084

RELATED CORRESPONDENCE

September 26, 1984

DOCKETED
USNRC

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

'84 SEP 27 P4:23

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289-SP
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	

NOTICE TO THE COMMISSION, APPEAL BOARD, LICENSING BOARD AND PARTIES

Enclosed is a September 17, 1984 letter from Mr. C.W. Sandford, Deputy General Manager, Bechtel North America Power Corporation, to Mr. P.R. Clark, President, GPU Nuclear Corporation, concerning the NRC staff's discussion in NUREG-0680, Supp. No. 5 of the allegations of harassment of Mr. R.D. Parks.

Also enclosed is a September 10, 1984 letter from Mr. H. Hukill, Vice President, TMI-1, to Mr. P. Beard, Jr., Director, E&A Division, INPO, which provides an update of Licensee's response to the May, 1983 INPO evaluation of TMI-1. Licensee's March, 1984 status report on its response to the 1983 INPO evaluation was forwarded to the Commission, the Appeal Board, the Licensing Board and the parties by Licensee's counsel on April 4, 1984.

Respectfully submitted,

Deborah B. Bauser

Deborah B. Bauser
SHAW, PITTMAN, POTTS & TROWBRIDGE
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Enclosures
cc: Attached Service List

D503

SEP 21 1984

Bechtel North American Power Corporation
Engineers — Constructors

15740 Shady Grove Road
Gaithersburg, Maryland 20877-1454
301—258-3000

September 17, 1984

Mr. P. R. Clark
President
GPU Nuclear Corporation
100 Interpace Parkway
Parsippany, New Jersey 07054

Re: Nuclear Regulatory Commission Report
NUREG-0680, Supp. No. 5, of July, 1984;
Allegations of Harassment of R. D. Parks

Dear Mr. Clark:

In a report entitled "TMI-1 Restart," NUREG-0680, Supp. No. 5 ("Staff Report"), and issued in July, 1984, the Nuclear Regulatory Commission ("NRC") Staff stated that R. D. Parks had been "harassed by management officials of Bechtel." There are many significant factual errors in the Staff Report. As a result of these errors the NRC Staff has drawn inferences as to the motives of Bechtel managers which would not be warranted if all the relevant facts were considered.

I am convinced that the information upon which the NRC Staff based its conclusion is seriously deficient. In large part, these deficiencies result from the fact that most of the information upon which the NRC Staff relied was obtained during a hurried investigation by the Wage and Hour Division of the Department of Labor ("DOL") conducted under severe time constraints imposed by federal statute. Accordingly, the NRC Staff has never had an adequate opportunity to consider Bechtel's side of this case. A full scale report is presently being prepared which will fully set forth Bechtel's reasons for its actions regarding Mr. Parks. We hope to submit this report to you in three to four weeks.

Although our full report is not yet ready, I wish to bring to your attention as early as possible several preliminary observations regarding the more obvious shortcomings of the Staff Report's conclusions regarding Mr. Parks' allegations of harassment. What follows is based on the investigation undertaken by our attorneys.

Conclusions of the Report
Regarding Parks

As a preliminary matter, it must be emphasized that the Staff Report relies in large part for its factual findings upon a report prepared by the NRC Office of Investigations dated May 18, 1984 ("OI Report"). The OI Report in turn relies entirely on a report of an investigation by the DOL prepared under severe time constraints. (OI Report, Ex. 102). The OI Report simply states that "[t]he scope of the DOL investigation of Parks' complaint, which found for Parks, was deemed sufficient for NRC purposes and is included as part of this report for regulatory and enforcement consideration." (Id. at 12). It is significant that the OI Report indicates that no independent investigation of Parks' allegations was conducted.

Despite the limited factual basis for the OI Report, the NRC Staff determined that various Bechtel managers harassed Parks in the following ways:

1. By removing Parks' responsibilities as alternate startup and test supervisor, one of many of his responsibilities, on February 23, 1983;

2. By interviewing Parks on March 14, 1983, regarding his involvement with the job shop Quiltec;

3. By temporarily removing Parks from the Test Work Group with regard to the polar crane tests, on March 17, 1983;

4. By putting Parks on leave with pay on March 24, 1983; and

5. By telling Parks that he should not go public with his concerns, that another employee had been humiliated, and that Parks had put Bechtel in a bad light with its client by raising safety concerns regarding the polar crane.

Actual Reasons for
Purported Harassment

Although the evidence cannot be recounted in detail at this point, the evidence which Bechtel will present in its report will show that each of the alleged acts of harassment were, in fact, unrelated actions taken for legitimate, non-retaliatory reasons.

In particular, the report will show that the first purported act of harassment was a simple organizational alignment to ensure appropriate representation of the various disciplinary departments at TMI-2 on the Test Work Group (TWG). Contrary to the Staff Report, the decision to replace Parks was not made by

Dr. Thiesing, but was made by the chairman of TWG, Mr. Kitler. The decision to replace Parks as the alternate was made so that the TWG chairman's alternate would be a representative of the chairman's department, Site Engineering, rather than a representative of Site Operations, which was Parks' department. When a startup engineer, Mr. Walker, arrived at the site and was assigned to the Site Engineering department, Parks was replaced by Walker so that the TWG chairman's alternate would be from the same department as the chairman.

The second purported act of harassment specified in the Staff Report is Parks' interview regarding his involvement with the job shop Quiltec. Parks was implicated in this matter by the fact that he personally arranged for the typing of resumes of TMI-2 personnel on Quiltec stationery. This questionable conduct clearly justified Bechtel's investigative interview of Parks. Moreover, the interview was conducted in a straight-forward, non-intimidating manner.

Third, Parks' assertion that he was involuntarily stripped of his functions on TWG regarding polar crane matters will be rebutted. In fact, Parks and his superior in the Site Operations department discussed Parks' removing himself from TWG for Parks' own benefit. Parks agreed to the change, and also indicated to the Director of TMI-2 that Parks did not consider his stepping down from TWG to be an act of intimidation. In short, this change in Parks' status was entirely voluntary on Parks' part.

Fourth, Parks suspension on March 24, 1983 was motivated by Parks' inflammatory and libelous accusations aimed at his fellow professionals at TMI-2 which threatened to destroy the working atmosphere at TMI-2, not by any desire to retaliate for filing a complaint with the DOL. It must be emphasized that Parks publicly laid the blame for the 1979 accident at TMI-2 upon a colleague at TMI-2. This libelous statement, together with the highly charged public allegations which he directed against the professional integrity of other co-workers and supervisors, destroyed his ability to continue working in a productive, cooperative manner with these individuals. We accordingly suspended Mr. Parks but continued his salary pending our investigation and resolution of his claims.

Last, contrary to the Staff Report, Parks never was told by Mr. Kanga not to go public with his concerns or that another employee had been humiliated. Furthermore, Parks never was told by Mr. Kanga that Parks had put Bechtel in a bad light with its client by raising safety concerns. In fact, Mr. Kanga never discouraged Parks from expressing safety concerns in any manner.

In addition to the fact that these purported acts of harassment were properly motivated, it must be emphasized that Parks' allegations of harassment do not stand up in view of all of the circumstances. Bechtel had no desire to retaliate against Parks for voicing his concerns because, in fact, Bechtel took steps to resolve substantially all of Parks' technical concerns well before his suspension. Moreover, if Bechtel had desired to retaliate against Parks it could have seized upon his involvement in the Quiltec matter as a basis for terminating him. In fact, Bechtel decided not to take any adverse employment action against Parks because of his apparent lack of familiarity with Bechtel's conflict of interest policy. This decision was made before Parks publicly released his allegations on March 23, 1983.

As mentioned above, this letter only generally addresses the main deficiencies in the NRC Staff's July, 1984 Report. Those deficiencies, and Bechtel's evidence rebutting the Staff Report's conclusions concerning Parks, will be set forth in greater detail in the forthcoming Bechtel report. However, I believe this letter demonstrates that the NRC Staff lacked a reasonable basis for its conclusions that Bechtel harassed Parks, and I would hope that you will reserve making an informed judgment upon Parks' allegations of harassment until after you have fully reviewed and considered Bechtel's evidence.

Very truly yours,

C. W. Sandford

C. W. Sandford
Deputy General Manager

CWS/vwc

bcc: Judy Burgess

GPU Nuclear

GPU Nuclear Corporation
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Route 441 South
Middletown, Pennsylvania 17057
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:
File: INPO
3000-84-309

September 10, 1984

Mr. P. M. Beard, Jr.
Director, E&A Division
Institute of Nuclear Power Operations
1100 Circle 75 Parkway
Suite 1500
Atlanta, Georgia 30339

Dear Mr. Pat Beard:

Your letter of July 16, 1984 to Mr. J. R. Thorpe requested that we update our March 28, 1984 status report on responses to the May 9, 1983 Three Mile Island Unit One evaluation. The purpose of this letter is to provide that update.

The following items are considered to be complete or implemented as applicable in accordance with the latest status provided in our March 28 report:

OP. 3-1, OP. 3-2, MA. 1-1, MA. 3-1, TS. 4-1, TS. 4-2, TS. 5-1, TS. 6-1, TQ. 5-1, TQ. 5-2, RP. 1-1, RP. 4-1, CY. 1-2, CY. 2-1, CY. 5-1, TS. 4-2 (1981 Evaluation)

The status of the following items has not changed appreciably and is still consistent with the latest status provided in our March 28 report:

QA. 5-1, OP. 2-1, MA. 9-1, MA. 9-2, TS. 3-1, CY. 4-1, OA. 3-1 (1981 Evaluation)

For the items listed below there has been some change, addition, or modification as indicated to the status provided in our March 28 report.

QA. 6-1 - The information in the latest status is basically still correct, however, we are reevaluating our basic approach to resolving the massive task of updating all vendor safety related documentation and have not yet put contracts in place to do this work. We have, however, selected about 80 manuals for "important" (NPRD or major) equipment that

the Plant Staff is updating and forwarding for Technical Functions review and concurrence. This effort is underway and an individual has been hired to coordinate it at the plant. New manuals received are processed by Technical Functions and issued to the plant as controlled documents.

OP. 4-1 - The Operations Plant Manual is now about 90% complete. Drafts of the remaining sections should be completed by October 1984 and the formal manual basically completed by the end of this year.

OP. 5-1 - Anticipated Transient Operator Guidelines (ATOG) have been implemented at TMI-1. Issuance of the ATOG procedures and the ATOG concept has further enhanced our procedures.

