus, the ability to complete the required work in the time allowed cannot be documented nor can problem areas be identified. These types of indicators could also be used to determine if manning levels are adequate to support plant operations.

3. Performance of organizations that support maintenance such as procurement, maintenance engineering, Comanche Peak engineering, and operations is not being monitored, although these areas contribute to significant work delays in the maintenance area.

4. Except for parts requisitions required for high-priority work, there is no periodic review or tracking of the requisition backlog.

Response:

The Manager, Plant Operations has implemented a series of meetings and discussions with the maintenance groups, support groups, Startup and Operations, directed at improving the work control system's effectiveness. Specific topics that have been addressed include the assignment of responsibilities for work control functions, work planning, weekly schedules, work coordination, and performance monitoring. Responsibilities and accountabilities for work control functions such as prioritizing, planning, scheduling, testing, and support have been clarified. Each involved group (Operations, the responsible maintenance organization, Startup and the system engineers) has specific responsibilities in the overall integration of the work control process. Station and departmental procedures will be revised as necessary to incorporate specific responsibilities. (Estimated completion date June 1, 1988).

Specific Response to Item MA.1-1.a:

The quality of the work planning process is being improved to ensure that work orders have complete information and that adequate preparation has been made to minimize lost time once the job has been started. Specifically, Station Administrative Procedure STA-606, "Work Requests and Work Orders", has been revised to streamline the work order process and to place more responsibility on the cognizant maintenance organization for the planning and pre-work review of the work orders. Station Administrative Procedure STA-605, "Clearance and Safety Tagging", is being revised to require increased interaction between the responsible maintenance group and Operations to improve pre-work preparation and subsequent scheduling. This procedure will be issued by June 1, 1988. Station Administrative Procedure STA-623, "Post Work Testing", has been revised to provide the planner more detailed guidance for assigning post-work testing based on the scope of the maintenance performed.

A job aid, based on a completed job task analysis, has been developed for I&C planners, and a similar one is being developed to train and assist Maintenance Department planners in writing effective work orders. Specifically, the planners will be tasked with ensuring that the work package identifies special tools, including measuring and test equipment (M&TE), known parts requirements and availability of parts, special rigging or interference requirements, acceptance criteria, such as torque values, and post-work testing requirements. (Expected completion date June 1, 1988).

Specific Response to Item MA.1-1.b:

The scheduling and coordination of maintenance work has been improved by the following specific actions:

- o A work control center has been established to provide for control of the weekly schedule and to provide direction at the daily scheduling meetings. The initial staffing includes Operations and Startup personnel who process clearances and approve work start and work closure documents. By May 1, 1988, Maintenance, I&C and additional personnel as necessary will be added to expand the scope of the center's activity to control all aspects of the work planning, scheduling and coordination efforts. The group is directed by a supervisor who has the necessary authority to resolve scheduling and coordination issues.

- o Additional effort is being placed on developing the weekly schedule to ensure that it is in direct support of the project schedule. The weekly schedule identifies those work activities that are necessary to support the project milestones, supplemented by other activities that are "ready to work" from the maintenance backlog to ensure that adequate "fill-in" work is available to maintain crew productivity. Required plant conditions are determined on the basis of work identified in the weekly schedule, and clearance requests are initiated as required to support the work. More attention is being given to priorities and to job sequencing in order to improve the efficiency of maintenance efforts.

- o Work orders and clearance requests are being sent to the work control center at least three days in advance of the scheduled work date to allow sufficient time to prepare the clearance.

- The weekly schedule is not currently intended to serve as a rigid sequencing document. As the plant progresses into more controlled sequence testing, it will be made more prescriptive. The daily scheduling meetings are being used to confirm which clearances will be needed to support the schedule for the next several days. They are attended by the affected groups, such as operations, so that a short-term "look ahead" is agreed upon in that forum.

- The daily scheduling meeetings are being used to provide better coordination between the maintenance groups for sequencing and mutual support in the common areas. The work control group supervisor is now in charge of the daily scheduling meetings and has the authority to assign responsibility for resolution of problems.

- Daily meetings are being held among Nuclear Operations, Construction and Engineering to coordinate interfaces, to minimize system or component outage time and to specifically address problems similar to the instrument air compressor outage noted by INPO.

- Each incoming work request is assigned an applicable project milestone. The system engineers and Startup review the assigned milestone dates to verify that the scheduled completion date will support project completion and testing.

Specific Response to Item MA.1-1.c:

Existing performance indicators are being evaluated to improve their specificity and consistency of data usage. Additional performance indicators needed to monitor and evaluate performance such as performance-to-schedule comparisons, delays due to parts, availability of engineering support and clearance delays are being considered. By September 1, 1988, the necessary decisions will be made to choose the performance indicators that will be tracked, the definition of each indicator (i.e., what parameters are measured, and how they are combined to produce the indicator), and how they will be displayed.

The following specific actions have been taken or are planned as indicated:

- The weekly status report will be revised to more accurately reflect actual status. The graph will be revised to reflect a three month record of past progress toward the reduction of the maintenance backlog and to reflect a three month goal of the required progress to achieve the project milestones. The status of open work orders will be revised to track all open work orders by system. (Estimated completion date April 1, 1988).

- A man-hour accountability program has been evaluated and is being developed for the Maintenance Department. This program will enable Maintenance to track and evaluate productivity and delays as well as develop additional performance indicators for supervisors and work crews. (Estimated completion date September 1, 1988).

- o Standards of performance have been established for the responsible maintenance groups and planners in processing work requests. Specifically, each routine work request will be assigned a project milestone (completion date) within two working days of receipt. Each routine work request will be planned within five working days of receipt. Emergent work activities will be planned and scheduled consistent with their urgency.

- o Daily project meetings are being conducted to monitor status of work restraints on the 10 top priority systems to ensure that the appropriate support groups (i.e., procurement, results engineering, CPE, and Operations) are aware of their support requirements and to monitor their progress. A performance indicator has not been developed, but will be considered in the overall evaluation of performance indicator monitoring.

- o Each responsible maintenance group is now performing a periodic review of the requisition backlog to ensure it is current and to identify unnecessary delays. Feedback is provided to the Requisition Processing Group (see response to Recommendation (MA.9-1)) to minimize delays to the project schedule.

RECOMMENDATION (MA.2-1)

Increase emphasis on maintaining equipment transferred to plant operations. Communicate standards desired for plant material condition and ensure that these standards are understood. Conduct more in-depth material condition inspections by managers and supervisors to reinforce adherence to established standards. Problems noted with equipment turned over to operations include the following:

a. Many material deifiencies exist on plant batteries even though battery maintenance is routinely performed. For example, many terminal connections have either corrosion buildup or are missing their lead coating.

b. Many material deficiencies exist on the water treatment plant such as leaks of either oil, water, caustic, or acid on most pumps.

c. Material deficiencies exist in the service water building such as corroded packing glands on most fire protection system valves.

d. Longstanding oil and water leaks on the station air compressors have not been corrected.

e. Lighting and emergency lighting is inoperative in several areas of the plant

It is recognized that the maintenance self-assessment recently conducted by the station identified the need for a material inspection program. INPO 85-038, Guidelines for the Conduct of Maintenance at Nuclear Power

Stations, and INPO Good Practice MA-312, Plant Inspection Program, should be of assistance in this area.

Response:

Additional emphasis has been placed on improving and maintaining the material condition of plant equipment that has been transferred to Nuclear Operations. The Manager, Plant Operations initiated (on December 15,1987) a program for regular management tours of Unit 1 areas to increase management attention to plant status, cleanliness and material conditions. The Unit 1 areas have been assigned to specific zones, and tour responsibilities are assigned to provide an inspection of each zone weekly. Auxiliary operators have been instructed in the standards of material condition and cleanliness expected in the plant and have been encouraged to identify items requiring work through the use of the work request system.

Specific Response to Item MA.2-1.a:

Corrective maintenance actions for battery deficiencies will be completed by May 1, 1988, except that Train C connectors will not be delivered until June 15, 1988. They will be scheduled for replacement upon receipt. (See response to Item (TS.5-1.g))

Specific Response to Item MA.2-1.b:

The poor material condition and poor maintainability of the water treatment plant has been a concern for some time. Partially as a result of this concern, extensive design modifications are planned. One modification, which will replace the filtration portion of the water treatment system, is scheduled for completion in September, 1988. A second design modification, which will improve the reliability, flexibility and maintainability of the water treatment plant, has not yet been scheduled, but will be completed prior to fuel load. Since many of the deficiencies in the water treatment plant can only be corrected by component replacement, and in some cases, the design modifications replace these components with different size items, only that maintenance required to keep the system operational is being performed.

Specific Response to Items MA.2-1.c and d:

The maintenance actions necessary to correct the deficiences noted in the service water building and on the station air compressors will be completed by May 1, 1988.

Specific Response to Item MA.2-1.f: (There was no Item e.)

The majority of the lighting systems have been returned to Construction for rework. Consequently, lighting is not being monitored with the normal frequency under the Maintenance Department preventive maintenance program. A walkdown of the lighting systems is currently being conducted semi-annually by Electrical Maintenance, and identified deficiencies are being corrected. Those specific material deficiencies under Nuclear Operations' cognizance noted during the INPO visit will be corrected by May 1, 1988.

RECOMMENDATION (MA.4-1)

Improve the conduct of some maintenance activities. Deficiencies were noted in the control of instrument and control measuring and test equipment, in the program for maintenance of motor-operated valves, and in the use of appropriate tools. Problems observed include the following:

a. The control of instrument and control measuring and test equipment (M&TE) was not maintained as required by station procedure. Personnel were observed using M&TE without documenting the use. Additionally, a sample of eleven work orders where M&TE was used showed that the M&TE for five of the work orders was not documented. This results in a lack of traceability in case the M&TE is later found to be out of calibration.

b. The motor-operated valve (MOV) maintenance program can be improved by including the following program elements:

   1. troubleshooting guidelines in MOV maintenance procedures

   2. guidance in the post-work test procedure for dynamic testing or equivalent testing of MOVs after maintenance

   3. continuing training on MOVs that includes plant and industry operating experience

c. Tools were used improperly during the conduct of several maintenance activities. For example, adjustable pliers were used by a technician to remove the cover bolts on a pressurizer level transmitter. A box end or socket wrench would be more appropriate to preclude bolt head damage.

Response:

Several of many action plans developed from the INPO Maintenance Self-Assessment, concluded in November 1987, specifically address the improvement of maintenance activities as detailed below. In addition, a program of field tours by I&C and Maintenance supervisors has been established to monitor areas needing improvement as identified during the INPO visit. Feedback from the tours is being used to improve work practices and the work control process.

Specific Response to Item MA.4-1.a:

Station Administrative Procedure STA-608, "Control of Measuring and Test Equipment", has been revised to clarify the requirement for recording each use of measuring and test equipment. The requirement has been reemphasized to all I&C technicians. In addition, I&C is developing a system to track all M&TE usage and to cross reference M&TE usage to a specific maintenance work order to assure traceability.

Specific Response to Item MA.4-1.b:

Improvements will be made to the motor operated valve (MOV) maintenance program as follows:

- o Motor operated valve maintenance procedures will be revised to incorporate troubleshooting guidelines by December 31, 1988.

- o A revision to the post work test procedure by December 31, 1988 will provide guidance for dynamic or equivalent testing of motor operated valves after maintenance.

- o A continuing training program for the operation and maintenance of motor operated valve actuators is being developed. (Estimated completion date December 31, 1988).

- o The need for including all Limitorque motor operated valve actuators in the MOVATS program will be determined by June 1, 1988.

Specific Response to Item MA.4-1.c:

Guidance has been provided to I&C technicians, electricians and mechanics on the proper use of tools to prevent damaging fittings, plugs, nuts and bolts.

RECOMMENDATION (MA.6-1)

Upgrade the quality of mechanical and electrical maintenance procedures. Human factors deficiencies and inadequate instructional detail should be corrected along with making technical information improvements. The following are examples of problems noted:

a. Notes and cautions are often located after the step to which they apply. This could result in the craftsmen not reading important information until after performing the step. For example in procedure MMI-808, "Crosby Pressurizer Safety Valve Repair," step 5.1.3.10 instructs the user to remove the disc holder and bellows assembly. A caution following the step provides the user information to prevent damage to the bellows and spindle.

b. Notes and cautions often convey specific actions. Actions should be reserved for instructional steps to ensure the actions are not overlooked, and allow for user sign-offs. For example, in procedure EMI-315, "Containment Spray Pump Motor Inspection," the note after step 5.1.28 instructs the user to place blocks on each side of the rotor to keep it stationary. It is more appropriate to provide this instruction in a step.

c. The level of detail in some procedures does not provide information necessary to ensure activities can be accomp''shed in a safe or consistent manner. For example, in procedure EM.-315, "Containment Spray Pump Motor Inspection," step 5.1.1 instructs the user to turn off the power supply breaker and pull the heater fuses. Normally, this action is included in the equipment clearances performed by the operations group. However, operations involvement is not indicated.

d. Some procedures contain poor quality illustrations that are illegible or can be misinterpreted. For example, in procedure MMI-302, "Reactor Coolant Pump Seal Inspection," Figure 1 is a reproduction of a photograph, and is not legible.

   It is recognized that the maintenance self-assessment recently conducted by the station identified procedure problems.

Response:

A comprehensive program has been initiated to review and revise, as necessary, all maintenance procedures to include the principles of INPO 85-026, "Writing Guideline for Maintenance, Test, and Calibration Procedures." The specific deficiencies noted by INPO regarding positioning of notes and cautions, reserving actions for instructional steps, improving the level of detail, and improving the quality of illustrations will be corrected. This effort is in progress, and is scheduled to continue through June 30, 1989. This date is consistent with current project milestones.

The following steps have been completed:

- A dedicated procedure writing group has been established within the Maintenance Department
- Hardware and software has been procured to publish high quality procedures, incl ding graphics with the capability for producing high resolution illustrations
- The procedure writer's guide is about 80% complete, with an estimated completion date of April 1, 1988

RECOMMENDATION (MA.9-1)

Implement a coordinated spare parts program that will provide effective support to the operating nuclear station. Identify parts needed to support maintenance efforts and develop a procurement system that can obtain those parts in a timely manner. Develop a comprehensive, accurate, and usable master equipment list that includes both "Q" and non-"Q" equipment. Problems observed with spare parts include the following:

a. The current inventory of spare parts is not adequate. Problems noted include the following:

1. Approximately 300 maintenance work requests are on hold due to a lack of parts. About 100 of these requests are over one year old.

2. The initial warehouse inventory, established several years ago, was not adequate. For example, many gaskets, o-rings, and other components needed for motor-operated valve maintenance have only recently been added to the inventory and were added because they were needed for a recent maintenance effort. A systematic review to ensure all needed spare parts are included in the inventory has not been completed.

3. Maintenance planners estimated that about one-third of the parts they use are not currently stocked in the warehouse.

b. The time required to process a requisition for quality-related parts is excessive. Problems noted include the following:

1. Routine requisitions typically take two to three months to generate a purchase order.

2. All requisitions for quality-related parts must be processed through procurement engineering, even if they are warehouse automatic reorders. This typically adds a delay of several weeks.

c. An accurate and usable master equipment list (MEL) has not been developed to resolve problems with the current parts list. The current parts list has numerous problems including the following:

1. The list does not contain all plant components and their respective piece parts. For example, skid mounted equipment such as the waste evaporator package are not included. Also errors exist in those components that are listed. For example, the TUGCO stock number (TSN) listed for a spent resin sluice pump gasket corresponds to a part that was cancelled. The correct TSN is not listed.

2. Many parts have not had evaluations performed to verify that the quality levels specified in the ordering information is correct. This is required before they can be initially ordered or reordered. The evaluations performed on parts that have been verified have not been entered into the MEL, resulting in time consuming manual searches for data to confirm the ordering information is correct. Having this data in the MEL would allow reorders to be processed electronically and eliminate one of the delays.

3. The cross-reference of parts for use on other similar components is incomplete, making it difficult to determine what other applications the part may have.

Response:

The key element in developing a coordinated spare parts program is an accurate and complete Master Equipment List (MEL). The initial issue of the MEL is expected by December 31, 1988. However, many parallel activities, as described in the specific responses below, are in progress to bring together the elements of an effective program. Nuclear Operations is developing a program that will identify parts needed to support maintenance efforts. The program will determine which parts are to be stocked, based on the equipment manufacturer's recommendations, known usage, and preventive maintenance requirements, order additional stock as necessary, revise the order point and order quantity of existing stock items based on known lead times and usage rates, confirm that items ordered under previous stocking activities have been received, and verify that the stocked items can be located in the warehouse. (Estimated completion date for ordering additional stock items, October 31, 1988). The MEL under development will identify both "Q" and "non-Q" equipment, and will include a "Bill of Materials" for each listed equipment tag. The spare parts program identified above will be used to verify the "Bill of Materials". Problems similar to those identified by INPO are expected to be effectively reduced through these actions.

Specific Response to Item MA.9-1.a:

A review of all work orders currently on hold awaiting parts will be conducted by May 1, 1988 to verify current status. Those for which the parts have arrived will be scheduled for work, and for those which are still awaiting parts, the requisitions will be verified to ensure that appropriate procurement action is in progress and that scheduled delivery dates will support the project schedule. If necessary, problem items will be referred to the Requisition Processing Group described in the response to Item (MA.9-1.b) below.

Nuclear Operations will conduct a review of existing warehouse stocked items and stock levels to assure that the range and depth of on-hand parts is adequate to support routine operation of the plant. This review is scheduled to complete by October 31, 1988.

Additional feedback will be provided to the materials management system concerning usage of out of stock items by requiring that a "Warehouse Issue Request" be initiated by the planners whenever the need is identified, regardless of current stock levels. This will assure that the materials management system is aware of "hits" on stocked items and enable the system to more accurately predict order point and order quantity. In the past, parts have been obtained from the construction warehouse or by direct purchase whenever current stock levels would not support the maintenance activity. Consequently, the usage would not normally be registered as a "hit" against that particular stock number. This action has been implemented.

Specific Response to Item MA.9-1.b:

The procurement quality requirements for each quality related item currently stocked in the CPSES warehouse will be developed by September 1, 1988. These requirements will be used for the repeat procurement of items. As additional stocking requirements emerge, new procurement quality requirements will be developed. With the existence of predetermined quality requirements, the processing time will be shortened.

A Requisition Processing Group has been formed to provide expedited processing of high priority parts requirements under the present conditions. In addition to TU Electric personnel, this group has representatives from each engineering lead contractor so that all functions related to converting a requisition into a purchase order can be done "under one roof". This group is also tracking all procurement related documents (e.g., requisitions, stock action requests, change orders) to expedite the processing. It is intended that this organization will be disbanded when the process has matured to the point that all responsible organizations are familiar with the required activities.

Specific Response to Item MA.9-1.c:

An equipment list for "Q" items at the parts level is available and is being used by Nuclear Operations. This list includes all quality related plant components and their respective piece parts, including those items that are provided as skid mounted equipment. By December 31, 1988, a Master Equipment List (MEL) will be provided which incorporates the same information for "non-Q" components. The current use of the "Q-list" and use of the MEL in the future will include a feedback loop so that errors, such as incorrect stock numbers, can be fed back to Engineering for updating the data base.

Engineering is developing the procurement quality requirements for each quality related item currently stocked in the warehouse. (See response to Item (MA.9-1.b)). As new stocking requirements are identified, the new quality requirements will be developed and entered into the MEL data base.

Engineering will develop the cross-reference of parts for use on other similar components following completion of the MEL and procurement quality requirement. This cross-reference will be used as the basis for substituting stock numbers when the prime number is stocked out and for eventual reduction in the inventory levels. Note that this is not a parts substitution program.

TECHNICAL SUPPORT

RECOMMENDATION (TS.1-1)

Strengthen the technical support system engineering program by clearly defining reponsibilities and increasing personnel experience and skills needed to support plant operations. System engineering responsibilities, authorities, and interfaces with other site engineering groups should be clearly defined and understood. Formally involve system engineers in startup activities on assigned systems. Develop expertise in plant systems, components, and operational requirements through a combination of startup involvement and formal training. The following problems were noted:

a. Responsibility and authority is not clearly defined for technical support system engineers. Similar system or component responsibilities exist in other groups, e.g., maintenance, startup, and Comanche Peak (Design) Engineering. Also, there are some conflicts in "ownership" when a system can also be considered a component. For example, the maintenance department considers diesels and batteries to be components and therefore, a maintenance responsibility. Technical support considers diesels and batteries to be systems and therefore, the responsibility of the system engineers. This situation has contributed to many longstanding problems with station batteries.

b. The present level of the technical support system engineers' commercial nuclear power experience is low. Of the 32 system engineers currently on staff, approximately 19 have fewer than three years experience; none have commercial nuclear power experience.

c. Technical support system engineers are not always cognizant of changes or tests performed on their systems. For example, the system engineer was not formally involved in the service water system upgrade and post modification tests. Also system engineer participation in preoperational or intial surveillance tests is neither required nor actively encouraged. This lack of involvement may result in missed opportunities for the technical support system engineer to acquire system knowledge and could preclude the development of a sense of system ownership.

d. System and component training has not been provided or actively encouraged for most system engineers. Also, involvement in industry efforts related to system responsibilities is limited. For example, the technical support diesel system engineer has no previous diesel generator experience and has not received training or participated in industry improvement efforts during his two years of diesel generator responsibilities.

It is recognized that management discussions pertaining to this problem have occurred. However, no formal written policies, procedures, position descriptions, or interface documents addressing the system engineering responsibilities or professional development have been prepared or issued for use by responsible personnel.

Response:

On January 11, 1988, the overlapping functions of Nuclear Operations Maintenance Engineering and Technical Support system engineering were combined into the Technical Support system engineering organization. A functional description clearly describing the Technical Support system engineer's responsibilities based on INPO Good Practice TS-413, "Use of System Engineers", was issued February 29, 1988 for comment and will be approved by April 1, 1988. The Technical Support testing engineers, as well as their testing responsibilities have been transferred to the Nuclear Operations Startup and Test Department. The division of responsibilities and interface contacts between the Technical Support system engineers (plant) and Comanche Peak Engineering (CPE) system engineers (design) have been agreed upon. This reorganization and redefinition of responsibilities has evolved from several months of evaluation of engineering support in CPE, Technical Support, Maintenance Engineering and Startup. The redefinition of responsibilities includes involvement of the system engineer in essentially all system activities.