TQ. 3-1 - In order to conduct a more comprehensive job analysis of all operator programs at TMI-1, a Task Force was activated in August 1984. The goal of this Task Force is to conduct a job analysis of the Auxiliary Operator, Control Room Operator, and Senior Reactor Operator programs. The job analysis will be used to validate/revise the present classroom, simulator, and OJT programs. This effort should be completed by September 30, 1984 and the results will be used to revise the training programs for future classes.

TQ. 9-1 - The Operations Plant Manual is now about 90% complete. Drafts of the remaining sections should be completed by October 1984 and the formal manual basically completed by the end of the year.

RP. 8-1 - A new procedure (9000-QAP-4244.01) has been written and is in effect. This procedure establishes the Quality Assurance testing requirements for GPUN TLD systems and vendor supplied finger ring services. This Quality Assurance program evaluates the accuracy, reproducibility and linearity of the TLD system.

This semi-annual Quality Assurance test employs TLD badges that are randomly picked from system TLDs. Four groups of badges are subjected to four discrete radiation exposure doses which fall within four defined ranges of radiation doses by a third independent party/vendor. The spiked TLDs, whose group and exposure dose identity is unknown, are returned to the Dosimetry Department for analysis. The results are forwarded to Corporate Rad Engineering for tabulation. Test results are compared to established acceptance criteria as defined by the National Bureau of Standards Laboratory Accreditation Program for Personnel Dosimetry Processors.

RP. 8-2 - A. A review of past Comparative Exposure Reports (in which TLD vs. SR differences exceeded Δ 35%) shows that for the majority of cases the discrepancy involves the digital (Xetec) and not the SRPD. As a conservative measure, it is currently a GPUN procedure to record the dose value of the Xetec whenever it is greater than the dose reading of the SRPD. Based on our own laboratory tests, when SRPD and Xetecs are exposed to common radiation doses, the Xetecs, on the average, tend to record a higher dose. Furthermore, Xetecs are worn at the waist level only and are subject to a radiation field which may be different from the TLD/SRPDs, which are worn at various body locations in pairs. In summary, past unfavorable comparisons between SR and TLD were due to the inherent high response of the digital dosimeter (Xetec) and its restrictive position on the body of the wearer. It is our plan to:

1. Continue to issue the Xetec as a personnel dosimeter for unofficial estimates of radiation exposure because of the ease of monitoring the visual display of integral dose as well as its audio-warning signal.

2. Confine dose tracking (REM entered dose values) to the quartz fiber pocket ionization chamber (SRPD). When multiple SRPDs are worn, the highest reading will be entered into the REM dose tracking system.

3. Issue SRPDs to Rad Con personnel by serial numbers and perform calibration checks when unfavorable comparisons with TLDs occur.

B. 1. Tolerance - In the past, TLD/SR differences greater than 35% were investigated. This value has been reduced to 25%.

2. Threshold - Previously, comparative investigation was based on an official dosimeter (TLD) threshold exposure value of 150 mrem. This value is currently under critical review. Pending additional review and analysis of past records, it is anticipated that a threshold of 100 mrem for either the SRPD or TLD will be adopted. Furthermore, an absolute differential value of 50 mrem is under consideration for a secondary investigative criteria. Investigation will, therefore, be based on a 25% and/or 50 mrem differential dose reading.

C. The abnormally high percentage of performance test failure of SRPDs as identified by the INPO audit has been previously addressed (See Attachments 1 and 2).

CY. 1-1 - All actions identified in our latest status have been completed. In addition, we are planning to provide supervisory coverage (foremen) on the 3-11 shift, five days per week, beginning in January 1985.

TS. 4-1 (1981) - In addition to the status provided in our March 1984 report, the following new information is submitted.

The preliminary Control Room drawings provide for operator use as modification turnovers are now prepared by the Site Design and Drafting group. In the event multiple modifications affect the same drawing, the changes are all composited onto the same preliminary drawing to minimize the number of attachments within the Control Room. Additional emphasis is also being placed on the updating of original plant drawings as defined in procedure EP-025. A computerized drawing revision tracking and aging system which interfaces with our CARIRS drawing index, is being intiated to ensure the drawings are revised in a timely and consistent manner.

TS. 6-1 (1981) - The following information is provided in augmentation of our status report of March 1984.

A course in Nuclear Energy Technology (80 hours) was conducted at TMI from January to June 1983 for selected members of the Plant Engineering staff and support divisions. This was followed by a course in TMI-1 Plant Systems (80 hours) from June 1983 to September 1983. We are currently conducting two classes in TMI-1 Plant Systems, which will be completed in mid-September 1984.

A program entitled TMI-1 Managers Technical Training Program, Unit 1 (40 hours) has been written and reviewed. The program is substantially the one offered as a Senior Managers Program for TMI-1 in 1981. The systems portion of the program (16 hours) is a condensation of the 80 hour TMI-1 Plant Systems course. The Corporate Training Department will interview selected members of the Engineering staff and supervisory personnel to identify their need to participate in either the TMI-1 Managers Technical Training Program or the TMI-1 Plant Systems course. These interviews will also be used to determine if managers/engineers need only attend specific portions of the two courses. The TMI-1 Managers Technical Training Program is scheduled to begin in

October of 1984. The next TMI-1 Plant Systems course is scheduled for March 1985.

No SOER information is provided with this letter, since our Systems Engineering personnel are working directly with your people (Jim Lemon) to provide them an up-to-date status as of this time.

Sincerely,

H. D. Hukill
Vice President & Director, TMI-1

HDH/pjl

Attachments

Attachment 1

GPU Nuclear

GPU Nuclear
P.O. Box 480
Middletown, Pennsylvania 17057
717-944-7621
Writer's Direct Dial Number:
(717) 948-8582

9210-83-1190

June 10, 1983

Institute of Nuclear Power Operations
Attention: T. Cellmer
1100 Circle 75 Parkway
Suite 1500
Atlanta, GA 30339

Subject: Self-Reading Pocket Dosimeter (SRPD) Failure Rate

Dear Mr. Cellmer:

Attached is a memorandum which describes a study conducted by G. D. Shriner, of my staff, which indicates a SRPD failure rate of 15% when a ±10% accuracy requirement is used. This study involved a random selection of records which covered the period November 1981 - May 1983.

The rejection rate of 30% which developed from your recent audit appears to be due to a combination of small sample size and the inclusion of SRPDs which had been tested subsequent to attempted reconditioning after one performance test failure.

If you would like additional information regarding SRPD calibration and performance test rejection rates at TMI, please do not hesitate to contact me.

Sincerely,

Michael J. Slobodien

Michael J. Slobodien, CHP
Manager, Radiological Health

MJS:plf

Attachment

cc: R. W. Heward, Jr., - Vice President, Radiological & Environmental Controls
J. E. Hildebrand - Radiological Controls Director, TMI-II
G. A. Kuehn - Manager, Radiological Controls, TMI-I
G. D. Shriner - Instrument and Respirator Booth Manager

ATTACHMENT 2

Inter-Office Memorandum

GPU Nuclear

Date May 23, 1983

Subject Direct Reading Dosimeter Failure

9210-83-1164

Location TMI

To J. E. Hildebrand
Radiological Controls Director, TMI-II

Between November 1981 and present, 579 dosimeter calibration records were randomly selected and checked. These checks revealed a 15% failure rate. Out of the 579 dosimeter records checked, 87 failed. Out of these 87, 67 failed ±10% of the delivered exposure requirement.

Pocket dosimeters have hermetically sealed chambers; consequently, if dropped or abused, the seal could be broken causing the device to read high or low by more than 10%. The calibration records checked did not include dosimeters returned having physical damage which is believed to be an additional 5%, or a total rejection rate of approximately 20%.

The "Health Physics Instrumentation Buyer's Guide," published by New Brunswick Electric Power Commission, surveyed thirteen users of dosimeters who used at least five different manufacturers and indicated a failure rate of greater than 20%.

G. D. Shriner
Instrument & Respirator Booth Manager

GDS:plf

cc: M. J. Slobodien - Manager, Radiological Health
File

A0000641

TRAINING AND QUALIFICATION

TRAINING ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Responsibilities and authority for each management, supervisory, and professional position are clearly defined.

D. Training staff personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Training staff personnel are trained and qualified to perform assigned job functions.

F. Administrative policies and controls are implemented for the following functions:

1. assessing trainee entry-level knowledge and skills
2. assessing training needs
3. developing programs
4. planning and scheduling training activities
5. documenting training program activities and results
6. evaluating instructor effectiveness
7. incorporating feedback from on-the-job performance
8. developing, administering, and controlling examinations
9. exempting personnel from training requirements
10. remedial training
11. simulator hardware/software maintenance

G. The effectiveness of training programs is periodically evaluated and the results used to make program improvements.

H. Performance appraisals are effectively utilized to enhance individual performance.

I. Training requirements for temporary employees and transient workers are established and are appropriate for the tasks to be assigned.

J. A plan is implemented to achieve and maintain INPO accreditation of training programs.

TRAINING FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Classroom facilities are adequate for effective group instruction.

B. Reference materials are adequate and readily accessible.

C. Equipment is available as needed to support training material development.

D. Training aids are adequate to support hands-on and practical demonstration training.

E. Training materials effectively support the training programs.

F. If training is conducted on a plant-referenced simulator, the simulator accurately reflects the physical and operational characteristics of the plant.

G. If training is conducted on a simulator not referenced to the trainees' plant, the training is adapted, to the extent practical, to the trainees' home plant.

SIMULATOR TRAINING PROGRAM DEVELOPMENT AND IMPLEMENTATION

PERFORMANCE OBJECTIVE

Simulator training should be conducted utilizing methods and techniques that maximize its effectiveness in developing necessary job-related knowledge and skills.

CRITERIA

A. Training programs are developed and implemented for initial and continuing training, recognizing distinctly different objectives for each program.

B. Clearly defined and measurable performance objectives are used in simulator training and competency demonstrations.

C. Simulator exercises are effective in developing and reinforcing necessary job-related knowledge and skills in the following areas:

1. application of theory to practical situations
2. in-house and industry operating experience
3. plant procedures, technical specifications, and operating practices
4. diagnosing operational problems
5. ability of the control room crew to work as a team
6. ability of the control room crew to handle simulated emergencies

D. The attitude and actions of trainees and instructors reflect a real-plant atmosphere to the extent practical.

E. Instructor/trainee interaction during simulator training exercises enhances the training process.

F. Training is enhanced by the use of pre-exercise briefs and post-exercise critiques.

G. Individuals other than those who conducted the training have a principal role in conducting qualification examinations.

H. Qualification examinations accurately measure trainee ability to operate the plant during normal, abnormal, and emergency conditions. Results are provided to appropriate managers in a timely manner.

I. Procedures used during simulator training reflect those used in the trainees' plant to the extent practical.

J. Methods are established to ensure that procedure conflicts and errors identified during simulator training are fed back to the plant for resolution in a timely manner.

QUALITY CONTROL INSPECTOR AND NON-DESTRUCTIVE EXAMINATION TECHNICIAN TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

The quality control (QC) inspector and non-destructive examination (NDE) technician training and qualification programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training consists of classroom and on-the-job training, develops necessary job-related knowledge and skills, and includes the following areas:

1. basic technical and applied science subjects
2. plant fundamentals
3. applicable codes, standards, and regulations
4. quality assurance and quality control fundamentals
5. inspection/examination equipment and procedures
6. job-specific inspection/examination techniques and
7. practical factor demonstration
8. documentation of results

C. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

1. inspection/examination equipment, technique, and procedure changes
2. applicable code, standard, and regulation changes
3. industry and in-house experience information
4. selected topics for B. above, to reinforce seldom-used knowledge and skills

D. Qualification standards and evaluation methods are adequate to verify trainee competence.

E. Feedback from actual job performance is used to improve training effectiveness.

OPERATING EXPERIENCE REVIEW PROGRAM

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are implemented to review and evaluate in-house and industry operating experiences and include the following:

1. experienced technical personnel appropriately utilized in all phases of the operating experience review program
2. distribution of operating experience information to appropriate personnel and departments in a timely manner
3. provisions to prevent conflict with or contradiction of other operating guidance provided to operators and other personnel
4. efforts to minimize the distribution of extraneous or unnecessary information
5. provisions for developing, approving, implementing, and tracking corrective actions to completion

B. The program for the review of in-house events includes the following additional elements:

1. identification and prioritization of events for review and evaluation
2. rigorous investigation and review to determine root cause, significance, generic implications, and necessary corrective action
3. provision for timely notification to other utilities of significant events with generic implications
4. a second multi-disciplined review independent of plant management

C. The program for industry operating experience review includes the following additional elements:

1. a comprehensive evaluation of appropriate operating experience information including the following:

a. NRC letters, bulletins, notices, and circulars

b. vendor and architect-engineer reports

c. INPO Significant Operating Experience Reports (SOERs) and Significant Event Reports (SERs)

2. a review of the following:

a. INPO Operations and Maintenance Reminders (O&MRs)

b. NUCLEAR NETWORK information pertaining to plant operating experience

3. a periodic, independent review to verify that industry operating experience information is being properly classified for applicability

D. The program for participation in the Nuclear Plant Reliability Data System (NPRDS) includes the following:

1. timely reporting of applicable system and component failures

2. maintenance of the plant engineering data file up-to-date

3. effective use of NPRDS to improve plant reliability (after September 1, 1984)

APRIL 1983

PERFORMANCE OBJECTIVES

AND CRITERIA

FOR

PLANT EVALUATIONS

Institute of Nuclear Power Operations

Atlanta, Georgia

ORDERING INFORMATION

Copies of this manual may be ordered from the Institute of Nuclear Power Operations, 1100 Circle 75 Parkway, Suite 1500, Atlanta, Ga. 30339. (404) 953-3600

Key Words: Criteria, Evaluation

NOTICE

This manual was prepared by the Institute of Nuclear Power Operations (INPO). Neither INPO, members of INPO, other persons contributing to or assisting in the preparation of the manual, nor any person acting on the behalf of any of these parties (a) makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this manual, or that the use of any information, apparatus, method, or process disclosed in this manual may not infringe on privately owned rights; or (b) assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this manual.

APRIL 1983

PERFORMANCE OBJECTIVES AND CRITERIA

FOR PLANT EVALUATIONS

INDEX

FORWORD

This document contains performance objectives and criteria intended for use by the Institute of Nuclear Power Operations (INPO) in its evaluation of nuclear power plants. The performance objectives are broad in scope. Each generally covers a single, well-defined management area. The supporting criteria are more narrow in scope and typically describe a specific activity that contributes to the achievement of a performance objective. Several criteria are listed under each performance objective.

The purpose of this document is to provide a working reference for INPO evaluators and for member utilities' use in self-evaluation. The criteria listed may not address every activity associated with the performance objective. Therefore, meeting all the criteria does not ensure that the performance objective is fully met. Conversely, it is recognized that a nuclear station may effectively achieve the performance objective without meeting each specific criterion. For these reasons, INPO's plant evaluations emphasize the performance objectives rather than focusing solely on the supporting criteria.

The criteria in this document are results-oriented. The methods for achieving the desired results are generally not stated. Thus, considerable judgment is required in applying the criteria. INPO develops Good Practices to assist member utilities in meeting the criteria and objectives. Good Practices define methods and procedures that have proven effective in meeting one or more criteria.

These performance objectives and criteria are augmented by the Performance Objectives and Criteria for Corporate Evaluation and Assistance Visits.

This edition supersedes the January 1982 edition. It is anticipated that this document will be revised as INPO gains additional experience.

ORGANIZATION AND ADMINISTRATION

STATION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The organizational structure, including corporate interfaces, is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. The responsibilities and authority of each management, supervisory, and professional position are clearly defined.

D. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Administrative controls are employed for activities important to plant safety and reliability.

F. A program is implemented to identify persons who are unfit for duty, as a result of drug or alcohol use or a psychological condition, and to remove them from duty. The program includes the following elements:

1. screening of prospective employees and contractors before assignment to work
2. training of personnel in important aspects of the program
3. training of managers and supervisors to identify and handle unfit personnel
4. application to both employees and contractors

MANAGEMENT OBJECTIVES

PERFORMANCE OBJECTIVE

Station management objectives should be established and progress monitored through a formal program.

CRITERIA

A. Specific objectives for each organizational unit down through the plant department head level are published and kept current.

B. Corporate, plant, and department objectives are consistent and complementary.

C. Station personnel understand the actions necessary, within the scope of their duties and responsibilities, to achieve the objectives.

D. Station managers and supervisors employ the objectives to achieve improvements.

E. Management reviews are periodically conducted to assess progress toward achievement of objectives.

F. Feedback is utilized to revise and update the objectives.

MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are implemented for the periodic monitoring and assessment of important aspects of station activities.

B. Managers and supervisors personally take part in monitoring and assessing station activities.

C. Managers and supervisors conduct frequent plant tours and observations of plant work activities.

D. Management assessment and improvement efforts are performance-oriented and are conducted in a manner that reinforces the line functions of managers and supervisors.

E. Selected station operational data are trended and the results forwarded to appropriate levels of management.

F. Timely and effective action is taken to track and correct identified deficiencies and their basic causes.

PERSONNEL PLANNING AND QUALIFICATION

PERFORMANCE OBJECTIVE

Personnel programs should ensure that station positions are filled by highly qualified individuals.

CRITERIA

A. A personnel management and acquisition program is effectively implemented.

B. Timely action is taken to anticipate and fill vacancies.

C. Selection of personnel to fill vacancies is based on merit and ability.

D. Appropriate job qualification requirements are established for all station positions that affect plant safety and reliability.

E. Position incumbents meet the prescribed job qualification requirements.

F. Job qualification requirements are periodically reviewed, evaluated, and revised as necessary.

G. Appropriate career advancement programs are used to develop the management, supervisory, and technical expertise of personnel.

H. Long-range staffing plans are developed.

I. The employee performance appraisal program is effectively utilized to enhance individual performance.

INDUSTRIAL SAFETY

PERFORMANCE OBJECTIVE

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

CRITERIA

A. An effective industrial safety program with clearly defined policies, procedures, and responsibilities is implemented.

B. Initial and continuing training is conducted on industrial safety program requirements and practices.

C. Managers and supervisors actively support and enforce the industrial safety program.

D. Personnel at all levels are fully committed to the industrial safety program.

E. A safe and orderly working environment exists. Safety hazards are identified and corrected in a timely manner.

F. Accidents and near accidents are investigated and analyzed. Lessons learned are used to improve industrial safety.

G. The effectiveness of the industrial safety program is periodically evaluated, and the results used to make program improvements.

DOCUMENT CONTROL

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Receipt and distribution of documents from sources outside the station are properly controlled.

B. Preparation, review, approval, and distribution of documents originated at the station are properly controlled and timely.

C. Documents are kept current.

D. Necessary documents are readily available at appropriate locations in the plant.

E. Documents are properly stored and readily retrievable.

STATION NUCLEAR SAFETY REVIEW GROUP

PERFORMANCE OBJECTIVE

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

CRITERIA

A. A nuclear safety review group is active under a clear charter covering group procedures and the responsibilities and qualifications of members. The group includes the technical disciplines necessary to adequately review material for which the group is responsible.

B. Group members and alternates meet the prescribed qualification requirements and are knowledgeable of the charter, duties, and responsibilities of the group.

C. The group reviews all station activities important to nuclear safety.

D. Items are reviewed in sufficient depth to identify significant safety issues. The nuclear safety review group is cognizant of safety concerns identified by task forces or subcommittees.

E. Reviews are conducted and results documented in a timely manner.

F. The interface with the corporate safety review group is clearly defined. Effective coordination is evident.

G. Action items identified by the group are tracked and resolved effectively.

H. The effectiveness of group activities is periodically evaluated, and the results used to make improvements.

QUALITY PROGRAMS

PERFORMANCE OBJECTIVE

Quality programs should contribute to the effective performance of activities important to safety and reliability. Quality programs include quality assurance, quality control, and other programs that provide an independent assessment of plant activities or that function specifically to promote quality of workmanship.

CRITERIA

A. Quality programs reinforce and support the line functions of managers and supervisors.

B. Managers and supervisors actively support quality activities. Personnel at all levels are committed to meeting quality requirements.

C. Audits and inspections of selected station activities are used to identify substantive issues affecting performance.

D. Conditions needing corrective action or improvement are tracked and resolved effectively.

E. Quality programs are applied in a graduated manner to selected non-safety-related systems and equipment that are important to reliable plant operations.

OPERATIONS

OPERATIONS ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Operations organization and administration should ensure effective implementation and control of operations activities.

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Responsibilities and authority for each management, supervisory, and professional position are clearly defined.

D. Operations personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Administrative controls are employed for operations activities important to plant safety and reliability.