Station Administrative Procedure STA-101, "Nuclear Operations Organization", will be revised by June 1, 1988 to reflect this redefinition of responsibilities.

Specific Response to Item TS.1-1.a:

The system engineer's responsibility and authority will be clearly defined by the revision to STA-101, with the system engineer functional description providing a more detailed explanation of each area of responsibility. As a result of the reorganization, the system engineer is now responsible for both component and system functions. The diesel generator system engineer handles all diesel generator issues, and the DC Electrical system engineer handles all battery issues. Startup is responsible for all testing functions and CPE is responsible for all design functions.

Specific Response to Item TS.1-1.b:

The experience level of this group will be increased by filling current openings and openings created by attrition with persons possessing commercial nuclear experience. In the interim, experienced consulting engineers have been retained by Technical Support to augment current system engineer experience. System engineers will also be provided extended training periods at other utilities, when possible. For example, some system engineers have participated in startup activities at South Texas Unit 1, and additional engineers will be assigned during later testing.

Specific Response to Item TS.1-1.c:

System engineers are now formally involved in the design process through required interdisciplinary review of all design modifications. Active involvement in the conceptual design is encouraged by the system engineer functional description. System engineer involvement in preoperational and initial startup testing will include review of system test procedures and test results as part of the Joint Test Group working group review. System engineers will also be responsible for providing technical support to the test engineer during the conduct of tests on their systems and are encouraged to actively participate in the testing activities.

Specific Response to Item TS.1-1.d:

To better equip the system engineer, a revised training program will be implemented by April 1, 1988 which will include specific system training, component training as appropriate, and project management training. There will also be increased emphasis on participation in industry events and experience.

RECOMMENDATION (TS.2-1)

Develop a comprehensive surveillance testing program. Generate a detailed test schedule and revise priorities as necessary to ensure initial surveillance tests are conducted in a timely manner. Emphasize the development, review, and approval of surveillance test procedures to support the schedule. Also, develop a formal plan for reviewing selected plant procedures, such as system operating procedures and abnormal operating procedures, to ensure conditional surveillance test requirements are incorporated. The following problems were noted:

a. The master startup plan has blocked out a time interval for conducting initial surveillance tests. However, the plan does not go beyond the milestone level of details. A pre-start test program, which includes a detailed breakdown of initial surveillance tests is under development by startup testing, has not been issued or integrated into the master startup plan. Preliminary estimates indicate that testing should have already begun in order to meet the June 1987 heat-up date.

b. Surveillance test procedures are currently under development by the responsible functional departments and are being sent to the technical support surveillance test coordinator for independent review. Of the 471 required test procedures, 155 are considered satisfactory, 178 have been returned to the functional department for further work, and 138 have not been independently reviewed. Progress reports indicate the projected completion will not meet the present heat-up schedule.

c. Although the technical support surveillance test coordinator has reviewed some plant procedures for conditional surveillance test requirements on a time availability basis, no formal plan exists for this effort. Furthermore, no plans exist for reviewing abnormal operating procedures for conditional surveillance requirements.

d. No program exists to thoroughly review changes to plant procedures after startup to identify the impact of each change on surveillance test requirements.

Response:

A comprehensive surveillance testing program is included in the Nuclear Operations Readiness for Operations Plan. A detailed test schedule has been prepared which is keyed to specific project milestones. A formal plan for reviewing selected plant procedures is being developed to ensure conditional surveillance test requirements are incorporated. Additional detail is contained in the specific responses below.

Specific Response to Item TS.2-1.a:

The master startup plan was developed using milestones to schedule surveillance testing in order to tie the testing requirements to a given block of time. A detailed schedule has now been developed for the conduct of surveillance tests. This schedule is necessarily tied to certain milestones, but test durations and sequencing are identified.

Specific Response to Item TS.2-1.b:

A detailed schedule for the review and update of surveillance test procedures will be completed by March 31, 1988. This schedule will be established to support the initial performance of surveillance tests. Due to the project schedule change for startup, there should not be any impact on fuel load due to a backlog of surveillance test procedures previously identified.

Specific Response to Item TS.2-1.c:

A schedule will be prepared for performing an independent review of selected procedures, including Abnormal Operating Procedures and System Operating Procedures, and developing a controlled listing of the conditional surveillance test requirements and the procedures that satisfy these requirements. All conditional requirements have been identified for the current draft of the CPSES Technical Specifications and these requirements have been cross-referenced to an implementing procedure. In addition, the trigger procedures which call out the use of these implementing procedures have been identified. The detailed review schedule of both implementing and trigger procedures will be developed by March 31, 1988.

Specific Response to Item TS.2-1.d:

Station Administrative Procedure STA-202, "Administrative Control of Nuclear Operations Procedures", has been changed to require that the Results Engineering Manager be included in the subcommittee review of initial issue, changes and revisions of selected plant procedures to incorporate an additional review for impact on surveillance test requirements.

RECOMMENDATION (TS.3-1)

Improve the temporary modification control program. Reduce the number of outstanding temporary modifications before system turnover and minimize the number to the extent practicable. Review, document, and control those temporary modifications remaining after turnover in the same manner as permanent modifications. Develop and maintain a single temporary modification log to ensure operator knowledge of plant configuration. Review temporary modifications periodically for continued need and remove them or initiate permanent modifications as appropriate. The following problems with the present temporary modification program were noted:

a. There are approximately 741 temporary modifications in the plant. Most of these are Unit 1 and 2 system interface temporary modifications, such as blank flanges on common or interconnecting systems to isolate Unit 1 from Unit 2. Present plans are to have the startup group remove all temporary modifications before system turnover. However, the system interface temporary modifications cannot be removed until the completion of Unit 2. As a result, there will be a large number of temporary modifications remaining after turnover which under the present policy, would not be shown on drawings or noted in affected procedures.

b. Temporary modifications are not periodically reviewed for continued need. Although procedure STA-602, "Temporary Modifications," states that temporary modifications are expected to be installed for short duration, most are older than three years.

c. Most of the temporary modifications have not received a technical review to address design and safety considerations and are not shown on drawings or annotated on affected procedures.

d. There are currently two types of temporary modification log books. One lists temporary modifications installed by operating plant personnel and the other lists those installed by startup personnel. Each group maintains their own log books; only the log books maintained by nuclear operations are kept in the control room and made available to shift operating personnel.

Response:

Station Administrative Procedure STA-602, "Temporary Modifications", will be revised by April 1, 1988. This revision will combine the Startup and Operations programs into a single system that has one log, receives the same technical review and incorporates changes to drawings and/or procedures. The number of temporary modifications will be reduced by eliminating those that are necessary for unit separation and by removing all Startup temporary modifications prior to turnover to Operations. Review, documentation and control of temporary modifications will be upgraded, and a periodic review of outstanding temporary modifications for continued need will be performed.

Specific Response to Item TS.3-1.a:

Temporary modifications needed to separate the units will be cleared by making permanent design changes. As such, they will be reflected in documentation and reviewed for procedural impact in accordance with the NEO

Procedure 3.03, "Preparation, Review and Disposition of Plant Design Modifications" or NEO Procedure 9.17, "Initiation, Review and Approval of Design Modification Requests - Construction Phase". This conversion of temporary modifications to permanent design changes will be completed prior to fuel load. Startup temporary modifications will be removed prior to system turnover to Operations.

Specific Response to Item TS.3-1.b:

Reviews of existing temporary modifications will be periodically conducted for continued need if older than 90 days. This review will include the technical and administrative requirements necessary to support original installation of temporary modifications.

Specific Response to Item TS.3-1.c:

Modifications remaining at the time that each system is declared "operable" to support plant operations will have an engineering review and a safety evaluation prior to plant startup. Drawings and procedures will be annotated for those modifications which remain in place over 90 days. This meets the critieria of INPO Good Practice OP-202, "Temporary Modification Control".

Specific Response to Item TS.3-1.d:

As stated in the general response, a single log book will be maintained for all temporary modifications. It will be maintained in the control room and be readily available to shift operating personnel.

RECOMMENDATION (TS.5-1)

Upgrade the station battery testing and maintenance programs to provide greater assurance that batteries are capable of supplying design loads during an emergency. The following problems were noted:

a. The decision to perform service (load profile) tests of the station batteries as part of the prestart test program has not been made. The service tests should be performed before the batteries are put in service in accordance with best industry practices, i.e., ANSI/IEEE Standard 450-1987. The last service test was performed in June 1984. Additionally, the load profile should be verified to be correct since numerous modifications have been installed since it was originally developed.

b. There are no requirements to trend battery capacity information to determine degradation. If a 10 percent capacity degradation is observed, an 18 month performance test is required by technical specifications in lieu of the normal five year test schedule. Without trending, this capacity degradation could easily be overlooked.

c. Neither the performance nor service test procedures require test performance in the "as-found" condition in order to determine the effectiveness of the maintenance process.

d. The test procedures allow the interruption of a test for an unspecified period of time (e.g., to jumper a bad cell or to allow a hot cell to cool down) and resumption of the test afterward. This practice could result in false high battery capacity values. For example, capacity will increase as cells cool down and better electrolyte mixing occurs during interruptions. The best industry practice is to rerun the test after any interruption greater than five minutes.

e. It is standard plant practice to maintain electrolyte levels on the batteries at the high mark. Approximately half of the train A 1950 amp hour cells were overflowing acid as a result of an equalizing charge. On several cells, acid was running down the side and in between cells onto the racks and supports, which has resulted in corrosion of the racks. This condition has existed for some time with no apparent attempt to determine the optimum acid level to prevent overflow during charging.

f. The vendor manual recommends that all cells be filled, if needed, prior to an equalizing charge in order to ensure proper electrolyte mixing. Contrary to this recommendation, the maintenance department currently fills each cell with water weekly for those cells greater than 1/4 inch below the high level mark, thereby increasing the likelihood of stratification.

g. Many of the terminals and connectors on trains A, B, and C batteries were corroded. Most of the flame-arresting vents on the train C batteries were encrusted with white residue and dirt. Some connector bars had the copper exposed due to cleaning and subsequent thinning of the lead coating. Some connections were not coated with protective grease. Also, there was evidence of acid spills on some cells. Where all three conditions existed, green (copper) corrosion existed in great quantities.

h. Panel voltmeters used to indicate battery float voltage are not checked against a standard every six months as required by the battery vendor's technical manual. These voltmeters are currently on a two-year calibration and check schedule.

Response:

The procedures for battery testing and maintenance will be reviewed by June 1, 1988 and revised by August 1, 1988 to ensure that they are current with the best industry practices, IEEE standards and manufacturer's recommendations and that they are capable of supplying design loads during an emergency.

Specific Response to Item TS.5-1.a:

Battery service (load profile) tests are being incorporated into the prestart test program. The load profiles will verify that system modifications are adequately supported and that the batteries are capable of supplying design loads.

Specific Response to Item TS.5-1.b:

Electrical Maintenance Procedure EMP-710, "Battery Performance Discharge Test", will be revised by August 1, 1988 to require trending of battery capacity information. The results of battery capacity testing are compared to Technical Specification requirements, and if a degradation of 10% is shown, the frequency of testing will be changed to 18 months in accordance with the provisions of Station Administrative Procedure STA-702, "Surveillance Testing Program".

Specific Response to Item TS.5-1.c:

IEEE-450, 1980 requires only the performance test to be performed in the "as-found" condition. The revision to EMP-710 will include this requirement.

Specific Response to Item TS.5-1.d:

The revision to EMP-710 will include a requirement to rerun a battery capacity test if the test is interrupted for longer than five minutes.

Specific Response to Item TS.5-1.e:

The optimum battery acid level is being determined. Procedure revisions, if required, will be completed by August 1, 1988.

Specific Response to Item TS.5-1.f:

The question of when to add battery acid is being studied in conjunction with the optimum level determination. Procedure revisions, if required, will be completed by August 1, 1988.

Specific Response to Item TS.5-1.g:

Train A and B connectors have been replaced. Train C connectors are on order, with an estimated delivery date of June 15, 1988. Cleaning of cells and flame-arresting vents will be complete by April 16, 1988.

Specific Response to Item TS.5-1.h:

The requirement to calibrate panel voltmeters every 6 months has not yet been found in the available technical manual. A query has been placed with the vendor, with an answer expected by April 16, 1988.

CHEMISTRY

RECOMMENDATION (CY.1-1)

Develop and implement a clearly defined chemistry action plan to support hot functional testing and plant startup. This should include milestones which support development or revision of plant procedures, and provide adequately trained personnel to support hot functional testing and initial startup. Lack of a clearly established plan has resulted in the following:

a. A chemistry readiness review prior to hot functional testing and startup has not been scheduled. This review is required to ensure all instruments are calibrated and functional, technicians are trained, and that chemistry's role in the hot functional testing and initial plant startup is clearly defined.

b. A review of the post-accident sampling system for operability, maintainability, and regulatory compliance has not been performed. NUREG-0737 establishes specific operability testing and maintenance requirements that must be met prior to initial plant startup.

c. A review has not been made of the required chemistry surveillance procedures and the status of their preparation. A review of the chemistry surveillance requirements, including implementing procedures, is essential to ensure all licensing requirements have been met.

d. Chemistry radiological training for handling radioactive streams is not presently scheduled. Radiological training on sampling and analysis of radioactive streams is essential to reduce the spread of contamination and minimize personnel contamination.

Response:

A Chemistry action plan to support hot functional testing and plant startup has been developed and is included in the Nuclear Operations Readiness for Operations Plan. The plan has identified and is tracking the development or revision of chemistry procedures, and tracks the progress of the training required to be completed in order to support hot functional testing, initial startup, and plant operation.

Specific Response to Item CY.1-1.a:

The Chemistry section of INPO 85-001, "Self Assessment Performance Objectives and Criteria for Operating License Plants" was performed in January 1988 by the chemistry staff and reviewed by the chemistry manager and supervisors. A review by Corporate Technical Support - Chemistry was performed in February 1988. Items identified in these reviews have been incorporated into the Nuclear Operations Readiness for Operations Plan for tracking. Completion of the activities included in the plan will assure that the chemistry section is ready to support hot functional testing and plant operation.

Specific Response to Item CY.1-1.b:

The post accident sampling system (PASS) has been demonstrated operational to the NRC (NRC Inspection Report 85-01). Chemistry procedures for the operation of the PASS have been issued. Samples will be taken from the containment air portion of PASS at 5% power to complete the testing requirement of NUREG 0737.

Specific Response to Item CY.1-1.c:

A review of the chemistry surveillance and implementing procedures is presently underway. This review includes identification of changes that will be required in surveillances, sample points, technique, format, or operating philosophy. The review will include a schedule for implementation of changes identified by the review. The review is scheduled for completion by August 11, 1988.

Specific Response to Item CY.1-1.d:

Chemistry training for radiochemistry, handling radioactive samples and ALARA principles will be completed by December 31,1988. (See also the response to Recommendation (CY.2-1)).

RECOMMENDATION (CY.2-1)

Improve chemistry technician fundamental knowledge. Technicians should have an understanding of the analytical principles involved in counting radioactive samples. The technician must also be knowledgeable of the analytical methods and the instruments used in the laboratory. This is necessary for the technicians to respond to abnormal conditions such as deteriorating reagents or faulty instrument performance. The following are examples of knowledge weaknesses that were identified. An experienced technician would have been expected to correctly answer these questions.

a. Most technicians could not explain what the "water dip" means in relation to ion chromatography.

b. Several technicians could not define cation conductivity.

c. Most technicians could not explain the fundamentals of operation of the liquid scintillation instrumentation.

d. Several technicians could not explain "dead time". This can be an important factor in obtaining accurate radioanalytical results.

e. Several technicians did not know what was meant by "iodine ratio". This ratio is a means of evaluating fuel integrity.

f. Most technicians could not determine what steps could be taken to reduce dead time when counting on a GeLi detector.

Response:

As described in the response to Recommendation (CY.1-1), Corporate Technical Support - Chemistry conducted a chemistry review in February 1988. This review included a general review of chemistry technicians' fundamental knowledge as well as the specific knowledge deficiencies described in the examples in this recommendation. The weaknesses identified in the chemistry technicians' fundamental knowledge required to support hot functional testing and plant operation will be corrected by the following training courses to be presented to the chemistry technicians:

- A vendor prepared and presented training course has been purchased which covers the following areas:

  Fundamental chemistry knowledge areas

  Analytical methods

  Instrumental analysis methods

  Primary, secondary, and support systems and chemical treatment

  Radiochemistry and counting room methods

This course will be presented to those chemistry technicians who have not previously received this type of training. It will be completed by December 31, 1988.

- The vendor prepared course will be modified, further developed and presented by CPSES training instructors to all other chemistry technicians. This training will be completed prior to fuel load.

- The CPSES training staff will develop and present a training course, prior to fuel load, to all chemistry technical staff covering as a minimum the following areas:

  ALARA concepts and principles

  Radioactive source handling

  Radioactive waste process system sampling and sample handling

  Radioactive sample stream sampling and sample handling

  This training will be completed by December 31, 1988.

RECOMMENDATION (CY.Unnumbered-1) (Chemistry Control)

Upgrade the chemistry monitoring program for on-line instrumentation and the reverse osmosis (RO) unit. This program is needed to maintain the accuracy of on-line instrument readings and maintain continuous operation of the reverse osmosis unit. Examples are as follows:

a. There is no frequency specified for comparing of on-line instrument values with laboratory grab sample analyses.

b. Acceptance criteria for comparing on-line instrumentation readings and laboratory results have not been established. Guidance also needs to be provided for actions to be taken when the values fall outside the established criteria.

c. Specific reverse osmosis parameters that measure performance or system degradation are not trended. Examples are as follows:

   1. normalized permeate flow -- This parameter monitors the membrane integrity by adjusting the daily permeate flow readings for temperature and pressure. This allows the operator to make daily comparisons of RO performance.

   2. system differential pressure -- This is used to measure the degree of membrane fouling. The differential pressure between the feed and concentrate is trended to identify any changes.

   3. percent rejection -- Membrane and hardware integrity is evaluated using this parameter. Percent rejection refers to the percentage of total dissolved solids that are rejected by the RO. A decrease in rejection may indicate leaky o-rings, fouling, or membrane hyrdolysis.

Response:

The chemistry monitoring program for on-line instrumentation and the reverse osmosis (RO) unit will be improved as described below in the specific responses to the examples.

Specific Response to Item CY.U-1.a:

The frequency of in-line instrument readings and grab sample analysis results is presently determined by each system procedure CHM-500 series. This frequency and the frequency of comparison samples will be reviewed as part of the chemistry program review. Changes will be made to system procedures as necessary to permit implementation by August 11, 1988.

Specific Response to Item CY.U-1.b:

The acceptance criteria for comparison of in-line instrument reading to grab sample analysis results will be determined and incorporated into the applicable procedures by August 11, 1988. Guidance for actions to be taken when values fall outside the established criteria will be included.

Specific Response to Item CY.U-1.c:

A formal program of trending reverse osmosis (RO) performance will be instituted to monitor the RO unit for system degradation. Normalized permeate flow (NPF) will be calculated and trended to ensure prompt identification of problems in the equipment. This monitoring will not require additional instrumentation and will be incorporated into the next revision of the system procedure due for completion by August 11, 1988.

System differential pressure measurement is redundant to the information tracked in the normalized permeate flow. System problems can be identified with either method, but NPF is slightly more accurate in the CPSES installation.

Percent rejection is not calculated and tracked at CPSES. The conductivity of the product is monitored and trended. By setting a limit on this parameter, the percent rejection is indirectly monitored. Data used to calculate percent rejection is collected and can be used in troubleshooting problems with system performance, if needed.

RECOMMENDATION (CY.4-1)

Upgrade the laboratory quality control program. The quality control program is necessary to validate the accuracy and reliability of analytical results, instrument operability, and technician performance. Weaknesses were identified in the following areas:

a. A program to periodically monitor chemistry technician performance for chemical analyses they are expected to perform does not exist. A monitoring program is necessary to identify areas where further improvement is warranted.

b. Quality control charts are not in use for the ion chromatograph. Control charts are an effective means of evaluating the long-term adequacy of the analytical results and instrument performance.

c. The quality control standards are not run in the expected sample concentration range. For example, if quality control standards are of much higher concentration than the sample concentration, the calibration of the instrument cannot be verified at the concentration where the sample measurement is being performed.

d. The minimum detectable concentration for some analytical methods needs to be verified. As an example, a technician was unable to detect a 5 ppb silica standard when the procedure stated the minimum detectable concentration was 5 ppb.

e. The quality control charts for the ultra violet-visible and the atomic absorbance spectrophotometers trend ionic concentration rather than absorbance. Failure to monitor absorbance could result in the analyst not detecting a gradual loss of the instruments sensitivity.

Response:

The chemistry program for verification of analytical performance (VAP) is described in Chemistry Procedure CHM-104, "Chemistry/Radiochemistry Quality Control Program". A review of this program, including required analyses, time periods, and program elements was performed in conjunction with the Corporate Technical Support audit in February 1988. There will be continued participation in vendor cross check programs. A review and revision of chemistry procedure CHM-104 will be completed by August 11, 1988.

Specific Response to Item CY.4-1.a:

A program to monitor chemistry technician performance for chemistry analyses was fully implemented in January 1988. This program will be used to identify areas that need further improvement.

Specific Response to Item C.4-1.b:

Although the present calibration method for the ion chromatograph provides adequate control to ensure accuracy of data, an additional calibration point and a functional check standard will provide additional control and trending information. The use of quality control charts will be incorporated into the applicable chemistry instructions by August 11, 1988.

Specific Response to Item CY.4-1.c:

The present program for verification of analytical performance allows for analysis of samples within the normal range and in the normal background matrix. The program will be evaluated and revised to reflect suggested concentrations listed in INPO 83-017, "Verification of Analytical Performance", by August 11, 1988.

Specific Response to Item CY.4-1.d:

The verification of minimum detectable concentration limits (MDL) is performed on some analyses each time a calibration sequence is performed. The instructions that lack this verification will be reviewed, evaluated, and revised if required. The information on verification of minimum detection limits provided by the verification of analytical performance program will be evaluated and changes to individual instructions will be made, if required. Identified revisions will be scheduled after the second group of analyses are completed on December 31, 1988.

Specific Response to Item CY.4-1.e:

The requirements for monitoring sequential plots of a sample parameter are described in INPO 83-017. This document indicates that parameter values should be reported in "units of the test results". The monitoring of absorbence in certain circumstances would be helpful, but is not required. This recommendation will be reviewed and incorporated into laboratory practice where appropriate.