G. Performance appraisals are effectively utilized to enhance individual performance.

CONDUCT OF OPERATIONS

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Operators are attentive and responsive to plant parameters and conditions.

B. Operator shift duties are limited to activities that support safe and reliable operation.

C. Control room activities are conducted in a businesslike and professional manner. Control room access is limited.

D. Plant evolutions and testing are planned and properly authorized.

E. Procedures are utilized and followed as required by plant policy.

F. Operating history indicates safe and reliable operation as evidenced by items such as the following:

1. the absence of repetitious operator errors
2. few unplanned trips
3. capacity factor consistent with planned outages

G. Managers and supervisors observe operations activities and ensure adherence to station policies and procedures.

PLANT STATUS CONTROLS

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Policies and procedures defining plant status controls are implemented. Provisions for special situations such as refueling, extended outages, and post-accident recovery are included.

B. Checksheets or other comparable means are used to ensure that proper conditions are established for each mode of plant operation and for mode shifts.

C. Equipment status changes are appropriately documented and are communicated to appropriate shift positions in a timely manner.

D. Activities affecting the status of installed systems and equipment are authorized by appropriate operations personnel.

E. The operating conditions of plant equipment are effectively monitored, and appropriate corrective action is initiated when required.

F. The number of alarms that are normally in a lighted or alarmed condition during power operation is minimized.

G. Defective or out-of-tolerance instrumentation and controls are identified and properly labeled, and corrective measures are taken in a timely manner.

H. Backup instrumentation, measurements, and readings are used as appropriate when normal instrumentation is found to be defective or out of tolerance.

I. Logkeeping is timely, accurate, and adequately reflects plant activities and status.

J. Turnovers conducted for each shift station ensure the effective and accurate transfer of information between shift personnel.

1. Each shift station uses a checksheet or similar method to guide the turnover process.
2. Shift turnovers include a general review of the control boards and panels.

K. Procedures are implemented to effectively control the placement of tags such as danger, clearance, warning, information, and other similar tags installed on plant equipment.

1. The adequacy of tagouts is verified by using current plant prints or other definitive documentation.
2. Tagout lineups are performed by persons knowledgeable of the affected systems and tagout procedures.
3. The tagout status is verified by the person performing or supervising the work on tagged-out equipment before the work is commenced.
4. Tags used for the protection of personnel and equipment are uniquely identifiable from other plant tags.
5. Plant status indications, controls, switches, and labels are not obscured by tags.

L. Tagouts are periodically reviewed to ensure the following:

1. applicability or need for outstanding tagouts
2. proper placement of each tag
3. proper position of tagged equipment
4. the absence of unauthorized tags
5. the accuracy, completeness, and legibility of information on tags and tagout sheets

M. An independent verification of component position is performed for safety-related and other important plant systems and equipment positioned after maintenance or testing. (Observation of control room indication can serve as one verification.)

N. Procedures are implemented to control the placement, removal, and periodic review of jumpers and lifted leads.

OPERATOR KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Operators complete formal qualification prior to assignment to a shift position.

B. Operator knowledge is evidenced by an appropriate understanding of areas such as the following:

1. technical subjects and applied sciences
2. power plant fundamentals
3. plant systems and components
4. plant procedures and operating practices
5. plant transient and accident analysis and control

C. Operators follow good operating practices in conducting plant operations, including industrial safety and radioiogical protection.

D. Operators are cognizant of recent procedure changes and plant modifications.

E. Operators are knowledgeable in appropriate lessons learned from industry and in-house operating experiences applicable to their position.

F. Operators are capable of diagnosing plant conditions during off-normal and emergency conditions.

G. Operators exhibit an attitude and approach that reflect an awareness of abnormalities, unusual conditions or trends, and a determination to inquire into and follow up on indications of abnormalities and unusual conditions or trends.

OPERATIONS PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The preparation, review, approval, and revision of procedures and documents are properly controlled.

B. The guidance of applicable source documents is incorporated into plant operating procedures (e.g., owner's group or plant-specific emergency procedure guidelines and vendor technical manuals).

C. Emergency operating procedures effectively guide the operations staff in responding to single and multiple casualities.

D. Procedures are clear, concise, and contain adequate information for users to understand and perform their activities effectively.

E. Portions or steps of other documents that are used or referred to when performing a procedure are specifically identified in the procedure.

F. Procedures are verified and validated prior to use.

G. A policy governing the use of procedures is implemented. The policy includes the following:

1. action to be taken when procedures are found to be inadequate for the intended tasks or when unexpected results occur
2. directions for when procedures are to be used as general guidance, are to be followed step-by-step, or require sign-off for each step

3. identification of procedures required to be in-hand when performing the operation to which they pertain
4. action to be taken if procedures conflict
5. operator authority to deviate from written procedures during an emergency if necessary to protect personnel and equipment

H. Methods are established to provide direction when procedures conflict or do not contain adequate guidance. Temporary procedures, if used, are controlled to ensure the following:

1. appropriate review and authorization prior to use
2. timely cancellation or incorporation into permanent procedure revisions
3. operator awareness of applicable temporary changes

I. Procedures are readily available and clearly identified.

J. Documents, drawings, and other operator references are available, authorized, and properly controlled.

OPERATIONS FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

Facilities and equipment should effectively support plant operation.

CRITERIA

A. Physical characteristics, environmental conditions, and maintenance of plant control stations support safe and reliable operation.

B. Cleanliness and order are evident.

C. Equipment needed for operational activities is readily available to shift personnel.

D. Plant equipment is accessible for operation and monitoring.

E. Communication equipment is reliable and provides necessary plant coverage.

F. Equipment is labeled and is readily identifiable.

MAINTENANCE

MAINTENANCE ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Maintenance organization and administration should ensure effective implementation and control of maintenance activities.

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Responsibilities and authority of each management, supervisory, and professional position are clearly defined.

D. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Administrative controls are employed for maintenance activities important to plant safety and reliability.

F. Performance appraisals are effectively utilized to enhance individual performance.

PLANT MATERIAL CONDITION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Fluid system leaks are minimized.

B. Mechanical systems and equipment are in good working order and in a good state of preservation.

C. Electrical and electronic equipment is operable and appropriately protected from adverse environmental conditions.

D. Instrumentation, controls, and associated indicators are operable and calibrated as required.

E. Good lubrication practices are evident.

F. Mechanical operators, fasteners, and supports are in place and operable.

G. Equipment, structures, and systems are properly preserved and insulated.

WORK CONTROL SYSTEM

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The work control system provides management with the means for determining the status of outstanding work orders and maintenance planning.

B. Advance planning is established for unscheduled outages.

C. The work to be accomplished is clearly defined by the work document.

D. Management control of work is accomplished through the use of a priority system. The backlog of work is minimized.

E. Work planning includes considerations such as material, tool, and manpower requirements; interdepartmental coordination; safety considerations; radiological protection requirements; and quality control requirements.

F. Scheduling of maintenance effectively utilizes available manpower.

G. The work order package identifies or includes applicable guidelines and/or procedures.

H. Requirements for post-maintenance testing and plant restoration are defined.

I. Completed work control documents are reviewed to ensure awareness of material conditions, to consider preventive maintenance program adjustments, and to verify completion of administrative requirements.

CONDUCT OF MAINTENANCE

PERFORMANCE OBJECTIVE

Maintenance should be conducted in a safe and efficient manner to support plant operation.

CRITERIA

A. Maintenance practices ensure the exclusion of foreign materials and contaminants from open systems and components.

B. Work sites are orderly.

C. Proper tools are employed.

D. Good industrial safety, radiological protection, and maintenance practices are followed.

E. Operations, quality control, and radiological protection personnel are involved in appropriate maintenance activities.

F. Maintenance re-work is minimized.

G. Managers and supervisors observe maintenance activities and ensure adherence to station policies and procedures.

H. Maintenance is performed by, or under the direct supervision of, qualified personnel.

I. Maintenance personnel are knowledgeable in appropriate lessons learned from industry and in-house maintenance experiences.

J. Contract and other non-utility personnel conducting plant maintenance operate under the same controls and procedures and to the same standards as plant maintenance personnel.

PREVENTIVE MAINTENANCE

PERFORMANCE OBJECTIVE

Preventive maintenance should contribute to optimum performance and reliability of plant equipment.

CRITERIA

A. A preventive maintenance (PM) program is effectively implemented and includes systems and equipment important to plant safety and reliability.

B. Inspection, lubrication, and maintenance are performed at appropriate intervals determined by vendor recommendations and operational experience.

C. The backlog of preventive maintenance is minimized. Preventive maintenance is not waived or deferred for extended periods of time without management approval.

D. Preventive maintenance documentation provides a record of PMs performed, associated data, and where appropriate, the condition of the equipment.

E. The effectiveness of the preventive maintenance program is periodically evaluated, and the results are used to make program improvements.

MAINTENANCE PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The preparation, review, approval, and revision of procedures and documents are properly controlled.

B. Procedures are clear, concise, and contain adequate information for users to understand and perform their activities effectively.

C. Hold points for quality control checks are included in procedures as necessary.

D. Procedures are readily available and clearly identified.

E. Procedures are approved and validated.

F. Work procedures, vendor manuals, and reference materials used in support of maintenance are technically accurate and up-to-date.

G. Portions or steps of other documents that are used or referred to when performing a procedure are specifically identified in the procedure.

H. A policy governing the use of procedures is implemented. The policy includes the following:

1. action to be taken when procedures are found to be inadequate for the intended tasks or when unexpected results occur
2. directions for when procedures are to be used as general guidance, are to be followed step-by-step, or require sign-off for each step

3. identification of procedures required to be in-hand when performing the operation to which they pertain
4. action to be taken if procedures conflict

I. Documents, drawings, and other technical data are available, authorized, and properly controlled.

MAINTENANCE HISTORY

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Maintenance history records are maintained for major systems, equipment, and components.

B. Malfunctions, repairs, modifications, and inspection/test results are effectively documented.

C. Maintenance history records are readily accessible.

D. Maintenance history records are appropriately considered in planning for corrective maintenance, modifications, and preventive maintenance.

E. Maintenance history is utilized to identify and evaluate trends and persistent maintenance problems. Appropriate corrective action is initiated.

MAINTENANCE FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Maintenance facility size and arrangement promote the safe and efficient completion of work.

B. Area lighting affords safe and efficient working and operating conditions.

C. Proper tools, equipment, and consumable supplies are available to support maintenance requirements.

D. Suitable storage is provided for tools, supplies, and maintenance equipment.

E. Maintenance facilities, equipment, and tools are maintained in good repair.

F. Maintenance work areas are maintained in a clean and orderly condition.

G. Unserviceable tools and equipment are controlled to prevent use.

H. The quality of stored equipment, repair parts, and material is maintained.

I. Suitable facilities are available to decontaminate tools and equipment.

J. Measurement and test equipment is calibrated and controlled to ensure accuracy and traceability.

MATERIALS MANAGEMENT

PERFORMANCE OBJECTIVE

Materials management should ensure that necessary parts and material are available when needed.

CRITERIA

A. Programs are implemented to provide proper parts and material for normal maintenance, outages, and modifications.

B. Mechanisms are in place to provide for the expeditious procurement of parts and material on a high priority basis when needed.

C. The quality of stored equipment, parts, and material is maintained by preventive maintenance and environmental and shelf-life controls.

D. Materials are stored and identified in a manner that results in timely retrieval of requested items.

E. Parts and components critical to safe and reliable operation of the plant are identified and controlled.

F. Proper engineering control and approval is obtained on any deviation from the design specifications for parts or material.

G. Stock records are maintained, and purchase orders are tracked.

TECHNICAL SUPPORT

TECHNICAL SUPPORT ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Technical support organization and administration should ensure effective implementation and control of technical support.

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Responsibilities and authority for each management, supervisory, and professional position are clearly defined.

D. Technical support personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Administrative controls are employed for activities important to plant safety and reliability.

F. Performance appraisals are effectively utilized to enhance individual performance.

SURVEILLANCE TESTING PROGRAMS

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Administrative systems and controls ensure timely completion of required surveillances.

B. Surveillance testing programs include equipment important to safety and reliability.

C. Procedures used for surveillance testing include acceptance criteria.

D. Surveillance testing is performed under procedural controls.

E. Prompt corrective action is taken when acceptance criteria are not met.

F. Independent review of completed surveillance tests is conducted to ensure acceptance criteria are met.

G. Actual equipment performance and test data trends are evaluated to improve safety and reliability.

H. The effectiveness of surveillance testing programs is periodically evaluated and the results used to make program improvements.

OPERATING EXPERIENCE REVIEW PROGRAM

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are implemented to review and evaluate in-house and industry operating experiences and include the following:

1. experienced technical personnel appropriately utilized in all phases of the operating experience review program
2. distribution of operating experience information to appropriate personnel and departments in a timely manner
3. provisions to prevent conflict with or contradiction of other operating guidance provided to operators and other personnel
4. efforts to minimize the distribution of extraneous or unnecessary information
5. provisions for developing, approving, implementing, and tracking corrective actions to completion

B. The program for the review of in-house events includes the following additional elements:

1. identification and prioritization of events for review and evaluation
2. rigorous investigation and review to determine root cause, significance, generic implications, and necessary corrective action
3. provision for timely notification to other utilities of significant events with generic implications
4. a second multi-disciplined review independent of plant management

C. The program for industry operating experience review includes the following additional elements:

1. a comprehensive evaluation of appropriate operating experience information including the following:
   a. NRC letters, bulletins, notices, and circulars
   b. vendor and architect-engineer reports
   c. INPO Significant Operating Experience Reports (SOERs) and Significant Event Reports (SERs)
2. a review of the following:
   a. INPO Operations and Maintenance Reminders (O&MRs)
   b. NUCLEAR NOTEPAD information pertaining to plant operating experience
3. a periodic, independent review to verify that industry operating experience information is being properly classified for applicability

D. The program for participation in the Nuclear Plant Reliability Data System (NPRDS) includes the following:

1. timely reporting of applicable system and component failures
2. maintenance of the plant engineering data file up-to-date

PLANT MODIFICATIONS

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established for design, review, and implementation of permanent and temporary modifications.

B. Modifications are effectively coordinated between on-site and off-site personnel.

C. All modification requests are reviewed for inclusion in the modification program. Approved requests are identified, prioritized, and tracked.

D. Codes and standards are considered in designing plant modifications.

E. Requirements for installing, verifying installation, inspecting, and testing modifications are specified as part of the design process.

F. Design changes undergo a formal, technical interdisciplinary review and approval.

G. Design changes receive an effective review for operability and maintainability.

H. Work required for installing and testing modifications is coordinated with and controlled by plant personnel.

I. Modification testing is completed prior to placing modified systems in service.

J. Documents, such as drawings and procedures, affected by plant modifications are updated prior to operation of the system or equipment.

K. Plant personnel are cognizant of the effect of modifications, prior to operating and maintaining modified systems and equipment.

L. Final documents (as-built drawings, procedures, etc.) are completed and issued in a timely manner.

M. The effectiveness of modification programs is periodically evaluated and the results used to make program improvements.

REACTOR ENGINEERING

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Approved procedures and qualified personnel are utilized to perform reactor engineering duties.

B. Important parameters affecting core performance, core power monitoring, and reactivity control are routinely trended to detect deviations from normal.

C. Fuel management and control programs are implemented to ensure safe core loading and power operation.

D. Fuel integrity is maximized by observing operating guidelines such as those recommended by nuclear fuel suppliers.

E. Parameters indicating fuel integrity are routinely analyzed to detect possible fuel failures.

F. Computer programs with functions important to safe operation are controlled, updated, and independently verified on a routine basis.

G. Approved backup analytical techniques for important computer functions are provided in procedures, and appropriate personnel are knowledgeable in their use.

PLANT PERFORMANCE MONITORING

PERFORMANCE OBJECTIVE

Performance monitoring activities should optimize plant efficiency and reliability.

CRITERIA

A. Programs are implemented to routinely monitor, collect, trend, and analyze performance data for equipment and systems important to plant efficiency and reliability.

B. Performance monitoring responsibilities are assigned to knowledgeable personnel.

C. Instrumentation used for performance monitoring is calibrated and has adequate sensitivity and accuracy to provide reliable results.

D. Optimum performance levels are defined through baseline data, design parameters, and/or modeling.

E. Performance data is analyzed and the results used to optimize plant efficiency and reliability.

F. The effectiveness of performance monitoring programs is periodically evaluated and the results used to make program improvements.

TECHNICAL SUPPORT PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The preparation, review, approval, and revision of procedures and documents are properly controlled.

B. Procedures are clear, concise, and contain adequate information for users to understand and perform their activities effectively.

C. Procedures are readily available and clearly identified.

D. Procedures are approved and validated prior to use.

E. Procedures, manuals, and reference materials are technically accurate and up-to-date.

F. Portions or steps of other documents that are used or referred to when performing a procedure are clearly identified in the procedure.

G. A policy governing the use of procedures is implemented. The policy includes the following:

1. action to be taken when procedures are found to be inadequate for the intended tasks or when unexpected results occur
2. directions for when procedures are to be used as general guidance, are to be followed step-by-step, or require sign-off for each step
3. identification of procedures required to be in-hand when performing the operation to which they pertain
4. action to be taken if procedures conflict

H. Documents, drawings, and other technical data are available, authorized, and properly controlled.

TRAINING AND QUALIFICATION

TRAINING ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Responsibilities and authority for each management, supervisory, and professional position are clearly defined.

D. Training staff personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

E. Training staff personnel are trained and qualified to perform assigned job functions.

F. Administrative policies and controls are implemented for the following functions:

1. assessing trainee entry-level knowledge and skills
2. assessing training needs
3. developing programs
4. planning and scheduling training activities
5. documenting training program activities and results
6. evaluating instructor effectiveness
7. incorporating feedback from on-the-job performance
8. developing, administering, and controlling examinations
9. exempting personnel from training requirements

G. The effectiveness of training programs is periodically evaluated and the results used to make program improvements.

H. Performance appraisals are effectively utilized to enhance individual performance.

I. Training requirements for temporary employees and transient workers are established and are appropriate for the tasks to be assigned.

NON-LICENSED OPERATOR TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training consists of classroom and on-the-job training, develops job-related knowledge and skills, and includes the following areas:

1. basic technical and applied science subjects
2. power plant fundamentals
3. plant systems and components
4. procedures and operating practices
5. practical factor demonstration
6. industrial safety
7. basic techniques for diagnosing plant conditions during off-normal and emergency conditions
8. radiological protection

C. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

1. plant system and component changes
2. procedure changes
3. industry and in-house operating experience
4. selected items from B. above, with emphasis on seldom-used knowledge and skills important to nuclear safety

D. Qualification standards and evaluation methods are adequate to verify trainee competence.

E. Feedback from actual job performance is used to improve training effectiveness.

LICENSED OPERATOR TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training for control room operators (reactor operator) consists of classroom and on-the-job training, develops job-related knowledge and skills, and includes the following areas:

1. technical subjects and applied sciences
2. power plant fundamentals
3. plant systems and components
4. procedures and operating practices
5. transient and accident analysis and control
6. practical factor demonstration
7. techniques for diagnosing plant conditions during off-normal and emergency conditions
8. communications
9. industrial safety
10. radiological protection

C. Initial training for senior control room operators (senior reactor operators) and shift supervisors develops necessary job-related knowledge and skills and includes the following areas:

1. supervisory techniques
2. increased emphasis on transient and accident analysis and technical specifications
3. division of responsibilities during abnormal and emergency conditions

D. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

1. plant system and component changes
2. procedure changes
3. industry and in-house operating experience
4. selected items from B. and C. above, with emphasis on seldom-used knowledge and skills important to nuclear safety

E. A simulator is used in initial and continuing licensed operator training to develop and improve the following:

1. skills in performing tasks for normal and emergency conditions
2. diagnostic skills for normal and emergency conditions

F. Qualification standards and evaluation methods are adequate to verify trainee competence.

G. Feedback from actual job performance is utilized to improve training effectiveness.

SHIFT TECHNICAL ADVISOR TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training consists of classroom and on-the-job training, develops necessary job-related knowledge and skills, and includes the following areas:

1. technical subjects and applied sciences
2. power plant fundamentals
3. plant systems and components
4. procedures and operating practices
5. transient and accident analysis and control
6. STA responsibilities and authority
7. techniques for diagnosing plant conditions during off-normal and emergency conditions
8. industrial safety
9. radiological protection

C. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

1. plant system and component changes
2. procedure changes
3. industry and in-house operating experience
4. selected items from B. above, with emphasis on seldom-used knowledge and skills important to nuclear safety

D. A simulator is used during initial and continuing training to develop diagnostic skills for off-normal and emergency conditions.