RECOMMENDATION (CY.Unnumbered-2) (Layup Chemistry Control)

Implement a formally defined plant layup program. A properly implemented layup program is necessary to protect the equipment prior to startup and to support future reliable operation. Presently, major equipment in Unit 1 is being properly layed up. However, the lay up program has not been formalized. This has resulted in authority, responsibilities, and accountabilities not being well defined and the priorities for system layup not being understood. As a result, Unit 2 is not being effectively layed up. Also, without formalizing the program there are no assurances that equipment will be layed up in a consistent and effective manner. A properly implemented layup program could have eliminated the following problems:

a. The Unit 1 turbine lubrication oil had to be replaced and flushed due to microbiologic growth.

b. The Unit 2 reactor vessel experienced biological growth in the water following a system flush. This situation was the result of the reactor vessel not being drained following the system flush. Microbiologic growth has been identified as a major factor in rapid pipe corrosion.

c. The Unit 2 steam generators are left open to the atmosphere. This is contrary to good industry practice and may result in excessive corrosion as a result of the moisture in the air.

Response:

Specific layup program activities and responsibilities have been assigned to the Operations and Startup departments for systems under their control. The Results Engineering section will provide technical support for component and system engineering control. The Chemistry section will provide corrosion monitoring suport and technical guidance in the selection of corrosion management chemical treatments. Station Administrative Procedure STA-612, "System Cleanness Control, Cleaning, and Layup", will be revised by June 1, 1988 to reflect these assignments.

The layup status of individual systems in both units will be periodically reflected in the plan of the day report and reviewed at the daily operations meetings. Specific schedules will be developed where necessary to ensure timely completion of layup activities.

Specific Response to Item CY.U-2.a:

The Unit 1 turbine lubrication oil system has been cleaned and flushed, and centrifugal separators have been installed and are operational. A biocide will be added to prevent a recontamination of the oil with microbiological agents. The Unit 2 turbine lubrication oil system has been treated in a similar manner.

Specific Response to Item CY.U-2.b:

The Unit 2 reactor vessel has been cleaned and disinfected and will be used as the system flush receiving vessel only if no other pathway exists. If the reactor vessel is wetted with flush water, a disinfectant will be used and the vessel will be rinsed, drained, and dried as soon as the flush is completed.

Specific Response to Item CY.U-2.c:

The Unit 2 steam generators will be placed into nitrogen (inert gas) layup as soon as practicable.

OPERATING EXPERIENCE REVIEW

RECOMMENDATION (OE.2-1)

Provide timely notification via NUCLEAR NETWORK of important in-house events that would be of generic interest to the nuclear industry. Develop and implement guidelines to ensure that important in-house items of generic interest are identified. Recent plant events of generic interest have not been reported. Examples include the following:

a. cracked gears in a Limitorque valve operator

b. inadequate fastening of a diesel generator engine connecting rod assembly

c. failures of a 6.9 KV switchgear jackshaft

Response:

The CPSES Nuclear Network Coordinator now participates in key plant activity status meetings to directly increase CPSES utilization of Nuclear Network information and to collect timely information for Network notifications of CPSES in-house events of generic interest to the nuclear industry.

Guidance consistent with INPO's General Criteria for Operating Experience Entries on Network will be added to procedure NOS-102, "Coordination with Nuclear Network". (Expected completion date April 1, 1988).

Each of the specific events listed as examples in the report had previously been reported to the NRC under the requirements of 10CFR50.55(e). CPSES Network interface personnel were aware, through telephone discussions with INPO contacts, that information provided to the NRC of this type is routinely screened by INPO. Consequently, no action was taken to prepare duplicate Network entries on the same events. However, one Network entry, OM-304 of October 12, 1987, was made concerning "Bolt-Hole Preparation Problems on (Diesel Generator) Connecting Rods", which addressed the event cited as example b.

SOER STATUS

The following recommendations have not been effectively implemented and further review is needed. One of these recommendations, previously evaluated by INPO to have been satisfactorily addressed, has been reopened as subsequent review has determined that the action taken was not effective; e.g., subsequent actions removed procedural requirements or deleted necessary training or the action intended was not completed.

SOER No.	Rcmdn No.
82-9	8

82-10	1
82-13	3
83-1	14
83-9 (reopened)	2
83-9	4
83-9	8
84-5	5
84-7	2
84-7	3
85-2	3
85-3	1
85-3	2
85-3	3
85-3	4
85-3	6
86-1	9

Response:

Each of the 17 SOER recommendations listed as needing further review will be reevaluated by the CPSES IOER Program. An update on the status of each of the above recommendations and the status of each red-tab SOER recommendation issued after December 1987 will be included in the six-month follow-on report to INPO. (Estimated completion date June 30, 1988).

RECOMMENDATION (OE.3-1)

Expand the effectiveness review of the operating experience program to include a sampling of knowledge of industry experiences at the working level. Interviews of operations and radiation protection personnel indicated a lack of knowledge of recent significant industry issues and experiences. Deficiencies noted include the following:

a. During simulator training, the reactor was observed to be critical below the minimum rod insertion limit. Questioning of the operators about this condition indicated that operators were not familiar with industry events involving premature criticalities.

b. A number of auxiliary operators did not have knowledge about industry experiences involving motor-operated valve failures.

c. Interviews with plant radiation protection technicians revealed knowledge weaknesses in industry events involving excessive personnel radiation exposures and small fuel and activation particle contamination which have produced very highly localized exposures to personnel at some plants.

Response:

The Industry Operating Experience Review program at CPSES accomplishes the routine review of all significant nuclear industry experience reports as suggested by the INPO SEE-IN program and INPO Good Practice OE-901. To date, the major effort of the CPSES IOER program has been to identify and incorporate lessons learned into plant systems, programs and work practices at CPSES. To provide feedback and promote general personnel awareness, reports summarizing industry events are produced monthly and have been widely distributed to all organizations on site since 1983. They have been incorporated into applicable training curricula to the extent they apply to CPSES. Effectiveness reviews are conducted by program managers, the Quality Assurance organization, and INPO.

The instances of lack of knowledge at the working level about important industry events indicates that the previous efforts to distribute the information and transmit it to appropriate users have not been effective in achieving the desired awareness of problem areas in the industry.

As recommended by INPO, the effectiveness reviews of the IOER program at CPSES will be expanded to include sampling of knowledge at the working level. The results of such sampling will be used to identify areas requiring additional focus or to make other improvements in programs, as warranted.

In addition, in order to make more effective use of the information available, Plant Evaluation has begun work to produce monthly video-taped presentations highlighting recent industry events and their impact on CPSES systems, programs and work practices. The first presentation will be produced and distributed for viewing at multiple on-site work centers beginning in June 1988. The video-taped presentation is a pilot program, and its usefulness will be evaluated after a trial period of several months.

ORGANIZATION AND ADMINISTRATION

RECOMMENDATION (OA.1-1)

Develop and implement an action plan for operational readiness that will prioritize and focus efforts on activities that must be completed prior to startup. Lack of a plan is adversely impacting transition from the current construction environment to an operating plant environment. The need for an action plan was identified by INPO in 1982 and 1984. The operational readiness plan should identify responsibilities and have sufficient detail to direct the efforts of station personnel in achieving a smooth transition to plant operation. Specific milestones for timely support of interdepartmental activities should be included. Additionally, the plan should provide for the time and manpower necessary to effectively implement programs and operational practices. As a minimum, the following problems should be addressed by the operational readiness plan:

a. Revision of procedures

The current rate of completing operations, maintenance, and surveillance procedure revisions needs to be evaluated. The present rate of completing procedure revisions could adversely impact activities necessary to support fuel load. Additionally, manpower and time requirements for procedure revisions have not been determined.

b. Pre-start testing and surveillance

The scope of pre-start testing has not been defined. Additionally, surveillance tests that could be satisfied by pre-startup testing have not been identified.

c. Operations control of plant systems

Currently, operations is not exercising some of the formal controls necessary for plant operation. Some programs necessary for the control of equipment status are not developed or fully implemented, such as the locked valve program. Additionally, operations does not demonstrate an attitude of ownership and responsibility for systems that are turned over to the plant.

d. Radiological controls

Development of the ALARA program and some radiological control policies is not complete, and facilities for decontamination and storage of contaminated equipment have not been established. Implementation of radiological controls should be carefully timed to allow adequate time to practice routine radiological activities before radioactivity is present in the plant.

e. Industrial safety programs

Station-managed industrial safety procedures such as those for scaffolding and confined spaces have not been implemented, and a station-managed medical first aid facility needs to be established. The station is currently relying on a contractor to fulfill these needs.

f. General employee training

General employee training (GET) activities have been suspended, and virtually the entire plant staff needs to be retrained. Additionally, the GET program should be reviewed to ensure it is consistent with upgraded operational priorities and will meet current requirements.

g. Fitness for duty

Although some fitness-for-duty elements are in place, a comprehensive program to provide assurance that personnel are fit to perform their assigned duties has not been implemented. Continuing training in fitness-for-duty is not currently provided to managers and supervisors. Full program implementation is being delayed awaiting decisions on random and periodic testing.

Response:

A comprehensive Nuclear Operations Readiness for Operations Plan has been developed and the initial issue was provided to appropriate managers on February 22, 1988. It provides a planned and systematic method of assuring that necessary programs, procedures and personnel will be available to operate Comanche Peak safely, efficiently, and in compliance with all applicable requirements. Activities requiring completion are identified by department or section responsibility. In order to achieve a smooth transition to plant operation, the activities have been prioritized and schedules have been established consistent with the unit's equipment completion and testing schedule. Eighteen operational milestones prior to fuel load and nine additional milestones from fuel load to initial entry into Mode 1 are identified to provide the basis for cooperative interdepartmental activities. The plan includes corrective actions resulting from the INPO assistance visit, the TU commitment tracking programs, a review of the INPO performance objectives, department self-assessments using INPO guidelines, and management reviews of programs and people. Interface points between organizations and constraints to activities will be identified and reviewed on a periodic basis to assure timely completion. As new activities are identified, they will be added to the plan. It will be statused, updated and reissued regularly until initial criticality.

Specific Response to Item OA.1-1.a:

Known revision requirements to operations, maintenance, and surveillance procedures are listed by individual procedures, with scheduled dates and activity durations for controlling steps of the drafting, review, and approval process. In other cases, where major overall review is required, such as the ALM procedures, the activity listed is to develop a program (with a scheduled completion date). The program will subsequently be entered in the plan in greater detail. This will enable a realistic assessment of resource limitations and will permit corrective action to be taken. In some cases, additional contract support has been obtained.

Specific Response to Item OA.1-1.b:

The scope of pre-start testing has now been defined to the extent that post-work test requirements and design changes are currently known. Additional work is continuing to be identified, which will require revision to the pre-start test requirements throughout the test program. As described in the response to Recommendation (TS.2-1), the detailed schedule for conduct of initial surveillance tests has been included in the Nuclear Operations Readiness for Operations Plan. An analysis of all testing requirements versus work performed on each system will be developed to document the need or absence of need for testing. A matrix will be prepared for each system, and test procedures will be developed as necessary to satisfy specific testing requirements. The key procedures for controlling the test program have been issued. Although the definition of test requirements will be an ongoing effort, the majority of known requirements will be documented by approved test procedures by December 1, 1988.

Specific Response to Item OA.1-1.c:

As described specifically in the response to Recommendation (OP.1-1), Operations has increased its control of plant systems, the operation of equipment and involvement in testing. Some of the formal controls necessary for plant operation are not appropriate until the level of construction activity has diminished, and the plant is more nearly in a completed state. The locked valve program, as described in the response to Recommendation (OP.3-3), will be reviewed by September 1, 1988, with a final review and upgrade 90 days prior to scheduled fuel load. The response to Recommendation (MA.2-1) describes a program to increase attention to the maintenance and material condition of systems and components turned over to Operations. Through increased management involvement in training, maintenance, area inspections, and direct control of systems and components, the attitude of ownership and responsibility for systems that are turned over to the plant has been strengthened.

Specific Response to Item OA.1-1.d:

As described in the response to Recommendation (RP.4-2), the station ALARA program will be fully implemented well in advance of the time when radioactivity is present in the plant. The plans for facilities for decontamination of equipment are described in the response to Recommendation (RP.1-4). Plans for training personnel and practicing radiological controls in the absence of radioactive fields are described in the response to Recommendation (RP.3-1).

Specific Response to Item OA.1-1.e:

The implementation of a station managed industrial safety program is discussed in the response to Recommendation (OA.5-1). It is discussed also in the response to the corporate assistance visit Recommendation (2.10A-1). Specifically, the station procedures for scaffolding and for confined space entry will be implemented by April 15, 1988. A station-managed medical first aid facility will be in effect by August 31, 1988.

Specific Response to Item OA.1-1.f:

The General Employee Training (GET) program has been maintained active, but the requalification requirement has not been enforced, since the protected area access restrictions were removed to permit greater availability to construction personnel. Protected area and vital area requirements have been maintained for access to the Fuel Building. In anticipation of Fuel Load, access restrictions will be reinstated early enough to provide 120 days of experience with security measures prior to receipt of an operating license. A program effort has been initiated to requalify those persons whose GET qualification has lapsed. The GET program is under the Training Configuration Management System, which maintains a regular program for reviewing procedures, modifications and commitments and identifying the impact on existing training courses or facilities (e.g., simulator) or the need for new training courses and tracking them to satisfactory resolution.

Specific Response to Item OA.1-1.g:

A plan for full implementation of the fitness for duty program has been developed and will be added to the Nuclear Operations Rea⁄.ness for Operations plan by April 1, 1988. Improvements in the existing program will be phased in, with full implementation expected by December 1, 1988. A revision to NEO Policy Statement No. 28, "Drug and Alcohol Abuse", was issued on February 20, 1988 to emphasise the availability of the Employeee Assistance Program and to state clearly that employees are expected to report for work ready to perform their duties. It is expected that decisions on random and periodic testing can be finalized by July 31, 1988. The plan includes recurrent training for managers and supervisors.

RECOMMENDATION (OA.3-1)

Increase management effectiveness in identifying and correcting station problems. Management should provide additional direction in establishing responsibilities and standards, assessing performance levels, taking action necessary to attain operational readiness, and promoting teamwork. Presently, several problems exist that have either not been identified or resolved because of a lack of management involvement and direction. Also, this has resulted in a lack of a sense of urgency by some station personnel in developing programs necessary for plant startup. Many managers know of activities that need to be accomplished, but are waiting for higher level direction. The following conditions require increased management attention:

a. Appropriate performance standards are not maintained for operations department personnel. The abilities of control room personnel to properly operate the plant and of auxiliary operators to properly conduct rounds need to improve. Additionally, observed operator performance in simulated emergencies was inadequate.

b. System engineer and system coordinator responsibilities are not clearly established. System engineers are not closely involved with startup and maintenance activities to increase their expertise and ability to assist in the resolution of future problems. System coordinators do not have a clear understanding of their duties and interactions with other groups.

c. Material condition problems have not been corrected in some systems that have been turned over to the plant for operation and maintenance. For example, problems exist with some equipment located in the service water pump house, the water treatment plant, and station battery facilities.

d. Timely availability of materials to support maintenance has not been achieved. Many maintenance jobs have been on hold for over one year due to parts unavailability, and procurement of many parts is awaiting the development of engineering specifications. In addition, material availability is sometimes not verified or parts staged sufficiently in advance to ensure timely initiation of maintenance work.

e. Practical knowledge weakness in chemistry, operations, radiological protection, and maintenance have not been effectively addressed. Improved coordination between training and the plant groups is needed to correct this situation.

f. Operations and maintenance personnel do not effectively coordinate equipment clearances for maintenance work. For example, several maintenance jobs were observed to be delayed because clearances had not been established. Also, several clearances had been prepared for jobs that were not being worked. Additionally, operations does not routinely receive a description of the work scope when clearances are requested. This practice resulted in inappropriate clearance boundaries being established for one job.

g. The responsibilities for layup of plant equipment have not been clearly assigned and are not well understood by the involved groups. As a result, several systems such as the Unit 2 reactor vessel and steam generators have not been properly layed up.

In addition, close management control over work practices and other important evolutions is necessary since workers and supervisors have almost no experience in operating a commercial nuclear power plant.

Response:

Increased management attention is being applied to all areas of the Nuclear Operations organization, especially with respect to standards of performance and adherence to those standards. Managers and supervisors have been reminded to pursue identified problems to timely resolution and to persist in obtaining higher management assistance for those issues that cannot be resolved at their own level. As discussed in the following specific responses to the examples cited, management attention and direction is being focused on establishing responsibilities and standards, assessing performance levels, taking action necessary to attain operational readiness, and promoting teamwork. The Nuclear Operations Readiness for Operations Plan is the basic vehicle by which management will monitor the adequacy and timeliness of actions to attain operational readiness. By including resource assessments in this plan, it is also the vehicle by which management instills in supervisors and workers the need to pursue completion of these actions on a priority basis. To the best of our knowledge, those programs that require higher level direction have now been adequately identified to the appropriate level of management, and the need for timely decisions has been emphasized. Each will be considered with its appropriate priority.

Identification of problems that might impact on readiness for operation has received particular emphasis. For example, managers have been assigned specific monitoring and inspection responsibilities, and plant operating personnel have been made more aware of the need to identify material condition problems (see responses to the corporate assistance visit Recommendation (1.2A-1) and to this evaluation Recommendation (MA.2-1)). Another example is the enhanced use of the Plant Incident Report (PIR) program. This report will be the main vehicle for identification and resolution of problems resulting from operational events. It is available to all station personnel for identification of problems, and requires specific management evaluation to close the issue. It will assure that problems are identified, corrective actions are completed, and programs changed as necessary to preclude recurrence.

Specific Response to Item OA.3-1.a:

The response to Recommendation (OP.2-1) discusses the actions being taken to establish and enforce appropriate performance standards for Operations Department personnel. The response to Recommendation (OP.4-4) discusses actions being taken to improve the performance of auxiliary operators. The response to Recommendation (OP.4-1) discusses actions being taken to improve operator performance in simulated emergencies. In each case, these actions involve significant management participation.

Specific Response to Item OA.3-1.b:

The definition of system engineer responsibilities is discussed in the response to Recommendation (TS.1-1). With the actions being taken, the system engineers will be more closely involved in startup (testing), maintenance activities and design changes for those systems to which they are assigned. The definition of responsibilities includes definition of required interactions with other groups.

Specific Response to Item OA.3-1.c:

Increased management emphasis on improving the material condition of those systems that have been turned over to the plant for operations and maintenance is described in the response to Recommendation (MA.2-1). The actions taken on specific deficiencies associated with the service water pump house, the water treatment plant, and station battery facilities are described in the specific responses to Items (MA.2-1.c),(b), and (a), respectively.

Specific Response to Item OA.3-1.d:

Efforts to improve the identification, requisitioning and procurement of necessary repair parts are described in the response to Recommendation (MA.9-1). Additional actions to improve the planning of maintenance work (including verification and staging of parts and material) are described in the response to Recommendation (MA.1-1).

Specific Response to Item OA.3-1.e:

Actions to improve the practical knowledge weaknesses in chemistry, operations, radiological protection, and maintenance are described in the responses to Recommendations (CY.2-1), (OP.4-3), (RP.3-1), and (TQ.1-1). The involvement of departmental managers in providing input to Training concerning requirements and improvements to training has been improved.

Specific Response to Item OA.3-1.f:

Improved coordination of equipment clearances for maintenance work is described in the response to Recommendation (MA.1-1). The establishment of the work control center and the daily scheduling meetings, as described in that response, will help alleviate the difficulties described in the INPO evaluation.

Specific Response to Item OA.3-1.g:

The response to one unnumbered recommendation in the Chemistry section, designated "Recommendation (CY.Unnumbered-2)(Layup Chemistry Control)", describes the actions that have been taken to improve the status of equipment layup, particularly in Unit 2. Layup conditions for Unit 1 are satisfactory.

Additional Response:

TU Electric agrees that close management control over work practices and other important evolutions is necessary due to the relative inexperience of the maintenance and operating staffs. The actions described above are intended to provide that management attention. In addition, TU Electric has taken advantage of many opportunities to provide working level personnel with first-hand operational experience through participation with other utilities during activities such as refueling outages for radiation protection personnel, startup testing for auxiliary operators, and the required levels of "hot operating participation" for licensed operators and SROs. Additional opportunities will be used as they become available.

RECOMMENDATION (OA.5-1)

Implement a comprehensive, station managed industrial safety program. The following deficiencies were noted and should be addressed by the program:

a. Specific procedures for the construction and inspection of scaffolds, posting of confined space entry, and prevention of heat stress have not been established. Deficiencies in scaffolds and confined space postings were observed in the plant. There is no detailed guidance available for scaffolding standards, and the station is relying on a contractor's procedure for control of confined spaces.

b. Standards for safety training, safety meetings, and plant inspection tours have not been implemented. Formal training and meetings are not being held in a consistent manner. Only the Maintenance Department is documenting inspection tours. Review of maintenance tour reports indicate that maintenance conducts effective inspections and could be used as a standard for other plant groups.

c. Utility personnel do not routinely review data or monitor contractor activities that could affect the safety of all station personnel. Utility personnel have not ensured scaffolding and confined space activities are consistent with utility policy. Additionally, contractor safety performance and data should be monitored to identify adverse trends and problems potentially affecting other personnel.

Response:

The response to the corporate assistance visit Recommendation (2.10A-1) provides the major milestone dates for implementaion of the station managed industrial safety program. In addition, the responses to specific observations follow.

Specific Response to Item OA.5-1.a:

Specific procedures for the construction and inspection of scaffolds, confined space entry and the prevention of heat stress will be in effect by April 15, 1988. The specific deficiencies noted by INPO (lack of toeboards, lack of protective mesh between toeboards and handrails, and failure to post some confined spaces) have been corrected.

Specific Response to Item OA.5-1.b:

Standards for safety training, safety meetings and plant inspection tours have been promulgated in Procedure NEO 2.22, "Industrial Safety Program", and in Station Administrative Procedure STA-211, "Administrative Control of

Industrial Safety". The standards for safety training include new employee training and recurrent training. It is the responsibility of each supervisor to conduct monthly safety meetings to present relevant industrial safety topics. The standards for conducting station inspection tours include participation of managers and supervisors in their area of responsibility, documenting their observations, correcting unsafe conditions and reporting results. The inspection reports indicating the effective inspections done by Maintenance will be used as a model for other groups.

Specific Response to Item OA.5-1.c:

The Safety Services organization will hold routine meetings wih contractor safety representatives in order to review and discuss safety data by June 15, 1988 and will routinely monitor contractor safety performance and data to identify adverse trends and problems potentially affecting other personnel. Safety Services is currently performing routine inspections of contractors to ensure scaffolding and confined space activities are consistent with utility policy. Contract language has been incorporated into all contractor agreements which establishes utility policy for contractor industrial safety performance, including scaffolding and confined space activities.

Institute of
Nuclear Power
Operations

Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339
Telephone 404 953-3600

January 12, 1988

Mr. E. A. Nye
Chairman and CEO
TU Electric
2001 Bryan Tower
Dallas, TX 75201

Dear Mr. Nye: Earle

This letter forwards the recommendations developed during INPO's corporate assistance visit to Texas Utilities Electric, conducted November 30 to December 4, 1987. The attached letter report is a refined version of the material presented and discussed at the exit meeting on December 21, 1987.

We ask that you review this report and provide responses to the recommendations by February 8, 1988. Separate responses are requested for each recommendation noted in the report. Concise statements describing your actions are desired. A general response to each of the important areas noted in the Summary section of the report is also requested.

In accordance with INPO policy, this letter report is provided only to you. If you should decide to provide copies to the NRC, or to otherwise release the report outside your organization, we request that you notify INPO in advance.

We appreciate the cooperation and response from all levels of your organization.

Sincerely,

Zach

Zack T. Pate
President

ZTP/ya
Attachment
cc: W. G. Council

SUMMARY

The Institute of Nuclear Power Operations (INPO) conducted a corporate assistance visit to Texas Utilities Electric from November 30 through December 4, 1987. The visit was coincident with the INPO assistance visit to Comanche Peak Steam Electric Station.

As a basis for the assistance visit, INPO used the August 1985 Performance Objectives and Criteria for Corporate Evaluations; these were applied in light of the experience of INPO's team members, INPO's observations, and good practices within the industry. Information was gathered from discussions, interviews, reviews of documentation, and the concurrent Comanche Peak assistance visit. The team focused on corporate support and monitoring of nuclear station activities in preparation for operation.

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

Recommendations were made in several areas. The specific recommendations are listed in this report under the applicable performance objectives. The recommendations were presented to Texas Utilities management at an exit meeting on December 21, 1987. Recommendations to strengthen performance in the following areas are considered to be the most important:

- senior management monitoring, assessment, and direction of nuclear operations
- coordination of efforts between nuclear groups, particularly operations and engineering
- engineering support of nuclear operations

MANAGEMENT INVOLVEMENT AND COMMITMENT

PERFORMANCE OBJECTIVE A: Corporate management monitors and assesses nuclear station operations and provides support, guidance, and assistance to ensure and enhance safe and reliable operation. Corporate managers assigned responsibilities for nuclear matters have direct involvement in significant decisions that could affect their responsibilities. Management commitment to the operation of the nuclear station(s) in a safe and proper manner is evident from personal involvement, interest, awareness, and knowledge.

Recommendation (1.2A-1)

Strengthen senior management monitoring, assessment, and direction of nuclear operations. Strengthen communication of senior management performance expectations to those responsible for day-to-day activities and for program developments to support nuclear operations. The emphasis on completion of engineering and construction work needed to obtain a license appears to have distracted from appropriate attention to operations readiness. Consequently, sufficient emphasis has not been given to preparation for operation. The lack of a credible schedule for completion of the engineering and construction effort has distracted unnecessarily from efforts needed to prepare for operation. This is most evident in the development of programs and procedures needed for operation and in the preparation of plant staff personnel for operation. Example problems reflecting the need for more effective senior management involvement include the following:

a. The action plan for start-up has not been developed in sufficient detail to permit effective direction or monitoring of progress. The lack of a credible schedule for construction completion has hampered efforts to develop a start-up schedule.

b. Some senior managers do not routinely tour the station to observe day-to-day work and monitor progress toward operational readiness. For example, senior managers have not been monitoring simulator training, an area where a number of problems exist.

c. Routine reports to management often do not provide clear indications of performance results in comparison with goals or standards.

d. The training manager has been given very little guidance from line managers on their training expectations or on the effectiveness of his efforts. In fact, training needs substantial improvement.

e. Responsibilities in some areas have not clearly been defined and communicated to working level personnel. Examples of this are as follows:

1. Four different groups believe they are responsible for dose assessment activities.

2. The split of responsibility for engineering activities has not been settled. Agreement on assignment of responsibilities was reached between the engineering and station staffs and within the station staff, but senior management has not approved their recommendation or provided alternate direction.

3. Fitness-for-duty responsibilities have not been clearly established. Three different organizations feel responsibility for the program, but their efforts have not been coordinated.

f. Nuclear goals and objectives, and follow-up on completion, need improvement to adequately address efforts needed to prepare for operation.

g. Feedback to individuals on their performance needs to be strengthened. Formal performance appraisals are often not done, and alternative methods of feedback are not used. Some managers stated their intent is to provide feedback only when performance is not acceptable.

h. Feedback on performance and planning up the chain of command is sometimes not complete or candid, and managers are not taking appropriate actions to obtain good feedback. One example is the vice president of nuclear operations' expectation that all of the managers reporting to him obtain SRO licenses by 1992. Some affected managers did not know of this expectation and others believe it is not achievable. That feedback has not been clearly provided to the vice president, and an action plan has not been developed to achieve this goal.

A lack of operational experience at the plant makes clear management direction, guidance, and assessment of activities an even more vital function than at a station with more operational experience.

Recommendation (1.2A-2)

Strengthen the goals and objectives program to help focus the efforts of the nuclear organization in preparing for commercial operation of the plant. The following problems were noted with the objectives that have been identified for 1987 and 1988:

a. The persons or the department responsible for accomplishment of specific nuclear operations objectives are not identified. Industry experience has shown the lack of clearly assigned responsibilities weakens accountability and timely completion of objectives. Most managers interviewed do not use the established goals and objectives as a management tool.

b. Action plans are not established to identify and schedule actions needed to accomplish several of the objectives and measure progress toward completion. For example, no action plan has been developed for the objective to complete all unit 2 operating procedures necessary to support start-up. During the recent INPO plant assistance visit, problems were noted with alarm response procedures, abnormal procedures, and the lack of updated operational procedures. The progress being made in this area has not been adequate to support preparations for operation.

c. Some objectives are not being fully achieved. Follow-up is not adequate to identify problems in achieving objectives as noted during the recent INPO plant assistance visit. For example, weaknesses were noted in operator skills and knowledge, and instructor training and performance. These deficiencies indicate that the objective to maintain the training, qualification, and requalification programs to meet the requirements for fuel load and subsequent commercial operations is not being achieved. The current utility status indicates that the objective is being achieved.

Recommendation (L.2A-3)

Improve the content and format of periodic status reports provided to management to increase the usefulness of these reports in tracking performance, identifying problems, and monitoring the effectiveness of corrective actions. Examples of areas needing improvement are as follows:

a. Executive summaries in some reports are not effective in highlighting areas needing attention. For example, the executive summary of the Nuclear Operations Monthly Report does not provide a summary of the significant adverse trends as reflected in the performance indicator graphs that follow. Instead, the executive summary provides status of events.

b. The graphs contained in the Nuclear Operations Monthly Report do not depict acceptable levels of performance or performance goals, increasing the difficulty of determining whether actual performance as depicted is acceptable or indicative of a problem needing management attention. For example, the trend of temporary modifications as shown in the Nuclear Operations Monthly Report indicates the number of temporary modifications has been steady at approximately 700 over the last year. This graph does not provide information as to the acceptable or targeted number of temporary modifications or compare the actual number to the number expected during commercial operations, which was stated to be about 50. Providing acceptable or targeted levels of performance may provide a clearer picture to management of problems needing attention.

c. Guidance on the desired format and content of periodic reports has not been clearly provided to persons responsible for preparation of the reports. Several managers interviewed stated that they recognized improvements could be made in the presentation of material in various reports, but that they had not yet communicated their desires or directions for the needed improvements.

MAINTENANCE

PERFORMANCE OBJECTIVE A: Corporate management monitors and assesses maintenance activities at the nuclear station(s) and provides necessary guidance and support to ensure and enhance safe and reliable plant operation.

Recommendation (2.1A-1)

Strengthen corporate management monitoring and assessment of plant maintenance, and strengthen guidance and direction to correct the causes of maintenance problems. Some maintenance problems and adverse trends are reflected in the Nuclear Operations Monthly Report and in the plant assistance visit report. The Nuclear Operations Monthly Report contains detailed information, including trending information that indicates the following problems:

a. The number of control room instruments that are out of service is increasing.

b. The ratio of preventive maintenance actions to corrective maintenance is decreasing.

c. The percent of preventive maintenance items overdue is increasing.

d. The number of corrective maintenance work orders open for various reasons is well above the goals established.

In addition, the INPO plant assistance visit report indicates frequent delays in scheduled maintenance are caused by inadequate planning, work preparation, and coordination between various work groups. No indicators have been developed to reflect performance in these areas.

Recent efforts to reduce the backlog include identifying all work orders that need to be completed prior to heat-up so that resources can be focused on those requiring more immediate action. However, efforts to reduce the total number of backlogged work requests have not yet been effective.

Though corporate management was aware of the existence of maintenance problems, there was little corporate involvement in assessing the nature or causes of the problems or in developing solutions.

MATERIALS AND OUTSIDE SERVICES

PERFORMANCE OBJECTIVE A: Corporate support for the nuclear station(s) ensures that parts and material are available when needed.

Recommendation (2.2A-1)

Improve the process for determining procurement quality requirements for spare parts and other materiel. Specific recommendations are as follows:

a. Implement the action planned by the engineering procurement section to develop and maintain a comprehensive technical data base of spare parts and materiel quality requirements. Each purchase requisition for spare parts or materiel to be used at the station is routed through the Comanche Peak Engineering (CPE) procurement section for determination of procurement quality requirements. A backlog of 380 requisitions currently exists for CPE processing, of which 200 are identified as rush items. This level of backlog is currently resulting in a six to nine week delay in the procurement of materiel. Though current operation and maintenance needs are not being severely impacted by procurement delays, the process will need to be enhanced to ensure timely availability of spare parts and materiel for an operating unit.

b. Update the data base as new and relevant information is received from vendors. Procurement quality information is being accumulated in files for future reference, but no process now exists to update that data as new information becomes available. Instead, time consuming technical reviews are performed by CPE during each subsequent procurement to determine if there have been any vendor component changes since the last procurement. This causes unnecessary delays in obtaining needed materiel and spare parts.

DESIGN ENGINEERING

PERFORMANCE OBJECTIVE B: NTOL: Corporate design engineering is provided to ensure that transfer of design responsibilities and documents from the architect/engineer to the utility occurs in a planned and orderly manner.

Recommendation (2.5B-1) Finalize the vendor technical manual program to ensure the manuals effectively support operational needs of the plant. Specific recommendations are as follows:

a. Develop a plan of action for ensuring that design documents and plant procedures appropriately address vendor technical manual requirements. Contractor reviews of vendor technical manuals are currently being conducted to identify requirements contained within the manuals. To ensure these requirements are addressed in the operation of the plant, normal industry practice is to extract requirements from the manuals and include them in the appropriate station implementation documents. While there was recognition by responsible engineering and maintenance personnel that this must be done, neither a plan of action nor a schedule for this activity was identified.

b. Implement a process that ensures exceptions to vendor technical manual requirements are appropriately reviewed and approved. There are long-standing differences between the design engineering and the plant maintenance staffs regarding how exceptions to vendor technical manual requirements are to be controlled. The design engineering position has been that exceptions to vendor technical manual requirements should be processed through the design change authorization program. Plant maintenance management feels the design change authorization program is too cumbersome and can result in a time-consuming effort that is not responsive to the needs of the plant. While there is merit to each position, depending on the nature of the exceptions being considered, a procedure needs to be developed and implemented to ensure technical reviews are conducted and appropriate exceptions are approved in a timely manner when necessary.

Recommendation (2.5B-2)

Improve support of Nuclear Operations by Comanche Peak Engineering to ensure that operations needs are appropriately addressed by the design group. Ensure plant needs are identified and addressed when developing design documents that are utilized by the plant. Consider rotating personnel between the plant and design technical staff to broaden the experience in both groups and promote better understanding of the needs of each group. Problems such as the following reflect a need for improved communication and mutual understanding between Nuclear Operations and Commanche Peak Engineering:

a. Design basis documents were produced at Commanche Peak Engineering's direction by the architect-engineer without input from plant personnel. Design engineers developing the documents had little appreciation for the potential use of these important documents by plant staff. The documents can be a valuable source of information on design limitations, system design operating modes, and other information needed by the operations staff in developing operating and maintenance procedures and directions for other activities. Portions of the documents that should have included this kind of information contained, instead, extracts of operating instructions, valve lineups and other detailed data already available to both design engineers and the plant staff.

b. Nuclear Engineering and Operations Procedure, NEO 3.03, "Preparation, Review, and Disposition of Plant Design Modifications (DMs)," does not provide for any reviews of planned design changes by the plant staff until completed design packages have been approved and issued by design engineering. Experience has shown that close coordination between design and operating staffs is needed, and that reviews of conceptual designs with the operating staff can be particularly effective in ensuring that design changes are operationally acceptable.

c. Differences between the plant staff and design engineering on the need to add two startup transformers before plant startup have not been adequately addressed. The decision has been made to add the transformers, but the reasons for that decision have not been effectively communicated to the plant staff.

d. Some design engineers and managers indicated a lack of understanding of plant staff needs for documents such as electrical load lists and design basis documents that present design information in a form more easily understood by operators and others on the operations staff.

e. Meetings are currently being held among various management levels of the design engineering and nuclear operations organizations to improve communications and understanding. However, several managers stated that these meetings have not been effective.

Recommendation (2.5B-3) Improve the maintenance of control room drawings to ensure they are readily usable by operators, changes are incorporated in a timely manner, and system temporary modification status is clearly shown. Problems that reflect a need for improved maintenance of these drawings are as follows:

a. Drawing control procedures require drawings to be updated when there are either five outstanding design change authorizations or when a design change authorization has been outstanding against the drawing for 90 days. Over 4000 drawings are past due for updating.

b. Most drawings provided for the main turbine-generator are in German and have not been sufficiently translated to enable operators to readily use them.

c. Temporary modifications are not identified on control room drawings, even though many have been outstanding for long periods of time. Consequently, there is potential for personnel to not be cognizant of all differences that exist between the plant and the drawings. Plant personnel stated that in one case, this situation resulted in incomplete isolation of 6.9KV electrical equipment prior to performing maintenance work.

HUMAN RESOURCES

PERFORMANCE OBJECTIVE A: Corporate management should provide a sufficient number of capable personnel to support safe and reliable operation of the nuclear station(s).

Recommendation (2.7A-1)

Implement an effective management development and career planning program to develop sufficient numbers of capable, qualified management and supervisory personnel to support plant operations. The nuclear organization is not currently using formal or interim measures that focus on management and career development, such as addressing personal development goals or reviews in regular personnel appraisals. It is recognized that such a program is under development by the personnel organization and work is in progress to establish a data base of incumbent qualifications and experience. To date, however, involvement by the nuclear organization in the development of the proposed program has occurred only on a limited basis. Nuclear involvement will be necessary to ensure the program addresses nuclear needs adequately and is implemented effectively. The following key elements should be addressed in implementing the program:

a. Periodic reviews of corporate short and long-range plans to determine staffing needs and the demand for key personnel

b. Identification and selection of candidates for key positions in the nuclear organization based on the knowledge, skills, and experience needed for each position and the qualifications and growth potential of possible candidates

c. Involvement of key nuclear managers in identification of potential candidates throughout the nuclear organization and appropriate consideration of the need to broaden experience by rotation of assignments

d. Individual development plans to prepare candidates for rotation or promotion in a timely manner

e. An individual performance appraisal program to provide constructive feedback to employees concerning their performance and professional development. Many managers interviewed indicated they are not currently performing formal performance appraisals due to a lack of time and emphasis by senior management. This will be an essential element of implementing the proposed program.

f. Evaluations of the success of the program in meeting personnel requirements, including periodic reviews with all levels of corporate management.

NUCLEAR SAFETY ASSESSMENT

PERFORMANCE OBJECTIVE A: The nuclear safety aspects of station activities are independently assessed at the corporate level. Typically, these assessments are performed by the corporate nuclear safety review committee.

Recommendation (2.8-1)

Strengthen the corporate Operations Review Committee assessment of station activities related to nuclear safety. Problems noted include the following:

a. The Operations Review Committee membership lacks expertise in areas such as chemistry, radiochemistry, emergency planning, metallurgy, and non-destructive examination. In addition, only one committee member has recent operational experience, and neither of the two alternates assigned have equivalent experience. The method of designating alternates to the committee does not ensure the above areas of expertise will be available when a member is absent. A provision exists to use advisors to provide needed expertise, but this has yet to be fully utilized.

b. Operations Review Committee members are not periodically involved in activities such as quality assurance audits, audit checklist preparation, Site Operations Review Committee meetings, and observation of operational evolutions or tests that could enhance the review effort. Committee members rely on information provided in various site reports without the benefit of periodic personal observation of the activities described in these reports. This reduces the effectiveness of the committee review, because some material provided for review is deficient in detail and clarity, as noted by committee members. Deficient reports include Site Operations Review Committee minutes, the Nuclear Operations Monthly Report, and a quality trend report. Improvements to several of these reports are in progress. Industry experience has shown that operations review committees are most effective when periodically involved in these types of activities.

c. Several items important to monitoring the safety of plant operations are not yet incorporated into the Operations Review Committee process. For example, the committee does not review technical specification changes, planned special tests or evolutions, personnel performance problems (except as highlighted as adverse trends in the monthly trend report summary), analyses of procedure changes, and safety evaluations. Although these reviews are not yet required, phasing in of these reviews as the plant approaches commercial operation may improve the effectiveness of the committee.

It is recognized the Operations Review Committee chairman is working to address the problems related to committee membership and the quality of information provided to the committee.

INDUSTRIAL SAFETY

PERFORMANCE OBJECTIVE A: Corporate management monitors and assesses activities related to industrial safety and provides support, guidance, and assistance to ensure the safety and health of personnel.

Recommendation (2.10A-1)

Implement the planned Nuclear Engineering and Operations industrial safety program at the site. Ensure the program includes elements such as appropriate on-site company medical facilities and services, published policies and procedures, and training appropriate for each organization at the site. Consider Emergency Medical Technician training for medical emergency response teams. Clearly define contractor and utility responsibilities for industrial safety, including contractor adherence to station industrial safety policies.

Currently, the construction contractor is responsible for most industrial safety activity on site. Work is in progress to transfer responsibility for industrial safety to Nuclear Engineering and Operations (NEO). An NEO industrial safety program is in draft form, but has not been approved or implemented. An executive safety committee has been established, as has a site safety committee; however, committees are not yet functioning. Currently, safety inspections or audits are not being performed by TU safety personnel.

Problems noted during the INPO plant visit reflect the need for improved industrial safety performance and strengthening of the NEO industrial safety capability.

TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE C: Corporate management monitors and assesses training and qualification activities and provides guidance and assistance to ensure and enhance safe and reliable plant operation.

Recommendation (2.11C-1)

Strengthen senior corporate and plant management involvement in the monitoring and assessment of training and qualification activities of plant personnel. Several training-related recommendations in the plant evaluation reflect a need for improved training effectiveness. Increased management involvement is needed to assist in identifying needed improvements and to help ensure that improvement efforts have the intended effect. Examples where additional involvement could be helpful are observations of ongoing training, both in the simulator and the classroom or laboratory, and assessment of operator performance in the simulator.

Corporate and senior plant managers stated that they have had limited involvement with training, and most recognized that their involvement needs to be substantially strengthened.

RADIOLOGICAL PROTECTION

PERFORMANCE OBJECTIVE A: Corporate management ensures radiological protection activities at the nuclear station(s) are effective in minimizing occupational radiation exposure and controlling release of radioactivity and minimizing the generation of radioactive waste.

Recommendation (2.12A-1)

Strengthen corporate support and guidance of radiological protection program developments needed to prepare for operation. To a large degree, the corporate organizations have the role of providing requested assistance and do not function in the needed role of providing review, assessment, and guidance to ensure the effectiveness of station efforts. The following areas need to be addressed:

a. Corporate organizations need to take a more aggressive role in achieving radiological protection improvements needed for start-up and operation. Problems in radiological protection readiness include a lack of needed facilities and procedures for local personnel frisking and protective clothing issue, storage of reusable tools and equipment, processing of radioactive waste, contaminated laundry operation, and respirator cleaning and issue. Corporate support and direction could be particularly useful in the following areas:

1. development of a coordinated radiological protection action plan -- Though corporate and plant personnel had an understanding of the improvements needed to prepare for operations, their estimates of the magnitude of effort required to implement the needed improvements were considerably lower than recent industry experience shows is reasonable. Consideration should be given to obtaining information from similar plants that have recently completed start-up to better define the effort required to implement needed improvements.

2. development of policies and procedures -- A large number of procedures still need to be written, and some current procedures are not consistent with accepted industry practice.

3. interactions with engineering to complete needed permanent or interim facilities

b. The division of responsibility between the plant organization and other organizations supporting radiological protection needs to be defined. Radiological protection functions are performed or are intended to be performed by Comanche Peak Engineering, Nuclear Engineering, and Administration. Individuals interviewed indicated that overlapping responsibilities exist in several areas. An example area is dose assessment. All these support organizations and the plant appear to have some responsibility for dose assessment. The current set of Nuclear Engineering and Operations procedures provide some guidance on division of responsibilities, but do not contain sufficiently detailed information on responsibility for specific functions. A recent meeting was held by supervisors within the three support organizations to identify overlaps and recommend an appropriate division of responsibilities. Agreement was reached in many areas, but the results of this effort have not yet been endorsed or approved by management.

EMERGENCY PREPAREDNESS

PERFORMANCE OBJECTIVE A: Corporate management monitors and assesses emergency preparedness activities to ensure an effective emergency preparedness program.