E. Qualification standards and evaluation methods are adequate to verify trainee competence.

F. Feedback from actual job performance is used to improve training effectiveness.

MAINTENANCE PERSONNEL TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training consists of classroom and on-the-job training, develops necessary job-related knowledge and skills, and includes the following areas:

1. basic technical and applied science subjects
2. maintenance fundamentals and techniques
3. plant systems and components
4. special maintenance craft skills
5. practical factor demonstration
6. work control procedures
7. industrial safety
8. radiological protection
9. quality assurance and quality control

C. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

1. plant system and component changes
2. procedure changes
3. industry and in-house operating experiences
4. selected topics from B. above, to reinforce seldom-used knowledge and skills

D. Qualification standards and evaluation methods are adequate to verify trainee competence.

E. Feedback from actual job performance is used to improve training effectiveness.

TRAINING FOR THE TECHNICAL STAFF

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training develops necessary job-related knowledge and skills and includes the following areas:

1. basic nuclear plant energy conversion processes
2. basic plant systems and equipment
3. plant procedures
4. integrated plant operation
5. departmental responsibilities and relationships
6. applicable codes, standards, and regulations
7. responsibilities during normal and emergency plant conditions.
8. industrial safety
9. radiological protection
10. quality assurance and quality control

C. Continuing training maintains and improves job-related knowledge and skills in the following areas:

1. plant system and component changes
2. procedure changes
3. applicable codes, standards, and regulation changes
4. industry and in-house operating experience
5. selected topics from B. above

D. Training standards and evaluation methods are adequate to verify trainee understanding of program content.

E. Feedback from actual job performance is used to improve training effectiveness.

TRAINING FOR SUPERVISORS AND MANAGERS

PERFORMANCE OBJECTIVE

The training program for supervisors and managers should broaden overall knowledge of plant processes and equipment and develop supervisory and management skills.

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Training programs for supervisors and managers are effective in supplementing previous training and experience to prepare individuals for responsibilities in areas such as the following:

1. job-related technical areas
2. supervisory/management skills and practices
3. quality assurance and quality control
4. plant security and emergency plans
5. purchasing and material stores
6. plant modification planning and implementation
7. budgeting and cost control
8. interfacing with external groups and organizations
9. industrial safety
10. radiological protection

C. Training programs maintain job-related knowledge and skills with emphasis on changes to the areas identified in B. above.

D. Feedback from actual job performance is used to improve training effectiveness.

GENERAL EMPLOYEE TRAINING

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training develops job-related knowledge and skills and includes the following areas:

1. plant organization and administration
2. plant description
3. industrial safety
4. radiological protection
5. quality assurance and quality control
6. plant security
7. emergency response
8. requirements for regulatory and procedure compliance

C. Continuing training reinforces job-related knowledge and skills developed in B. above and includes applicable changes in related procedures and administrative controls.

D. Evaluation methods and standards are adequate to verify trainee understanding of program content.

E. Feedback from actual job performance is used to improve training effectiveness.

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TRAINING FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Classroom facilities are adequate for effective group instruction.

B. Reference materials are adequate and readily accessible.

C. Equipment is available as needed to support training material development.

D. Training aids are adequate to support hands-on and practical demonstration training.

E. Training materials effectively support the training programs.

RADIOLOGICAL PROTECTION

RADIOLOGICAL PROTECTION ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Radiological protection organization and administration should ensure effective implementation and control of radiological protection activities.

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks. The radiological protection manager (RPM) has professional, technical, or engineering personnel within his department or has adequate access to other engineering personnel to support radiological projects.

C. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

D. Responsibilities and authority for each radiological protection management, supervisory, and professional position are clearly defined. Appropriate responsibilities are assigned to other plant managers and supervisors, including maintenance and operations, in radiological protection areas such as the following:

1. minimizing personnel radiation exposure
2. minimizing the contamination of areas, equipment, and personnel
3. reducing solid radioactive waste volumes

E. Radiological protection program requirements are actively supported by plant managers and supervisors and are adhered to by plant personnel.

F. The RPM has direct access to the plant manager and is sufficiently independent to effectively perform his duties.

G. Radiological protection technicians have sufficient authority in controlling work activities to protect workers.

H. Radiological protection problems are documented and evaluated. These evaluations are reviewed for trends, and actions are taken to correct the causes.

I. Managers and supervisors observe radiological protection activities to ensure adherence to station policies and prodedures and to identify and correct problems.

J. Performance appraisals are effectively utilized to enhance individual performance.

RADIOLOGICAL PROTECTION PERSONNEL TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training includes classroom and on-the-job training, develops job-related knowledge and practical abilities, and includes the following areas:

1. fundamental mathematics, sciences, and techniques
2. health physics theory
3. health physics equipment
4. plant systems
5. plant operations and maintenance
6. plant procedures
7. accident radiological considerations
8. industrial safety

C. Continuing training maintains and improves job-related knowledge and practical abilities and includes the following areas:

1. plant system and component changes
2. procedure changes
3. industry operating experience
4. weaknesses, including radiological incidents, identified in the plant's radiological protection program
5. selected topics from B. above, to reinforce seldom-used knowledge and skills

D. Knowledge and practical abilities are evaluated during initial qualification and at least every two years by written and oral examinations and practical ability demonstrations.

1. Written examinations are used to determine the technician's level of knowledge. Problem-solving and essay questions are primarily used for these examinations.
2. Oral examinations are used to determine the technician's ability to apply knowledge and skills to practical situations in the plant, both routine and accident.
3. Practical ability demonstrations by each technician are used to determine proficiency in equipment operation and the application of radiological protection procedures and techniques.
4. Records are maintained of the following:
   a. written and oral examination results
   b. written and oral examination questions
   c. practical demonstration requirements, including an indication that each technician carried out the required demonstrations

E. On-the-job qualification requirements are completed and documented prior to assignment to the associated tasks.

F. Radiological protection technician instructors are adequately trained and qualified to perform their tasks. Instructors periodically perform in-plant radiological protection activities.

G. Qualifications of contract radiological protection technicians are equivalent to those of station radiological protection personnel for the functions to which they are assigned.

H. Feedback from actual job performance is used to improve training effectiveness.

GENERAL EMPLOYEE TRAINING IN RADIOLOGICAL PROTECTION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training develops job-related radiological protection knowledge and practical abilities. This training emphasizes those actions employees can take to reduce their own exposures to radiation during routine operations and emergencies.

C. Continuing training maintains and improves job-related knowledge and practical abilities and includes the following areas:

1. basic technical subjects
2. pertinent changes in radiological protection procedures
3. radiological problems identified during the previous year

D. Knowledge and practical abilities are evaluated during initial training and at least annually thereafter.

1. Written examinations are used to determine the employee's level of knowledge, including the ability to specify actions to be taken by the employee in the event of a radiological incident.
2. Examinations are changed periodically to ensure their validity.
3. Each individual demonstrates the required proficiency in frisking, donning and removing protective clothing, reading pocket ionization chambers, and using step-off pads.

4. Records are maintained of the following:
   a. written examination results
   b. written examination questions
   c. practical demonstrations performed

E. Feedback from actual job performance is , to improve training effectiveness.

EXTERNAL RADIATION EXPOSURE

PERFORMANCE OBJECTIVE

External radiation exposure controls should minimize personnel radiation exposure.

CRITERIA

A. Effective exposure control methods are in use.

1. Accurate and timely radiation level information is available for planning, determining the boundaries of radiation and high radiation areas, and posting entry requirements. The boundaries of these areas are clearly identified and posted.
2. Small areas with radiation levels significantly higher than the surrounding general areas (hot spots) are clearly posted.
3. Radiation work permits or similar controls are used to control exposures associated with specific jobs.
4. Personnel exposures are controlled in work areas involving high exposure rates by a combination of timekeeping and monitoring of accumulated exposure.
5. Personnel traffic is routed through lower exposure rate areas, and waiting, staging, and office areas are established in low background areas.
6. Controls exist that will protect personnel from transient high radiation levels such as those involved in moving spent fuel or transferring spent resin.

B. Proper controls are used to minimize beta exposure to the skin and eyes, e.g., by use of protective clothing and equipment.

C. The radiation exposure reduction program includes the following whenever collective personnel exposure is expected to be significant:

1. planning for the work
2. work scheduling that provides for completion of exposure reduction efforts prior to and during work, and that ensures the order of work provides the lowest exposures
3. job goals for exposure based upon estimates made using plant and industry experience; job goals are realistic but stringent enough to encourage improvements.

D. Specific job-related exposure reduction efforts are incorporated into work procedures, including the following, where appropriate:
1. use of temporary or permanent shielding
2. use of special tools
3. flushing and decontamination, as appropriate
4. preoperational and post-operational briefings of personnel
5. specialized training and "dry runs" on mock-up equipment
6. use of auxiliary lighting and a working environment with comfortable temperature, humidity, and adequate space, where feasible
7. adequate communication capabilities
8. assignment to the job site of the minimum number of personnel needed to perform the work

E. Personnel radiation exposure goals are established.
1. An annual exposure goal of 0.5 rem or less is established for personnel who perform no radiation work or wear dosimetry only for administrative purposes.
2. An annual exposure goal of 5 rem or less is established for personnel who perform radioactive work.
3. Annual goals for the total collective personnel exposure (man-rem) at the plant are established to achieve improved performance based on the expected or planned work for the year.
4. Progress toward achieving goals is monitored, and appropriate corrective actions are taken. Goals are adjusted periodically to ensure they are realistic.

F. Analysis of current practices and comparison with industrywide exposure controls are ongoing actions to achieve minimum exposure.

INTERNAL RADIATION EXPOSURE

PERFORMANCE OBJECTIVE

Internal radiation exposure controls should minimize internal exposures.

CRITERIA

A. Engineered controls are used when feasible to prevent the intake of radioactive material, for example:

1. Ventilation systems are balanced to ensure that airflow is toward areas of higher contamination.
2. Portable filtration systems are used to control airborne contaminants.
3. Containment structures, such as tents, are used to protect personnel working in adjacent areas.
4. Unique fittings are used for the plant breathing air system.

B. Accurate and timely airborne radioactivity survey information is available for determining the boundaries of airborne radioactivity areas, posting entry requirements, and minimizing internal exposure to workers during work activities. The boundaries of these areas are clearly identified and posted.

C. Radiation work permits or similar controls are used to control personnel entry into areas where airborne radioactivity exists or where radioactive material may become airborne due to work being performed.