Recommendation (2.14A-1)

Strengthen corrective action for emergency preparedness problems. Many deficiencies noted in prior program reviews, inspections, and drill and exercise reports remain unresolved. Some items remain open from the 1985 exercise, 35 items remain open from the January 1987 full scale exercise, and none of the items from the September 1987 drill have been posted to the tracking system. Though an emergency preparedness commitment tracking system exists, it is not being used effectively to resolve identified problems. The following weaknesses contribute to the lack of effective corrective action.

a. The format of the commitment tracking list is simply a running computer log of identified problems. It does not reflect corrective action status, dates that items are posted or completed, or assignment of corrective action responsibilities outside the emergency preparedness group.

b. The tracking list is distributed internally to the emergency preparedness staff and not to those outside the department who need to take the corrective action.

c. No regular report on corrective action status is provided to management.

e. The emergency preparedness group does not analyze the list to identify recurring problems, determine fundamental causes, and initiate appropriate corrective actions. Recurring problems noted include some in communications, on-site and off-site notifications, on-shift medical response, operation of access control points, and flow of information through emergency facilities.

As a related matter the emergency plan has not been updated since 1985. It should be reviewed to ensure it is still current.

Recommendation (2.14A-2)

Take additional actions to ensure that the post-accident sampling system (PASS) will reliably obtain and analyze reactor coolant and containment gas samples under accident conditions, and that core damage estimates can be obtained from PASS data. Address the following problems:

a. The post-accident sampling system has never been demonstrated operational. The unit 1 start-up group has not determined the testing that should be performed before critical operations and has not included the system on the start-up schedule. Currently, system meters and radiation monitors are out of calibration, some light bulbs are burned out so that it is impossible to determine sample flow path, some valves are improperly tagged, and other valves are not tagged. The pH and conductivity meters have not been calibrated. The chemistry and I&C departments disagree on the appropriate calibration interval for these instruments, and no interval has been selected.

b. Procedures for operation of the system and assessment of core damage have been in revision for nearly 18 months. Some chemistry technicians identified a lack of needed specific direction in current procedures. Most of the technicians have not been trained in the use of the countroom computer and the multichannel analyzer.

c. A preventive maintenance program, appropriate maintenance training, and spare parts stock have not been established.

d. A time and motion study is needed to evaluate total accumulated dose under severe accident conditions. The results of the study need to be compared with current exposure criteria.

Recommendation (2.14A-3)

Improve emergency public information performance in providing timely, accurate, and complete information to the media and the public. Strengthen procedures and training to support emergency news center activities.

Emergency preparedness drills have identified the following problems:

a. News releases distributed at the emergency news center did not provide accurate information. For example, information concerning injured personnel, the location of a bomb explosion, and the number of ambulances responding to the site was incorrect.

b. Timely information was not provided at news center briefings; it was not until five hours into the emergency that the majority of information concerning plant status was released to the media.

Public information training, other than participation in drills, has not been conducted since 1984. Training for company spokesmen has not been conducted since April 1986. The company spokesman during the September 1987 drill lost control of the briefing with the media.

Procedures supporting the emergency news center have not been revised in 20 months. Some news center activities are not adequately addressed by procedures. For example, media monitoring and rumor control procedures have not been prepared. Procedures for collecting information from call-ins and the media, and for responding to rumors or false information are needed.

Equipment in the emergency news center is not regularly tested to ensure it remains operable.

INPO

Institute of
Nuclear Power
Operations

Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339
Telephone 404 953-3600

January 21, 1988

Mr. Erle A. Nye
Chairman and CEO
TU Electric
2001 Bryan Tower
Dallas, TX 75201

Dear Mr. Nye: Erle

This letter forwards the recommendations and good practices identified during INPO's preoperational review and assistance visit to Texas Utilities Electric's Comanche Peak Steam Electric Station during the weeks of November 9 and 16, 1987. The attached document is a refined version of the material presented and discussed at the exit meeting on December 21, 1987.

We ask that you review this report and provide responses to the recommendations by February 12, 1988. Separate responses are requested for each recommendation noted in the report. Concise statements describing your actions are desired. A general response to each of the important areas noted in the Summary section of the report is also requested.

In accordance with INPO policy, this letter and the attached report are provided only to you. If you should decide to provide copies to the NRC, or to otherwise release the report outside your organization, we request that you notify INPO in advance.

We appreciate the excellent cooperation and positive response from all levels of your organization.

Sincerely,

Zack

Zack T. Pate
President

ZTP/sap

JAN 22 1988

RESTRICTED DISTRIBUTION

START-UP ASSISTANCE VISIT

TO

COMANCHE PEAK

November 1987

INSTITUTE OF NUCLEAR POWER OPERATIONS

CONTENTS

SUMMARY

The Institute of Nuclear Power Operations (INPO) conducted an assistance visit to Comanche Peak Steam Electric Station during the weeks of November 9 and November 16. The station is located on Squaw Creek Reservior near the town of Glen Rose, Texas. Both units are 1150 MWe (net) Westinghouse pressurized water reactors. Unit 1 is nearing completion and is scheduled for heat up in June 1988.

INPO reviewed site activities to assist in the station's preparation and readiness for operating in a safe and reliable manner. Areas reviewed included station organization and administration, operations, maintenance, technical support, training and qualification, radiological protection, chemistry, and operating experience review. Information was assembled from discussions, interviews, observations, and reviews of documentation. Corporate support and plant construction activities were not included in the scope of the review, except as an incidental part of the team's effort to assist the station in preparing to operate.

As a basis for the assistance visit, INPO used its April 1987 Performance Objectives and Criteria for Operating and Near-term Operating License Plants; these were applied 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.

The following beneficial practices and accomplishments were noted:

- Positive attitude among station working level personnel as exhibited by the following:

  a. strong desire to achieve commercial operation

  b. willingness to learn from the experience of others

- Management commitment to provide ample provisions for facilities and equipment to support most station operations. Noteworthy examples include the following:

  a. training facilities including a site-specific simulator, classroom facilities, offices, laboratories, and station specific equipment mock-ups

  b. modern equipment and office spaces for work groups

- o Effective support of station activities by the Independent Safety Evaluation Group as exemplified by the following:

  a. evaluation of first cycle scrams at other stations and subsequent action, including requests for modifications, to minimize the potential for similar scrams at Comanche Peak

  b. immediate investigation of station events by independent personnel to provide senior management with a basis for implementing effective corrective action

  c. observations of station activities, with written feedback to senior management, to identify problems needing corrective action

Recommendations were made in a number of areas. The following are considered to be among the most important areas in need of improvement:

1. Management direction and assessment

   a. A fully developed action plan has not been prepared to prioritize and focus efforts on activities which must be completed prior to station startup.

   b. High standards have not been established for some important station activities including the following:

      (1) operator performance in the control room and the simulator

      (2) radiological protection program policies

      (3) material conditions in areas turned over to operations

      (4) industrial safety program training, safety meetings, and station inspection tours

   c. Management assessment and review of existing programs has not been effective in upgrading deficiencies that can adversely effect station operations. Exemplifying this problem are the following:

      (1) Procedural problems in operations and maintenance continue to exist and minimal corrective action has been taken over the last several years.

      (2) Some programs to control equipment status have not been developed or effectively implemented.

      (3) Knowledge deficiencies exist in the operations, chemistry, and radiological protection staffs.

(4) The ability to plan, schedule, coordinate, and obtain spare parts for daily maintenance activities is weak.

2. Operations readiness and ability to operate and control the plant

   a. Shift operating crew performance was weak on the simulator and during a transient at the station.

   b. Auxiliary operators did not monitor and operate plant equipment in a consistent and adequate manner.

   c. Operations personnel have not assumed full control of systems and equipment turned over to the plant.

3. Training program implementation

   a. Simulator training does not provide challenging scenarios or effective feedback to improve operator performance.

   b. Some important industry events are not effectively communicated to station personnel. As a result, some personnel are not aware of relevant industry events.

   c. A continuing training program for station personnel has not been implemented in support of plant startup.

   d. Instructor training has not been effectively implemented for simulator training, on-the-job training, and laboratory/mock-up training.

   e. General employee training is not being conducted to keep employees aware of radiation protection, safety, and administrative policies and procedures.

Specific recommendations are listed under the performance objectives to which they pertain, and describe conditions that should assist Comanche Peak in meeting the performance objectives. Additional supporting details for selected recommendations are provided in the Appendix. Particularly noteworthy conditions that contribute to meeting performance objectives are identified as good practices. The recommendations were presented to Texas Utilities Company management at an exit meeting on December 21, 1987.

During the next INPO assistance visit to Comanche Peak, the evaluation team will review the results of this assistance visit as part of its preparation for the assist visit and as part of its on-site activities.

OPERATIONS

OPERATIONS ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Operations organization and administration should ensure effective implementation and control of operations activities.

Recommendation (OP.1-1) Clearly establish the operations department responsibilities on unit 1 for current plant conditions. The following are examples of operators not clearly understanding their current responsibilities:

a. On-shift supervisors do not know what systems are the responsibility of the Operations Department and what systems have been turned back to startup or construction. A current list of turned-back systems is not available in the control room.

b. On-shift supervisors do not know if non-operational personnel, such as individuals assigned to startup, are permitted to operate unit 1 components.

c. The division of responsibilities between the Startup Group and the Operations Department is not described in station procedures. For example, both the Startup Group and Operations Department issue clearances on unit 1 components. Neither group maintains records of the other group's clearances.

CONDUCT OF OPERATIONS

PERFORMANCE OBJECTIVE: Operational activities should be conducted in a manner that ensures safe and reliable plant operation. Reactor safety should be a foremost consideration in plant operations. Management policies and actions should actively support this operating philosophy.

Recommendation (OP.2-1) Establish and enforce standards for the conduct of operations. A lack of standards in many areas contributed to the performance problems observed during simulator training. Areas where standards are lacking include roles and responsibilities of operators and the shift technical advisor, operator acknowledgement and reporting of alarming conditions, as well as shift crew communications and teamwork. The following examples of problems observed during simulator training illustrate the need for standards in the above areas:

a. Roles and responsibilities

1. Reactor operators (RO) do not understand when they should take actions to ensure the plant is safe without obtaining prior permission from the supervisor. For example, in a simulated loss of all component cooling water to the reactor coolant pumps, an RO requested permission to trip the reactor and the pumps. The supervisor did not grant permission before the pumps tripped automatically, causing a reactor trip. The reactor and the pumps need to be tripped quickly to prevent pump damage in this situation.

2. The division of responsibility between the RO and balance-of-plant (BOP) operator for control room panels is not well defined. The RO and the BOP operator monitored and operated controls on the same control panels, occasionally interfering with each other. In one instance, during a steam generator tube rupture, both operators manipulated controls at an emergency core cooling panel. As a result, the BOP operator did not observe steam generator levels declining in the intact steam generators.

3. The shift technical advisor (STA) did not assist the shift supervisor in understanding plant conditions. In one exercise, the STA determined that a steam generator tube rupture had occurred but did not inform the shift supervisor who was unaware of this condition. The only support that the STA provided to the shift supervisor was checking the critical safety function status trees on two occasions. The STA was involved with off-site dose calculations for most of the exercise and did not monitor overall plant conditions.

b. Alarm acknowledgement and reporting

1. Operators acknowledged and silenced numerous alarms without reporting or

acting on the alarms. Examples of alarms acknowledged but not reported include pressurizer relief tank temperature, level, and pressure alarms, power operated relief valve tailpipe temperature alarm, and rod control urgent failure alarm. This practice can result in not taking necessary actions on important alarms.

2. Operators did not periodically walk down annunicator panels to ensure all alarms were expected for respective plant conditions.

c. Communications and teamwork

1. In an exercise involving a steam generator tube rupture, the BOP operator rapidly injected auxiliary feedwater without informing the RO or supervisor. As a result, pressurizer level and pressure rapidly decreased leading the assistant shift supervisor to order reinitiation of safety injection.

2. In one exercise, the BOP operator reduced turbine load but did not inform the RO. As a result, average reactor coolant temperature increased to the technical specification limiting condition for operation. Several minutes later, the RO realized that a power mismatch existed between the primary and secondary systems and manually inserted control rods to compensate for the mismatch.

3. The assistant shift supervisor did not require the operators to acknowledge or report completion of directed emergency operating procedure actions.

PLANT STATUS CONTROLS

PERFORMANCE OBJECTIVE: Operations 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.

Recommendation (OP.3-1) Establish a method to track active technical specification limiting conditions for operation (LCO). An administrative program to track active LCOs does not exist. In addition, operators are not required to log entry and exit from LCO action statements. An LCO tracking mechanism is needed to help maintain tight control of technical specification equipment status to prevent technical specification violations.

Recommendation (OP.3-2) Improve the implementation of the station clearance program. Coordination problems and lack of attention to detail caused errors while implementing clearances. Also, the sequence of component isolation is not properly considered in some cases. In addition, some personnel do not understand or respect the clearance program. The following examples illustrate these problems:

a. An auxiliary operator removed a danger tag from the incorrect valve during a partial clearance on the hydrogen seal oil system.

b. An inadequate clearance was used to support replacing oil seals on a steam generator wet layup recirculation pump. The maintenance planner requested the power be tagged-off and that the suction and discharge valves be closed but not tagged. Operations tagged the power off and tagged the suction and discharge valves shut. However, the system was not drained and, as a result, water spilled from the system when the pump flange was unbolted.

c. Interviews indicated that a number of operators were not familiar with the pump isolation problem identified in SER 12-84, "Heater Drain Pump Expansion Joint Failure". This SER highlighted the need to isolate pump discharge valves before suction valves on centrifugal pumps due to the potential for overpressurizing pump suction piping if the discharge check valve leaks through. Operators questioned stated that they do not always ensure a pump discharge valve is shut before shutting a pump suction valve.

d. Some contractor personnel operated danger tagged valves in the hydrogen seal oil system without authorization. They had not received any training prior to working on site. In another instance, a danger tag associated with the startup clearance program was used as an information tag with the danger and high voltage warnings blackened out.

Recommendation (OP.3-3) Establish criteria for locking valves, and resolve discrepancies between the locked valve procedure, system operating procedures and flow diagrams. INPO 85-017, Guidelines for the Conduct of Operations at Nuclear Power Stations, should be of assistance in this effort. The following are examples of problems observed:

a. During a review of five systems, several discrepancies were noted between the locked valve procedure, the system operating procedure (SOP) and the flow diagram. For example, safety injection valves 8810A through D (reactor coolant system cold leg injection valves) are required to be locked in the throttled position according to the flow diagram and SOP. The locked valve procedure does not include these valves.

b. Many valves in non-safety systems, such as the auxiliary steam, heater drain, and turbine lube oil purification systems, are locked. An excessive number of locked valves reduces the significance of locked valves and can hinder timely operation of the valves in an emergency.

c. Operators interviewed were unaware of any criteria to determine which valves should be locked.

OPERATOR KNOWLEDGE AND PERFORMANCE

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

Recommendation (OP.4-1) Improve the ability of licensed operators to control the plant during abnormal conditions and plant casualties. Ensure each shift team can effectively execute actions required by the emergency operating procedures. Increase management involvement in simulator training to reinforce expected levels of operator performance. Significant crew performance problems were observed during simulator training. The following are examples of problems experienced by two operating crews during simulator training:

a. The crews did not recognize that a steam generator tube rupture had occurred during any of the three exercises that included this casualty.

b. In one exercise, the crew failed to recognize a stuck-open pressurizer safety valve even after the pressurizer relief tank ruptured from overpressure and pressurizer level rapidly increased.

c. In two exercises involving loss of all component cooling water to the reactor coolant pumps, the crews did not trip the reactor and the reactor coolant pumps. The pumps tripped on high current causing a reactor trip.

Recommendation (OP.4-2) Improve the ability of licensed operators to prevent an inadvertent criticality during start up. The following problems underscore the lack of preparation to prevent this occurrence:

a. During two reactor startup exercises, the reactor was inadvertently taken critical below the rod insertion limit. In both startups, control rods were pulled continuously until the first doubling of neutron count rate with few pauses and then to criticality with few additional pauses in rod motion. This method did not allow a careful approach to criticality.

b. The reactor startup procedure does not incorporate alternate methods such as inverse count rate monitoring or multiple doubling checks to monitor the approach to criticality. The procedure also does not require periodic pauses in rod motion to allow subcritical multiplication to increase neutron count rates to a stable level.

c. The operators have not been given simulator exercises during requalification training that would challenge their ability to recognize and prevent an inadvertent criticality.

d. Many operators are not familiar with industry events concerning inadvertent criticalities.

Recommendation (OP.4-3) Identify the extent of licensed operator knowledge weaknesses and provide training to upgrade weak areas. The following are examples of knowledge deficiencies observed during simulator training:

a. Procedures and technical specifications

1. During an exercise involving a steam generator tube rupture with a stuck-open steam generator relief valve, the assistant shift supervisor had difficulty finding the applicable emergency operating procedure (EOP). Transition steps that would have

directed him to the correct procedure were overlooked.

2. During a plant cooldown, following a steam generator tube rupture, the assistant shift supervisor directed that safety injection be reinitiated rather than manually actuating the required components as directed by the EOPs.

3. One shift team referred to the incorrect technical specification to determine required actions after attaining criticality below the rod insertion limit.

b. System knowledge

1. Reactor operators had difficulty operating the reactor makeup system in the manual mode and did not understand the flow path for emergency boration.

2. Reactor operators demonstrated knowledge weaknesses with the rod control and rod position indication systems. One operator misaligned control rods and another misinterpreted rod position indications.

3. The operators did not understand why only three steam dump valves would open while they were cooling down the plant. They did not recognize that the low-low average temperature interlock prevents operation of more than three steam dump valves.

c. Integrated system response

1. In an exercise involving a failed reference temperature instrument from the turbine, power increased to greater than 100 percent and average reactor coolant temperature increased to its technical specification limiting condition. The balance of plant operator decreased turbine load causing average temperature to further increase, which aggravated the transient.

2. In an exercise involving the [illegible] of a diesel bus, the operators did not understand why the load sequencer for the diesel generator actuated. One crew considered the

actuation to be spurious. The sequencer had properly actuated due to loss of power on the diesel bus.

Recommendation (OP.4-4) Provide closer supervisory oversight of and involvement with auxiliary operator (AO) performance to prepare them for plant operation. Performance problems were observed with AOs during rounds and other activities. The AOs did not receive formal training on rounds or plant systems prior to qualification, and their performance on rounds has not been monitored by their supervisors. The following are examples of performance problems observed:

a. One AO did not check oil levels on the station service water pumps. These pumps were the only major operating pumps on the watchstation.

b. One AO did not know how to silence, acknowledge, or reset alarms on two fire alarm panels. The same AO allowed the diesel fire pump to operate without a flow path for greater than two minutes, contrary to procedure.

c. Some AOs only recorded required parameters on their round sheets without thoroughly checking equipment and plant areas for abnormal conditions.

d. None of the AOs routinely tested local panels for burned out annunciator bulbs.

OPERATIONS PROCEDURES AND DOCUMENTATION

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

Recommendation (OP.5-1) Review and revise operational procedures to ensure they are technically adequate to support plant operations. Many operational procedures contain technical deficiencies and have not been maintained current. The following are examples of problems noted:

a. Many alarm procedures lack sufficient guidance to be useful to operators responding to alarms. Some of the procedures provide little guidance beyond dispatching an operator to investigate. In some cases, the probable causes listed for the alarms are not the most likely causes. For example, the probable causes listed for a residual heat removal (RHR) pump high discharge pressure alarm are improper valve lineup and fouled heat exchanger. More probable causes such as leakage through an isolation valve or reactor coolant system pressure perturbation while on shutdown cooling are not listed in the procedure.

b. Many abnormal procedures contain technical deficiencies. For example, ABN 104A, "RHR System Malfunction", does not address any of the industry lessons learned from loss of RHR during mid-reactor coolant loop operation. Examples of lessons not incorporated in this procedure include not starting a second RHR pump until the reason for the loss of the first pump is known, and actions to take if a pump becomes air or steam bound. Other examples of abnormal procedures with technical deficiencies include ABN 301A "Instrument Air System Malfunction" and ABN 103A, "Excessive Reactor Coolant Leakage". ABN 301A does not describe adverse consequences to the plant on loss of instrument air and ABN103A does not address reactor coolant system temperature change as a potential cause of the symptoms for excessive reactor coolant leakage.

c. Many operational procedures have not been revised for greater than three years. A substantial backlog of procedure comments exists that have not been incorporated into the procedures.

Recommendation (OP.5-2) Develop controlled load lists/drawings and procedures to enable operators to readily identify loads on electrical panels and busses. This information is needed to enable operators to respond to a loss of a bus, isolate a ground, and understand the consequences of tagging out a breaker. Existing plant electrical drawings and procedures are not adequate for these purposes. The following problems were observed:

a. Two supervisors were unable to identify the specific loads off a breaker on a vital DC bus with information available in the control room. The supervisors traced the circuitry through three drawings with the third drawing referencing another drawing not available in the control room. A similar situation occurred when trying to identify the power supply to a pressurizer pressure transmitter.

b. While performing clearance reviews, an operator was unable to locate the specific load off a 120 volt AC breaker that was included in the clearance request. The drawing with the needed information was not available in the control room.

c. Procedures have not been developed to identify deenergized loads when an electrical bus is lost. For example, during an observed loss of a startup transformer, no procedure was available to enable the operators to readily identify deenergized loads when the electrical busses supplied by the transformer were lost.

TRAINING AND QUALIFICATION

TRAINING ORGANIZATION AND ADMINISTRATION

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

Recommendation (TQ.1-1) Identify knowledge and skill weaknesses of current job incumbents and provide training to correct identified weaknesses in time to support plant startup. This training should include industry and plant events, plant modifications, procedure changes and should be provided on a continuing basis. This should be a coordinated effort between the training department and the station departments. The following are examples of knowledge and skill weaknesses noted:

a. Some licensed operators demonstrated knowledge and skill weaknesses in the simulator. Examples are as follows:

1. In two exercises dealing with a failure of the reactor makeup control system to operate in any mode except manual , both reactor operators (RO) were unable to operate the system (even utilizing the procedure) without help from the instructor. One student attempted to figure out the system by looking at a station drawing detailing the control logic, but could not read the drawing. The resulting delays in injecting boron into the reactor coolant system (RCS) contributed to problems encountered in controlling average temperature.

2. In one reactor startup exercise, the RO did not notice that the rod selector switch was still positioned for shutdown bank E. He actuated the rods-out switch and shutdown bank E group position indicator stepped to step 230. The RO then reinserted shutdown bank E to step 228. The RO incorrectly stated the rods were now at step 228. By design, the rods will not move out beyond step 228. Thus, when the RO repositioned the bank demand counter to 228, the rods actually moved in to step 226.

b. Auxiliary operators exhibited some performance problems as well as inconsistencies during the conduct of their rounds. The following items are contributing factors:

1. Auxiliary operators are not required to demonstrate proficiency in watchstanding and making rounds prior to qualification.