D. The respiratory protection program defines responsibilities and requirements in the following areas:

1. training
2. control and use of respirators
3. mask and fit testing
4. breathing air purity

E. The number of areas where respiratory protection is required is minimized.

F. Personnel who perform work in radiologically controlled areas are monitored for internal deposition of radioactivity as follows:

1. annually
2. prior to performing radioactive work, after initial employment, and upon termination of employment
3. whenever it is suspected that personnel breathed high airborne radioactivity
4. periodically for those workers who have the highest potential for breathing high airborne radioactivity
5. following personnel contaminations unless exempted by the RPM or his designee

G. Appropriate corrective action is taken whenever there are significant numbers of positive whole-body counts, even though less than regulatory limits.

H. Eating, drinking, smoking, and chewing are not permitted in contaminated areas or potentially contaminated areas.

I. Procedures or resources are available to perform dose calculations when significant internal exposures occur.

RADIOLOGICAL PROTECTION INSTRUMENTATION AND EQUIPMENT

PERFORMANCE OBJECTIVE

Instrumentation and equipment used to obtain measurements of radioactivity should be calibrated, used, and maintained so that results are accurately determined.

CRITERIA

A. Radiological survey equipment should be calibrated and used as follows:

1. Multiple point calibrations are conducted using sources for which the accuracy and strength can be directly traced to the National Bureau of Standards and that provide radiation energies similar to those that will be encountered during use.
2. Calibrations are performed prior to first use of the instrument, after repair or maintenance, when readings are suspect, and at a minimum interval of six months.
3. Radiological survey equipment is used only by qualified personnel.
4. Radiological survey equipment is source-checked on the scale normally used prior to use or daily, whichever is less frequent.

B. Defective or out-of-tolerance instrumentation and equipment are identified and properly labeled, and corrective measures taken in a timely manner.

C. Use of counting room and internal monitoring equipment includes the following elements:

1. Operation is performed by and results interpreted by qualified personnel.
2. Equipment is located in an appropriate environment.
3. A quality control program is implemented.
4. A preventive maintenance program is implemented.
5. Measurements identify isotopes actually present in the plant.
6. Appropriate minimum detection limits are used.

SOLID RADIOACTIVE WASTE

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Personnel are trained in and participate in minimizing the generation of solid radioactive waste.

B. Goals are promulgated for solid radioactive waste reduction. A program to monitor trends and improve performance toward these goals is established.

C. Materials are not taken unnecessarily into radiologically controlled areas.

D. The practices for utilizing protective clothing contribute to minimizing solid radioactive waste.

E. Uncontaminated trash is segregated from contaminated trash and is monitored in a low background area to ensure adequacy of segregation.

F. High compression volume reduction equipment is in use and is operated in a manner that achieves maximum compaction.

G. Radioactive material packaged for transportation is stored in a manner that minimizes exposure, precludes deterioration of the container, and prevents the spread of contamination.

H. Current copies of applicable regulations and procedures are used as references when preparing radioactive materials for transportation.

I. Personnel involved in the transfer, packaging, and shipment of radioactive waste are trained and knowledgeable in the applicable regulations and procedures.

J. Independent quality control checks verify that applicable radioactive material shipment procedures are in place and are being followed.

K. Personnel involved in transporting radioactive materials, including contractors, are provided with the instructions necessary to handle an incident while en route.

PERSONNEL DOSIMETRY

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Personnel who enter radiologically controlled areas wear dosimetry devices capable of accurately measuring whole-body exposures from gamma and beta radiation as appropriate. Neutron radiation monitoring is performed as needed.

B. Dosimetry devices for measuring whole-body exposures are worn in the proper location and manner to measure the highest whole-body exposure. Multiple badging is used when the area of maximum exposure cannot be readily determined.

C. Extremity dosimetry devices are worn when performing work where extremity exposures are likely to be significantly higher than whole-body exposures.

D. Current personnel exposure information is readily available to individuals who have been exposed and to those responsible for exposure control.

E. A quality control program is implemented and includes the following features:

1. comparisons between pocket ionization chambers and TLDs (thermoluminescent dosimeters) or film badges
2. drift checks for pocket ionization chambers
3. use of National Bureau of Standards traceable methodology for calibration
4. exposing dosimetry devices to known levels of radiation to evaluate system performance

F. Correction factors or other appropriate methods are employed to ensure exposures from neutrons, betas, and high and low energy gammas are accurately recorded in rem.

G. Dosimetry operations are performed by and results interpreted by qualified personnel.

RADIOACTIVE CONTAMINATION CONTROL

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Area and equipment contamination controls include the following measures:

1. Contamination controls ensure accessibility to all areas of the plant with minimum use of protective clothing.
2. Leaks from radioactive systems are promptly contained, repaired, and the affected areas are decontaminated.
3. Methods such as cofferdams, drip pans, and containments are used to minimize the spread of contamination.
4. Contaminated or potentially contaminated areas are surveyed at a specified frequency, based upon the contamination levels, traffic patterns, and occupancy level.
5. Routine contamination surveys are conducted in areas that are normally not contaminated. Frequency of these surveys is commensurate with the potential for contamination and with the significance of finding contamination in a particular area.
6. Accurate and timely contamination level information and protective measures required for entry are provided for personnel entering contaminated areas. The boundaries of these areas are clearly identified and posted.
7. Protective measures are employed, when feasible, to prevent tools or equipment from being contaminated.
8. Contamination controls are employed for areas, equipment, materials, tools, and other items if contamination levels exceed the following:

   a. Beta-gamma

Removable	1,000 dpm/100 cm^2
Total (fixed plus removable)	5,000 dpm/100 cm^2

b. Alpha

Removable	20 dpm/100 cm^2
Total (fixed plus removable)	300 dpm/100 cm^2

Release surveys are performed by qualified personnel.

9. Operations with a high potential for release of contamination are performed in accordance with job-specific procedures that minimize the potential for release.

10. The use of equipment capable of spreading contamination, such as blowers, fans, and vacuum cleaners, is controlled to prevent the spread of contamination.

11. Radiation work permits or similar controls are used to control access to contaminated areas.

B. Personnel contamination controls include the following measures:

1. Procedures for use of step-off pads and the removal sequence for anti-contamination clothing are posted where removal of anticontamination clothing is required.

2. Personnel exiting posted contaminated areas (per Criterion **A.8**) are required to monitor their whole body for contamination. For personnel exiting a radiologically controlled area, the degree of monitoring is based on the potential for contamination. Equipment used is capable of detecting a single spot with a total beta-gamma contamination level of 5000 dpm/100 cm^2.

3. Portal monitors are not used as the primary monitoring method for personnel contamination unless their sensitivity is shown to be equal to that in criterion **B.2.**

4. Personnel contaminations (skin or clothing) in excess of 5000 dpm/100cm^2 beta or gamma or 300 dpm/100cm^2 alpha are investigated and documented as to source, probable cause, and other pertinent information. Records of these investigations are maintained and reviewed by radiological protection management for trends, and corrective actions are taken as necessary.

CHEMISTRY

CHEMISTRY ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Chemistry organization and administration should ensure effective control and implementation of chemistry activities.

CRITERIA

A. The organizational structure is clearly defined.

B. Staffing and resources are sufficient to accomplish assigned tasks.

C. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

D. Responsibilities and authority for each management, supervisory, and professional position are clearly defined.

E. Managers and supervisors observe chemistry activities to ensure adherence to chemistry policies and procedures and to identify and correct problems.

F. The employee performance appraisals are effectively utilized to enhance individual performance.

CHEMISTRY PERSONNEL TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Programs are established and implemented for initial and continuing training.

B. Initial training consists of classroom and on-the-job training, develops job-related knowledge and practical abilities, and includes the following areas:

1. fundamentals of mathematics and science
2. plant systems
3. plant-specific chemistry
4. radiation detection and measurement
5. principles of radiological protection
6. chemistry department operations
7. chemistry specifications
8. accident chemistry considerations
9. industrial safety

C. Continuing training maintains and improves job-related knowledge and practical abilities and includes the following areas:

1. plant system and component changes
2. procedure changes
3. industry operating experience
4. weaknesses identified in the plant's chemistry program
5. selected topics from B. above, to reinforce seldom-used knowledge and skills

D. Knowledge and practical abilities are evaluated during initial qualification and periodically thereafter by written examinations and practical ability demonstrations. These methods are augmented by oral exams, as necessary.

1. Written examinations to determine the technician's level of knowledge consist primarily of problem-solving and essay questions.
2. Practical ability demonstrations by the technician are used to determine proficiency in performing chemistry procedures.

E. Records are maintained of the following items:

1. written examination results
2. written questions
3. practical demonstration requirements, including an indication that each technician carried out the required demonstrations

F. On-the-job qualification requirements are completed and documented prior to assignment to associated tasks.

G. Feedback from actual job performance is used to improve training effectiveness.

CHEMISTRY CONTROL

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Chemistry specifications and methods of control are clearly established for fluid systems requiring an active corrosion control effort.

B. Sufficient chemistry parameters are monitored to ensure detection of abnormal conditions. Appropriate limits for key parameters have been established.

C. On-line chemistry monitors accurately measure, record, and provide alarms for key chemistry parameters, where feasible.

D. Sampling frequency provides timely detection of chemistry trends.

E. Chemistry data are evaluated and trended to identify chemistry control problems and analytical errors. Managers are aware of chemistry trends.

F. Out-of-specification conditions are corrected in a timely manner. When feasible, corrective actions are taken before specifications are exceeded.

G. The plant staff strives to maintain chemistry parameters at optimum points within the specific bands.

H. The effectiveness of the chemistry program is assessed by selected inspections of plant components.

I. Bulk chemicals, laboratory chemicals, corrosive agents, and cleaning agents are effectively controlled to prevent improper use.

J. Controls are implemented to maintain the quality of process chemicals and media, such as resins.

K. The plant monitors for leaks between systems.

L. Chemistry controls are used to protect equipment during layup, testing, and maintenance.

M. The effectiveness of water processing equipment is evaluated on a routine basis, and adjustments are made as necessary to achieve optimum performance.

LABORATORY ACTIVITIES

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Procedures have a known accuracy and precision and are based on recognized standard practices such as those published by the American Society for Testing and Materials.

B. Analytical information is recorded in a manner that facilitates trend reviews.

C. A quality control program is implemented to ensure the accuracy of analyses. Some elements of a quality control program are listed below:
   1. use of certified reagents and standards
   2. preparation and analysis of spiked samples
   3. frequent analysis of samples of known concentration
   4. control of reagents to ensure that shelf lives are not exceeded or that the purity is not compromised.