2. Auxiliary operators are not provided training on systems they are responsible for monitoring during rounds prior to qualification.

c. Some plant chemistry personnel were weak in their knowledge of basic laboratory terms. For example, they were unfamiliar with the following:

1. purpose of control charts

2. definition of self-absorption

3. difference between precision and accuracy

d. Maintenance personnel were not prepared to effectively work in radiological controlled areas. The following problems were observed during maintenance work in a simulated radiologically controlled area:

1. While donning protective clothing, three workers had to be coached on each step of the procedure governing the proper wearing of clothing designed to protect workers from radioactive contamination.

2. The protective hoods worn by workers did not cover all areas of the face around the respirator nor a sufficient amount of neck and shoulder area to protect workers from skin contamination during work activities.

3. Four workers were asked at the entrance to the work area what their administrative radiological dose limits were for the job. None of these workers could correctly state the 300 millirem limit although this limit was written on the individual dose card issued to each worker.

e. Training and qualification programs are not implemented for electrical and mechanical maintenance personnel. The following items were noted during interviews with electrical and mechanical maintenance supervision:

1. There is no formal process to qualify electrical and mechanical maintenance personnel.

2. Supervisors have no means of verifying assigned personnel are qualified.

3. Training for electrical and mechanical maintenance personnel consists of following experienced personnel on the job for a period which does not ensure personnel develop and demonstrate skills and knowledge necessary to perform the task associated with the position.

f. Some plant radiation protection technicians demonstrated knowledge and skill weaknesses. During interviews, answers to questions concerning the following issues were not consistent with station procedural guidance or requirements.

1. personnel contamination level at which station policy requires investigation

2. definition of "hot spot"

3. definition of "facial contamination"

During maintenance work in a simulated radiologically controlled area, the following skill problems were observed:

1. A radiation protection technician instructed the worker to walk onto the contaminated area step-off pad while wearing a hood, a pair of coveralls, and a pair of plastic booties. The step-off pad clearly stated "remove protective clothing before stepping here."

2. The radiation protection technician instructed the worker to remove his outermost rubber shoe covers, one of the items most likely contaminated, while wearing only a pair of thin cotton glove

liners which do not provide protection from contamination. This action increases the likelihood of contaminating the worker's hands.

g. Some plant personnel were weak in their knowledge of industry events. Examples are as follows:

1. Licensed operators were not familiar with industry events involving creation of a bubble in the reactor vessel during natural circulation.

2. Some auxiliary operators were weak in their knowledge of motor-operated valves and associated industry events. The auxiliary operators stated they had not been trained on motor-operated valves and associated industry events.

3. Four of five radiation protection technicians could not recall significant radiological events dealing with spent fuel pool dives, refueling cavity entries, radioactive resin processing activities, and work near radioactive waste storage tanks. These evolutions have created unplanned high radiation exposures to personnel at other plants.

4. Some chemistry technicians were weak in their knowledge of industry events concerning resin intrusions and their effects.

Recommendation (TQ.1-2) Implement an initial and continuing instructor training program that includes instructional techniques used in laboratory, simulator, and on-the-job settings. Personnel assigned as instructors should be trained in areas appropriate to their job assignments. Also, the program should include weaknesses noted during periodic evaluations of instructor's performance. INPO 82-026, Technical Instructor Training and Qualification, should be of assistance in this effort.

SIMULATOR TRAINING

PERFORMANCE OBJECTIVE: Simulator training should be conducted utilizing methods and techniques that maximize its effectiveness in developing and maintaining necessary job-related knowledge and skills.

Recommendation (TQ.8-1)

Develop the teamwork and diagnostic skills needed by licensed operators to perform their job functions to control the plant during off-normal conditions. Provide classroom training in the fundamentals of these skills and develop simulator scenarios that train operators to diagnose and respond to a variety of plant events. Current training only focuses on normal plant operations.

The following problems are attributed to the lack of teamwork and diagnostic skills training:

a. During 1987, licensed operator requalification training consisted of only seven scenarios that exercised emergency operating procedures. Of those seven scenarios, four involved steam generator tube ruptures. However, in three of three observed simulator exercises, the team was unable to diagnose the existence of a steam generator tube rupture.

b. Operators have not been adequately trained on the simulator to recognize conditions that can lead to a premature criticality. For example, two of two teams failed to recognize the reactor was going to achieve premature criticality and permitted the reactor to achieve criticality with a startup rate in excess of the administrative limits.

c. The operators had difficulty using the emergency operating procedures to mitigate the consequences of multiple failures. For example, when given an exercise involving a small break loss of coolant and a design basis steam generator tube rupture, both observed teams failed to transition through the various emergency operating procedures to the proper procedure for the tube rupture.

d. One reactor operator started a load reduction at 10 megawatts per minute and did not inform the other reactor operator. Control rods were in manual and average reactor coolant temperature increased greater than the technical specification limiting condition for operation.

e. The only person on the team aware of a design basis tube rupture (460 gpm) condition was the shift technical advisor (STA). The STA was not involved in the activities of the team and did not know the team was unaware of the tube rupture.

f. In one design basis steam generator tube rupture exercise, a reactor operator was distracted by unnecessarily trying to help the other reactor operator at another part of the control board and allowed steam generator level to decrease (about 15 percent narrow-range level) in all three intact generators.

INPO Good Practice TQ-503, Developing Teamwork and Diagnostic Skills, could be of assistance in this effort.

Recommendation (TQ.8-2) Train simulator instructors to identify and critique performance problems during simulator training. Numerous operator performance problems were noted during simulator observations which were not critiqued. Also, the critiques usually did not identify methods operators could use to prevent recurrence of errors made during training exercises or methods to improve performance. The following are examples of problems observed with simulator post-exercise critiques:

a. Performance of two teams of operators was considered to be satisfactory by the instructor even though both operating teams demonstrated the following significant performance problems:

1. Operators did not recognize the reactor was being taken critical below the rod insertion limit.

2. Once critical, the operators took no action to reduce the startup rate and thus exceeded the administrative limit for startup rate.

3. Operators failed to diagnose a failed boron instrument even though the reading of 374 ppm on the instrument should have increased by 1100 ppm due to boron addition.

b. Operators were provided an opportunity to discuss their performance only after the instructors had discussed all of the errors they observed. In fact, during one critique, the instructor discouraged self-critiques of performance problems by the operators. These practices can result in an unwillingness by the operators to further discuss their performance.

RADIOLOGICAL PROTECTION

RADIOLOGICAL PROTECTION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Radiological protection organization and administration should ensure effective implementation and control of radiological protection activities.

Recommendation (RP.1-1) Establish and implement an integrated action plan that will ensure all radiation protection functions necessary for plant startup are completed in a timely manner. The plan should be developed to be compatible with the station startup schedule. Establish milestones and realistic goals to assist in monitoring progress. Assign responsibilities to the key personnel involved in implementing the plan.

It is recognized that radiation protection supervisors have established some informal preliminary plans and, in some cases, have developed time charts for certain projects. However, efforts to coordinate and track radiation protection department support preparations have been limited. The following planning problems were noted:

a. Plans to support contamination control

   1. Plans for local personnel contamination frisking areas and local protective clothing issuance points have been considered but not fully developed.

   2. Little progress has been made to establish a radiologically controlled area (RCA) tool crib, although the need to control contaminated tools and equipment through this approach has been recognized. Also, RCA tool stocking requirements have not been determined.

b. Plans to support radioactive material control

   1. Plans have not been fully developed for storage areas for radioactive materials and equipment such as contaminated lead blanket shielding, contaminated scaffolding, instrument and control test equipment, and outage-related equipment and tools.

   2. Although contingency plans have been considered for providing temporary radioactive waste processing, radioactive laundry, and respirator cleaning trailer

facilities during initial stages of plant operation, these plans are not coordinated and developed sufficiently to establish support facilities and radiological protection requirements.

3. Plans to provide alternate breathing air in lieu of the unusable plant breathing air system are not firmly set.

Recommendation (RP.1-2) Continue to develop and implement routine policies that will enable good radiological protection performance in radiologically controlled areas (RCA) on a daily basis. Review current station and radiation protection department policies to determine their effectiveness based on established industry standards. Ensure policies will provide effective daily guidance and will be fully implemented prior to plant startup. The following examples of radiological protection policies have not been fully developed:

a. authorization and inventory of radioactive material storage

b. requirements for controlling, inventorying, and marking of RCA tools

c. specific controls of contaminated vacuum units and portable air-filtration ventilation units

d. selection of markings on and types of waste segregation containers at contaminated area exits

e. requirements for personnel contamination monitoring after exiting contaminated areas

f. requirements for respirator issuance, tracking, and follow-up

g. requirements for radioactive material marking and labeling

Recommendation (RP.1-3) Review radiological protection procedures and verify all procedural guidance is clearly stated and instructions are consistent with good industry practices. All radiation protection procedures, both administrative and instructional, should establish a consistently high level of performance. The following problems were noted which should be addressed in the procedure upgrade program:

a. One procedure on personnel decontamination requires follow-up whole-body counting only if a positive nasal smear is found to be equal to or above 1,000 disintegrations-per-minute (dpm). Industry experience has shown internal contamination can occur in cases where nasal contamination is not present. Typical industry practice is to perform a whole-body count when facial contamination is present. Also, the procedure provides no clear direction to investigate personnel contaminations less than 20,000 dpm. Most personnel contamination levels are considerably less than 20,000 dpm in operating plants. Investigations of contamination incidents at levels below 20,000 dpm can be important in identifying and correcting program weaknesses.

b. The draft procedure of the respiratory protection program should reference corporate policy on the implementation of engineered controls as an alternative to mandatory respirator usage. Presently, the procedures do not address the use of engineered controls such as glove bags, portable containments, and portable ventilation equipment.

c. The procedure on radiological incident and problem reports should require documentation and investigation of radiological protection incidents that may point to program problems. Presently, the procedures do not address the documentation and investigation of incidents such as the unauthorized presence of radioactive materials outside the radiologically controlled area.

d. The procedure on dry radioactive waste minimization should provide clear guidance on sorting, survey, and release requirements for bags of trash from radiologically controlled areas. Presently, procedural instructions do not clearly state that each item of radioactive waste should be individually checked and surveyed to determine if beta radiation is present. Industry experience has shown that radioactive material may not be detected on individual items if only the bag is surveyed because of shielding by the contents of the bag and by the bag itself.

Recommendation (RP.1-4) Upgrade and complete facilities needed to support radiological protection activities. Ensure these fac... ies are operational, that necessary procedures are issued, anc personnel are trained to use the facilities prior to plan . operation. Currently, several facilities have significant limitations in support capabilities, and plans to upgrade these facilities have not been fully formulated. The following are examples of problems noted:

a. The hot machine shop has no area for large item decontamination. In addition, the hot machine shop does not contain a crane to handle heavy items, has limited access and low ceilings, and has floor drains connected to unit 2 drain tanks.

b. Plans have not been formulated to achieve access through the containment equipment hatch, although the bottom of the hatch is elevated more than 20 feet above the outside ground level.

c. Solid radioactive waste processing areas and facilities have not been fully developed, including areas for sorting, compaction, storage, solidification, and resin dewatering.

d. Respirator washing, drying, and storage facilities have not been established.

RADIOLOGICAL PROTECTION PERSONNEL KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE: Radiological protection personnel have the knowledge and practical abilities necessary to implement radiological protection practices effectively.

Good Practice (RP.2-1) The station's radiation protection technicians and decontamination workers have been provided additional practical experience through planned work assignments at several operating nuclear power plants. While permitted on a voluntary basis, more than 80 percent of the RP technicians have participated in at least one refueling outage at four similar pressurized water reactors over the last three years. Although decontamination personnel were largely hired without decontamination experience, more than three-fourths of these personnel have been sent to at least one operating plant to gain hands-on experience in difficult activities such as decontamination of a steam generator channel head, containment building after initial entry, and a refueling cavity.

GENERAL EMPLOYEE KNOWLEDGE AND ABILITY IN RADIOLOGICAL PROTECTION

PERFORMANCE OBJECTIVE: Plant personnel, contractors, and visitors have the knowledge and practical abilities necessary to effectively implement radiological protection practices associated with their work.

Recommendation (RP.3-1) Train plant workers, through classroom sessions and practical training, on their responsibilities under the radiological protection program. Consider providing simulated radiological work exercises for those workers expected to perform routine jobs in radiation or radioactive contamination areas. These simulated exercises could include evolutions such as steam generator work, change-out of radioactive filters, and reactor coolant pump seal work. During these exercises, implement as many requirements of the radiological protection program as practical to ensure the program will be effective during actual radiological conditions. Reinstate general employee and radiation worker training for key radiation workers well in advance of plant startup. Problems observed during a simulated radiological work evolution include the following:

a. Workers were not familiar with the administrative dose limits assigned to them for this job.

b. Several workers were not familiar with the radiation and contamination levels anticipated in the work area which were written on the radiation work permit.

c. Workers had to be coached during each step of the donning and removal of protective clothing; also, workers were not familiar with the use of contaminated area step-off pads. Instructions provided by radiation protection technicians were not always consistent with good industry practice.

d. Job planning and preparation problems led to lengthy work delays in areas that, during plant operations, will be radiologically controlled.

EXTERNAL RADIATION EXPOSURE

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

Good Practice (RP.4-1)

A program to review plant procedures for radiological protection interactions has enabled specific radiological instructions to be included in many key plant procedures. Also, many cautions and radiological hold points have been placed immediately prior to those steps in procedures that could cause an increase in radiological hazards. This review program covers nearly all operating procedures. Examples of procedures that have incorporated radiological instructions include radioactive filter replacement, graphite valve packing, steam generator manway removal and replacement and check valve inspections.

Recommendation (RP.4-2)

Implement the station's ALARA program and ensure it is fully functional to support plant startup. While it is recognized that the ALARA supervisor and the ALARA technicians have only recently been selected, the following problems were noted:

a. ALARA personnel job functions

   1. The job functions of both the ALARA supervisor and ALARA technicians are not formalized.

   2. ALARA personnel are not routinely attending periodic work planning meetings nor observing routine maintenance and operations work activities to increase job scope familiarization. Also, job "dry-runs" under simulated radiological conditions have not been scheduled in anticipation of power operations.

b. ALARA support functions

   1. Controls for temporary shielding have not been fully developed.

   2. The mechanisms for the filing and storing of job history ALARA information, such as radiological conditions encountered and lessons learned from previous evolutions, have not been formally decided.

c. ALARA program implementation

1. Some specific job planning for anticipated routine job activities such as steam generator work and radioactive filter change-outs are only in the initial stages of development. This planning is behind the schedule originally projected. ALARA personnel have no firm plan for completion.

2. Experience gained from initial job specific planning efforts has not been consistently documented for future use.

MAINTENANCE

MAINTENANCE ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The maintenance organization and administration should ensure effective implementation and control of maintenance activities.

Recommendation (MA.1-1) Improve the work control system's effectiveness in supporting plant maintenance activities. Assign responsibilities and accountabilities for work control functions such as prioritizing, planning, scheduling, testing, and support. Improve planning of scheduled work activities to identify necessary items such as clearances, parts, tools, and other support so that job delays are minimized. Improve scheduling so that the weekly schedule can be used to coordinate activities among organizations such as operations, the various maintenance departments, and later on, health physics. Upgrade performance monitoring of the work control process. Problems observed include the following:

a. Examples where additional planning would have reduced work delays include the following:

1. Spare parts and special tools needed to perform a pressurizer level transmitter calibration were not identified in the work document.

2. Special tools needed to change oil on a containment spray pump were not identified.

3. Torque values needed to tighten bolts on an instrument air compressor were not provided.

4. The rigging and tools needed to perform work on a sump pump were not specified on the work document.

5. Unnecessary work delays were noted resulting from failure to identify all needed parts when tasks were worked the first time. For example, a Limitorque operator was worked five times and placed on parts hold six times in a sixteen month period for parts that should normally be stocked. These parts should have been identified, ordered, and made line items in the

warehouse when the problem was first identified.

b. Scheduling and coordination of maintenance work needs to be improved. Examples of problems noted include the following:

1. The weekly schedule is not used as a basis for issuing clearances and setting plant conditions. Clearances are hung without consideration of priorities or job sequencing. For example, work on a motor-operated valve required electrical maintenance to perform signature analysis followed by a motor-operator overhaul by mechanical maintenance. When electrical personnel attempted to perform the signature analysis, the mechanical maintenance clearance was already hanging which prevented signature analysis. This lack of sequencing resulted in a two-day delay.

2. Several examples were observed where clearances were not obtained as needed. For example, a turbine building sump pump that was to be electrically disconnected required three attempts over a three-day period to obtain a clearance. These delays were reportedly due to lost paperwork.

3. The weekly schedule is used by supervisors as a weekly work list and not as a day-to-day schedule. This prevents using the schedule as a sequencing or scheduling document by other organizations such as operations.

4. Scheduling meetings are conducted generally for status updates without any individual or organization clearly in charge. This results in lack of coordination of activities and resolution of problems that arise. For example, during one scheduling meeting, the possibility of using temporary service air was discussed as a method to alleviate coordination problems with air compressor work. Several options were discussed but nobody was assigned to resolve the issue.

5. The various scheduling inputs are not coordinated to minimize system or component outage time. For example, construction work on the station instrument air compressors was not coordinated with preventive and corrective maintenance, resulting in the equipment being tagged several times in a three-week period. In addition, mechanical maintenance was required to work an emergency work order on one air compressor to allow the construction work to be completed in the desired time frame on the other air compressor. This resulted in several hours of lost work effort since the mechanical maintenance team had already started work on another task and had to be diverted to the emergency work order. Component outage scheduling would have prevented this problem.

c. Indicators used for monitoring work control performance are very general and in some cases use inconsistent data, making identification of problem areas difficult to determine. Additionally, some useful information to evaluate performance, such as performance-to-schedule comparisons, delays due to parts, availability of engineering support, and clearance delays are not tracked. Examples of the types of problems noted include the following:

1. In the weekly status report, a graph is presented to display the status of required work to be performed versus a goal. Since the "required" work and the "goal" are based on two different sets of data, the graph is not usable as an indicator.

2. Performance indicators are not identified that measure performance of planners, supervisors, foremen or workers in meeting the work schedule. Thus, the ability to complete the required work in the time allowed cannot be documented nor can problem areas be identified. These types of indicators could also be used to determine if manning levels are adequate to support plant operations.

3. Performance of organizations that support maintenance such as procurement, maintenance engineering, Comanche Peak

engineering, and operations is not being monitored, although these areas contribute to significant work delays in the maintenance area.

4. Except for parts requisitions required for high-priority work, there is no periodic review or tracking of the requisition backlog.

(See Appendix, p.1 for additional details.)

PLANT MATERIAL CONDITION

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

Recommendation (MA.2-1) Increase emphasis on maintaining equipment transferred to plant operations. Communicate standards desired for plant material condition and ensure that these standards are understood. Conduct more in-depth material condition inspections by managers and supervisors to reinforce adherence to established standards. Problems noted with equipment turned over to operations include the following:

a. Many material deficiencies exist on plant batteries even though battery maintenance is routinely performed. For example, many terminal connections have either corrosion buildup or are missing their lead coating.

b. Many material deficiencies exist on the water treatment plant such as leaks of either oil, water, caustic, or acid on most pumps.

c. Material deficiencies exist in the service water building such as corroded packing glands on most fire protection system valves.

d. Longstanding oil and water leaks on the station air compressors have not been corrected.

f. Lighting and emergency lighting is inoperative in several areas of the plant.

It is recognized that the maintenance self-assessment recently conducted by the station identified the need for a material inspection program. INPO 85-038, Guidelines for the Conduct of Maintenance at Nuclear Power Stations, and INPO Good Practice MA-312, Plant Inspection Program, should be of assistance in this area.

(See Appendix, p.2 for additional details.)

CONDUCT OF MAINTENANCE

PERFORMANCE OBJECTIVE: Maintenance should be conducted in a safe and efficient manner to support plant operation.

Recommendation (MA.4-1) Improve the conduct of some maintenance activities. Deficiencies were noted in the control of instrument and control measuring and test equipment, in the program for maintenance of motor-operated valves, and in the use of appropriate tools. Problems observed include the following:

a. The control of instrument and control measuring and test equipment (M&TE) was not maintained as required by station procedure. Personnel were observed using M&TE without documenting the use. Additionally, a sample of eleven work orders where M&TE was used showed that the M&TE for five of the work orders was not documented. This results in a lack of traceability in case the M&TE is later found to be out of calibration.

b. The motor-operated valve (MOV) maintenance program can be improved by including the following program elements:

   1. troubleshooting guidelines in MOV maintenance procedures

   2. guidance in the post-work test procedure for dynamic testing or equivalent testing of MOVs after maintenance

   3. continuing training on MOVs that includes plant and industry operating experience

c. Tools were used improperly during the conduct of several maintenance activities. For example, adjustable pliers were used by a technician to remove the cover bolts on a pressurizer level transmitter. A box end or socket wrench would be more appropriate to preclude bolt head damage.

(See Appendix, p.3 for additional details.)

MAINTENANCE PROCEDURES AND DOCUMENTATION

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

Recommendation (MA.6-1) Upgrade the quality of mechanical and electrical maintenance procedures. Human factors deficiencies and inadequate instructional detail should be corrected along with making technical information improvements. The following are examples of problems noted:

a. Notes and cautions are often located after the step to which they apply. This could result in the craftsmen not reading important information until after performing the step. For example in procedure MMI-808, "Crosby Pressurizer Safety Valve Repair," step 5.1.3.10 instructs the user to remove the disc holder and bellows assembly. A caution following the step provides the user information to prevent damage to the bellows and spindle.

b. Notes and cautions often convey specific actions. Actions should be reserved for instructional steps to ensure the actions are not overlooked, and allow for user sign-offs. For example, in procedure EMI-315, "Containment Spray Pump Motor Inspection," the note after step 5.1.28 instructs the user to place blocks on each side of the rotor to keep it stationary. It is more appropriate to provide this instruction in a step.

c. The level of detail in some procedures does not provide information necessary to ensure activities can be accomplished in a safe or consistent manner. For example, in procedure EMI-315, "Containment Spray Pump Motor Inspection," step 5.1.1 instructs the user to turn off the power supply breaker and pull the heater fuses. Normally, this action is included in the equipment clearances performed by the operations group. However, operations involvement is not indicated.

d. Some procedures contain poor quality illustrations that are illegible or can be misinterpreted. For example, in procedure MMI-302, "Reactor Coolant Pump Seal Inspection," Figure 1 is a reproduction of a photograph, and is not legible.