D. Laboratory equipment and work areas are clean.

E. Work areas for processing radioactive and non-radioactive samples are segregated.

F. Services and environmental controls are adequate for the instrumentation in the laboratory.

G. Analytical equipment is properly calibrated and maintained.

H. Applicable purge and recirculation times for sample points have been determined and are in use.

I. Analytical methods and equipment are capable of precisely and accurately measuring the parameters of interest in the appropriate concentration ranges.

CHEMICAL AND LABORATORY SAFETY

PERFORMANCE OBJECTIVE

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

CRITERIA

A. Safe practices are used in the receipt, storage, handling, use, and disposal of reagents, compressed gases, and bulk chemicals.

B. Safety apparel, including safety glasses, are worn as appropriate.

C. Safety equipment, including fume hoods, emergency showers, eye washes, and fire safety equipment, is readily available and capable of performing its intended function.

D. Laboratory equipment is not used for other than its intended purpose. This applies especially to use of laboratory equipment as containers for food or drink.

E. Laboratory wastes are disposed of in a safe and proper manner.

RADIOACTIVE EFFLUENTS

PERFORMANCE OBJECTIVE

Radioactive effluent controls should minimize radioactivity released to the environment.

CRITERIA

A. Plant activities are evaluated to minimize the generation of radioactive liquid and gaseous waste. Liquid tank levels and waste gas decay tank pressures are monitored periodically to detect unexpected changes.

B. Radioactive liquid waste is recovered and reused to the maximum extent practicable. Waste streams are segregated during collection according to the treatment required for each waste stream.

C. Release of radioactive gaseous wastes is delayed as long as practicable to allow for maximum radioactive decay.

D. Radioactive waste system operators are knowledgeable of radioactive waste systems and operations.

E. The effectiveness of radioactive waste processing equipment, such as ventilation systems filters, demineralizers, reverse osmosis units, and evaporators, is routinely evaluated. Criteria are established for the replacement or regeneration of the active elements.

F. Effluent monitors accurately measure the radioactivity in effluent streams and reliably perform all alarm and trip functions.

G. Nonradioactive systems that have the potential to become contaminated are monitored by installed radiation detectors or are periodically sampled and analyzed.

H. Nonradioactive liquid discharges into radioactive waste systems are minimized.

I. Total curie content and volume of plant effluents are accurately determined and recorded; trends are determined and evaluated.

EMERGENCY PREPAREDNESS

EMERGENCY PREPAREDNESS ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Emergency preparedness organization and administration should ensure effective planning, implementation, and control of emergency preparedness activities.

CRITERIA

A. The organizational structure is clearly defined.

B. Responsibilities and authority for each person in the emergency response organization are clearly defined.

C. Personnel in the emergency response organization clearly understand their authority, responsibilities, and relationships within the organization, and interfaces with support groups.

D. The on-site and off-site emergency operating organization ensures effective command and control of the plant during the assessment, mitigation, and recovery phase of an accident.

1. The on-site emergency operating organization is adequate to carry out immediate on-shift duties until the organization is augmented.
2. The off-site organization is adequate to staff the emergency operating organization and still perform other important functions.

E. Emergency operating organization personnel possess the necessary knowledge, skills, and qualifications. Selection of these personnel is based on the following:

1. the similarity of their emergency response duties to their normal day-to-day responsibilities
2. their ability to analyze data and to determine appropriate actions in situations beyond those covered by normal procedural guidance

F. Responsibility is assigned for coordination of on-site and off-site radiological emergency response planning.

EMERGENCY PLAN

PERFORMANCE OBJECTIVE

The emergency plan and its supporting documents should provide for effective emergency preparedness and response.

CRITERIA

A. Preparation, review, approval, and revision of the emergency plan is controlled.

B. The emergency plan is concise, usable, and includes the following elements:
   1. emergency classification
   2. notification process (including normal and alternate means of communication)
   3. responsibilities of the emergency organization
   4. emergency assessment
   5. protective actions (including evacuation and accountability)
   6. personnel evacuation and accountability
   7. emergency public information
   8. agreements with external organizations
   9. re-entry and recovery process

C. The detailed actions required to carry out the emergency plan are specified in emergency plan implementing procedures. Such procedures are consistent with and, where appropriate, cross-referenced with the emergency plan and other documents.

D. The emergency plan, implementing procedures, and agreements are periodically updated or verified.

E. An independent review of the emergency plan and implementing procedures is conducted periodically.

F. Emergency response plans of supporting external organizations are reviewed and updated as required.

G. Feedback from evaluations, appraisals, and simulated drills and exercises (or actual emergencies in the industry) is evaluated and utilized to improve emergency plan effectiveness.

EMERGENCY RESPONSE TRAINING

PERFORMANCE OBJECTIVE

Emergency response training should develop and maintain the knowledge and skills for emergency personnel to respond to and control an emergency effectively.

CRITERIA

A. Programs are established and implemented for initial training, exercises, drills, and continuing training. These programs include training methods, evaluation standards, and implementation responsibilities.

B. Initial training develops emergency task-related knowledge and skills and includes the following areas:

1. emergency plan
2. emergency plan implementing procedures
3. emergency operating procedures
4. normal operating procedures used in an emergency
5. emergency facilities, equipment, and systems
6. communications
7. special precautions and limitations

C. Continuing training maintains and improves emergency task-related knowledge and skills and includes items such as the following:

1. a review of the items listed in B. above
2. industry emergency operating experience
3. changes in emergency operating policies, plans, and procedures

D. Exercises and drills to improve emergency task-related knowledge and skills include the following:

1. postulated accidents of both large and small consequences
2. exercise or drill plans that have stated objectives and criteria
3. realistic scenarios that adequately test emergency equipment and resources

4. participation by key emergency organization personnel and appropriate on-site and off-site groups
5. timely critiques that include a follow-up plan for correcting identified weaknesses and improving training effectiveness

E. The knowledge and capabilities of emergency personnel are evaluated during initial training and at least annually thereafter. Adequate training records are maintained for each individual.

F. The effectiveness of the emergency preparedness training program is periodically evaluated and the results used to make program improvements.

EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES

PERFORMANCE OBJECTIVE

Emergency facilities, equipment, and resources should adequately support emergency operations.

CRITERIA

A. Facilities of adequate size and appropriate location are designated, equipped, and ready for emergency response use.

B. Adequate backup facilities are available as required by the emergency plan and supporting documents.

C. Appropriate equipment and supplies necessary to support emergency response activities are accessible during accident conditions.

D. Emergency equipment is inventoried, tested, and serviced on a periodic basis to ensure accountability and reliability.

E. Sufficient reliable communications channels are available to accommodate emergency needs.

F. Off-site emergency resources are identified, and plans are made to ensure their timely mobilization and use.

EMERGENCY ASSESSMENT AND NOTIFICATION

PERFORMANCE OBJECTIVE

Emergency assessment and notification procedures should enable the emergency response organization to correctly classify emergencies, assess the consequences, notify emergency response personnel, and recommend appropriate actions.

CRITERIA

A. Classification of emergency events is consistent with current regulatory guidance.

B. External voice communications are authenticated and verified. Internal voice communications are verified.

C. Notification procedures minimize distraction of shift operating personnel and include concise, preformatted messages.

D. Appropriate follow-up messages to off-site authorities are used.

E. Procedures for assessing a radiological emergency include methods for measuring radiation levels in the environment, measuring the release rates, and determining the source term and projected dose for potential releases.

F. Appropriate interface is established with state and local authorities promoting common notification and dose assessment methodology/terminology.

G. Source term data are made available to control room, technical support center, emergency operations facility, and appropriate state personnel.

H. Protective action guides are available and used by appropriate personnel.

PERSONNEL PROTECTION

PERFORMANCE OBJECTIVE

Personnel protection procedures should minimize and control personnel radiation exposure, ensure that radiation exposures are accurately determined and recorded, and ensure proper medical support.

CRITERIA

A. Individual radiation exposure limits are established for emergencies such as saving a life or protecting vital equipment. Procedures designate who can authorize the use of these limits.

B. Sufficient quantities of calibrated radiological instruments are available to measure expected dose rates.

C. Arrangements are made for providing and processing appropriate dosimetry devices for the emergency condition.

D. Procedures and training are provided for the determination of radioiodine concentration in contaminated areas and a policy established for thyroid-blocking agents.

E. Pre-arranged plans and agreements provide for transportation and medical treatment of injured and contaminated personnel.

F. Emergency limits are established for decontamination of personnel, equipment, and facilities.

G. First aid and decontamination supplies, procedures, and facilities are readily available.

H. Sufficient respiratory equipment and supplies are available. A backup method for recharging air bottles is available. The responsibility for maintaining and repairing respiratory equipment is established.

I. An effective system for personnel accountability is in place.

EMERGENCY PUBLIC INFORMATION

PERFORMANCE OBJECTIVE

The emergency public information program should ensure timely dissemination of accurate, reliable, and understandable information.

CRITERIA

A. Sufficient professional and clerical personnel are assigned so that emergency public information activities can be carried out. Emergency response positions closely conform with normal duties and responsibilities.

B. Public information personnel participate in the development and review of the emergency plan and procedures.

C. The emergency plan and implementing procedures ensure utility public information emergency response personnel are notified and receive updated information.

D. Implementing procedures are developed to address public information aspects of the emergency plan and include the following:

1. lines of authority and communication
2. description and use of facilities, equipment, and resources
3. provisions to coordinate the public information activities of the involved organizations
4. provisions to respond to inquiries from the public and the news media
5. provisions for news release preparation, approval and dissemination to public information personnel, the news media, the utility industry, appropriate government officials, and employees
6. Provisions to inform the public during the recovery phase of an emergency

E. Statements made by the news media and representatives of the other organizations are monitored to identify and correct significant inconsistencies in a timely manner.

F. Facilities, equipment, visual aids, and information materials are available to ensure adequate communication with a large number of media representatives. Telephone equipment and personnel are available to respond to a large volume of media inquiries.

G. The utility public information staff provides advance and ongoing information to the media and public on subjects that would be discussed during an emergency, such as radiation, nuclear plant operation, site and local emergency plans, and sheltering and evacuation procedures.

H. Specific provisions exist to notify transients of emergencies and inform them of protective actions.

I. Public information emergency response personnel receive training that includes emergency public information duties and procedures and the basics of nuclear power plant operations.

J. Technical personnel are assigned as appropriate to the emergency public information organization and are trained in public information practices.