It is recognized that the maintenance self-assessment recently conducted by the station identified procedure problems.

(See Appendix, p.4 for additional details.)

MAINTENANCE FACILITIES AND EQUIPMENT

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

Good Practice (MA.8-1)

The Maintenance Department Lubricant Issue and Control Program provides effective control of lubricant usage while allowing prompt issuance to support maintenance. Key features of the program include the following:

a. All lubricant is withdrawn through the maintenance department tool issue room. Tool room personnel maintain control of the lubricant storage facility and require craftsman to show an authorized work document that specifies the required lubricant.

b. The lubricant is issued in the needed quantity in approved containers with the type of lubricant clearly marked on the side. Required documentation for safety-related material is provided at the time of issue with a quality control acceptance tag, that becomes part of the work document.

c. Unused and waste oil are returned to the tool issue room for authorized disposal.

d. The tool room is adequately manned to prevent any delays in the procurement of the lubricant. During observed performance, it took less than five minutes to obtain the needed supplies.

e. The lubrication locker is exceptionally clean and orderly, with provisions for leakage installed to minimize housekeeping problems.

MATERIALS MANAGEMENT

PERFORMANCE OBJECTIVE: Materials management should ensure that necessary parts and materials meeting quality and/or design requirements are available when needed.

Recommendation (MA.9-1) Implement a coordinated spare parts program that will provide effective support to the operating nuclear station. Identify parts needed to support maintenance efforts and develop a procurement system that can obtain those parts in a timely manner. Develop a comprehensive, accurate, and usable master equipment list that includes both "Q" and non-"Q" equipment. Problems observed with spare parts include the following:

a. The current inventory of spare parts is not adequate. Problems noted include the following:

   1. Approximately 300 maintenance work requests are on hold due to a lack of parts. About 100 of these requests are over one year old.

   2. The initial warehouse inventory, established several years ago, was not adequate. For example, many gaskets, o-rings, and other components needed for motor-operated valve maintenance have only recently been added to the inventory and were added because they were needed for a recent maintenance effort. A systematic review to ensure all needed spare parts are included in the inventory has not been completed.

   3. Maintenance planners estimated that about one-third of the parts they use are not currently stocked in the warehouse.

b. The time required to process a requisition for quality-related parts is excessive. Problems noted include the following:

   1. Routine requisitions typically take two to three months to generate a purchase order.

   2. All requisitions for quality-related parts must be processed through procurement engineering, even if they are warehouse automatic reorders. This typically adds a delay of several weeks.

c. An accurate and usable master equipment list (MEL) has not been developed to resolve problems with the current parts list. The current parts list has numerous problems including the following:

1. The list does not contain all plant components and their respective piece parts. For example, skid mounted equipment such as the waste evaporator package are not included. Also errors exist in those components that are listed. For example, the TUGCO stock number (TSN) listed for a spent resin sluice pump gasket corresponds to a part that was cancelled. The correct TSN is not listed.

2. Many parts have not had evaluations performed to verify that the quality levels specified in the ordering information is correct. This is required before they can be initially ordered or reordered. The evaluations performed on parts that have been verified have not been entered into the MEL, resulting in time consuming manual searches for data to confirm the ordering information is correct. Having this data in the MEL would allow reorders to be processed electronically and eliminate one of the delays.

3. The cross-reference of parts for use on other similar components is incomplete, making it difficult to determine what other applications the part may have.

(See Appendix, p.6 for additional details.)

TECHNICAL SUPPORT

TECHNICAL SUPPORT ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Technical support organization and administration should ensure effective implementation and control of technical support.

Recommendation (TS.1-1) Strengthen the technical support system engineering program by clearly defining responsibilities and increasing personnel experience and skills needed to support plant operations. System engineering responsibilities, authorities, and interfaces with other site engineering groups should be clearly defined and understood. Formally involve system engineers in startup activities on assigned systems. Develop expertise in plant systems, components, and operational requirements through a combination of startup involvement and formal training. The following problems were noted:

a. Responsibility and authority is not clearly defined for technical support system engineers. Similar system or component responsibilities exist in other groups, e.g. maintenance, startup, and Comanche Peak (Design) Engineering. Also, there are some conflicts in "ownership" when a system can also be considered a component. For example, the maintenance department considers diesels and batteries to be components and therefore, a maintenance responsibility. Technical support considers diesels and batteries to be systems and therefore, the responsibility of the system engineers. This situation has contributed to many longstanding problems with station batteries.

b. The present level of the technical support system engineers' commercial nuclear power experience is low. Of the 32 system engineers currently on staff, approximately 19 have fewer than three years experience; none have commercial nuclear power experience.

c. Technical support system engineers are not always cognizant of changes or tests performed on their systems. For example, the system engineer was not formally involved in the service water system upgrade and post modification tests. Also system engineer participation in preoperational or initial surveillance tests is neither required nor actively encouraged. This lack of involvement may result in missed opportunities for the technical support system engineer to acquire system knowledge and could preclude the development of a sense of system ownership.

d. System and component training has not been provided or actively encouraged for most system engineers. Also, involvement in industry efforts related to system responsibilities is limited. For example, the technical support diesel system engineer has no previous diesel generator experience and has not received training or participated in industry improvement efforts during his two years of diesel generator responsibilities.

It is recognized that management discussions pertaining to this problem have occurred. However, no formal written policies, procedures, position descriptions, or interface documents addressing the system engineering responsibilities or professional development have been prepared or issued for use by responsible personnel.

SURVEILLANCE TESTING PROGRAMS

PERFORMANCE OBJECTIVE: Surveillance inspection and testing activities should provide assurance that equipment needed for safe and reliable plant operation will perform within required limits.

Recommendation (TS.2-1) Develop a comprehensive surveillance testing program. Generate a detailed test schedule and revise priorities as necessary to ensure initial surveillance tests are conducted in a timely manner. Emphasize the development, review, and approval of surveillance test procedures to support the schedule. Also, develop a formal plan for reviewing selected plant procedures, such as system operating procedures and abnormal operating procedures, to ensure conditional surveillance test requirements are incorporated. The following problems were noted:

a. The master startup plan has blocked out a time interval for conducting initial surveillance tests. However, the plan does not go beyond the milestone level of detail. A pre-start test program, which includes a detailed breakdown of initial surveillance tests is under development by startup testing, has not been issued or integrated into the master startup plan. Preliminary estimates indicate that testing should have already begun in order to meet the June 1987 heat-up date.

b. Surveillance test procedures are currently under development by the responsible functional departments and are being sent to the technical support surveillance test coordinator for independent review. Of the 471 required test procedures, 155 are considered satisfactory, 178 have been returned to the functional department for further work, and 138 have not been independently reviewed. Progress reports indicate the projected completion will not meet the present heat-up schedule.

c. Although the technical support surveillance test coordinator has reviewed some plant procedures for conditional surveillance test requirements on a time availability basis, no formal plan exists for this effort. Furthermore, no plans exist for reviewing abnormal operating procedures for conditional surveillance requirements.

d. No program exists to thoroughly review changes to plant procedures after startup to identify the impact of each change on surveillance test requirements.

PLANT MODIFICATIONS

PERFORMANCE OBJECTIVE: **Plant modification programs for permanent and temporary modifications should ensure proper design, review, control, implementation, and documentation of plant design changes in a timely manner.**

Recommendation (TS.3-1) Improve the temporary modification control program. Reduce the number of outstanding temporary modifications before system turnover and minimize the number to the extent practicable. Review, document, and control those temporary modifications remaining after turnover in the same manner as permanent modifications. Develop and maintain a single temporary modification log to ensure operator knowledge of plant configuration. Review temporary modifications periodically for continued need and remove them or initiate permanent modifications as appropriate. The following problems with the present temporary modification program were noted:

a. There are approximately 741 temporary modifications in the plant. Most of these are unit 1 and unit 2 system interface temporary modifications, such as blank flanges on common or interconnecting systems to isolate unit 1 from unit 2. Present plans are to have the startup group remove all temporary modifications before system turnover. However, the system interface temporary modifications cannot be removed until the completion of unit 2. As a result, there will be a large number of temporary modifications remaining after turnover which under the present policy, would not be shown on drawings or noted in affected procedures.

b. Temporary modifications are not periodically reviewed for continued need. Although procedure STA-602, "Temporary Modifications," states that temporary modifications are expected to be installed for short duration, most are older than three years.

c. Most of the temporary modifications have not received a technical review to address design and safety considerations and are not shown on drawings or annotated on affected procedures.

d. There are currently two types of temporary modification log books. One lists temporary modifications installed by operating plant personnel and the other lists those installed by startup personnel. Each group maintains their own log books; only the log books maintained by nuclear operations are kept in the control room and made available to shift operating personnel.

PLANT PERFORMANCE MONITORING

PERFORMANCE OBJECTIVE: **Performance monitoring activities should optimize plant reliability and efficiency.**

Recommendation (TS.5-1) Upgrade the station battery testing and maintenance programs to provide greater assurance that batteries are capable of supplying design loads during an emergency. The following problems were noted:

a. The decision to perform service (load profile) tests of the station batteries as part of the pre-start test program has not been made. The service tests should be performed before the batteries are put in service in accordance with best industry practices, i.e. ANSI/IEEE Standard 450-1987. The last service test was performed in June 1984. Additionally, the load profile should be verified to be correct since numerous modifications have been installed since it was originally developed.

b. There are no requirements to trend battery capacity information to determine degradation.

If a 10 percent capacity degradation is observed, an 18 month performance test is required by technical specifications in lieu of the normal five year test schedule. Without trending, this capacity degradation could easily be overlooked.

c. Neither the performance nor service test procedures require test performance in the "as-found" condition in order to determine the effectiveness of the maintenance process.

d. The test procedures allow the interruption of a test for an unspecified period of time (e.g. to jumper a bad cell or to allow a hot cell to cool down) and resumption of the test afterward. This practice could result in false high battery capacity values. For example, capacity will increase as cells cool down and better electrolyte mixing occurs during interruptions. The best industry practice is to rerun the test after any interruption greater than five minutes.

e. It is standard plant practice to maintain electrolyte levels on the batteries at the high mark. Approximately half of the train A 1950 amp hour cells were overflowing acid as a result of an equalizing charge. On several cells, acid was running down the side and in between cells onto the racks and supports, which has resulted in corrosion of the racks. This condition has existed for some time with no apparent attempt to determine the optimum acid level to prevent overflow during charging.

f. The vendor manual recommends that all cells be filled, if needed, prior to an equalizing charge in order to ensure proper electrolyte mixing. Contrary to this recommendation, the maintenance department currently fills each cell with water weekly for those cells greater than 1/4 inch below the high level mark, thereby increasing the likelihood of stratification.

g. Many of the terminals and connectors on trains A, B, and C batteries were corroded. Most of the flame-arresting vents on the train C batteries were encrusted with white residue and dirt. Some connector bars had the copper exposed due to cleaning and subsequent thinning of the lead coating. Some connections were not coated with protective grease. Also, there was evidence of acid spills on some cells. Where all three conditions existed, green (copper) corrosion existed in great quantities.

h. Panel voltmeters used to indicate battery float voltage are not checked against a standard every six months as required by the battery vendor's technical manual. These voltmeters are currently on a two-year calibration and check schedule.

CHEMISTRY

CHEMISTRY ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Chemistry organization and administration should ensure effective control and implementation of chemistry activities.

Recommendation (CY.1-1) Develop and implement a clearly defined chemistry action plan to support hot functional testing and plant startup. This should include milestones which support development or revision of plant procedures, and provide adequately trained personnel to support hot functional testing and initial startup. Lack of a clearly established plan has resulted in the following:

a. A chemistry readiness review prior to hot functional testing and startup has not been scheduled. This review is required to ensure all instruments are calibrated and functional, technicians are trained, and that chemistry's role in the hot functional testing and initial plant startup is clearly defined.

b. A review the post-accident sampling system for operability, maintainability, and regulatory compliance has not been performed. NUREG 0737 establishes specific operability testing and maintenance requirements that must be met prior to initial plant startup.

c. A review has not been made of the required chemistry surveillance procedures and the status of their preparation. A review of the chemistry surveillance requirements, including implementing procedures, is essential to ensure all licensing requirements have been met.

d. Chemistry radiological training for handling radioactive streams is not presently scheduled. Radiological training on sampling and analysis of radioactive streams is essential to reduce the spread of contamination and minimize personnel contamination.

CHEMISTRY PERSONNEL KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE: Chemistry personnel have the knowledge and practical abilities necessary to implement chemistry practices effectively.

Recommendation (CY.2-1) Improve chemistry technician fundamental knowledge. Technicians should have an understanding of the analytical principles involved in counting radioactive samples. The technician must also be knowledgeable of the analytical methods and the instruments used in the laboratory. This is necessary for the technicians to respond to abnormal conditions such as deteriorating reagents or faulty instrument performance. The following are examples of knowledge weaknesses that were identified. An experienced technician would have been expected to correctly answer these questions.

a. Most technicians could not explain what the "water dip" means in relation to ion chromatography.

b. Several technicians could not define cation conductivity.

c. Most technicians could not explain the fundamentals of operation of the liquid scintillation instrumentation.

d. Several technicians could not explain "dead time." This can be an important factor in obtaining accurate radioanalytical results.

e. Several technicians did not know what was meant by "iodine ratio." This ratio is a means of evaluating fuel integrity.

f. Most technicians could not determine what steps could be taken to reduce dead time when counting on a GeLi detector.

CHEMISTRY CONTROL

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

Recommendation Upgrade the chemistry monitoring program for on-line instrumentation and the reverse osmosis (RO) unit. This program is needed to maintain the accuracy of on-line instrument readings and maintain continuous operation of the reverse osmosis unit. Examples are as follows:

a. There is no frequency specified for comparing of on-line instrument values with laboratory grab sample analyses.

b. Acceptance criteria for comparing on-line instrumentation readings and laboratory results have not been established. Guidance also needs to be provided for actions to be taken when the values fall outside the established criteria.

c. Specific reverse osmosis parameters that measure performance or system degradation are not trended. Examples are as follows:

   1. normalized permeate flow — This parameter monitors the membrane integrity by adjusting the daily permeate flow readings for temperature and pressure. This allows the operator to make daily comparisons of RO performance.

   2. system differential pressure — This is used to measure the degree of membrane fouling. The differential pressure between the feed and concentrate is trended to identify any changes.

   3. percent rejection -- Membrane and hardware integrity is evaluated using this parameter. Percent rejection refers to the percentage of total dissolved solids that are rejected by the RO. A decrease in rejection may indicate leaky o-rings, fouling, or membrane hydrolysis

LABORATORY ACTIVITIES

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

Recommendation (CY.4-1) Upgrade the laboratory quality control program. The quality control program is necessary to validate the accuracy and reliability of analytical results, instrument operability, and technician performance. Weaknesses were identified in the following areas:

a. A program to periodically monitor chemistry technician performance for chemical analyses they are expected to perform does not exist. A monitoring program is necessary to identify areas where further improvement is warranted.

b. Quality control charts are not in use for the ion chromatograph. Control charts are an effective means of evaluating the long-term adequacy of the analytical results and instrument performance.

c. The quality control standards are not run in the expected sample concentration range. For example, if quality control standards are of a much higher concentration than the sample concentration, the calibration of the instrument cannot be verified at the concentration where the sample measurement is being performed.

d. The minimum detectable concentration for some analytical methods needs to be verified. As an example, a technician was unable to detect a 5 ppb silica standard when the procedure stated the minimum detectable concentration was 5 ppb.

e. The quality control charts for the ultra violet visible and the atomic absorbance spectrophotometers trend ionic concentration rather than absorbance. Failure to monitor absorbance could result in the analyst not detecting a gradual loss of the instruments sensitivity.

LAYUP CHEMISTRY CONTROL

PERFORMANCE OBJECTIVE: Chemistry control should ensure optimum chemistry conditions during plant or system layup periods.

Recommendation

Implement a formally defined plant layup program. A properly implemented layup program is necessary to protect the equipment prior to startup and to support future reliable operation. Presently, major equipment in unit 1 is being properly layed up. However, the layup program has not been formalized. This has resulted in authority, responsibilities, and accountabilities not being well defined and the priorities for system layup not being well understood. As a result, unit 2 is not being effectively layed up. Also, without formalizing the program there are no assurances that equipment will be layed up in a consistent and effective manner. A properly implemented layup program could have eliminated the following problems:

a. The unit 1 turbine lubrication oil had to be replaced and flushed due to microbiologic growth.

b. The unit 2 reactor vessel experienced biological growth in the water following a system flush.

This situation was the result of the reactor vessel not being drained following the system flush. Microbiologic growth has been identified as a major factor in rapid pipe corrosion.

c. The unit 2 steam generators are left open to the atmosphere. This is contrary to good industry practice and may result in excessive corrosion as a result of the moisture in the air.

OPERATING EXPERIENCE REVIEW

IN-HOUSE OPERATING EXPERIENCE REVIEW

PERFORMANCE OBJECTIVE: In-house operating experiences should be evaluated, and appropriate actions should be undertaken to improve safety and reliability.

Recommendation (OE.2-1) Provide timely notification via NUCLEAR NETWORK of important in-house events that would be of generic interest to the nuclear industry. Develop and implement guidelines to ensure that important in-house items of generic interest are identified. Recent plant events of generic interest have not been reported. Examples include the following:

a. cracked gears in a Limitorque valve operator

b. inadequate fastening of a diesel generator engine connecting rod assembly

c. failures of a 6.9 KV switchgear jackshaft

INDUSTRY OPERATING EXPERIENCE REVIEW

PERFORMANCE OBJECTIVE: Significant industry operating experiences should be evaluated, and appropriate actions should be undertaken to improve safety and reliability.

SOER STATUS

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

Total number of recommendations issued to date	400
Number previously evaluated as satisfactory or not applicable	203
Number reviewed this evaluation (including 25 previously evaluated as satisfactory or not applicable)	222
o Number satisfactory	172
o Number not applicable	8
o Number pending - awaiting decision (0 red tab)	3
o Number pending - awaiting implementation (8 red tab)	22
o Number needing further review (0 red tab)	17

The following recommendations have not been effectively implemented and further review is needed. One of these recommendations, previously evaluated by INPO to have been satisfactorily addressed, has been reopened as subsequent review has determined that the action taken was not effective; e.g., subsequent actions removed procedural requirements or deleted necessary training or the action intended was not completed.

SOER Number	Recommendation Number
82-9	8
82-10	1
82-13	3
83-1	14
83-9 (reopened)	2
83-9	4,8
84-5	5
84-7	2, 3
85-2	3
85-3	1, 2, 3, 4, 6
86-1	9

(See Appendix, p.8 for additional details.)

An update on the status of each recommendation listed above is requested in the follow-on response to this report. In addition, the status of each red-tab SOER recommendation received subsequent to this evaluation should be included in the follow-on response.

Recommendation (OE.3-1)

Expand the effectiveness review of the operating experience program to include a sampling of knowledge of industry experiences at the working level. Interviews of operations and radiation protection personnel indicated a lack of knowledge of recent significant industry issues and experiences. Deficiencies noted include the following:

a. During simulator training, the reactor was observed to be critical below the minimum rod insertion limit. Questioning of the operators about this condition indicated that operators were not familiar with industry events involving premature criticalities.

b. A number of auxiliary operators did not have knowledge about industry experiences involving motor-operated valve failures.

c. Interviews with plant radiation protection technicians revealed knowledge weaknesses in industry events involving excessive personnel radiation exposures and small fuel and activation particle contamination which have produced very highly localized exposures to personnel at some plants.

ORGANIZATION AND ADMINISTRATION

STATION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Station organization and administration should ensure effective implementation of policies and the planning and control of station activities.

Recommendation (OA.1-1) Develop and implement an action plan for operational readiness that will prioritize and focus efforts on activities that must be completed prior to startup. Lack of a plan is adversely impacting transition from the current construction environment to an operating plant environment. The need for an action plan was identified by INPO in 1982 and 1984. The operational readiness plan should identify responsibilities and have sufficient detail to direct the efforts of station personnel in achieving a smooth transition to plant operation. Specific milestones for timely support of interdepartmental activities should be included. Additionally, the plan should provide for the time and manpower necessary to effectively implement programs and operational practices. As a minimum, the following problems should be addressed by the operational readiness plan:

a. Revision of procedures

The current rate of completing operations, maintenance, and surveillance procedure revisions needs to be evaluated. The present rate of completing procedure revisions could adversely impact activities necessary to support fuel load. Additionally, manpower and time requirements for procedure revisions have not been determined.

b. Pre-start testing and surveillance

The scope of pre-start testing has not been defined. Additionally, surveillance tests that could be satisfied by pre-startup testing have not been identified.

c. Operations control of plant systems

Currently, operations is not exercising some of the formal controls necessary for plant operation. Some programs necessary for the control of equipment status are not developed or fully implemented, such as the locked valve program. Additionally, operations does not demonstrate an attitude of ownership and responsibility for systems that are turned over to the plant.

d. Radiological controls

Development of the ALARA program and some radiological control policies is not complete, and facilities for decontamination and storage of contaminated equipment have not been established. Implementation of radiological controls should be carefully timed to allow adequate time to practice routine radiological activities before radioactivity is present in the plant.

e. Industrial safety programs

Station-managed industrial safety procedures such as those for scaffolding and confined spaces have not been implemented, and a station-managed medical first aid facility needs to be established. The station is currently relying on a contractor to fulfil these needs.

f. General employee training

General employee training (GET) activities have been suspended, and virtually the entire plant staff needs to be retrained. Additionally, the GET program should be reviewed to ensure it is consistent with upgraded operational policies and will meet current requirements.

g. Fitness for duty

Although some fitness-for-duty elements are in place, a comprehensive program to provide assurance that personnel are fit to perform their assigned duties has not been implemented. Continuing training in fitness-for-duty is not currently provided to managers and supervisors. Full program implementation is being delayed awaiting decisions on random and periodic testing.

MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE: Management and supervisory personnel should monitor and assess station activities to improve all aspects of station performance.

Recommendation (OA.3-1) Increase management effectiveness in identifying and correcting station problems. Management should provide additional direction in establishing responsibilities and standards, assessing performance levels, taking action necessary to attain operational readiness, and promoting teamwork. Presently, several problems exist that have either not been identified or resolved because of a lack of management involvement and direction. Also, this has resulted in a lack of a sense of urgency by some station personnel in developing programs necessary for plant startup. Many managers know of activities that need to be accomplished, but are waiting for higher level direction. The following conditions require increased management attention:

a. Appropriate performance standards are not maintained for operations department personnel. The abilities of control room personnel to properly operate the plant and of auxiliary operators to properly conduct rounds need to improve. Additionally, observed operator performance in simulated emergencies was inadequate.

b. System engineer and system coordinator responsibilities are not clearly established. System engineers are not closely involved with startup and maintenance activities to increase their expertise and ability to assist in the resolution of future problems. System coordinators do not have a clear understanding of their duties and interactions with other groups.

c. Material condition problems have not been corrected in some systems that have been turned over to the plant for operation and maintenance. For example, problems exist with some equipment located in the service water pump house, the water treatment plant, and station battery facilities.

d. Timely availability of materials to support maintenance has not been achieved. Many maintenance jobs have been on hold for over one year due to parts unavailability, and procurement of many parts is awaiting the development of engineering specifications. In addition, material availability is sometimes not verified or parts staged sufficiently in advance to ensure timely initiation of maintenance work.

e. Practical knowledge weakness in chemistry, operations, radiological protection, and maintenance have not been effectively addressed. Improved coordination between training and the plant groups is needed to correct this situation.

f. Operations and maintenance personnel do not effectively coordinate equipment clearances for maintenance work. For example, several maintenance jobs were observed to be delayed because clearances had not been established. Also, several clearances had been prepared for jobs that were not being worked. Additionally, operations does not routinely receive a description of the work scope when clearances are requested. This practice resulted in inappropriate clearance boundaries being established for one job.

g. The responsibilities for layup of plant equipment have not been clearly assigned and are not well understood by the involved groups. As a result, several systems such as the unit 2 reactor vessel and steam generators have not been properly layed up.

In addition, close management control over work practices and other important evolutions is necessary since workers and supervisors have almost no experience in operating a commercial nuclear power plant.

INDUSTRIAL SAFETY

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

Recommendation (OA.5-1) Implement a comprehensive, station managed industrial safety program. The following deficiencies were noted and should be addressed by the program:

a. Specific procedures for the construction and inspection of scaffolds, posting of confined space entry, and prevention of heat stress have not been established. Deficiencies in scaffolds and confined space postings were observed in the plant. There is no detailed guidance available for scaffolding standards, and the station is relying on a contractor's procedure for control of confined spaces.

b. Standards for safety training, safety meetings, and plant inspection tours have not been implemented. Formal training and meetings are not being held in a consistent manner. Only the Maintenance Department is documenting inspection tours. Review of maintenance tour reports indicate that maintenance conducts effective inspections and could be used as a standard for other plant groups.

c. Utility personnel do not routinely review data or monitor contractor activities that could affect the safety of all station personnel. Utility personnel have not ensured scaffolding and confined space activities are consistent with utility policy. Additionally, contractor safety performance and data should be monitored to identify adverse trends and problems potentially affecting other personnel.

APPENDIX

ADDITIONAL SUPPORTING DETAILS

Appendix II provides additional information concerning selected recommendations which should be useful in determining corrective action.

MAINTENANCE

Recommendation (MA.1-1)

Additional examples of areas where the scheduling effort could be improved include the following:

1. At one meeting, a possible reactor water makeup tank outage was discussed. One organization stated they had work to complete while the tank was drained. Another organization stated that possibly an outage was needed but nobody was tasked to resolve or coordinate the activities.

2. Instrument and controls representatives discussed the need to perform some valve work prior to a hydrostatic test. Coordination of these activities was not assigned at the scheduling meeting.

3. Additional related work such as chemistry controls for newly filled systems is not included in the schedules. At a scheduling meeting, chemistry stated that they wanted to add hydrazine to a system when it was filled. Actions to coordinate or schedule this activity were not assigned nor did they appear on the schedule.

4. The "system coordinators" were established to be a focal point for completion of required work on specific systems. Other work, such as preventive maintenance, construction, testing, and non-mandatory maintenance is not coordinated through these individuals.

5. Many clearance requests are submitted on Friday for work to be performed during the next week. Priorities and sequences are not provided, resulting in failure to clear those work items maintenance desires first. Additionally, no maintenance personnel are available over the weekend to discuss any questions relative to the clearances. (Note: A change was implemented at the end of the assistance visit to require clearances be submitted on Thursday for work commencing the following Monday.)

6. Discussions with the scheduling organization that issues the schedule indicated that no single person has overall responsibility for the coordination of the schedule.

7. System coordinators have scheduled priority work which includes work orders in the restrained (Hold) category. This category includes work on hold for parts, engineering resolution, plant conditions or other restraints. The individual departments, however, are not aware of the schedule and do not have a mechanism to determine required start work dates for restrained

work. Thus, it can not be determined if the schedule can be met or if support requirements for engineering and procurement can be supplied on time.

Recommendation (MA.2-1)

1. Additional examples of material deficiencies include:

   a. Batteries

      o Corrosion exists on some grounding strap connections.

      o Most flame arrestors on the battery vents show an accumulation of electrolyte deposits. Many appeared not to have been cleaned for some time.

      o There is evidence that the batteries have overflowed, spilling electrolyte on top of batteries and storage racks.

      o The lead coating on many terminal straps has been removed by brushing.

      o Some bolts and nuts at the terminal connections are not coated with grease to reduce the possibility of corrosion.

   b. Water Treatment System

      o The following information was obtained from tags hanging on the system:

         - The number one mixed bed caustic inlet flange leaks. The acid day tank sight glass is plugged.

         - The number two cation inlet valve does not regulate flow at 68 and 110 gallons per minute.

         - The number one acid pump will not deliver the correct acid flow rate.

         - The acid dilution flow meter does not indicate the correct flow.

      o The motor of the B acid feed pump shows signs of a corrosive liquid spill.

      o The 01 caustic pump has an oil leak.

      o The number one potable water pump has a casing leak.

- The number two caustic pump does not deliver the correct amount of caustic.
- There were numerous small water leaks observed on the reverse osmosis system. (Approximately one drop every 5 minutes.)
- Water seepage is evident at the base of the Reactapak.
- Corrosion of piping, valves and tanks was evident on the Reactapak.

c. Service Water Intake Building

- A one quart per minute leak exists at the bottom of flange for MOV IHV-4286, discharge for Train A Service Water.
- The cover is removed from a large electrical junction box behind one of the pumps motors. The cover is labeled JBM-2140-
- A cover labeled as JBM-2106 is hanging by one screw. .
- Leak-off from a service water pump is running down the pump base and across the floor.

d. Plant Lighting and emergency lighting

- Emergency lights are broken and not set correctly on Elevation 852 of the auxiliary building. Lights are labeled:

  CPI-ELBPSG-12D,-121 and -126
  CPX-ELBPSG-030 and -031
  CPX-ELBAB-15B

- Overhead lights are out on two of three landings of the south stairwell on elevation 778 of the turbine building.
- Lights are out over feedwater heater 1-2A, LEV-2723 and over the generator core monitor on elevation 803 of the turbine building.

Recommendation (MA.4-1)

Additional examples of the use of improper tools to perform work include the following:

1. The motor bearing viewing window on the containment spray pump motor must be removed to add new oil. The window is threaded into the motor

and has an approximately 1-1/2" hex head casing. The window was removed by using a pump wrench instead of a socket, box, or open end wrench.

2. A mechanic used an adjustable wrench while disconnecting the tubing on an emergency diesel governor. An open end wrench of the correct size would be more appropriate to prevent damage to the tube fittings.

3. Two mechanics used a 10 pound sledge hammer and a pipe to beat on the manual jacking device cover area on an emergency diesel generator to try and force the cover to fit properly. This could result in personnel injury or equipment damage.

Recommendation (MA.6-1)

1. Additional examples of notes and cautions located after the step to which they apply include the following:

   a. MMI-301, "Reactor Coolant Pump Seal Inspection," Revision 2, issue te April 14, 1987. Most cautions, notes and some QC instructions follo he step to which they apply. Examples include the following: .

      o Step 5.1.7.2 instructs the user to remove the coupling nut by using a wrench. A caution follows the step warns that too much torque can cause the shaft to turn which will damage the back seat and shaft.

      o Step 5.5.3.6.1 gives instructions for installing the No. 2 runner. A note following the next step (5.5.3.6.2) instructs the user to use a second person to align the marks and to guide the runner to prevent cocking while lowering the runner.

   b. EMI-315, "Containment Spray Pumps Motor Inspection," Revision 2, issue date February 18, 1987. Most notes, cautions and QC instructions follow the step to which they apply. The following are some examples:

      o Step 5.1.14 and 5.1.24 instruct the user in removing the lower half of the outboard and inboard bearing with the aid of a hoist and sling. A caution following a note after the step 5.1.24 cautions the user that the lower seal could be damaged if the motor is lowered without the lower motor cover being removed. Additionally, the caution for step 5.1.24 is located on the next page of the procedure.

      o Step 5.3.1 instructs the user to reinstall the rotor back into the motor. A note giving the rotor weight and a caution about using gasket material or insulation board in the air gap between the station and rotor are located on the next page of the procedure.

2. Additional examples of notes and cautions that convey specific action include:

   a. MMI-30?, "Reactor Coolant Pump Seal Inspection," Revision 2, issue date April 14, 1987.

      o The note after step 5.2.3.10 instructs the user to remove both of the seal brackets from the upper seal housing.

      o The caution after 5.7.1 states, "Remove the pump shaft centering screws before the pump shaft is lifted".

   b. EMI-312, "RHR Pump Motor Inspection and Rework," Revision 1, issue date September 23, 1986.

      o The note following step 5.2.5 instructs the user as follows:

NOTE: When turning the rotor from a vertical to a horizontal position, a sling should be attached around the shaft at the bottom side of the lower bearing housing.

      o The note after step 5.2.6 states: "Blocks should be placed under the rotor core. Cover the blocks with gasket material where it contacts the rotor core."

3. Additional examples of instructions that lack detail include:

   a. MMI-311, "Motor Driven Auxiliary Feedwater Pump Inspection", revision 2, issue date March 6, 1987.

      o Step 5.1.4.2 instructs the user to drain the oil from each housing. The amount of oil or size of container needed to collect the oil is not specified.

      o Step 5.4.8.6 instructs the user to apply only a portion of the final torque so that all the main parting flange bolting is tightened evenly until the final torque values (up to 4250 ft. lbs.) are obtained. It would be more appropriate to specify incremental torque values to ensure repeatability in quality.

   b. EMI-315, "Containment Spray Pump Motor Inspection," Revision 2, issue date February 18, 1987.

      o Step 5.1.12 instructs the user to insert screwdrivers or small pinch bars into slots cast into the bottom half of the bracket at the split line. Screwdrivers are not appropriate for prying or separating mating surfaces.

      Step 5.1.14 instructs the user to lift the rotor a few mils when removing the lower half of the outboard bearing and to use a hoist or jack if necessary. The user is not directed to check the distance the rotor is lifted to ensure it is lifted only a "few mils", or provided any caution against lifting the rotor in excess of a "few mils".

4. Additional examples of poor quality illustrations include:

   a. MMI-311, "Motor Driven Auxiliary Feedwater Pump Inspection," Revision 2, issue date March 6, 1987.

      o Substeps under step 5.4.10 refer the user to Figure 4 for instructional information. The referenced information is illegible in the figure.

      o Step 5.5.4.5 instructs the user to reinstall the coupling hub onto the pump shaft per Waldron coupling instructions (Attachment 2). Attachment 2 is not completely legible.

Recommendation (MA.9-1)

1. Additional examples of problem related to excessive time in processing quality - related parts include the following:

   a. In the past, many "Q" class components were ordered commercial grade without proper documentation. As a result, all "Q" class orders are processed through procurement engineering which is part of Comanche Peak engineering (CPE). This is to ensure the proper quality levels are assigned to the component.

   b. The manager of procurement engineering stated that he intends to propose to his management that the 13,000 line items in the warehouse that are safety-related be reviewed and the ordering information be placed in the "Q" list MEL. Currently, this information, for those items that have been reviewed, is located in file cabinets and must be re-reviewed when a new order is placed for the material.

2. Additional examples of problems related to the Master Equipment list (MEL) include the following:

   a. Two different MELs have been developed. One is for "Q" components and was developed by CPE, the other was generated by maintenance engineering for non-"Q" components. Both lists are available to the maintenance organization on the same computer, however, the "Q" list is not used by the planners due to the number of errors present in it. A proposed new MEL is being generated by the Management Systems Group under the projects organization. The new MEL group has been operating for about 1 month.

   b. The basis for the new MEL is supposed to be information included in the current MEL supplemented by plant walkdowns, post-construction hardware validation, installation drawings and other checks. This is only to cover "Q" list equipment. When questioned about the non-"Q" equipment, the manager stated that he would like to include it but his direction was not to at this time.

c. The "Q" MEL was placed into service early in 1986. Since then, few changes have been made to the list. The responsible engineer in the CPE organization stated that approximately 19,000 changes had been identified to be incorporated.

d. When orders are placed for new line items in the warehouse, procurement engineering requires that all known uses for the material be identified. This is difficult without a complete MEL. When the line item is placed in the warehouse, it is only listed for those applications that maintenance engineering can identify. When a new application is identified, it requires additional engineering evaluations which are time consuming. A complete MEL would eliminate this problem.

e. Additional specific problems noted with the MEL include the following:

- The distillate pump is a component part of the waste evaporator package. When a parts listing is requested for the distillate pump, the computer produces the component parts list for the entire waste evaporator package which does not include the specific parts for the distillate pump.

- When the TUGCO Stock Number (TSN) for a gasket in a service water strainer is inputted to the list, the other stocked items show as they should except that two screens appear. One screen belongs to one set of strainers and the other to another set. Both should not be listed. When the strainer itself is inputted, none of the replacement parts are listed and an expansion joint is displayed that is not related to the strainer.

- Approximately 75 spare parts for motor-operated valves with tag numbers 1-8701A and 1-8702A do not appear when the tag numbers are inputted. These parts have been ordered within the past 18 months and are stocked in the warehouse. The CPE engineer responsible for the "Q" MEL stated that these parts were in the "working" portion of the MEL. The "working" portion is available to the engineers, but not to the planners who need to use it.

- Gaskets for the Fuel Transfer System are listed with the wrong title and do not have the TSN numbers listed.

OPERATING EXPERIENCE REVIEW

The following Significant Operating Experience Report (SOER) recommendations have not been effectively implemented and further review is needed because actions taken to date are not satisfactory:

SOER 82-9 "Turbine Generator Exciter Explosion"

- Recommendation 8 -- Requires utilities with both nuclear and fossil units to consider communicating significant and applicable operating experiences from fossil units (operated by the utility) to the nuclear industry via NUCLEAR NETWORK (or other means).

  This recommendation needs further review because a review of the operating experience program did not identify where or how this recommendation is addressed.

SOER 82-10 "Fire Barrier Degradation"

- Recommendation 1 -- Requires the training of plant personnel to recognize the different types of fire barriers, the importance of fire barriers, and how to recognize obvious signs of fire barrier degradation.

  This recommendation needs further review because the response indicates that the training will only be provided to fire brigade personnel and does not cover other plant personnel such as maintenance personnel.

SOER 82-13 "Intrusion of Resin, Lubricating Oil and Organic Chemicals into Reactor Water"

- Recommendation 3 -- Requires that plant procedures address actions to be taken in the event of excessive unexplained lubricating oil loss.

  This recommendation needs further review because the applicable procedures (MEI-005, EDA-106) do not address actions to be taken to ensure that oil leakage does not get into the reactor coolant system. The procedure only addresses fixing the leaks and does not address interim actions to be taken when leakage occurs.

SOER 83-1 "Diesel Generator Failures"

- Recommendation 14 -- Requires that piping and components subject to engine-induced vibration be examined under engine operating conditions and that mounting methods be modified (as appropriate) to minimize fatigue and other vibration-related failures.

  This recommendation needs further review because the response indicates that engine-induced vibration testing of piping and components is not to be conducted during the station start-up and testing program.

<u>SOER 83-9</u> "Valve Inoperability Caused by Motor-Operator Failures"

- Recommendation 2 -- Requires that valve motor-operator training programs for operations personnel include case studies of operational problems.

  This recommendation needs further review because the response indicates that case studies of specific industry events are not used in order to reinforce training.

- Recommendation 4 -- Requires that (root cause) trouble shooting procedures be developed for each model of valve motor-operator.

  This recommendation needs further review because the response indicates that specific (root-cause) trouble shooting procedures are not provided.

- Recommendation 8 -- Requires that post maintenance testing be performed under normal system operating conditions whenever possible.

  This recommendation needs further review because the response indicates that post maintenance testing will not be conducted under normal system operating conditions.

<u>SOER 84-5</u> "Bolt Degradation or Failure in Nuclear Power Plants"

- Recommendation 5 -- Requires that training programs for maintenance, plant engineering, and quality control personnel include topics on industry experiences with bolt failures (including effects of borated water leakage on closure bolts), and how to specify and makeup bolted joints.

  This recommendation needs further review because the response indicated that an on-going training program for worker level personnel is not to be conducted.

<u>SOER 84-7</u> "Pressure Locking and Thermal Binding of Gate Valves"

- Recommendation 2 -- Requires that steps be taken to ensure that safety related valves required to open for system operation will open when required.

  This recommendation needs further review because the response indicates that the use of redundant valves is sufficient to ensure that system functions can be accomplished.

- Recommendation 3 -- Requires that the training program for operations and maintenance personnel include instructions on valve failures discussed in SOER 84-7.

  This recommendation needs further review because the response indicates that continuing training at the worker level is not conducted.

<u>SOER 85-2</u> "Valve Mispositioning Events Involving Human Error"

- Recommendation 3 -- Requires a review of industry valve mispositioning events and a discussion of lessons learned.

  This recommendation needs further review because industry mispositioning events are not discussed to reinforce training.

<u>SOER 85-3</u> "Excessive Personnel Radiation Exposure"

- Recommendation 1 -- Requires the development of the concept of ALARA and the individual responsibility in maintaining low radiation exposure.

  This recommendation needs further review because the ALARA concept is not developed in station actions at the worker level (i.e., ALARA suggestions, survey information, temporary shielding requests, low dose waiting areas, etc.)

- Recommendation 2 -- Requires that selected industry events involving large unplanned exposures be included in training and retraining programs for plant personnel.

  This recommendation needs further review because there are knowledge weaknesses at the worker level about excessive industry radiation exposure events.

- Recommendation 3 -- Requires direct supervisory involvement for those jobs where large doses could be received in a short period of time.

  This recommendation needs further review because procedure (TRA-102, Rev 3) makes not specific reference to supervisors, or supervisory involvement, as a means to reduce radiation exposures.

- Recommendation 4 -- This recommendation requires the trending of radiological activities.

  This recommendation needs further review because the ALARA program does not call for the use of root cause analysis and trend analysis, nor does the program procedure call for evaluation of program effectiveness.

- Recommendation 6 -- This recommendation requires the identification, posting, and controlling of areas with existing, or potentially high radiation exposure rates.

  Although high radiation areas do not currently exist in the power plant, this recommendation needs further review because interviews with radiation protection workers indicates a knowledge weakness in the administration of access to high radiation areas.

SOER 86-1 "Realiability of Auxiliary Feedwater System"

- o Recommendation 9 -- Requires hands-on training under actual operating conditions for operating personnel on the local manual actions to restore auxiliary feedwater equipment.

  This recommendation needs further review because formal and continuing (hands on) training is not to be conducted in order to limit wear and tear on in-use components. The current practice of using walkthroughs on depressurized systems does not adequately simulate difficulties in resetting the trip and throttle valve under actual pressurized system conditions.

UNITED STATES OF AMERICA

DOCKETED USNRC

NUCLEAR REGULATORY COMMISSION '88 APR -6 P4:02

before the

ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

In the Matter of	)	Docket No. 50-445-CPA
TEXAS UTILITIES ELECTRIC COMPANY et al.	)	
(Comanche Peak Steam Electric Station, Units 1 and 2	)	

CERTIFICATE OF SERVICE

I, Thomas A. Schmutz, hereby certify that the foregoing letter was served this 6th day of April 1988, by mailing copies thereof (unless otherwise indicated), first class mail, postage prepaid to:

*Peter B. Bloch, Esquire
Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

*Alan S. Rosenthal, Esq.
Chairman
Atomic Safety and Licensing Appeal Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

*B. Paul Cotter, Jr., Esq.
Chairman
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Assistant Director for Inspection Programs
Comanche Peak Project Division
U.S. Nuclear Regulatory Commission
P.O. Box 1029
Granbury, TX 76048

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*/ Asterisk indicates service by hand or overnight courier.

*Juanita Ellis
President, CASE
1426 South Polk Street
Dallas, TX 75224

William R. Burchette, Esquire
Heron, Burchette, Ruckert,
& Rothwell
Suite 700
1025 Thomas Jefferson St., N.W.
Washington, D.C. 20007

*William L. Clements
Docketing & Service Branch
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Susan M. Theisen
Assistant Attorney General
Attorney General of Texas
Environmental Protection
Division
P.O. Box 12548
Austin, Texas 78711-1548

Robert A. Jablon, Esquire
Spiegel & McDiarmid
1350 New York Avenue, N.W.
Washington, D.C. 20005-4798

*Dr. Walter H. Jordan
881 West Outer Drive
Oak Ridge, Tennessee 37830

Robert D. Martin
Regional Administrator,
Region IV
U.S. Nuclear Regulatory
Commission
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Dr. Kenneth A. McCollom
Administrative Judge
1107 West Knapp
Stillwater, Oklahoma 74075

Jim Bailey, Esquire
Texas Municipal Power Agency
P.O. Box 7000
Bryan, Texas 77805

*Janice E. Moore, Esquire
Office of the General Counsel
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

*Robert A. Wooldridge, Esquire
Worsham, Forsythe, Sampels
& Wooldridge
2001 Bryan Tower, Suite 3200
Dallas, Texas 75201

*W. G. Counsil
Executive Vice President
Texas Utilities Electric -
Generating Division
400 N. Olive, L.B. 81
Dallas, Texas 75201

Thomas A. Schmutz

Dated: April 6, 1988